ENVIRONMENTAL AND SOCIAL IMPACT STATEMENT FOR THE PROPOSED ESTABLISHMENT OF ACADEMIC BLOCK, WORKSHOPS AND CENTRE OF INNOVATION AND TECHNOLOGY TRANSFER (CITT) TO BE BUILT AT MBEYA UNIVERSITY OF SCIENCE AND TECHNOLOGY ON PLOT NO. 1 BLOCK 'FF', IYUNGA WARD, MBEYA CITY COUNCIL, MBEYA REGION, TANZANIA.

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EXECUTIVE SUMMARY

1. INTRODUCTION

Mbeya University of Science and Technology (MUST) of P.O. Box 131 Mbeya was established as Mbeya Technical College (MTC) in 1985 and offered full technical certificates programs in the fields of civil engineering, mechanical engineering, electrical engineering and architectural technology. MTC was thereafter transformed to Mbeya Institute of Science and Technology (MIST) in 2002 and inherited all programmes which were being offered by MTC. Parallel to this transformation new programmes like computer engineering, laboratory technology and business administration at Ordinary Diploma and Bachelor levels were introduced. The last transformation involved the transformation of MIST to MUST (MUST Charter 2012) and resulted to the introduction of other new Diploma, Bachelor and Postgraduate programmes. However, the increased number of students from 4,527 in 2018/2019 to 9,674 in 2022/2023 and staff from 506 in 2018/2019 to 727 in 2022/2023 is beyond the carrying capacities of the existing facilities.

Owing such concerns, MUST intends to expand the facilities by constructing a new academic block, workshops and CITT on Plot No. 1 Block 'FF' at Iyunga Ward in Mbeya City Council, Mbeya Region. The plot site of 490ha (4,900,000m2) with Title Deed No. 14322- MBYLR that legally owned by proponent is big enough to accommodate project design and future expansion plan. The project life span is expected to be 99 years, with total investment costs estimated at Tanzania Shillings Thirty-one billion six hundred twenty-five million (TZS 31,625,000,000).

The construction of an academic building, workshops and CITT like many other facilities must abide to the World Bank Environmental and Social Framework (ESF) and Environmental Management Act of 2004 of Tanzania which require the project developers to carry out Environmental and Social Impact Assessment prior to project implementation. The First Schedule of the Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations, 2018, categorize major urban projects including multi-storey buildings as type B1 project (borderline project), which may or may not require ESIA study and upon screening the Council will guide the course of the study. Likewise, the World Bank's Environmental and Social Standards requires the borrower to identify, assess and manage potential environmental and social impacts and risks associated with the project before project execution.

In fulfilment of the above, MUST commissioned a consultant who undertook groundwork and prepared EIA application documents which included Scoping Report and Terms of Reference (TOR) as a first step in the environmental assessment process. The documents were submitted to the Council (NEMC) and the project was registered and allotted Project Reference No. EC/EIA/2021/3504 as well as an approval of Terms of Reference (ToR) for undertaking ESIA study was made. The approval was communicated through a letter of 25/10/2021 with Reference Number HC.145/88/28/01 (Appendix I) and the and issued an EIA Certificate by

NEMC. These ToR provided guidance under which the environmental and social assessment was done. Therefore, Environmental Management Act, Cap 191, the Environmental Impact Assessment and Audit (Amendment) Regulations, 2018, and World Bank Environment and Social Framework (ESF) as well as the project's Environmental and Social Management Framework (ESMF) were observed in the study.

1.1 Project Description

The Tanzanian Government through the Ministry of Education Science and Technology (MoEST) is currently implementing a Higher Education for Economic Transformation (HEET) Project under the World Bank support. The HEET project is a five-year venture that aims to strengthen the learning environment and labour enhancing alignment of priority programs, while enhancing the delivery of knowledge to produce graduates who meet the demand and standard of the current and future labour market.

MUST as one of HEET project beneficiary is constructing a new academic block, workshops and CITT with associated facilities to be used for teaching, workshops, research, and office space. In addition, the space utilization of all building components has taken into consideration people with special needs including the disabled e.g. water closet and ramp for wheel chair bound people.

2. POLICY, LEGAL AND INSTITUTIONAL ARRANGEMENT

Tanzania is committed to attaining sustainable development goal. Some of the Acts, policies and legislation that have a close bearing to this project are listed hereunder:

(a) Environmental Management Act No. 20 of (2004)
(b) The Water Supply and Sanitation Act No. 12 of 2009
(c) Land Act no 4 (1999), Cap. 113 R.E. 2019
(d) The Urban Planning Act (2007)
(e) Occupation Health Safety (2003)
(f) Employment and Labour Relations Act No. 6 of 2004
(g) Engineers Registration (Amendment) Act, 2007
(h) The Contractors Registration Act (1997)
(i) The Architects and Quantity Surveyors Act (1997)
(j) The HIV and AIDS (Prevention and Control) Act of 2008
(k) The Local Government Laws (Miscellaneous Amendments) Act (1999)
(l) The Tanzania 2025 Development Vision
(m) Environmental Impact Assessment and Auditing (Amendment) Regulations (2018)

Furthermore, this ESIA study has also complied with the following tools:

(a) World Bank's new Environmental and Social Framework (ESF);
(b) The World Bank Environmental and Social Safeguarding Policy for Investment;
(c) WB relevant Environmental and Social Standards. HEET will apply 5 relevant standards out of 10 Environmental and Social Standards (ESSs), which are:

(i) ESS1- Assessment and Management of Environmental and Social Risks and Impacts;
(ii) ESS2 - Labor and Working Conditions;
(iii) ESS3 - Resource Efficiency and Pollution Prevention and Management;
(iv) ESS4 - Community Health and Safety; and
(v) ESS10 - Stakeholder Engagement and Information Disclosure.

3. BASELINE ENVIRONMENTAL AND SOCIAL CONDITIONS

3.1 Description of Environment

The Information on the bio-physical, socio-economic environment, institutional and legal regimes were collected from a variety of sources, namely project documents and general literature review, visual and inspection, expert opinion, consultations with selected stakeholders and discussions with proponent representatives. The proposed site covering the proposed project is flat land, no important conserved area. The proposed site has been used for educational purpose since 1985. The proposed site is close to MUST health facility at a distance of 500m. The proposed site has electrical, water supply and telecommunication system.

Floristically, the site found with both native and exotic species. The identified native species were *Vangueria infausta*, *Cynodon dactylon*, *Desmodium intortum*, *Sesbania sesban, Bothriochloa barbinodis*. The exotic species include *Acacia farnesiana* and *Eucalyptus camaldulensis*. The vegetation of the area gives the indication for habitat for fauna and based on the vegetation condition of the area there was no indication for presence of large wild animal. Few species of birds were observed in the area while some small reptiles, and insects are expected to be present in some parts of the general area. Thus, there was no identified specie with significance conservation status (i.e. threated or endangered as per IUCN guidelines/CITES List) in the area.

3.2 Stakeholder Engagement

Stakeholder consultations were carried out, including interviews and meetings with officials from Government departments and Town authorities, officials from public and private organizations, local leaders, general public and student's representatives. Stakeholders consulted included Mbeya City Council, OSHA, Fire, students, staff, service providers, Ward and Mtaa Leaders, as well as neighbours and students' representative. Other key stakeholders at the national level were also consulted.

Major issues raised are:

(i) Increased pressure on the existing municipal services;
(ii) Increased dust and noise during construction in areas surrounding the site;
(iii) Waste Management;
(iv) Security and safety issue during construction phase;
(v) Increased revenue to Mbeya City Council and country as a whole;
(vi) Deterioration of social welfare due to upcoming of new students and workers;

(vii) Poverty alleviation by small and medium enterprises;
(viii) Authentic appearance of the city;
(ix) Increased HIV/AIDS and other infections transmission due to increase in population and social-interactions;
(x) Destruction of roads by heavy construction equipment and vehicles.

4. POTENTIAL IMPACTS DURING MOBILIZATION AND CONSTRUCTION PHASE

The predicted impacts during mobilisation and construction phases include the following:

4.1 Negative Environmental Impacts during Mobilization and Construction phase

- Air Pollutions (Fugitive Dust and Exhaust Emissions)
- Increased Waste Generation
- Noise Pollution
- Soil and Water Quality Contamination
- Land Degradation from Extraction and Use of Building Materials
- Pollution from Poor Management of Liquid Waste
- Erosion of Exposed Surface
- Increased Traffic Flow and Accidents
- Loss of Life and Property Due to Fire Outbreak and Other Related Environmental Disaster
- Occupational Health and Safety Hazards
- Loss of life and property due to Risks of Fire and Explosions

4.2 Negative Social Impacts during Mobilization and construction Phases

- Occupational Health and Safety Hazards
- Increased traffic jam
- Increased in level of crimes
- Prevalence of Communicable Diseases
- Increased Incidence of GBV/SEA/SH

4.3 Positive Environmental Impacts during Mobilization and Construction phase

- No significant environmental impact

4.4 Positive Social Impacts during Mobilization and Construction phase

- Employment Opportunities
- Local and National Economic Gains
- Provision of Market for Supply of Building Materials
- Informal Business Growth

5. POTENTIAL IMPACTS DURING OPERATIONAL PHASE

5.1 Negative Environmental Impact During Operational Phase

- Environmental Pollution from poor management of Solid Waste

- Increased Surface/Storm runoff generation
- Air Pollution (Dust, Noxious Gases) From Equipment and Machinery
- Noise Pollution

5.2 Negative Social Impacts during operational Phase

- Loss of life and property due to Risks of Fire and Explosions
- Occupational Health and Safety Hazards
- Increased traffic jam
- Increased in level of crimes
- Prevalence of Communicable Diseases
- Increased Incidence of GBV/SEA/SH
- Environmental Pollution from Poor Management of Wastewater

5.3 Positive Environment Impacts during operational phase

- Improved environmental amenity
- Conservation of plant and animal species

5.4 Positive Social impacts during operational phase

- Employment Generation
- Increase in Revenue
- Improved Security
- Diversification of MUST University

6. POTENTIAL IMPACTS DURING DECOMMISSIONING PHASE

6.1 Negative environmental Impacts during decommissioning Phase

- Pollution from Increased Solid Waste
- Air Pollution from Dust
- Noise and Vibration

6.2 Negative Social Impacts During Decommissioning Phase

- Loss of Aesthetics due to Abandoned Project Facilities
- Loss of Employment Due to Closure of The Project
- Loss of Revenue to Both Government and The Proponent
- Abandoned Infrastructure

6.3 Positive Environmental impacts during decommissioning Phase

- Reduced waste generation
- Soil and Water Quality Contamination

6.4 Positive Social impacts during decommissioning Phase

- Minimized Occupational Health and Safety Hazards
- Reduced traffic jam
- Increased In Level of Crimes

6.5 Project alternatives

The EIA procedure requires that an environmental investigation identify main project alternatives for any proposed development. On assessment of the project locations as well as construction and operations methodology, several options were analysed and finally the Consultant recommended that the construction of the proposed academic block, workshops and CITT on the preferred proposed site should proceed on the condition that proper planning is implemented and the construction and operation activities will adhere to all the proposed mitigation measures detailed in this report.

6.6 Environmental and Social Impact Management Plan

The Environmental and Social Management Plan is presented in Table 23. The ESMP is an important tool that enables concerned parties to measure successes or failures of implementation of mitigation measures on identified impacts. The contractor shall implement components relevant to the actual construction and operation phases. The mentioned proponent shall be responsible for overall implementation of the ESMP with the collaboration with their contractor. ESMP is an estimate cost of the measures so that the project proponent can budget the necessary funds. Appropriate bills of quantities should clearly give the actual figures. In any case, the consultant used informed judgment to come up with these figures.

The project shall ensure that the activities which are causing impacts to the environment are managed in a comprehensive, systematic, planned and documented manner. Proponent shall communicate the environmental and social management plan and environmental and social monitoring plan to its employees and its contractors to ensure that implementation is done accordingly.

Furthermore, proponent shall ensure availability of resources which are required for implementation of its environmental management plan. The plan shall also be monitored to ensure that environmental objectives are well met. Project proponent shall carry out routine auditing to ensure continued sustainability of the environmental management system.

7. RESOURCE EVALUATION

Costs for mitigating social and environmental impacts as well as monitoring process are estimated to be TZS 70,500,000. The estimated costs for mitigation do not include the environmental costs, which could not be accurately calculated. Since some of the impacts will only be realized during construction phase, the costs for these will also be short term; especially if mitigation measures are fully implemented the project benefits outweigh the project costs by far.

8. COST AND BENEFIT ANALYSIS

The cost and benefits of the project have been analysed to provide the base for the proponent to make decision on whether it makes sense to continue with the project. In the analysis, both

quantifiable and non-quantifiable benefits to the client and the general community were considered.

9. DECOMMISSIONING

The Project Proponents might consider renovating or demolishing his building as the case may be depending on the condition of the building at that time let say after about 99 years projected life of the structure. In case the demolition is considered, specific conditions for mitigation are generally inherently uncertain. The conditions include methods of demolition, material handling, proposed sequences, protective measures, traffic management, occupational health and safety and environmental management as well as the estimated cost of conducting the decommissioning.

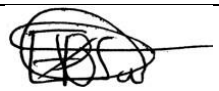
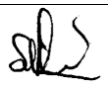
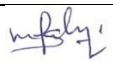
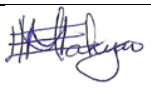
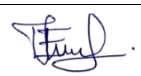
10. CONCLUSION

The study concludes that, the proposed project is in appropriate location as far as land use and interactions with human social and economic setting is concerned. Most of the environmental and social impacts have been identified and assessed and none of these are considered to be that severe after mitigation to prevent the further planning, design, and development of the proposed construction of the new academic block, workshops and CITT on Plot No. 1 Block 'FF' Iyunga Ward, Mbeya City Council, Mbeya Region.

Thus, the project in the area can be considered suitable subject to implementing the mitigation measures as indicated in the Environmental and Social Management Plan. Further, to further sustainability of the project in the area, it is recommended that the proposed Monitoring Plan should be implemented accordingly for consistent efficacy of mitigation measures or timely corrective measures before significant impacts to the environment and social components.

SIGNED DECLARATION OF ESIA TEAM

I hereby certify that the particulars given to this report are correct and true to the best of our knowledge and we shall provide any additional information that shall come to our notice in the course of the processing of this report.

Name of Consultant	**Position**	**Signature**
Dr. Nicholaus Mwageni	Environmental Engineer- Team leader	
Prof. Zacharia Katambara	Assistant Team Leader	
Ms. Everlyn Estomiah Swai	Air Quality Expert	
Christopher Mgimba	Environmental Scientist	
Edwin B. Ngailo	Economist and GBV Expert	
Lawrence Silabi	Economist	
Beatrice Makyao	Sociologist	
Mary Exaud	Botanist	
Evance Thadeus	Occupational Health and Safety	
Speratus Sospeter	GIS Expert	

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Mbeya University of Science and Technology wishes to convey sincere appreciation to all key players who in one way or another supported the completion of this work. Special thanks should go to all the people who provided prompt assistance during the whole period of consultancy. The Proponent specifically acknowledges all those who consistently worked very closely with the consultancy team up to the successful completion of the assignment. Thank you very much for the support and your prompt availability.

ACCRONYMS AND ABRIVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
BATNEEC	Best Available Technology Not Entailing Excess Cost
BOQ	Bill of Quantities
CBD	Central Business District
CRB	Contractors Registration Board
DoE	Division of Environment
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental management Plan
EP	Environmental Permit
ESMP	Environmental and Social Management Plan
ERB	Engineers Registration Board
GOT	Government of Tanzania
HIV	Human Immune Deficiency Virus
NACP	National HIV/AIDS Control Programme
NEMC	National Environment Management Council
NEP	National Environmental Policy
NGO	Non-Governmental Organization
PLHAS	People Living with HIV/AIDS
SEA	Strategic Environmental Assessment
STD	Sexually Transmitted Diseases
TAC	Technical Advisory Committee
TACAIDS	Tanzania Commission for AIDS
TANESCO	Tanzania Electricity Supply Company Limited
ToR	Terms of Reference
TRA	Tanzania Revenue Authority
TMA	Tanzania Metrological Agency
VAT	Value Added Tax

CHAPTER ONE

1. INTRODUCTION

1.1. Background

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Owing such concern, MUST intends to expand its existing facilities by constructing a new academic block, workshops and CITT on Plot No. 1 Block 'FF' at Iyunga Ward in Mbeya City Council, Mbeya Region. The proposed development will be built on legally owned plot of 490ha (4,900,000m^2) with Title Deed No. 14322- MBYLR wich is big enough to accommodate project design and MTC's future expansion plan. The proposed project is funded by the World Bank through Ministry of Education, Science and Technology which has developed the Higher Education Economic Transformation (HEET) project. HEET Project focuses on the development of requisite strategies that support and catalyse transformative changes of the key sectors, with the view to build an industry-cantered economy; attain a middle-income country earning status and reduce unemployment. This national aspiration considers the need to enhance construction, trade, agriculture, transport and storage, manufacturing, financial and insurance and tourism sectors, which have been anchor points for growth of the National Gross Domestic Product [GDP]. It also asserts the importance of Agricultural Education and Training (AET), Science, Technology and Innovation in transforming various Tanzanian sectors, which is the lifeline of rural economies in Tanzania. Aim is to ensure employment for Tanzanian youth, majority of who are unemployed. The university aim to train at degree and technical levels for graduates to acquire knowledge, competency, skills and passion in Science, Technology and agri-business, which includes commercial agriculture, agro-processing industry and trade.

1.2. Project Rationale

According to the Environmental and Social Management Framework (EMSF), Tanzania has made commendable gains in basic education in recent years. For example, enrolment at the primary level has shown an increase of 24.5% from 8,116,488 in 2015 to 10,111,671 pupils in 2018 (10,601,616 in 2019). Similarly, the enrolment trend in secondary education in the year

2013/14 showed a positive increase in the number of students transitioning to post-primary education. Student demand for higher education is expected to surge by 2030, so the tertiary education system (public and private) must expand and be of better quality to accommodate these additional students (PAD, 2021).

While the country has recorded expansion in basic education, there is widespread acknowledgement among policy makers that the overall outcome of the successful performance in basic education is the demand for subsequent levels of education and especially higher education. In this regard, the main challenge is inability of the system to absorb the expanding number of graduates in basic education inspired and capable of joining the higher education subsector. Of immediate need is the expansion of investment in infrastructure, facilities and quality assurance system in Engineering (agro-processing, mechanized agriculture, railway, hydropower, aeronautic etc.), Medical Science and Technology, Agriculture and Allied Sciences, Energy and Minerals, Forestry and Natural Resource Management. Another concern is on the gender issues.

HEET Project Appraisal document of 2021 points out a number of challenges in the current higher education system. These include:

(i) Gender inequality in lower levels of education (especially upper secondary) that persists up to the university level, although the gender parity index in higher education has improved from 56.5 percent in 2013 to 67.4 percent in 2018;

(ii) University graduates struggle to find jobs, at least in part due to skills mismatches;

(iii) Demand-side considerations underscore the need for greater numbers of students in disciplines and programs sought after by employers, such as engineering, agribusiness, tourism, and climate change. The overall quality of post-secondary academic programs is low and does not prepare university graduates adequately for current and future formal jobs or self-employment;

(iv) Shortage of well-trained lecturers, and the majority of academic staff use traditional teaching methodologies;

(v) Most of higher education institutions are not currently able to access or use modern technologies to deliver training; and

(vi) The global pandemic has reinforced the need for higher education institutions to develop thoughtful resiliency plans.

A more strategic mix of education, skills and technology will help Tanzania develop its productive sectors and create jobs for the growing number of youths entering the labour market (PAD 2021).

The Higher Education for Economic Transformation (HEET) Project will finance the development of infrastructure, faculties, and quality assurance systems in higher education to facilitate rapid economic transformation in the country. Through HEET project, the Government of the United Republic of Tanzania seeks to build requisite operational capacity for public universities to empower them to be dependable drivers for economic transformation by building on their respective institutional visions, missions, objectives and core values.

In line with this and since the establishment of MTC and the successive institutional transformations that have culminated to the establishment of MUST, there has been a need to increase the human resource in the fields of engineering and science as recommended in various stakeholders' meetings during review and development of curriculums for the University programmes.

MUST being a public university with the objective of assisting the government in producing competent human resource, finds it is necessary to embark on the proposed construction project so that the enrolment of students who will be pursuing engineering and technology related programmes will increase from the current 6,000 students to at least 15,000 students.

Within the Southern Africa, MUST will also have an opportunity to offer prospects students from neighbouring countries including Malawi, Mozambique, Zambia and Democratic Republic of Congo and conducive learning environment. Such service requires facilities including class rooms, laboratories for hands-on practical learning as well as theatre for teaching and learning purposes.

1.3. Project Objectives

1.3.1. Objectives of the HEET Project

According to the HEET Project Appraisal Document (PAD) of 2021, the main objective of the project is to strengthen the learning environment and labour market alignment of priority programs at beneficiary higher education institutions and improve the management of the higher education system.

The stipulated objective is in line with Mbeya University of Science and Technology Strategic Plan which focuses on expanding infrastructures to match with increase in the student's enrolment. The strategic plan of the University is to enrol 15,000 students by year 2024-2025. This calls for the need to expand its facilities including infrastructures so as to create supportive environment towards achieving its goal.

Prior to the construction of the proposed project, Environmental and Social Impact Assessment is required by World Bank and Tanzanian laws and governing in order to protect the environment and lives of people. The ESIA study shall be conducted in accordance with World Bank Environmental and Social Framework, Tanzania's National Environmental Management Act, Cap 191 and its subsequent Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulation of 2018.

In complying with World Bank's ESF (ESMF, ESCF, RPF, SEP, LMP) and the provisions of the Environment Impact Assessment and Audit Regulations, (GN) No.474 of 2018, the project beneficiary (MUST) has commissioned the consultant to prepare the ESIA report which address: the nature of the project; its location; main processes; materials use, by products and their disposal; environmental impacts; and their mitigation measures. It also analyses the economical and socio-cultural impact of the project to the local community and the nation at large.

1.3.2. Specific Objectives for MUST HEET project: case of Main Campus

In addressing the overall objective of the project, MUST is also the beneficiary of the project had the following specific objectives:

(i) To construct and equip one academic block (with classrooms, lecture halls and laboratories), workshop and Centre for Innovation and Technology Transfer;
(ii) To upgrade learning resources and equipment including capacity building in development of online and ODL learning and pedagogy;
(iii) To update curriculum and introduce innovative pedagogical methodologies;
(iv) To promote applied research and innovation capacity;
(v) To building functional linkages with private sector/industry;
(vi) To develop online learning platforms and digital technology applications (including selecting and customizing Moodle based learning platforms);
(vii) To promote self-generated income; and
(viii) To building capacity of academic staff and university leadership.

1.4. Need for ESIA Study

The ESIA study needs to be conducted so as to understand the environmental and social sensitivities associated with the project implementation phases and to implement mitigation measures in order to avoid adverse impacts during the Project's lifecycle. The development of facilities may have certain Environmental and Social impacts which may be negative or positive. The negative environmental and social impacts need to be avoided as far as possible. The impacts which cannot be avoided need to be mitigated or managed. The key necessities of the ESIA study are:

To conduct ESIA study to take environmental and social impacts into account in the selection of preferred project options and to determine appropriate measures for mitigating/compensating anticipated environmental and social impacts at different stages of the project including the preparation of site specific ESIA and Environmental and Social Management Plan for affected persons for the Project; and to ensure the compliance with the World Bank's Environmental and Social Frameworks, safeguards Policy and Standards as well as Tanzanian regulatory requirements.

1.5. Objectives of the ESIA Study

To ensure sustainability of the proposed project it is essential to integrate environmental and social concerns into the development process of MUST. The Tanzanian Environmental Management Act 2004 and the World Bank's Environmental and Social Framework (ESF) recognize ESIA as an effective tool for facilitating the inclusion of the principles of sustainable development into the project development. In addition, the ESIA report has been prepared as per ESMF for HEET project implementation. The main objectives of this ESIA were to:

(i) Ascertain the environmental and social issues pertaining to the development of MUST sub-project,

(ii) Describe the existing bio-physical and socio-cultural features of the proposed project environment,

(iii) Assess the potential positive and negative effects, and

(iv) Recommend appropriate mitigation measures that will avoid or minimize any undesirable effects expected to result from the construction and operation activities of the project.

The consultant hired by MUST undertook this Environmental and Social Assessment to address the above objectives.

1.6. 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; and
(vii) To develop an Environmental Management Plan (EMP) detailing actions and responsibilities for impacts mitigation and monitoring.

1.7. Approach and Methodology of the ESIA Study

The ESIA being a multidisciplinary field involved a team of experts, the key ones being EIA Expert (Team Leader), Civil Engineer, Environmental Engineer, Occupational Health and Safety expert, Botanist, Air quality and GIS experts, GBV expert, and Sociologist. The team identified key stakeholders and potential social and environmental impacts (positive and negative).

1.7.1. Desk Study

Desk study involved: identification and review of the country policies and laws which are relevant to the project; collection and review of previous study reports (including design reports) pertaining to the project; collection and review of information and data on the physical, social, economic, cultural as well as archaeological (if present); preliminary identification of key issues to be included in scoping report and the main EIA study; and preparation for fieldwork, including notification of all stakeholders on the intention to conduct EIA study as well as seek their co-operation. This was done by making phone calls, writing e-mails, and distribution of letters seeking appointment to the stakeholder.

1.7.2. Fieldwork

The field visits were essential to fully realizing the scope of the project. Fieldwork intended to facilitate acquisition of information and data on physical, biological and social-economic aspects of the project site and neighbouring area. The collection of baseline data was conducted by defining the scope of the EIA. Data collected during scoping allowed the study team to determine whether more detailed information on environmental conditions at the development site and its surroundings are needed and where such information can be obtained.

1.7.2.1. Measurement of Baseline Air Quality Data

The ESIA team collected and analysed baseline air quality and noise level at the site, and adjacent areas within the University Campus. Sampling locations were selected based on relative distance to the proposed project sites, and existing multiple sources of air pollution in the campus. Sampling and analysis methodology for dust, gaseous pollutants and noise levels are presented in the following sections. Apart from the air quality data, some meteorological data of the site which have direct relationship with project implementation were collected once to enable interpretation of air quality data. These include temperature and relative humidity. The collection of data was done during the busiest day and hours (10am to 2pm) so as to predict the level of air quality during the construction phase. Statistical basis was considered but due to variation of activities during the day, the statistical data could mislead the prediction.

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

Dust levels were measured in terms of $PM_{2.5}$ and PM_{10}. Dust levels were measured using a portable device, brand Temtop M2000C. The Elitech Temtop M2000 2nd Generation sensor unit uses a Temtop PM200 particulate sensor, which separates dust particle size in 2.5 ug/m^3 and 10 ug/m^3 size range. The measurement principle is based on laser scattering to convert particle number to mass concentrations through its proprietary algorithm. During measurements, the device was mounted at a breathing height of approximately 1.5 meters above the ground, and samples were collected for one hour.

1.7.2.3. Measurement of Ambient Gaseous Pollutants

Baseline levels of ambient gaseous pollutants were measured using a FD-4S Portable Multi-Gas Detector. 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. Parameters measured included: carbon monoxide (CO) in parts per million (ppm), Oxygen (O_2) in %, and hydrogen sulphide (H_2S) in ppm. 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.

1.7.2.4. Meteorological Conditions

Temperature and relative humidity were measured at the same sampling points used for ambient air quality, using the same device (i.e. Temtop M2000C). Four readings were recorded for each parameter and the average value was used.

1.7.2.5. Collection of Biological Information

The survey was based on qualitative method where by field observation using car for travelling within the entire proposed project site aided with ocular survey in places where a car couldn't go through was conducted. The vegetation types were classified basing on their physiognomic characterization. Identification of plant species was conducted directly in the field by botanist aided by various plant identification books includes Flora of Tropical East Africa series. Existing two documents of **CITES** list (Convention on International Trade an Endangered Species of Wild Fauna and Flora) and the **IUCN** (International Union for Conservation of Nature) Red List of Threatened plant species, have been used to identify those plant species which falls in any of its categories and appendices respectively.

1.7.2.6. Collection of Socio-Economic Data

Both primary and secondary data were collected. Primary data were collected by direct measurement, observations and using semi-structured interviews with respective and targeted parties (as explained in the previous section). Secondary data were obtained from various relevant sources of information such as education and many other official and non-official documents.

1.7.3. Public Participation

The EIA study identified stakeholders to be consulted and involved throughout the project life cycle. Stakeholders' identification in this study was done through a continuous and comprehensive brainstorming process to collect an exhaustive list of people/ groups or institutions that are likely to be affected by the project/affect the project, influence the direction of the project or have those having interest over the project. In this study the following stakeholders were identified and consulted:

(i) Public institutions who have influence on the project (or some components of the project). The identified stakeholders under this study were the Mbeya Regional Secretariat, Mbeya City Council, Ministry of Education Science and Technology (MoEST), Tanzania Commission for Universities (TCU), the Occupation and Safety Authority (OSHA) - Mbeya Office and Fire and Rescue Army;

(ii) Service providers, including the Mbeya Water Supply Authority (MUWASA), Tanzania National Electric Supply company (TANESCO), and Basin Water Board

(iii) Project Affected Communities- the village, including vulnerable groups of people (elderly people and women), students, staffs and service providers at MUST campus.

1.7.4. Project Impact Assessment, Identification and Development of Mitigation Measures

1.7.4.1. Project Impact Assessment

The environmental and social assessment has been undertaken in close interaction with the master plan team and the design team. In this process environmental impacts have been evaluated for various alternatives. Several project alternatives were considered including that of not implementing the project. The fundamental environmental protection strategy and environmental considerations influencing engineering design were incorporated. However, reasonable regard to technological feasibility and economic capability were considered.

The actions undertaken to determine the significance of potential project impacts involved the following three key steps:

(i) **Prediction**: What will happen to the status of specific receptors as a consequence of this project activities (primarily; what is the magnitude of the impact?);

(ii) **Evaluation of significance:** How significant is the impact to the identified receptors namely, affected communities and the wider environment – land, air and water? What is its relative significance when compared to other impacts?

(iii) **Residual Impacts:** After mitigation, are the impacts still of concern and/or significant? If yes, the process needs to be repeated at least once before the 'final' determination of residual impact significance occurs.

Potential impacts arising from planned activities, cumulative impacts with other developments and unplanned events (e.g. accidents, natural disasters, etc.) were also assessed. Stakeholder engagement is undertaken throughout the implementation of the proposed project to ensure that Affected and Interested Parties are aware and informed of the proposed project and have an opportunity to provide input regarding potential proposed project impacts and mitigation measures.

1.7.4.2. Project's Impact Identification

Superimposing project elements onto the existing social and environmental natural conditions made it possible to identify the potential impacts of the proposed project. The checklist method was used to identify the impacts in which the contender list of key impacts such as noise pollution, waste management was developed etc.; Further, environmental impact matrix method was adopted in identifying impacts of major concerns. A key guiding assumption in this study is that the project will be designed, constructed and operated with due care for safety and environmental matters using current and practical engineering practices and/or Best Available Technology Not Entailing Excess Cost (BATNEEC). The implementation schedule of the mitigation measures is summarized in the ESMP.

1.7.4.3. Development of Mitigation Measures

As part of the EIA process, when impacts (adverse and/or significant) were identified and could not be managed via design controls, mitigation measures were developed in line with the Mitigation Hierarchy. First, efforts were made develop measures to avoid, or prevent, then

minimize or reduce adverse impacts or to enhance potential beneficial impacts. For remaining significant and moderate residual impacts, mitigation measures were developed.

1.8. Report Structure

The report is presented in accordance to the format given in Section 18 (1 and 2) of the Environmental Impact Assessment and Audit Regulations, 2005. This report is structured in the following style: -

i) Executive Summary
ii) Table of Contents
iii) Acknowledgement
iv) List of Acronyms
1. Introduction
2. Project description
3. Policy, administrative and legal framework
4. Environmental and Social Baseline/ Existing conditions
5. Stakeholders Analysis
6. Assessment of Impacts and Identification of Alternatives
7. Environmental and Social Mitigation Measures
8. Environmental and Social Management Plan
9. Environmental and Social Monitoring Plan
10. Resource Evaluation / Cost Benefit Analysis
11. Decommissioning and Closure
12. Summary and Conclusions

References
Appendices

CHAPTER TWO

2. PROJECT DESCRIPTION

2.1. Location and Accessibility

2.1.1. Location

Mbeya City lies between latitude $8^0$50′-$8^0$57′ South of the Equator and Longitude $33^0$30′-$35^0$55′ East of Greenwich. Mbeya City is surrounded by Mbeya District in all directions except in the North-East, which is bordered by the Mbarali district. As the headquarter of Mbeya Region, it is strategically located between 20-70 km to other districts within the region. Its location is close to Zambia and Malawi, which are members countries of the Southern African Development Community (SADC) (Mbeya City Council Investment Profile, 2019).

Iyunga Ward, the ward where the Campus is located is bordered by Iwambi, Nzovwe and Iyele wards to the North, Igale Ward to the South, Iwindi Ward to the West, Tembele, Mwansanga and Mwakibele Wards to the East. The proposed project site is about 150m away from the existing University buildings, one (1) kilometre away from the Inyala residential area on the eastern side. To the northern side is about 800m away from the Ikuti Street and about one kilometre from the Sisiem Village on the southern side. Moreover, the site is located about 8km from Central Business District (CBD) of Mbeya City. From Dar es Salaam, the University can be reached through three modes of transport that is road, air and railway. The coordinates for the project site are; -8.941810° 33.404910°, -8.942993° 33.437039°,-8.945694° 33.428780°, -8.953889° 33.430078°, -8.957896° 33.408245° and -8.955698° 33.404667° (Figure 2.1).

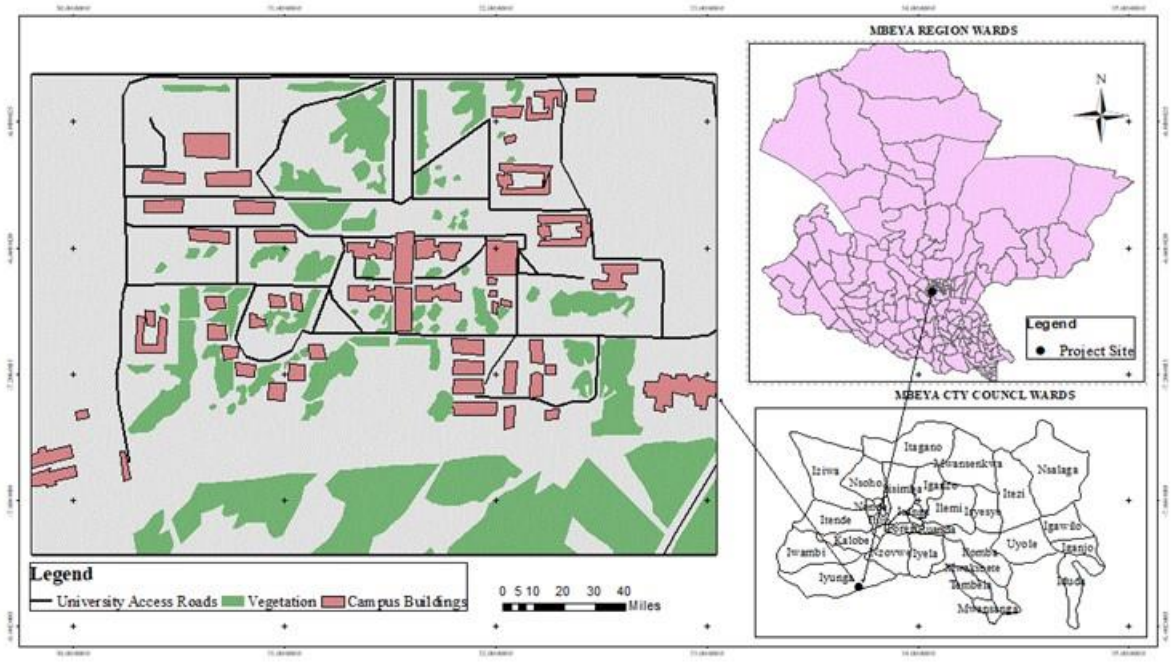

Figure 2.1: Land use map for the proposed MUST campus

2.1.2. Accessibility

The MUST Mbeya Campus is accessible by TANZAM Road and is located on the left side of the road at about1.4 kilometres when heading from central business centre of Mbeya City to Tunduma. From TANZAM Road, there are number of street roads heading to the Campus which are easily accessible by both motorized and non-motorized traffic. The Campus can also be accessed via TAZARA Railway located at about 924.5 meters to the North (Figure 2.2).

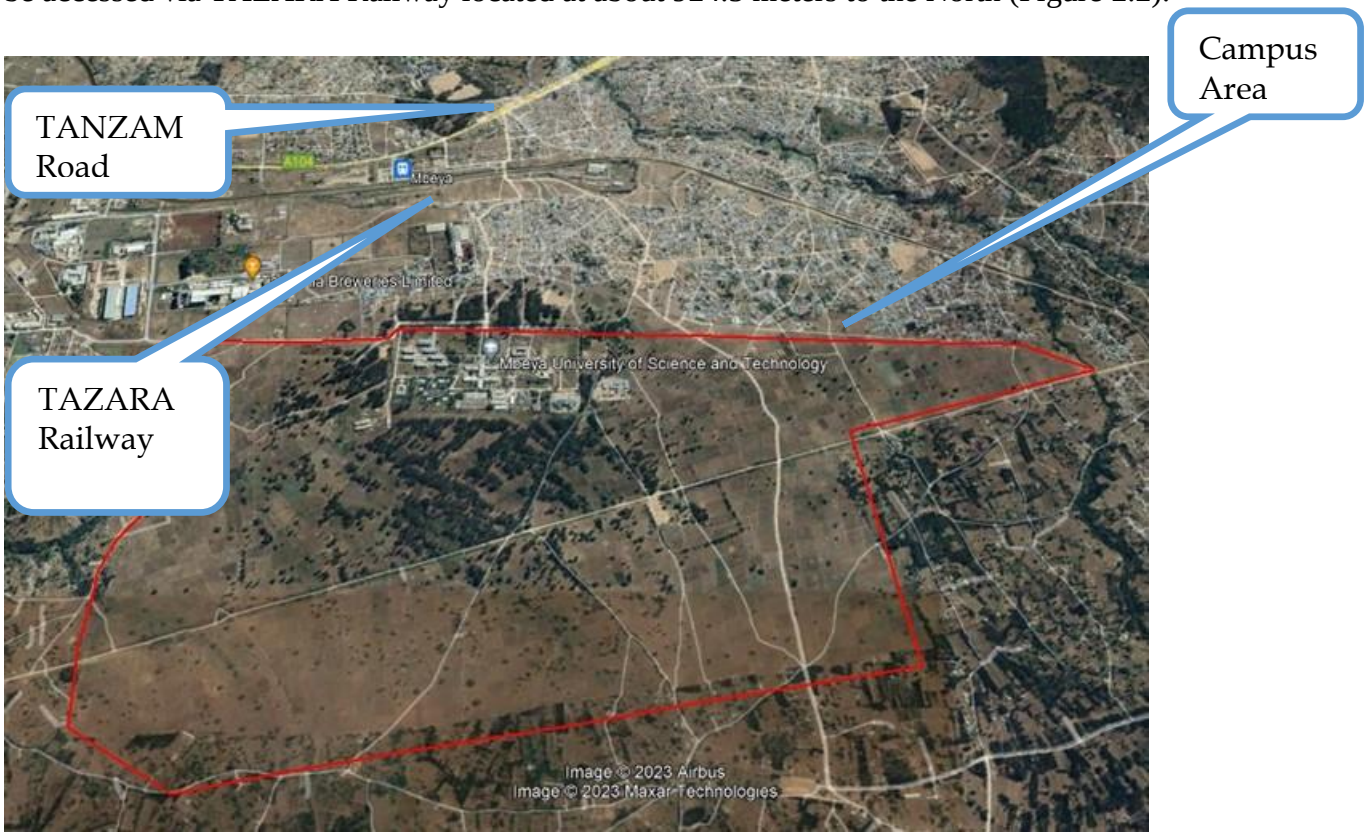

Figure 2.2: Satellite Image Showing Accessibility of the MUST Mbeya Campus.
Source; Google Earth, April 2023

2.1.3. Description of the Proposed Project Area

The proponent intends to expand the existing facilities by constructing a new academic block, workshops and CITT on Plot No. 1 Block 'FF' Iyunga Ward, Mbeya City Council, Mbeya Region, Tanzania with built up at area of 8815.73 m^2, which is 8.17% of a total area of 111,385.220 m^2. The plot covers an area of 490ha (4,900,000m^2). The proposed project area was used as a cultivation land. It also has scattered to dense eucalyptus trees that are matured (Figure 6). The site is not a habitat of any endangered species. It has been surveyed for all the endangered or protected species listed by International Union for Conservation of Nature (IUCN). Figure 2.3 shows current land use within the proposed project site. The site is about 1640 m.a.s.l with gentle slopes from North to South and South to North of the site forming shallow valley near the middle of the site. It is characterized by generally clayey sand where the sand is in the range of medium to coarse size.

2.1.4. Adjacent land uses

The proposed project site conforms to the Master Plan of the University. The University Master Plan shows that the area is for construction of buildings as it expands the colleges. However, adjacent to the University's site the city plan indicates that the surrounding area will be used for residential buildings on the eastern and northern sides and industries on the western side. On the southern part the proposed site boarders the villages are which under Mbeya District Councils as shown in Figure 5. The site is about 150m away from the existing University buildings, one (1) kilometre away from the Inyala residential area on the eastern side. To the northern side is about 800m away from the Ikuti Street and about one kilometre from the Lupeta Village on the southern side.

2.2. Project Components

The building shall be used solely for educational purposes only. The buildings shall have several components that will be used for teaching, workshops, research, and office space. In addition, the space utilization of all building components have taken into consideration people with special needs including the disabled e.g. water closet and ramp for wheel chair bound people.

2.3. Project Design

Buildings are constantly subject to several climatic and environmental elements (wind, sunlight, temperature, rain, earthquakes, and other factors). During the preparatory phase of the project, MUST engaged experts in assessing and understanding risk and integrating risk management in development planning of the Campus as per Environmental and Social Standards (ESS1: Assessment and Management of Environmental and Social Risks and Impacts). Several studies were conducted during the preparatory phase of the project, as part of Risk Hazard Assessment (RHA). The studies include geotechnical investigation, topographical surveys and environmental and social impacts assessment. Furthermore, with inputs from these studies, the project design took into consideration aspects of climate change risks, disaster risk management, gender, and occupation health and safety.

2.3.1. Climate Change Risks Mitigation and Adaptation in the Project Design

To mitigate and adapt the climate change risks (e.g. heat, drought, floods, water scarcity, etc.), the design of the MUST campus shall accommodate the infrastructures to enhance low energy use, rainwater harvesting, storm water management systems, adequate natural ventilation and lighting, and maintaining a significant green spaces, as described hereunder;

- **Park and open space**: In the open spaces, native plants have been recommended to add the benefit of being useful for storm water treatment and infiltration in the valley, which is in the central part of the site. A park and public open spaces are planned to maximize the tree canopy cover and shade provided by trees in the area and more provision of ecosystem services.
- **Greenery walkways:** The design maximizes pedestrian movement and minimizes motorized transport within the site to reduce air emissions (greenhouse gasses (GHGs)) and maximizing Carbon sequestration. Walkways are provided to restrict free

movement that causes vegetation destruction in the site and reducing land cover important for carbon sequestration. Trees are proposed to be planted along the vehicular access road and footpaths to improve landscape and reduce effects of sun radiation during the day.

- **Green areas:** Green areas are distributed in every zone/ block to allow cross fresh air into the buildings. Due to the topographical nature and natural vegetation cover, green belt and conservation zone intend to preserve the ecosystem and control land degradation and enhance mountainous scenery. Vegetation including artificial forests will reduce soil erosion in sloping plains and all areas prone to soil erosion.
- **The building with low energy use;** Provisions for adequate openings for cross ventilation, that will ensure easy flow of clean air and reduce energy use (thus reducing emissions); provisions for motion sensors in public areas, to enable auto switch ON/OFF of lights; installation of presence sensors in offices, class rooms; proper orientation to reduce indoor discomfort and capture natural air as much as possible and minimization of the sun effects (installation of fans; and provisions for solar lights along the pathways for sun shading); maximizing the potential of utilization of renewable energy options such as solar and wind; Utilization of biogas from the wastewater treatment plant for cooking; buildings to be oriented and constructed to take advantage of natural lighting and cross ventilation as a means of minimizing energy consumption during operation;
- **The buildings with low footprint.** This increases green spaces; and accommodation of rainwater harvesting, storm water and waste management systems and embracing water-efficient processes.

2.3.2. Disaster Risk Management

The proposed project shall have provisions for fire prevention and fire fighting facilities. Also, the building shall have provisions for solid waste and liquid waste management for diseases prevention. In addition, two possible access roads shall be used to ensure easy walkability and vehicular access to and from the building to avoid car accidents. The roads shall be safely connected to the parking area huge enough to accommodate cars. MUST campus shall have an emergency management plan that assigns the responsibilities for various emergency tasks, specifically to WHO does, WHAT, WHEN AND HOW.

2.3.3. Gender Inclusivity

The University buildings shall be developed to be smart and friendly to gender, including considerations of persons with special needs (e.g. physical, learning impairment, emotional and behavioural). These include provisions of ramps, toilets, special rooms for lactating women, cloth changing and sanitary issues, etc.

2.3.4. Occupational Health and Safety (OHS)

MUST will protect workers throughout the project lifetime as per Environmental and Social Standards, ESS2 (Labor Working Conditions) and ESS4 (Community Health and Safety)

OHS During pre-construction phase

During the demolition period the contractor shall provide, adequate and necessary personal protective equipment. Appropriate protective gear including, but not limited to helmets, heavy duty gloves, safety vests and boots, shall be provided to site workers and visitors. Hazards and risk awareness will be provided to workers to ensure that they are not affected with hazards during demolition. Further, structural elements of a project will be designed and constructed by competent professionals and certified or approved by competent authorities or professionals. Where the project includes new buildings and structures that will be accessed by members of the public, the MUST will consider the incremental risks of the public's potential exposure to operational accidents or natural hazards, including extreme weather events. Where technically and financially feasible, MUST will also apply the concept of universal access to the design and construction of such new buildings and structures.

OHS During construction phase

MUST with support from the supervision consultant will ensure regular training to permanent and temporary workers (including community workers) on occupational health and safety to workers and information relevant to health risk including cholera, HIV/AIDS, COVID-19, and impacts of dust to workers health will be provided to workers. During the construction period the contractor shall provide, equip and maintain adequate personal protective equipment, first-aid stations and signboards directing where these services are situated and transport in case of emergency. Appropriate protective gear including, but not limited to helmets, heavy duty gloves, safety vests and boots, shall be provided to site workers and visitors. Training related to hazards and hazard management will be provided to workers and particularly as stipulated in the general IFC general EHS guidelines during construction the contractor will be required to put emphasize on training related to specific hazards such as working at height, ergonomic, slips and falls, dust and moving machinery and any other relevant hazard that will be identified during construction.

OHS During operation phase

All the emergency situations associated with building operations will be included as part of the design aspects including allocation of emergency assembly point. Emergency plans procedures will be developed to prevent and mitigate likely consequences associated with each incident. The document that details potential emergencies and response to such situations and how to prevent and mitigate the environmental aspects will be in place. Occupational Health and Safety hazards related to the daily operations of the like exposure to eruption disease, risks of fire explosion and security will be given due considerations. Fire extinguishers of powder foam type and fire hose reel will be placed in several strategic areas at the site and serviced on time.

OHS during decommissioning phase

If decommissioning must happen, it is anticipated that the project will have hazards resulting from noise and vibration that may be caused by the operation of pile drivers, earth moving and excavation equipment, concrete mixers, cranes and the transportation of equipment, materials and people. According to IFC Guidelines specifically the general Environmental Health and Safety guidelines, slips and falls on higher elevation associated with poor housekeeping, such

as excessive waste debris, loose decommissioning materials, liquid spills, and uncontrolled use of electrical cords and ropes on the ground, are also among the most frequent cause of lost time accidents at decommissioning site. To control these challenges during decommissioning phase, the contractor shall be required to have a clear understanding on the historical use of the land with regard to the potential presence of hazardous materials or oil prior to initiation of decommissioning activities, preparing plans and procedures to respond to the discovery of contaminated media to minimize or reduce the risk to health, safety, and the environment but equally important to provide adequate and the right PPEs for the anticipated hazards during decommissioning..

2.3.5. Project Design Criteria

The building shall be used for educational purpose only. The building rules and regulations will be in accordance with Tanzania government specifications and the planning regulations of Mbeya City Council and specific conditions as provided a certificate of occupancy from Ministry of Lands, Housing and Human Settlements Development. The following are the design criteria that have been followed during the design of the building;

(i) Easy vehicular access to and from the building,
(ii) Short internal walking distances
(iii) Ensure easy flow of clean air
(iv) Aesthetic values added
(v) Proper orientation to reduce indoor discomfort and minimize the effect of the sun
(vi) Ensure coherence, diversity compatible uses and scale in the context
(vii) Wastewater disposal facilities are part of the design whereby storm water is directed into the highway storm drains.

2.4. Development Conditions

The proposed project is in line with the priority of the fifth phase government on industrialization and Vision 2025 in general, requires higher learning institutions to produce high quality, ready to use skilled labour. MUST ought to expand its physical infrastructure to accommodate this need. Furthermore, the buildings rules and regulations will be in accordance with Tanzania government specifications and the planning regulations of Mbeya City Council and specific conditions as provided in certificate of occupancy from Ministry of Lands, Housing and Human Settlements Development. The project is in line with city plan for the Mbeya University of Science and Technology. The expansion of MUST facilities was characterized by two main factors, one of which being to fulfil the objectives and requirements of the HEET project. HEET is coordinated by the Ministry of Education, Science and Technology (MoEST) and will be implemented in almost all public higher learning institutions located in regions. The second factor was the stipulated objectives that are in line with Mbeya University of Science and Technology Strategic Plan which focuses on expanding infrastructures to match with increase in the student's enrolment. The strategic plan of the University is to enrol 15,000 students by year 2024-2025.

2.5. Land ownership and Requirement

MUST is the registered owner of Plot No.1 Block 'FF' Iyunga Ward, Mbeya City Council, Mbeya Region under Title Number 14322- MBYLR, with a total area of 490ha (4,900,000m2). The land use of the plots is designed for offices for educational purposes only, Use Group 'K' Use Class (b) as defined in the Town and Country Planning (use Classes) Regulations, 1960 as amended in 1993. Hence the development in the area is compatible with the designed land use of the title.

2.6. Manpower and Utility Requirements

2.6.1. Manpower Requirements

The proposed project is expected to temporarily deploy about 150 to 200 people during construction phase. Employment during construction phase will be under contractor and will be in the form of managers, skilled as well as unskilled labourers, considering all gender types.

2.6.2. Energy Provisions

The proposed site for the MUST-Mbeya Campus is connected to the National grid of TANESCO. The transmission line of TANESCO has passed across the proposed project site, thus making easy for connection. Based on the power use, the average electricity Demand for the MUST-Mbeya Campus is 4210KVA a month. It is expected that the power consumption of the Campus will increase when the proposed project will be in entire operation.

To meet the Campus demand of electricity, the project design has provision for installation of backup power (generators) to operate in zones with a capacity of 450KVA to serve administrative and academic purposes only. The Campus will also look into feasibility of installing solar panels on the buildings in the proposed MUST-Mbeya Campus and running the beamers and laptops.

2.6.3. Water and Waste Water Requirement

2.6.3.1. Water Requirement

MBEYA-UWSA is the leading water supplier in Mbeya City Council. Other water sources include pipe schemes, boreholes, shallow wells, springs, and rain water harvesting. The MUST-Mbeya Campus is within the water scheme catchment area. Water will be used for construction activities and for domestic purposes (flushing of toilets) and cleaning activities during construction and operation phases of the project. The water required to be used during construction is estimated to 30,000L/day. The proponent shall apply water use efficiency technologies during construction and operation phase and there will be enough water storage tanks during operation.

2.6.3.2. Waste water Requirement

The sewerage system from the project site will be connected to the public sewerage system which collects the waste and discharge to the treatment ponds at Kalobe ward in Mbeya city. According to Mbeya-UWSA management, the public system has a capacity of handling

28,000m^3/day wastewater. The waste generation per day is 14,000m3/day which 50% of the system capacity. In addition, the sewerage network covers 30% of Mbeya city whereas only 14% of the total network has been used so far.

2.6.4. Access and Service Roads

The MUST Mbeya Campus is accessible by TANZAM Road and is located on the left side of the road at about1.4 kilometres when heading from central business centre of Mbeya City to Tunduma. From TANZAM Road, there are number of street roads heading to the Campus which are easily accessible by both motorized and non-motorized traffic. Therefore, with the upcoming project it is anticipated that there will be an increased pressure for roads. However, the proponent will use most of the existing roads and will require only few additional onsite access roads to connect existing roads for delivery of construction materials and also to easy movement during construction and operation of the proposed project**.**

2.7. Project Activities in General

The proposed project will be the construction of an academic building, workshop and CITT for educational purposes in Mbeya University of Science and Technology. The undertaking involves various phases from the planning phase all the way to the construction and operation phase. Each specific phase has its own activities and as a result different waste fraction. Waste types and generation varies depending on implementation phases as elaborated in these sections. The sections identify expected waste generation, storage, options for pollution prevention, necessary treatment, and disposal infrastructure. It involved the following:

(i) Gathering information about project activities and processes, description of waste streams by type, quantities, and potential environmentally friendly methods for handling the wastes;
(ii) Establishment of priorities based on potential Environmental Health and Safety risks risk anticipated by the waste streams and the available infrastructure to manage the waste in an environmentally sound manner;
(iii) identification of options for waste reduction at the generation point but equally important the possibility for reuse and recycling;

(iv) Identification and proposing procedures and operational controls for onsite storage, treatment and final disposal of wastes.

2.7.1. Mobilization/Pre -Construction Phase

Activities that will be carried under this phase of project development include:

2.7.1.1. Topographical Survey

The topographical survey activity was contracted to MUST Consultancy Bureau. This activity enabled the designers to establish suitable orientation and optimal positioning of the facilities as well as access roads so as to fit the existing structures and those that are yet to be constructed as the needs arise. This process necessitates the optimally space utilization, while maintaining the aesthetic appearance of the University as a whole and the Mbeya City Council in general.

2.7.1.2. Geotechnical Investigation

The site elevation is about 1640 m a.m.s.l with gentle slopes from North to South and South to North of the site forming a shallow valley near the middle of the site. According to the geotechnical investigation done by MUST through its Civil Engineering Department, the results indicate that the soil profile has some varying characteristics from the top surface to lower layers of the soil to a depth of 9.0 meters and therefore based on allowable bearing capacity specified at different depths, shallow foundation may be suitable. However, it is recommended to avoid locating the foundations on pumice materials as the soil may deform by particle crushing. Moreover, it is recommended to determine deformation settlement beneath the proposed foundations to ensure them being within acceptable limits. This may be achieved by performing SPT and sampling at selected points followed by laboratory testing.

2.7.1.3. Architectural, Structural Engineering and Service Designs as Well as Project Costing

In general, the aesthetic appearance of the academic blocks, workshop and CITT have been provided by the architects, the structural integrity of the buildings that enables the structure to resist against the various loads acting on it are handled by the structural engineer and the various services in the building are designed by the service engineer.

In addition, the internal roads and pavements as well as the storm water drainage system is designed by the highway engineer. In this regard, the project team is composed of Architects, Structural Engineer, Service Engineer, Quantity Surveys Highway Engineers, Environmental Impact Assessments and Environmental Audit Expert. All these constitute part of MCB's experts and was assigned to design the project buildings.

2.7.1.4. Environmental and Social Impact Assessment (ESIA)-

EIA was conducted by following the EIA and Audit (Amendment) regulations of 2018 and World Bank Environmental and Social Standards.

2.7.1.5. Acquisition of Various Permits/ Certificates-

This include getting building permit from relevant authorities.

Duration

The duration of this phase will be Six (6) months.

2.7.2. Construction Phase

This is the initial phase of project implementation; this phase commences when all necessary permits and processes have been accomplished. During this phase the contractor shall recruit all necessary administrative and engineering staff for the project and procedure and transport construction equipment to the site. Mobilization phase also entails establishment of offices on site, assembling equipment, geo technical investigation works as well as construction of materials and workforce.

The main activities of the project during construction will include but not limited to the following:

(i) **Earthworks (site clearance)** - This shall be done by means of motor grader. The proponent shall ensure as many indigenous trees as possible are left intact. This will also ensure that the drainage pattern of the site is not interfered with.

(ii) **Foundations excavation**- Most part of the site is covered with vegetation. The same will be removed and disposed-off by a licenced waste handler to pave way for the construction.

(iii) **Material transportation**- Materials (fine and coarse aggregates) from quarries will be transported by trucks to the construction site. Other materials like cement, timber and reinforcement bars will be transported by trucks from Mbeya City, Mbalali, Dar Es Salaam, and Njombe to the construction site.

(iv) **Material Storage-** Materials like aggregates and sand will be stored at the site ready for use. Cement and reinforcement bars will be stored in special storage rooms. Timber will directly be used at the required areas and consequently there will be no stockpiling of timber at the camp sites. Fuel will be stored in drums in secluded areas.

(v) **Construction crew-** This will include skilled, semi-skilled personnel and labourers who will be hired locally or outsourced where necessary. Temporary construction camp at site will be constructed at the project area. This camp will consist of offices, stores and boardroom for conducting site meetings. Accommodation for the workers including senior staff members and most of junior staff will be in appropriate accommodation within Mbeya city. Security crews and on-duty staff members will be based on camp site. Local labourers and other unskilled staff will be accommodated within their normal residence in Mbeya City Council and surrounding areas.

(vi) **Local licensed supplies and services (food, medical, fuel, water, etc)-** Food and other domestic essentials will be provided by local supplies. Medical services will be received from Ikuti Dispensary and when the case cannot be handled by the dispensary, patients will be referred to Mbeya Regional Hospital. Fuel will be supplied by local supplier.

(vii) **Masonry, Concrete works and related activities**- The construction of the building walls, foundations, floors, pavements, drainage systems, perimeter fence and parking area among other components of the project will involve a lot of masonry work and related activities. General masonry and related activities will include stone shaping, concrete mixing, plastering, slab construction, construction of foundations, and erection of building walls and curing of fresh concrete surfaces. These activities are known to be labour intensive and will be supplemented by machinery such as concrete mixers.

(viii) **Steel Structure works-** The buildings will be reinforced with structural steel for stability. Structural steel works will involve steel cutting, welding and erection.

(ix) **Roofing and Sheet metal works**- Roofing activities will include sheet metal cutting, raising the roofing sheets and structural timber to the roof and fastening the roofing materials to the roof.

(x) **Electrical Work**- Electrical work during construction of the premises will include installation of electrical gadgets and appliances including electrical cables, lighting apparatus, sockets etc. In addition, there will be other activities involving the use of electricity such as welding and metal cutting.

(xi) **Plumbing**- Installation of pipe-work for water supply and distribution will be carried out within all units and associated facilities. In addition, pipe-work will be done to connect sewage from the premises to the effluent treatment plant.

(xii) **Landscaping-** To improve the aesthetic value or visual quality of the site once construction ceases, the proponent will carry out landscaping. This will include establishment of flower gardens and lush grass lawns where applicable and will involve replenishment of the topsoil. It is noteworthy that the proponent will use plant species that are available locally preferably indigenous ones for landscaping as advised by the botanist.

Duration

The duration of this phase will be Two (2) years.

Types, Amounts and Sources of Project requirements

Large percent of the building materials such as sand, aggregates, masonry units, cement, paint, timber, roofing sheets, shall be sourced locally via certified suppliers. However, quality and quantity availability shall dictate the material sources. Many of the construction projects in Mbeya region obtain materials locally except for specialized building elements and installations. The quantities of materials shall be specified in the Bill of Quantities (BOQ). Water will be sourced from Mbeya Urban Water and Sanitation Authority through existing water supply point available at site and electricity will be sourced from the available transmission line (TANESCO) at the site.

Types, amounts and sources of project requirements during the construction phase are shown in Table 2.

Types, Amounts and Treatment/Disposal of Wastes

During the construction phase, various wastes will be generated. Types and amounts of wastes to be generated during this phase are shown in Table 2.1.

Table 2.1: Types and Amounts of Wastes to Be Generated During Construction Phase

Waste	Types	Amount	Treatment/ Disposal
Solid Waste (Degradable)	General garbage (food remains, cardboards and papers etc)	35kg/day (based on generation rate of 0.25kg/day/person and 140 people)	To be collected in a large skip bucket at each site and disposed at the authorized dumpsite
	Vegetation	Approximately 80% of the area that contain vegetation will be cleared during construction.	✓ The logs shall be given to people to be used as fire wood ✓ Other vegetation will be left at site for soil conditioning
	Remnants of timber	4-10kg/day	Shall be given to recyclers
Solid Waste (Non-Degradabl			
	Plastics	5-7kg/ day	Given to plastic recyclers
	Tins, glasses	3-5kg/day	To be collected in a large skip bucket at each site and disposed at the authorized dumpsite
Hazardous Wastes	Scrap metals, Other Chemical mixing agents, paint containers, drums, iron sheets etc)	200-400kg/day	To be sold to authorized recyclers To be disposed by an authorized Hazardous waste agent by NEMC
Liquid waste	Sewage	4.48m^3/day (Based on 140 people, water consumption rate of 40L/capita/day and wastewater discharge factor of 80%)	To be directed to the public sewer system
	Oils and greases	None	Service and maintenance of vehicles will be done at designated garages.

Source: Source: Computed by Consultant, 2023

2.7.3. Demobilization Phase

Demobilization of temporary structures will be done for proper restoration of the site. Other activities include rehabilitation of the workshop and stockpile yard, at least to the original condition, clearance of all sorts of wastes including sewage and solid wastes (plastics, wood, metal, papers, etc.). All wastes will be deposited at the designated dumpsite and temporary employment will be terminated.

Duration

Demobilization stage will last for a period of two (2) months.

Types, Amounts and Sources of Project Requirements

Types, amounts and sources of project requirements during the demobilization phase are shown in Table 2.2:

Table 2.2: Types, Amounts and Sources of Project Requirements During the Demobilization phase

Requirement	Type	Source	Amount
Manpower	Skilled	Contractor	5
	Unskilled	Local area	25
Water	Domestic water use (drinking and sanitation hygiene)	Mbeya UWSA	1.8 m^3/day. Assuming the phase will have 30 workers each demanding 60 l/day
Equipment	Bull dozer	Contractor	2
	Motor grader	Contractor	1
	Plate compactor	Contractor	1
	Tippers	Contractor	1

Source: Consultant Analysis, 2023

Types, Amounts and Treatment/Disposal of Wastes

The demobilization of the temporary structures will result mainly into solid wastes such as timber, iron sheets and rubbles from demolitions. Timber and metal sheets will be sold to people in the nearby communities for reuse while rubbles will be used in backfilling the borrow pits.

2.7.4. Operation Phase

The activities that are expected to be executed during operational phase include

i. Tenancy/ Occupancy;
ii. Imparting Knowledge;
iii. Occupational health and safety management;
iv. Good housekeeping of the area;
v. Project Maintenance.

Duration

The duration of this phase will be more than fifty (50) years

Types, Amounts and Sources of Project requirements

Types, amounts and sources of project requirements during the operational phase are shown in Table 2.3.

Table 2.3: Types, Amounts and Sources of Project Requirements During the Operational Phase

Requirements	Type	Source	Quantity
Water		MBEYA UWSA	655,410 m^3/day Estimated based on the number of occupants for all buildings ((15,000 Students +605 (staff)) *60l/c/d*70%). Assuming that 70% of the population will use the structure full time
Energy	Electricity	• TANESCO (National Grid) • Standby generator at the Site	• 1050kwhr per day • 450kVA

Source: Consultant Analysis, 2023

Types, Amounts and Treatment/Disposal of Wastes

Types, amounts and treatment/disposal of wastes during the operation phase are shown in Table 2.4.

Table 2.4: Types, Amounts and Treatment/Disposal of Wastes During the Operation Phase

Waste	Types	Amount	Treatment/ Disposal
Solid Waste (Degradable)	Food remains, cardboards and papers	3.7 tons/day (based on generation rate of 0.35kg/day/ person, campus intended to accommodate ((10,090 Students +502 (staff)) people, worst case scenario)	•Sorting will be done onsite and a large refuse collection point shall be provided to facilitate collection of Solid wastes from Building. •The solid waste from the refuse collection point shall be collected by Municipal/Private trucks for disposal at the designated dumpsite

Waste	Types	Amount	Treatment/ Disposal
Solid Waste (Non-Degradable and recyclable)	Scrap metals, drums, Tins, glass and plastics	5-10 kg/day	Sorting will be done at site to reduce waste fractions Scrap metals and drums will be sold to Recyclers disposal at the designated dumpsite
Liquid waste	Sewage	524.410m^3/day (The campus intended to accommodate people, water consumption rate of 60L/capita/day and wastewater discharge factor of 80%) and 70% will use facilities Q= 0.8*(60*((15,000 Students +605 (staff)) people, worst case scenario) *0.7 =524,410 l/day	To be directed to the sewer system
Electronic wastes	Worn out computers, telephones and other non-functioning electronics		To be taken by authorized E-waste collectors
Hazardous waste	-Oils and greases -Chemicals -Scrap metal -Tins, -glass -Electronic waste -Medical waste	-Assumption is that 1 person may generate 5kg of E-waste annually and 70% of the occupants will produce the E waste, therefore E-wastes generated will be: ((10,090 Students +502 (staff)) people, worst case scenario) *5= 37,072 kg/year	-Service and maintenance of vehicles will be done at designated garages -Sorting of wastes will be done onsite to allow recycling of electronic wastes since these wastes contain important materials such as cupper etc. sorted recyclable e-wastes will be sold to recyclers -Chemicals from dispensary will be managed following SOPs for managing medical waste. The project will have an incinerator for hazardous solid waste management from the dispensary

Source: Consultant Analysis, 2023

2.8. Project Boundaries

Identification of boundaries within the EIA process was undertaken as an important component of the scoping exercise. This exercise focused and encircled the project within an area where impacts both positive and negative would be felt on the environment, to the economy and to the local community. Three types of boundaries were considered in the scoping and the EIA study that included: institutional; temporal; and spatial boundaries.

2.8.1. 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. The proposed project to be built on Plot No. 1 Block 'FF' Iyunga Ward, Mbeya City Council, Mbeya Region, Tanzania, involves the construction of an academic block, workshops and CITT. The proposed development cuts across the interest of many institutions and administrative units in relation to several policies, laws and plans in Tanzania and several sector ministries as identified above. These institutions define the institutional boundary for this development, and will have to be consulted in this EIA, as they are stakeholders. The list of these institutions and administrative units are provided below;

(i) Ministry of Education Science and Technology
(ii) Mbeya City Council
(iii) Tanzania Commission of Universities (TCU)
(iv) Fire and Rescue Force
(v) Occupational Safety and Health Authority (OSHA)
(vi) Mbeya UWSA
(vii) TANESCO Mbeya City
(viii) Iyunga Ward

These institutions will be consulted in this EIA process, as they are key stakeholders with vested interest in the development at MUST for environment and economic prosperity of the local people and Tanzanians in general.

2.8.2. Temporal Boundaries

Temporal boundaries refer to the lifespan and reversibility of impact. For example, the impact of construction works may be short-lived, but the presence of the academic block, workshops and CITT within the area may have implications that stretch far into the future until when 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 facility. Therefore, some of the impacts that may occur during construction e.g. noise caused by construction activities will disappear as soon as construction is finished while during operation period there will be regular checking of the noise levels to make sure that they are within standards prescribed by the laws. Increased wastes generation and increased pressure on social services and utilities will be controlled. Health and safety risks due to fire hazards may arise as problems during operation phase unless measures are taken to ensure relevant Health and Safety Acts and Regulations are strictly adhered to.

2.8.3. Spatial Boundary

The spatial dimension encompasses the geographical spread of the impacts regardless of whether they are short term or long term. The spatial scale considers the receptor environmental component and can be local or broader. Two zones of impacts namely core impact zone and influence impact zone are considered.

(i) The core Impact zone- The core impact zone includes the area immediately bordering the project (0-500m radial distance). In the case of this project, local impacts will include the site of the construction and the immediate surrounding areas. Ikuti, Lupeta, Sistila, and Inyala villages are within the core impact zone, and are in the social, direct, indirect and cumulative impact areas due to their close proximity to project area.

(ii) The influence impact zone- includes the areas beyond 500m from the proposed site within Mbeya city and other areas outside the city because of indirect impacts such as population increase and extraction of building materials. Mbeya region will experience cumulative impacts as result of change in population growth rate due to new student's enrolment and workers influx.

CHAPTER THREE

3. ENVIRONMENTAL AND SOCIO-ECONOMIC BASELINE

3.1. Introduction

This chapter provides a description of relevant environmental characteristics of the proposed project. This chapter provides a description of relevant environmental, economic and social characteristics of the project core area (site specific) and areas in the immediate vicinity of Iyunga Ward as well as broad description of the area of influence i.e. Mbeya University of Science and Technology (MUST).

The major purposes of describing the environmental settings of the study area were:

- To assess the existing environmental quality, as well as the environmental impacts of the future developments being studied;
- To identify environmentally significant factors or geographical areas that could preclude any future development; and
- Additional purposes of the baseline studies were to provide sufficient information so that decision makers unfamiliar with the general location can develop an understanding of the project need.

The environmental impacts were assessed for a project at a specific location to establish baseline status and monitor the environmental quality prevailing in the study area prior to implementation of the project. The environmental status within the study area was used for identification of significant environmental issues that were addressed for assessment of the project impacts (positive and negative) and suggest remedial measures thereof.

3.2. The Physical Environment

3.2.1. Climate

Changes in the local climatic conditions have potential to affect the nature and location of project and infrastructure. Thus, it is important to assess the baseline climatic condition, and design projects with knowledge on the climate. Mbeya City lies within Mbeya Mountain ranges at an altitude of between 1600 and 2400 meters above sea level. In general, the City lies within highland areas that have normal temperatures and adequate rainfall (Mbeya City Council Social Economic Profile, 2015). Climatic elements described here include rainfall, temperature, wind, solar radiation (sunlight/ultraviolet) and humidity. Climatic analysis detects better decision-making processes in master planning and development proposals.

The nature of the proposed project is perceived as one with minimal impact on the local climate. There are a few activities that may produce emissions with potential to affect the local climate, including clearance of vegetation on site, emissions from construction equipment and trucks; and emissions from standby generators. The management options for these emissions were provided in detail in the ESMP.

3.2.2. Temperature

The temperature of Iyunga Ward, where the Campus is located does not differ from the temperature of Mbeya City Council. The area experiences moderate to cold temperatures through the year. The annual daily temperature range between 15^{o}C to 20^{o}C with the coldest months being June and July which are also among the driest (Mbeya City Council Social Economic Profile, 2015). Table 3.1 presents the mean monthly temperature distribution for Mbeya District Council.

Table 3.1: Mean Monthly Temperature (°C) Distribution in Mbeya District Council

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Av. Temp (^{0}C)	17.8	18	17.6	17.2	16.7	15.4	15.2	16.7	18.6	19.7	19.3	18.2
Min. Temp	14.5	14.4	14.3	13.8	12.6	10.7	10.1	11.2	12.8	14.4	14.8	14.6
Max. Temp	22.2	22.6	22.3	21.6	21.7	21.4	21.6	23.3	25.1	25.7	24.6	22.8

Source: Climate-Data.Org, 2011

The proposed developments at the site, have potential to cause changed in to the local mean temperature. Clearance of local vegetation and the establishment of paved area may increase the local temperature. Pavements absorb and store solar radiation, leading to a further increase in the surface temperatures. This phenomenon is known as the urban heat island (UHI) effect. Large quantities of solar radiation are absorbed by these materials during the day and released during the night time.

3.2.3. Existing Land Cover

The proposed project area was used as cultivation land. In current state, the area is covered by MUST Campus buildings, small farms that were used for cultivation, grasses, shrubs and other matured tress such as eucalyptus trees. Most of the features are concentrated at the centre and to the Northen side of the Campus area. However, the eastern, southern and western sides are mostly covered with grasses, shrubs and scattered trees which are matured (Figure 6). Also, the area has existing rough roads connecting to the different parts of the Campus and nearby Villages.

3.2.4. Topography

The project site is located at Mbeya University of Science and Technology main campus (8° 56' 30.3" S, 33° 24' 58.7" E) in Mbeya City. The site elevation is about 1640 m a.m.s.l with gentle slopes from North to South and South to North of the site forming a shallow valley near the middle of the site. Administratively, it is located within Mbeya City Council, which lies within Mbeya Mountain ranges at an altitude of between 1600 and 2400 meters above sea level. The proposed land site is characterized by gravelly clayey sand where the sand is in the range of medium to coarse size. The topography of MUST Mbeya Campus portrays the potential for natural storm water drainage and rain water harvest systems. Infrastructure design may consider

to utilize this potential while conserving the environment at the campus. In addition, the presence of valleys imply that storm water produced at the University will flow towards lowland valleys. They may also guide the design of water retention ponds, storm water drainage and choice of location to set up waste water treatment plants.

3.2.5. Soils

The site elevation is about 1640 m a.m.s.l with gentle slopes from North to South and South to North of the site forming a shallow valley near the middle of the site. According to the geotechnical investigation indicates that the soil profile has some varying characteristics from the top surface to lower layers of the soil to a depth of 9.0 meters and therefore based on allowable bearing capacity specified at different depths, shallow foundation may be suitable. Generally, the geotechnical study has affirmed that the site is suitable for construction of the proposed facilities at MUST Mbeya Campus. However, it is recommended to avoid locating the foundations on pumice materials as the soil may deform by particle crushing. Moreover, it is recommended to determine deformation settlement beneath the proposed foundations to ensure them being within acceptable limits. This may be achieved by performing SPT and sampling at selected points followed by laboratory testing.

3.2.6. Geology

The quarter degree sheet of Mbeya (Geological Survey Department, 1958) suggests that the geology of MUST and surrounding areas consists of Karoo sediments that rest unconformably on the quartz-magnetite gneisses rocks that exist. These sediments are purple to white sandstones with minor siltstones. The sandstone is said to be comparatively soft and is associated with some mudstone.

The sediments are uncomfortably overlain by pebble beds, gravels, pumice and tuffs which contain much material from Rungwe volcanic province. Wide spread tuffs are associated with the lavas in the trachyte and phonolite range.

3.2.7. Soil Erosion Potential

Soil erosion potential is an estimate of the quantity of soil that could be removed from construction site due to erosion and transportation by unconcentrated surface water flow. This will leave large parts of construction area as a bare land and thus increase the potential of soil erosion by different agents such as wind and surface runoff. However, soil erosion will also be accelerated with the topographical condition of the proposed project area which is gentle slope. The construction of the proposed buildings shall increase storm water volume. It is probable that the slopes and the erosion will continue to grow, and multiple rill erosions may merge into one very wide valley which will hamper the other land development activities at the campus. This implies that the effective soil conservation measures and proper storm water management methods are needed during project implementation.

3.2.8. Hydrological and Hydrogeology of MUST Mbeya Campus

Mbeya City Council forms the major catchment area of the two main rivers; Ruaha and Songwe which end up in Indian Ocean and Lake Rukwa respectively. Both rise from the central Plain and Highlands of the city supplemented with Mbeya and Makete escarpments. The main streams which pour water into River Ruaha are Kimani and Chimala while that of River Songwe is Minitta stream.

At site there are no any water sources or stream which may be impacted by the proposed development. There are also no signs surface water bodies to indicate presence of ground-surface water interaction. Ground water observation was made during pitting and water was not encountered at either open pit from ground surface. The proposed establishment will utilize available tap water pipeline nearby the site. Hydrology and hydrogeology condition will help in determine nature of building material to be used and nature of foundation. The construction of the building structures at the campus will contribute to impervious surfaces leading to higher generation of surface runoff that need more attention in their management.

3.2.9. Ambient Air Quality

The assessment of ambient air quality at the proposed site location was done using a portable desktop gas analyser type KANE900 Plus. The gas analyzer recorded the air composition characteristics by establishing the proportions of oxygen (O_2) [%], carbon monoxide (CO) [mg/nm^3], nitrogen oxide (NO) [mg/nm3], nitrogen oxides (NOx) [mg/nm^3], sulphur dioxide (SO_2) [mg/nm^3], carbon dioxide (CO_2) [%], and ambient temperature [°C]. Furthermore, a portable gas detector type GMI VISA model 66369BENX was utilized to detect the presence of hydrogen sulfide gas (H_2S). Four air samples were averaged to establish the characteristic air quality per sampling point.

The proposed site had an average oxygen level of 20.80% and average temperature level was 22°C. On the other hand, air gaseous contaminants of carbon monoxide (CO), carbon dioxide (CO_2), sulphur dioxide (SO_2), and hydrogen sulphide (H_2S) were not detected whereas the concentration of nitrogen oxides (NO_x) was scanty. With reference to Tanzania's Environmental Management (Air Quality Standards) Regulations (2007) the observed air quality at the proposed project site is within acceptable level (Table 3.2).

As indicated, most of the measured parameters were below the standards and detection levels. However, for the concentration values below the detection levels does not necessarily indicate the measured gases are absent, but it rather indicates that the levels present (if any) might be below the lowest resolution of the measuring device. On the other hand, zero reading results indicate that the measured parameters are below the pollution limit/thresholds.

The proposed project may cause the increase in concentration of these gases through its fuel combustion engines for power generators or heavy equipment. Hence a proponent is emphasized to put more efforts to mitigate the impact.

3.2.10. Noise Levels Measured at Onsite and Offsite Identified Stations

Table 3.2: Noise Levels Recorded in dB(A)

Point No.		GPS Readings	Reading 1	Reading 2	Reading 3	MEAN	TBS-MAX. NOISE LEVEL Day time(dBA)	WHO Day time (dBA)
		(a) Noise levels recorded at Onsite station in dB(A)						
1		545652.16m E; 011264.16m S	37.8	39.8	33.8	39.13	60	55
2		545804.77m E; 9011193.35m S	39.6	40.6	38.4	39.53	60	55
3		545862.79m E; 9011199.43m S	44.7	36.4	30.7	40.27	60	55
4		545988.07m E; 9011263.78m S	30.9	48.9	46.9	45.23	60	55
5		546079.65m E; 9011232.96m S	32.2	36.8	42.3	55	60	55
		Mean Noise levels at onsite receptors in dB(A)				**40.39**	**60**	**55**
		(b) Noise levels recorded at offsite receptor in dB(A)						
1		546232.54m E; 9011417.06m S	33.8	36.5	34.3	34.9	60	55
2		546032.77m E; 9011357.41m S	34.2	33.7	35.6	34.5	60	55
3		545742.19m E; 9011457.31m S	33.4	35.3	33	33.9	60	55
4		545610.58m E; 9011426.19m S	33	36.1	31.7	33.6	60	55
5		545453.30m E; 9011473.63m S	32.6	35.3	30.4	32.8	60	55
		Mean Noise level for offsite receptors in dB(A)				**33.94**	**60**	**55**

Source: Field measurements, April 2023

3.2.11. Dust – Total Suspended Particulates (TSP)

Dust levels were assessed using the Casella Micro dust Pro particulate monitor model 176000A. 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 (1µg/m^3). The Micro dust Pro measures particulate concentrations using a near forward angle light scattering technique. Infrared light of 880nm 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 metres above the ground.

Table 3.3: The Dust Levels Recorded at Onsite Stations in Mg/M^3

Point No.	GPS Readings	Reading 1	Reading 2	Reading 3	Mean	TBS PM10 Limit µg/Nm3	WHO PM 10 Limit µg/Nm3
(a) Dust levels recorded onsite as particulate matter in terms of PM_{10}							
1	545652.16 m E; 9011264.16 m S	0.041	0.054	0.003	0.033	0.1	0.1
2	545804.77 m E; 9011193.35 m S	0.036	0.097	0.019	0.051		
3	545862.79 m E; 9011199.43 m S	0.101	0.001	0.013	0.038		
4	545988.07 m E; 9011263.78 m S	0.017	0.037	0.053	0.036		
5	546079.65 m E; 9011232.96 m S	0.058	0.012	0.045	0.038		
Mean dust level in mg/m^3					**0.039**	**0.1**	**0.1**
Dust levels recorded offsite as particulate matter in terms of PM_{10}							
1	546232.54 m E; 9011417.06 m S	0.039	0.034	0.012	0.028	0.1	0.1
2	546032.77 m E; 9011357.41 m S	0.034	0.084	0.021	0.046		
3	545742.19 m E; 9011457.31 m S	0.098	0.004	0.024	0.042		
4	545610.58 m E; 9011426.19 m S	0.023	0.033	0.043	0.033		
5	545453.30 m E; 9011473.63 m S	0.048	0.018	0.039	0.035		
Mean dust level in mg/m^3					**0.037**	**0.1**	**0.1**

Source: Field measurements, April 2023

The survey findings on the average particulates (dust) level along the proposed site showed that the dust particulates were below the threshold value set by the World Health Organization (0.23 mg/m^3) of PM_{10} (Table 3.3).

The earthworks related to construction of project will generate dust which is not only associated with nuisance but also a health problem therefore it is important that the proponent invests in efforts not to cause an increase in dust into the environment. Also, the proposed project has a potential to increase noise levels due to use of construction equipment and heavy machines. During operation phase, noise levels will increase due to use of generator during power cut-off. If not well controlled, high noises can cause various health impacts to workers and neighbours such as hearing problems.

3.2.12. Ground Vibration

XTECH SDL-800 vibration meter datalogger was utilized to quantify the ground vibration at the proposed sites. With a resolution of 0.1 m/s^2, accuracy of ±5%, acceleration of 200 m/s^2, the datalogger has a wide frequency range of 10 Hz to 1 kHz for capturing almost all possible vibrations for workplace assessments. Four vibration readings were taken from each of the assessed point.

3.2.13. Ground Vibration Level

After capturing the ground vibration level to the individual assessed locations, the exposure action value (EAV) and exposure limit value (ELV) were computed based on the assumption of 2 hours duration of exposure to the vibration per day.

The findings whose detail is presented in Table 8 show that with the exception to the locations close the access road, no vibration value was detected to the remaining locations. However, the detected vibration was still below the Exposure Action Value (EAV) and Exposure Limit Value (ELV) (Table 3.4).

Table 3.4: Ground Vibration Measured as Peak Particle Velocity (PPV) in Millimeters Per Second

POINT NO.	GPS Readings	Measured Vibration Level, m/s^2						
		Reading 1	Reading 2	Reading 3	Reading 4	MEAN	TBS tolerance limit mm/s	WHO Mm/s
(a) Ground vibrations in mm/s PPV at onsite measured station								
1	545652.16m E; 9011264.16m S	0.4	0.4	0.4	0.3	0.38	5	3 -10**
2	545804.77m E; 9011193.35m S	0.2	0.6	0.4	0.2	0.35		
3	545862.79m E; 9011199.43m S	0.4	0.5	0.5	0.4	0.45		
4	545988.07m E; 9011263.78m S	0.4	0.5	0.4	0.3	0.40		
5	546079.65m E; 9011232.96m S	0.4	0.4	0.4	0.3	0.38		
Mean Vibration Level						**0.06**		
(b) **Ground vibrations measured in mm/s PPV at offsite measured station**								
1	546232.54m E; 9011417.06m S	0.3	0.4	0.4	0.3	0.35	5	3 -10**
2	546032.77m E; 9011357.41m S	0.3	0.5	0.3	0.3	0.35		
3	545742.19m E; 9011457.31m S	0.4	0.4	0.4	0.3	0.38		
4	545610.58m E; 9011426.19m S	0.4	0.4	0.5	0.3	0.4		
5	545453.30m E; 9011473.63m S	0.4	0.5	0.4	0.3	0.4		
Mean Vibration Level						**0.375**		

Source: Field Measurement, April 2023

EAV = Exposure Action Value (0.5 m/s^2)

ELV = Exposure Limit Value (1.15 m/s^2)

* Computed based on 2 hours duration of exposure to vibration per day Control of Vibration at Work Regulations 2005, No. 1093 (UK.)

** Standard DIN 4150-3 values

It can be concluded that, the area has no impact on vibrations to nearby local communities around the proposed project site. Therefore, some efforts should be directed to maintain these lowest values during constructions and operations activities of the proposed project.

3.2.14. Potential Natural Disasters Risks

The proposed project is at risk of climate change and climate variability risks. The rainfall trends at Mbeya City where the project is going to be implemented has been erratic for the past decades leading to food insecurity and loss of natural springs. The proposed project shall attract more people in the project area which may compromise water and food availability. Additionally, the possibility of flooding at the project site is reduced by the topographical nature at the area which is gentle slope.

3.3. Biological Features

3.3.1. Fauna

The project site is a modified habitat due to anthropogenic activities especially cultivation. However, during site visit, various fauna species were identified including small mammals (*Mus musculus*), birds (*Pycnonotus barbatus, Lagonosticta rubricate, Passer domesticus, Corvus albus*) reptiles (*Agama agama, Naja nigricollis, Chamelion species) and arthropods (Apis mellifera, Pedinini Platynotina, Aeoloplides turnbulli, Phlibostroma quadrimaculata, Beetle species*). All identified fauna has been assessed for The IUCN Red list of Threated Species and listed as Least Concerned "LC". Therefore, the proposed project site is not one of the sites forming biodiversity hotspots in Tanzania.

3.3.2. Flora

Floristically, the site found with both native and exotic species. The identified native species were *Vangueria infausta, Cynodon dactylon, Desmodium intortum, Sesbania sesban, Bothriochloa barbinodis*. The exotic species include *Acacia farnesiana and Eucalyptus camaldulensis Dehnh*. Thus, there was no identified specie with significance conservation status (i.e. threated or endangered as per IUCN guidelines/CITES List) in the area.

3.4. Socio-Economic and Cultural Conditions

The socio-economic survey documented a number of activities in the area for people and communities living around. The main economic activities of the residents of Mbeya City Council are in the agriculture sector as well as well in the formal and informal employment sectors. According to 2002 Census results main occupation carried out by City residents are;

(i) Agriculture and livestock keeping which employs 33.3% of the population.
(ii) 43.4% of the population is estimated to engage themselves in informal and petty trades /small business.
(iii) 21% are employees, 1.4% are contributing family workers and 0.9% in the rest of categories. The estimated per capital income is TZS 675,047/= (Mbeya City Council Socio-economic profile, 2015).

3.4.1. Demography

As per the National Population Census of 2012, Iyunga Ward had 15,026 people, with 7,188 (47.8%) males and 7,838 (52.2%) females, population density of 1,326 per kilometre square

and annual population change of 4.2%. The expected increase in the number of people at the area will increase pressure on the available social services and change the lives of the people of Iyunga Ward and the surrounding communities. The population of Iyunga Ward is expected to double in the next few years as a result of additional construction of facilities at MUST-Mbeya Campus. During construction, the project is expecting to employ more than 150 people from outside Iyunga Ward. Therefore, the Ward will be having more people than before. The change in population level due to influx of workers and labourers will contribute to the new market opportunities for small, middle and big business persons. This will increase money circulation at the area leading to high income to the local suppliers and service providers.

3.4.2. Education

Mbeya City Council has 83 Primary school, 74 are owned by the Council and 9 are privately owned with a total number of 3,290 pupils (1,671 boys and 1,619 girls). Council schools have 66,871 pupils of which 32,506 are boys and 34,365 are girls. All schools have pre-primary classrooms with a total of 5,344 pupils being 2,721 boys and 2,643 girls. Among the schools, three are special schools with 214 disabled pupils.

Mbeya City Council has 51 Secondary Schools of which, 21 are privately owned and 30 are Government Schools. Among the Government schools 27 are built by the community efforts supported by the city council. Mbeya City Council has illiteracy rate 3.8% of the adult population. Hence adult education is an area that the Council has accorded a high priority.

However, the MUST-Mbeya Campus has the potential to stimulate the development of existing educational facilities in Iyunga Ward as well as knowledge dissemination to the surrounding community. Residents in the project area and surrounding communities do not have sufficient education facilities. In view of this, the influx of people in the project area will increase pressure on already limited education institutions and may without the taking of steps to alleviate this place a heavy additional burden on the existing service delivery systems.

3.4.3. Health Services

According to Mbeya City Strategic Plan 2019/20-2023/24, the city council has 19 Government Health Facilities, 2 hospitals, 4 Health Centres and 13 Dispensaries. Among the dispensaries, three are located in Iyunga Ward. Major problems faced by Health sector are inadequate number of qualified medical personnel, insufficient drug supply and medical equipment from MSD. The City Council is expecting to inaugurate its City Hospital. The major top ten (10) endemic diseases in the city are; acute respiratory infection, Malaria, sexually transmitted diseases, Diarrheal diseases, pneumonia, skin infection, intestinal worm infestations, minor injuries and eye infections. In ensuring that the health service becomes accessible and available to majority of people, the Council is implementing the Health Sector Development Programme by improving infrastructure to its old health facilities and constructing new facilities where not available.

3.4.4. Gender Based Violence (GBV) in Mbeya City

The intersection between gender-based violence and HIV infection problems is multi-dimensional and complex. For example; coerced sex and other forms of sexual violence resulting in genital trauma may directly increase HIV exposure and transmission. While exposure to emotional abuse has been found to be associated with faster decline in markers of cell immunity. GBV and HV share common root causes grounded in power inequalities, cultural norms, and gender inequalities. Female in relationships often are less likely to be able to negotiate the frequency or circumstances of sex, thus exacerbating their HIV risk. Violence or the fear of violence, particularly in the form of intimate partner violence has been shown to be a barrier to HIV prevention, care and treatment services, and adherence to treatment regimes, thus limiting women access to life-saving treatment (WHO, 2004).

The establishment of the MUST-Mbeya Campus will be at high-risk environment for GBV affecting community members, workers and service users. GBV will intensify within local communities due to influx of male workers outside the area. Such workers who often come without their families and have large disposable incomes relative to the local community, and can pose a risk in terms of sexual harassment, violence and exploitative transactional relationships. These risks will be higher when workers come into close contact with the local community. The proponent will address the gender-based violence to the construction project in order to improve workers' physical and emotional wellbeing and strengthens occupational health and safety also builds relationships and social license to operate in communities.

3.4.5. Community Safety and Security

The implementation of the project may positively/negatively impact the community. Positively includes the provision of education, community HIV/AIDs training, safety and environmental conservations trainings, improved health services at the dispensaries and health centres in the vicinity of the project.

Negatively the host community is likely to be affected directly/indirectly with the dust from the proponent operations, noise and vibrations. The project construction contractors may come into contact with the nearby villages where by social sexual relations may arise. It should be borne in mind that individual characteristic differs from one person to another and may be affected by the existing environmental conditions and community around. It should be borne in mind that Mbeya Region is associated with immigrants from neighbouring countries of Zambia and Malawi hence HIV/AIDs spread is inevitable. Awareness to both workers and the hosting community is essential to avoid unsafe sexual intercourses.

Furthermore, the public is likely to be involved in hazards associated with during construction of proposed buildings. Sources of hazards include road accidents, public-company conflicts, bribes, and sabotages, movements of vehicles, transportation of materials, and transportation of

workers to and from the project site. The potential hazards include vehicular-vehicular conflicts, vehicular-pedestrian conflicts, over speeding on the public roads.

3.4.6. Transportation Network

Mbeya City Council Road network has a total of 559.2kilometers, whereby Iyunga division covers the longest road network with 359.7 kilometres. District/Urban roads accounts for the longest road network of 277.85 kilometres (49.7 percent) followed by feeder roads with 236.7 kilometres equivalent to 42.3 percent and trunk roads with 44.6 kilometres (8.0 percent). Also, out of 559.2 kilometres in the City Council, 44.8 percent of the road network is earth road, 39.9 is ravel and 15.3 is tarmac. Existence of longest earth road network in the council indicates limitations of passability during the rainy seasons. Road network management is under both Mbeya City Council and Tanzania Roads Agency (TANROADS).

These road network generally forms the most basic level of transportation infrastructure within the council and links between one area to others and both within and beyond the boundaries. The quality road network is essential for improving connectivity of remoteness areas where can facilitates more opportunities and services without difficulties. MUST-Mbeya Campus is assessed through TANZAM Road. The road is paved and has traffic separation for motorized and non-motorized traffic. The existence of quality and passable roads will simply transportation of materials at site during construction as well as transport of vehicles and pedestrians to and from the Campus during operation phase.

3.4.7. Water Supply

Water supply services in Mbeya City Council are delivered by the Mbeya Urban Water Supply and Sewerage Authority (MBEYAUWSA). The City Council has responsibility of delivering water services to the peripheral wards which are served to a small extent or not served by the MBEYAUWSA through the National Rural Water Supply and Sanitation Programme (NRWSSP) under the Water Sector Development Programme (WSDP). The programme has been started implemented in the peripheral wards of the City namely Iganjo, Mwansanga and Tembela in the financial year of 2007/08 and it serves at least 20,000 people. The water supplied by both MBEYAUWSA and City is abstracted from ten natural sources, with a quality standard of 90% according to Tanzanian water standards. Currently, MBEYAUWSA supplies 32,000 cubic meters of water per day to the city while the actual demand is 35,000 cubic meters of water per day. The MBEYAUWSA has a sewerage system network with a capacity to serve 90,000 people although up to now only 25.4% of this population has been connected with this network (Tanzania Strategic Cities Project- Additional Financing, 2015–2017). The site will be connected to MBEYAUWSA water supply system within the university which will be used during construction and operation.

3.4.8. Power

Tanzania electric supply company (TANESCO) is responsible for provision of electricity for industries and domestic use. Mbeya region gets most of its electricity from national Grid - transmitted from Kidatu and Mtera Power Plants (220kV Transmission lines). Some electricity

power comes from Kiwira Coal Mine-which is able to produce about 3MW, and some power is imported from Zambia for use in one coffee mill (Mbeya City Council Socio-economic profile, 2015). Other sources of energy include; thermal, coal, fire wood, charcoal, compressed natural gas (CNG), petroleum oil products and to a negligible extent Solar and biogas. The proposed project will be connected to power supply from TANESCO. However, for reducing any disturbance that may occur due to power cutoff from TANESCO, there will be a 450Kva standby generator at the site to provide power supply.

Table 3.5: The Project Implementation Unit (PIU) and the role of each.

S/N	Titles	Roles
1	**Project Coordinator**	i. Responsible for the overall management of Project activities and compliance with its objectives; ii. Determine HEET project resource requirements in conjunction with MoEST; iii. Define the project's governance framework (resource management, monitoring and control, quality and risk management, stakeholder engagement and benefits management); iv. Maintain overall integrity and coherence of the project and develops and maintains the project environment to support sub-projects within the HEET project; v. Handle the day-to-day management of the programme and oversees the implementation of the project/ sub-project activities, monitoring delivery with the respect of predetermined quality, costs and time; vi. Ensure maximum efficiency in the allocation of resources and skills within the project; vii. Ensure that clear communication and good relationships are developed and maintained within the HEET project, with internal support units such as Human Resources, Procurement, Finance and Academic units and with MoEST;

		viii. Oversee preparations and implementation of project Annual Procurement Plans; ix. Provide timely and accurate project tracking, analysis of outputs, and reporting; x. Be responsible for project budgeting and resources planning and Oversee projects audits and issue of financial statements

CHAPTER FOUR

4. POLICY, LEGAL AND INSTITUTION FRAMEWORK

4.1. Introduction

In Tanzania there are several policies, legal and administrative structures that govern execution of environmental and social impact assessment (ESIAs). The administrative aspects require that all the new projects that are likely to affect the environment should have an environmental impact assessment done and submitted to the National Environment Management council (NEMC). The objective being to evaluate the environmental and social impacts and risks of the proposed development on the environment and to provide appropriate mitigation measures.

In constructing the proposed project in the area, various environmental and social issues may arise at any phase of the project development i.e. from site selection, mobilization to decommissioning phases. These issues need to be addressed so that the envisaged operations do not impair the integrity of the environment and ensure that they are in line with policies and legal regime operating in Tanzania as well as World Bank safeguards policies. This chapter list down relevant policies and legislations pertaining to the planning and implementation of the proposed project.

4.2. Relevant Policies

The following are relevant sectoral and cross–sectoral policies which provide directives on how the project should be operated in relation to concerned environmental and socio-economic settings. MUST will need to observe these policies in the course of designing and implementing the proposed project activities.

4.2.1. The National Environmental Policy (NEP) of 2021

Tanzania currently aims to achieve sustainable development through the rational and sustainable use of natural resources and to incorporate measures that safeguard the environment in any development activities. The environmental policy document seeks to provide the framework for making the fundamental changes that are needed to bring consideration of the environment into the mainstream of the decision-making processes in the country.

The National Environmental Policy, 2008 stresses that for a framework law to be effective, environmental standards and procedures have to be in place. For example, Chapter 4 of the policy (Instruments for Environmental; Policy), Section 61, states that "*As part of the (National Environmental Policy) strategy in the implementation of the National Environmental Guidelines, specific criteria for EIA conduct will be formulated".*

The National Environmental Policy as a national framework for environmental management emphasized that the housing development sector shall focus on the following environmental objectives:

(i) Ensuring sustainability, security and the equitable use of resources for meeting the basic needs of the present and future generations without degrading the environment or risking health or safety.

(ii) To prevent and control degradation of land, water, vegetation and air which constitute our life support system.
(iii) To conserve and enhance our natural and man-made heritage, including the biological diversity of the unique ecosystem of Tanzania.
(iv) To improve the condition and productivity of degraded areas including rural and urban settlement in order that all Tanzanians may live in safe, healthful, productive and aesthetically pleasing surroundings.
(v) To raise public awareness and understanding of the essential linkages between environment and development and to promote individual and community participation in the environmental action.
(vi) To promote international co-operation on the environment and expand our participation and contribution to relevant bilateral, sub-regional, regional, and global organizations and programs, including implementation of treaties.

Commitments: The NEP advocates the adoption of Environmental Impact Assessment (EIA) as a tool for screening development projects which are likely to cause adverse environmental impacts. The proponent has initiated a process in view of the policy objectives.

4.2.2. The National Education and Training Policy (2014)

Science, technology and innovation provides a good foundation for the envisaged economic transformation as implied in the National Science and Technology Policy, 1996. The National Education and Training Policy, 2014 highlight the need for quality education at all levels of the education supply chain. As part of the need to strengthen use of science and technology in national development and upon taking into account that the expansion of the middle level and higher education sectors of education supply chain has mainly involved non-science programmes, the government has, of recent, renewed the call for strengthening science teaching and learning education.

Commitments: Through establishment of the project, the proponent is in-line with this policy as it will improve the university capacity in providing quality education.

4.2.3. The National Research and Development Policy (2010)

Tanzania recognizes the power of science and technology in national development. The policies echo the need to embrace science and technology in development. Thus, in aspiring to achieve the objectives of these policy frameworks, government take cognizance of the weak links between research and development and continued low transition of youths into science and technology disciplines. Low transition intoscience and technology disciplines is partly as a result of weaknesses of science teaching foundation, which is partly attributed to inadequate numbers of qualified science teachers. The university will also addressee research issues and thus in line with the policy requirements.

Commitments: Proponent shall address research issues and thus in line with the policy requirements.

4.2.4. The Construction Industry Policy (2003)

Among the major objectives of the policy, which supports a sustainable building development sector, include the promotion and application of cost effective and innovative technologies and practices to support socio-economic development activities such as buildings, road-works, water supply, sanitation, shelter delivery and income generating activities and to ensure application of practices, technologies and products which are not harmful to either the environment or human health.

Commitments: This project is in-line with this policy as ultra-modern technology shall be used during construction and its operation.

4.2.5. The National Land Policy (2019)

The National Land Policy states that, "the overall aim of a National Land Policy is to promote and ensure a secure land tenure system, to encourage the optimal use of land resources, and to facilitate broad - based social and economic development without upsetting or endangering the ecological balance of the environment".

The National Land Policy advocates the protection of land resources from degradation for sustainable development. Among other things the policy requires that project development should take due consideration the land capability, ensures proper management of the land to prevent erosion, contamination and other forms of degradation. Important sections of the policy relevant to the Proponent are 2.4 (on use of land to promote social economic development), section 2.8 (on protection of land resources) and section 4 (on land tenure). Section 4.1.20 provides guidance on compensation for land acquired, and section 4.2.0 provides guidance on land administration.

Commitment: Proponent shall observe these provisions and ensure no land conflict to his neighbours and adhere to approved land use.

4.2.6. The National Gender Policy (2002)

The key objective of this policy is to provide guidelines that will ensure that gender sensitive plans and strategies are developed in all sectors and institutions. While the policy aims at establishing strategies to eradicate poverty, it puts emphasis on gender quality and equal opportunity of both men and women to participate in development undertakings and to value the role-played by each member of society.

Commitment: The proponent shall adopt the policy through the provision of equal opportunities to both men and women in construction and related activities.

4.2.7. The National Policy on HIV/AIDS (2001)

The National Policy on HIV/AIDS (2001) was formulated by the Government of Tanzania (GOT) under technical support from the World Health Organization Global Programme on AIDS (WHO-GPA) that led to the establishment of National HIV/AIDS Control Programme (NACP) under the Ministry of Health. However, due to its multi-sectoral nature there was a need to involve all sectors and community participation was found to be crucial. One of the

government strategic initiatives is to establish Tanzania Commission for AIDS (TACAIDS) under the Prime Minister's Office. The Commission provides leadership and coordination of national multi-sectoral response to the HIV/AIDS epidemic. The management functions, institutional and organizational arrangement of TACAIDS is outlined in the National Policy.
The policy identifies HIV/AIDS as a global disaster, hence requiring concerted and unprecedented initiative at national and global levels. It recognizes HIV/AIDS as an impediment to development in all sectors, in terms of social and economic development with serious and direct implication on social services and welfare. Thus, the policy recognizes the linkage between poverty and HIV/AIDS, as the poor section of the society are the most vulnerable.

The main policy objective is reflected well in the establishment of TACAIDS. However, the policy has also set a number of strategic objectives to deal with specific HIV/AIDS problems:

(i) Prevention of transmission of HIV/AIDS;
(ii) HIV Testing;
(iii) Care for People Living with HIV/AIDS (PLHAS);
(iv) Enhance Sectoral roles through participation and financial support;
(v) Promote and participate in research on HIV/AIDS-including dissemination of scientific information and development of HIV vaccine;
(vi) Creating a legal framework through enactment of laws on HIV/AIDS-governing ethical issues and legal status of HIV/AIDS affected families;

Individuals will also be responsible for protecting themselves and others contracting infection through unprotected sexual intercourse and unsterilized piercing objects. The community requires accurate information on how to protect family members from further transmission and spread of HIV/AIDS.

Commitment: The proponent shall observe this policy by introducing awareness creation programmed and sensitization to protect workers and communities around the project area against HIV/AIDS both during the project establishment phases.

4.2.8. The National Health Policy, 2008

The National Health Policy is aimed at providing guidance regarding improvement and sustainability of the health status of all people by reducing disability, mobility and morbidity, improving nutritional status and raising life expectancy. The objectives of the policy among others include reduction of the burden of disease, maternal and infant mortality, and increase life expectancy through the provisions of adequate and equitable services. Furthermore, the policy aims at facilitating the promotion of environmental health and sanitation, adequate nutrition, control of communicable diseases and treatment of common conditions. The policy also emphasises environmental cleanliness, monitoring of food and water quality, and safety achieved through collaboration with other stakeholders.

Commitment: The proponent will ensure that his operations adhere to the National Healthy Policy as the student population increases.

4.2.9. The National Water Policy 2002

The National Water policy was formulated to provide a comprehensive framework for sustainable development and management of water resources in Tanzania. It aims at ensuring that beneficiaries participate fully in planning, construction, operation, maintenance and management of community based domestic water supply schemes. It seeks to address cross-sectoral interests in water, watershed management and integrated and participatory approaches for water resources planning, development and management. Additionally, it lays a foundation for sustainable development and management of water resources in the Tanzania.

Commitment: Thus, the execution of the proposed project will abide to the provision under this policy and its associated regulations to avoid in any way the deterioration of water quality for both surface and underground resources for the benefit of the community by putting in place good sanitary facility.

4.2.10. Mineral Policy (2009)

The Mineral Policy of 2009 aims at strengthening integration of mineral sector with other sectors of the economy; improving economic environment for investment. Maximizing benefit from mining; improving the legal environment; strengthening capacity for administration of the mineral sectors; developing small scale miners; promoting and facilitating value addition to minerals; and strengthening environmental management. The National Mineral Policy also addresses that the mining activities that should be undertaken in a sustainable manner. Reclamation of lands after mining activities is recommended.

Commitment: The proponent will use minerals classified as building materials which include stone aggregates and sand. This will promote economic growth but will also ensure that the extraction of construction materials secured in a manner that do not environmentally contravene the policy provisions.

4.2.11. The Energy Policy (2015)

The policy outlines measures to adopt clean technology and minimize energy losses. The policy states that energy is a prerequisite for the proper function of nearly all sectors of the economy. It is an essential service whose availability and quality can determine the success or failure of development endeavours. The policy seeks to promote energy efficiency in all economic sectors.

Commitment: MUST will promote the objectives of this policy from design perspective of the building to minimize energy uses. Further shall explore the use of clean energy during the project implementation.

4.2.12. The Urban Planning and Space Standards Policy 2012

The policy provides guidance for continuing delivery of a high-quality pedestrian and other people friendly public realm within the city centers to support the economic, social, cultural and environmental attractiveness of the city centers to businesses, residents and visitors. The policy explains more as the management of space is a key foundation of the asset management strategy.

Also, the provision of appropriate space is becoming even more important as institutions increasingly competing in urban areas.

Commitment: MUST will plan for proper utilization of project area during its implementation.

4.2.13. The National Employment Policy (2008)

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

Commitment: The proponent and contractor shall promote this policy by employing many Tanzania of relevant qualifications with priority to the community around and special groups as stated by the policy especially during development phase.

4.2.14. The National Women and Gender Development Policy (2000)

This policy aims to improve opportunities for women and men to play their full roles in society, recognizing specific gender requirements. The policy aims to minimize shortcomings related to the limited participation of women in most economic development activities. It focuses on using available resources to increase incomes, eradicate poverty and improve living standards. The policy also recognizes and emphasizes creating awareness of how environmental degradation increases poor women's burden.

Commitment: This project will respond to the policy by ensuring equal opportunities in employment during development and operation phases.

4.3. Legal Framework

In addition to the above policies, there are a number of legal and regulatory frameworks that the proposed project must comply with and which this study has taken into consideration. The Environmental Management Act (No. 20), 2004 is the principal legislation governing all environmental management issues in the country. Within each sector, there are sectoral legislations that deal with specific issues pertaining to the environment. Some of the relevant legislation and regulations that are relevant in the management of the environment include: -

4.3.1. The Environmental Management Act, Cap. 191

The Environmental Management Act (2004) introduces a concept of right of Tanzanians to clean, safe and healthy environment and right of Tanzanians to access various segment of environment for recreational, educational, health, spiritual, cultural and economic purposes (Section 4 (1) and (2)). The Act imposes an obligation on developers to: -

(i) Comply with license conditions including the EIA certificate (S.201). The act requires the developer to conduct an EIA prior to the commencement of the project to determine

whether the project may/or is likely to have, or will have a significant impact on the environment.

(ii) As land user and occupier to protect, improve and nourish the land and using it in an environmentally sustainable manner, (S. 72)

(iii) Abstain from discharging any hazardous substances, chemicals, oils or their mixture into waters or into any segment of the environment (S.110)

(iv) Comply with environmental quality standards (S.141)

(v) Control, manage and dispose in a sound manner waste including litter, liquid, gaseous and hazardous wastes (Part IX).

Commitment: By conducting this study, the proponent complies with the requirement of the Act and will further comply to various sections noted above through this report and eventual its implementation.

4.3.2. The Land Act, Cap. 113 R.E., 2019

These laws declare all land in Tanzania to be "Public land" to be held by the state for public purposes. The Acts empower the President of the United Republic of Tanzania, to revoke the "Right of Occupancy" of any landholder for the "public/national interest" should the need arise. The laws also declare the value attached to land. The Act seeks to control the land use and clarify issues pertaining to ownership of land and land-based resources, transactions on land and land administration. The law provides for technical procedures for preparing land use plans, detailed schemes and urban development conditions in conformity with land use plan and schemes. The LGA has the power to impose conditions on the development of any area according to the land-use planning approved by the Minister.

Commitment: This project conforms to this law because it has followed all development conditions provided.

4.3.3. The Urban Planning Act (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. Under Section 3, among others the law seeks to improve level of the provision of infrastructure and social services for sustainable human settlement development. Therefore, the proposed building development is in line with the objectives of this law.

Section 58 of the Urban Planning Act provides for protection of buildings or group of buildings of special architectural or historic interest. The law states "The planning authority may compile a list of areas, buildings or group of buildings of special architectural or historic interest and may amend any list so compiled, such areas may include; buildings, group of buildings, areas of unique biodiversity; and rare species of trees and special trees". Section 59 gives powers to the planning authority to grant permission for demolition of such buildings or otherwise powers to restrain any proposed demolition.

Commitment: This project is in line with this law as the proponent buildings shall be constructed at the area where no relocation of people is needed and also there are no buildings of special architectural or historic interest.

4.3.4. The Land Use Planning Act No. 6, 2007

The Act provides procedures for: preparation; administration and enforcement of the Land Use Plans to facilitate an orderly management of land use. It empowers land occupiers and users to make better and more productive use of lands, to enhance security and equity in accessing land and its resources.

Commitments: The project site is designed educational purpose only and proponent shall not use otherwise. The proponent shall abide to this Act by complying with all legal requirement as directed by Mbeya City Council plan. The proponent will also make sure that the project adhered to sustainable land use practices by protecting the environment from pollution degradation and destruction in order to attain sustainable development

4.3.5. The Occupational Health and Safety Act No.5 of 2003

The occupation health and safety Act no.5, 2003 section 73-76, is an act for health and safety different from the regulations provided This Act provide for the protection of human health from occupational hazards. It requires the employer to ensure the safety of workers by providing gear at work place. It specifically demands: the provision of regular medical examination of employees, safe means of access and safe working place; prevention of fire; supply of clean and safe water to workers; sanitary convenience; washing facilities; and first aid facility.

Further the commitments of proponent to provision of PPE, warning signs are articulated hereunder with relevant to the occupation health and safety act no 5, 2003 section 62 which states that in any factory or workplace where workers are employed in any process involving exposure to any injurious or offensive substance or environment, effective protective equipment shall be provided and maintained by employer for the use of the persons employed.

(i) Penalties could be imposed to proponent in case of any injuries or death resulting from reluctantly use of PPE. Where any person is killed or suffers seriously body injury in consequence of the occupier or owner of the factory or workplace having contravene the provisions of this act or of any regulation rule or order made hereunder the proponent be without prejudice to any other penalty be liable to a fine and imprisonment

(ii) In any case of injury to health the occupier to health the occupier or owner shall not be reliable to a penalty under this section unless the injury was caused directly by the contravention.

(iii) Proponent shall not be reliable to any penalty under this section if a charge against him/her under this section if a charge against him under this Act in respect of the act or the injury occurred.

Commitments: Proponent shall observe the provision of this Act for the proposed project whereby protective gears during all times of working will be available and ensure protection of human health and safety against any associated risks while working.

4.3.6. The Employment and Labour Relations Act No. 6 of 2004

This Act guarantees fundamental Labour rights and establishes basic employment standards. The Act provides broad protection against discrimination. Specifically, the Act mandates that employer "promote equal opportunity in employment and strive to eliminate discrimination in any employment policy or practice." It prohibits direct or indirect discrimination by employers, trade unions and employers' associations on a number of grounds, including gender, pregnancy, marital status or family responsibility, disability, HIV/AIDS and age. Harassment of an employee on any of these grounds is equally prohibited. The Act also requires employers to take "positive steps" to guarantee women and men the right to a safe and healthy environment. The Act makes provisions for core labour rights; establishes basic employment standards, provides a framework for collective bargaining; and provides for the prevention and settlement of disputes.

Commitments: Proponent shall see to it that the Contractor adheres to employment standards as provided for by the law.

4.3.7. Engineers Registration Board (Amendment) Act of 2007

The Acts regulate the engineering practice in Tanzania by registering engineers and monitoring their conduct. The Board has responsibilities of regulating engineering activities and the conduct of engineers, engineering technicians and engineering consulting firms in Tanzania.

Commitments: Proponent shall ensure that all projects are registered by ERB and practicing professional own practicing license.

4.3.8. The Contractors Registration (Amendment) Act, 2008

The Contractors Registration Act requires contractors to be registered by the Contractors Board (CRB) before engaging in practice. It requires foreign contractors to be registered by the Board before gaining contracts in Tanzania. Also, the legislation provides powers to the Board to inspect any site for construction works, for the purpose of ensuring that the construction activities are being undertaken by registered contractors and the works comply with the governing regulation of the nation. In case a firm, company, organization, partnership or individual person undertakes construction activation legal action is taken against such acts. In addition to these, the Board ensures that all action is taken against such acts. In addition to these, the Board ensures that all constructions sites hoarded so as to adhere to occupational health and safety regulations.

Commitments: In compliance with the Act, the Proponent will hire a registered consultant firm.

4.3.9. The Architects and Quantity Surveyors Act (2010)

Similarly require architects and quantity surveyors (QS) to be registered with the Board before practicing. Foreign architects and QS should abide by the law.

4.3.10. The HIV and AIDS (Prevention and Control) Act of 2008

The law provides for public education and programmes on HIV and AIDS. Section 8(1) of the law states that "The Ministry (Health), health practitioners, workers in the public and private sectors and NGOs shall for the purpose of providing HIV and AIDS education to the public, disseminate information regarding HIV and AIDS to the public". Furthermore, Section 9 states that "Every employer in consultation with the Ministry (Health) shall establish and coordinate a workplace programme on HIV and AIDS for employees under his control and such programmes shall include provision of gender responsive HIV and AIDS education"

Commitments: The proponent will observe the provision of this Act by introducing awareness creation programme and sensitization to protect workers and communities around the project area against infection of HIV/AID.

4.3.11. The Local Government Law (Miscellaneous Amendment) Act, 2006

This act established the local governments and urban authorities with mandates to spearhead developments in districts and urban centres (for cities and municipalities) respectively. By this law, the authorities have mandates to formulate bylaws to enhance environmental management within their district/urban authorities.

Commitments: Proponent shall observe the bylaws set by Mbeya City Council.

4.3.12. The Public Health Act 2009

An Act provide for the promotion, preservation and maintenance of public health with the view to ensuring the provision of comprehensive, functional and sustainable public health services to the general public and to provide for other related matters. Section 66 of the Act state that: (1) A building or premises shall not be erected without first submitting the plans, sections and specifications of the building site for scrutiny on compliance with public health requirements and approval from the Authority. (2) A building or premises or its part or any structure shall not be occupied until a certificate of occupancy has been granted. (3) The provisions of subsections (1) and (2) shall not apply to the dwelling houses in the rural areas or houses erected in urban which have been recognized as such under the Squatter Upgrading Programme.

The Act creates obligations for the project proponent for this as follows:

(i) To keep premises free from breeding sites of mosquitoes (Section 30)
(ii) To maintain cleanliness and prevent nuisance (Section 55).
(iii) To manage solid and liquid wastes with the purpose of protecting public health (Sections 73-112).
(iv) To supply safe water and prevent any pollution and contamination (Section 121)

Commitment: Proponent shall observe the provisions of this Act in the execution of the proposed project by ensuring that the public shall not be affected.

4.3.13. The Fire and Rescue Services Act No. 14 of 2007

The Act provides for the better organization, administration, discipline, and operation of Fire and Rescue Force. The Act, Part II section 4 establishes a Fire brigade for the mainland

Tanzania (Fire and Rescue Force). Section 5 of the Act provides duties and Functions of the Force. Amongst the functions of the force is to raise public awareness on the prevention and fire services. The force is assigned by section 13 to provide and maintain or cause to be provide and maintained fire hydrants and other water installations as are necessary for securing the best practical use of the available water supply in case of the outbreak of fire. Provisions and maintenance of fire escapes is elaborated in section 22 in which subsection 1-3 go in details and gives requirements to be fulfilled for the safety of buildings.

Commitment: Proponent shall observe the provisions of this Act in the execution of the project by applying and obtaining a valid fire certificate. Also, proponent will ensure fire extinguishers are present in every section and other firefighting equipment like baskets full of dry sand are available for use in the event of firefighting. These plants and equipment will be serviced every 6 months for their proper functioning.

4.3.14. The Water Supply and Sanitation Act No. 5 of 2019

Part IV of the Act states obligations of water supply and sanitation authorities to provide water supply and sanitation services, indicates their functions, powers and duties. Consequently, it gives responsibilities for provision of adequate and reliable water supply and sanitation services in urban areas to Urban Water Supply and Sanitation Authorities (WSSA). With respect to their responsibilities to ensure adequate and reliable service provision, the Act gives power to WSSA to enter any land for the purpose of laying water pipe network and charge fees to facilitate financial obligation necessary for operation and maintenance of the water supply and sanitation networks.

Commitment: The proponent shall use clean to water from Mbeya Urban Water Supply and Sanitation Authority.

4.3.15. The Local Government (Urban Authorities) Act, Cap. 288 R.E 2009]

Tanzania is implementing the Local Government Reform Programme (which has instituted "Decentralization by Devolution". District and Urban councils have extensive powers under the two acts, both in governance aspects and in the management of natural resources and land in their respective jurisdictions. The administrative aspects of valuation and payment of compensation are assigned to local government authorities' and Regional administration.

Commitments: It is on the basis of this Act that, the proponent is determined to ensure continuous conservation of the project site while maintaining environmental and public health safety.

4.3.16. The Workmen's Compensation Act, Cap. 263 of 2008

The Act provides for compensation to employees for disablement of death caused by or resulting from injuries or diseases sustained or contracted in the cause of employment. It provides for adequate and equitable compensation for employees who suffer occupational injuries or contact occupational disease arising out of and in the course of their employment and in the case of death, for their dependents; rehabilitation of employees who have suffered occupational injuries or contracted occupational; framework for the effective, prompt and

empathetic consideration, settlement and payment of compensation benefits to employees and their dependents; establishment, control and administration of the workers compensation fund and the legal framework for contribution and payment from the fund; give effect to international obligations with respect to workers compensation; and Promote prevention of accidents and occupational diseases.

Commitments: The relevance of this Act to the proposed project is to put emphasis on workers compensation in case of injuries, death, diseases while working. It is therefore a responsibility of the Proponent to ensure that all requirements of this Act and working standards are followed for safe working environment and prevention of accidents and occupational and or related illnesses or diseases.

4.3.17. The Water Resource Management Act. 2009 (Act No. 11/ 2009)

The Water Resource Management Act 2009 is a new principal legislation dealing with the protection of water resources and control of water extraction for different uses. According to section 39 (1) of this act, owner or occupier of land on which any activity or process is or was performed or undertaken, or any other situation exists which causes has caused or is likely to cause pollution of a water source, shall take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.

This Act repeals the Water Utilisation Act of 1974 and its subsequent amendments. It provides right to water for domestic uses by any person from any surface water sources and rainwater without a permit as long as no works are constructed for the purpose. The Act indicates the need of a water use permit for any works for water abstractions or water abstraction for uses other than domestic ones. The Act further prohibits discharge of waste streams into any water body including rivers (e.g., small rivers within the project areas) without written permit from the water officer. The Act requires adherence to present environmental standards of receiving water bodies when legally discharging waste waters. TheContractor shall observe this legal provision throughout construction, operation and decommissioning phases.

Commitment: Proponent will connect the project to public sewage system and also ensure the provisions of this Act are observed.

4.3.18. The Roads Act No. 13 of 2007

The Roads Act governs the deviation, widening, construction or realignment of a road or access road, as well as describing the compensation details for people that need to be resettled as a result of these. Section 15 provides details on the power of the Minister for provision of consent for the new construction of such infrastructure. Section 16 provides details on the compensation for land and cut vegetation during road construction. Section 35 describes owner to be given power concerning the decision of creating an access road in line with laid conditions.

Section 39 and regulation 42 detail the prohibition of certain classes of traffic, and sets out maximum weight, speed and dimensions of vehicles. Section 40 provides the chance for appeal to the proponent if not given consent for the proposed access road construction. Furthermore, the Act provides for road safety through creating road signs and bumps to avoid any occurrence of accidents, and the authority that has jurisdiction for carrying out road undertakings.

Commitment: The proposed project will utilise the current public roads and therefore obliged to observe the requirement of this Act.

4.3.19. The Electricity Act No 10 of 2008

This Act provides for facilitation and regulation of generation, transmission, transformation, distribution, supply and use of electric energy, cross border trade in electricity and the planning and regulation of rural electrification.

Section 25 details the relevant Power Purchase Agreements concluded subsequent to the entry into force of this Act. Section 25 (2) A licensee may by rules made by the Authority conclude agreements for the purchase or sale of electricity. This section provides for (among others) agreements relating to electricity purchase and sale in the market determined by the authority, to be competitive Standardized Power Purchase Agreement and Tariff for small power projects. The primary power supply for the project will be the Tanzania Electricity Supply Businessman (TANESCO).

Commitment: Therefore, proponent shall adhere to the requirement of this Act in the process of the Electricity purchase from TANESCO.

4.3.20. The Persons with Disability Act, 2010

The basic principles of this Act are to respect for human dignity, individual's freedom to make their own choices and independence of persons with disabilities, non-discrimination, full and effective participation and inclusion of persons with disabilities in all aspects of society, equality of opportunity, accessibility, equality between men and women with disabilities and recognition of their rights and needs, and provide a basic standard of living and social protection.

Commitment: The project proponent will fulfil this legal requirement in all project phases, from design, construction and operation.

4.3.21. The Child Act, 2010

The legal framework for child labour in Tanzania is contained in the Law of the Child Act (Act No. 21, 2009). The Act sets the minimum age for admission of a child to employment at 14 (Sec. 77.2). It also contains a provision permitting light work for children who are at least 12, where light work is defined as work that is not likely to be harmful to the health or development of the child and does not affect the child's attendance at school or the capacity of the child to benefit from schoolwork (Sec.77.3). The Act prohibits the engagement of children and children below 18 in hazardous work, posing a danger to health, safety or morals and in "night work" taking place between 8 pm and 6 am (Sec. 82.2). The Law of the Child (Child Employment) Regulations (G.N. No. 196, 2012), which is used to implement the Law of the Child Act (Act No. 21, 2009), contains list of all hazardous activities in which a child shall not be allowed to work, even on a voluntary basis. Section 82 of the Act also protects children from sexual exploitation. A child shall be protected from sexual exploitation and use in prostitution, inducement or coercion to engage in sexual activity and exposure to obscene materials.

Commitment: This project will protect against child labour, especially during the construction period.

4.4. Relevant National Plans and Strategies

To guide national development more effectively and systematically, Tanzania has prepared many strategies aiming at operationalizing the various policies in key sectors. Some of the strategies that have a bearing on the proposed project are:

4.4.1. The Tanzania Development Vision 2025

The Tanzania Vision 2025 aims at achieving a high-quality livelihood for its people attain good governance through the rule of law and develop a strong and competitive economy. Specific targets include:

(i) A high-quality livelihood characterized by sustainable and shared growth (equity), and freedom from abject poverty in a democratic environment. Specifically, the Vision aims at: food self-sufficiency and security, universal primary education and extension of tertiary education, gender equality, universal access to primary health care, 75% reduction in infant and maternal mortality rates, universal access to safe water, increased life expectancy, absence of abject poverty, a well-educated and learning society.

(ii) Good governance and the rule of law moral and cultural uprightness, adherence to the rule of law, elimination of corruption.

(iii) A strong and competitive economy capable of producing sustainable growth and shared benefits a diversified and semi-industrialized economy, macro-economic stability, a growth rate of 8% per annum, adequate level of physical infrastructure, an active and competitive player in regional and global markets.

MUST is one of the important projects to enable Tanzania achieve its Development Vision objectives notably eradicating poverty. MUST project will contribute to the attainment of the 2025 Vision through provision of adequate skilled labor force for implementing various development plans.

4.4.2. Third National Five-Year Development Plan (FYDP III; 2021/22 – 2025/26)

The Plan is a continuation of Government's efforts in achieving the goals set in the National Development Vision 2025 enduring exertion to further improve the standard of living for all Tanzanians. The main objective of the Third Plan is to contribute to realization of the National Development Vision 2025 goals. These goals include Tanzania becoming a middle-income country status and continue with transformation of becoming an industrial country with a high human development or a high standard of living. Upon reaching its vision, which have the following attributes: peace, stability and unity; good governance; an educated and learning society; and a strong economy that can withstand competition and benefit many people. The FYDP III, therefore, will seek to enable the country to more effectively use her geographical opportunities and resources for production and economic growth, while, ensuring that the outcomes benefit all citizens in line with the Vision's goals of a high quality of life. FYDP III will continue to implement the projects and programmes aimed at opening up economic

opportunities, build an industrial economy, strengthen competitiveness in domestic, regional and global markets as well as strengthen human development including the education sector. The proposed project supports this development plan by increasing academic, research and innovation opportunities in various geographical areas of Tanzania including Mbeya City Council, Mbeya region where the proposed MUST project will be constructed.

4.4.3. The National Plan of Action to End Violence Against Women and Children (NPA-VAWC) 2017/18-2021/22

From a situation analysis of this plan, violence is a daily reality for large numbers of women and children in Tanzania. The NPA-VAWC recognizes that reducing violence has positive implications for inclusive growth and has ambitious targets that could positively impact the agency of women and girls. The plan aims to dramatically lower rates of teenage pregnancy, reduce the practice of female genital mutilation/cutting (FGM/C), and drastically reduce child marriage throughout the country. The plan incorporates strategies to help local authorities and police, service providers, and communities better provide prevention and response services that have the greatest potential for reducing violence against women and children. To put the plan in action, MUST should with relevant government officials, social welfare officers, religious leaders, and police officers during implementation of the proposed project to end existing Violence against Women and Children.

4.5. Relevant Regulations and Guidelines

4.5.1. The Environmental Management (EIA and Audit) (Amendment) Regulations of 2018

The Regulations have been promulgated to give effect to the provisions of the EMA Cap 191 Section 82 (1) and 230 (2) on how Environmental Impact Assessment shall be conducted.
Prior to the implementation of the project, the Proponent is required (R. 4) to submit a certificate of Environmental Impact Assessment to the licensing Authority. It is an offence under Regulation 60 to conduct project without EIA approval; failure to prepare and submit to NEMC project brief, EIS, Audit or make false statements in the documents. Any Authority is prohibited to issue license / permit without EIA authorization.

The Proponent is tasked with registration of project (Regulation 6, 7); while NEMC assign environmental assessment category to the project using set of screening criteria. Project may fall under List A of projects for which ESlA is mandatory or List B of projects requiring a Preliminary Environmental Assessment. Screening requires (Regulation 8) participation of relevant institutions or local government environmental management officer or regional secretariat. Regulation 12-17: are requirements for conduct of environmental assessment procedure and steps for undertaking EIA study. Specific requirements include: Scoping and TOR approved by NEMC to guide the EIA study; EIA conducted by registered experts; consideration of social, cultural and economic aspects /impacts of project; and provision of all opportunities for the public (any person who is likely to be affected or any interested party) to participate.

Regulation 18 & 19: Stipulate content and format of EIA reports and Environmental Impact Statement (EIS) including inclusion of a non-technical executive summary in English and Kiswahili languages. Regulation 22 & 28 sets requirements for review of EIA reports by various

stakeholders: NEMC / Cross-Sectoral Advisory Committee /relevant Ministries, institutions and general public using stipulated review criteria. Regulations 26 – 28 are provisions for public hearing when deemed necessary.

Minister Responsible for Environment is the only authority empowered to issuing of decision letter on EIS and EIA Certificate for approved registered projects. The regulations allow appeals to Environmental Appeals Tribunal on refusal to grant or transfer EIA certificate, and imposition of other conditions, fees and costs. Minister is empowered to delegate powers of approval of EIS (R. 65). (Part VIII) provides for access to EIS and Information - documents that are outputs of the EIA process are deemed to be public documents accessible to all. Procedures for undertaking Audit for existing development projects and for environmental monitoring and reporting are expounded under Parts X and XI respectively. The proponent shall take all precaution measures to ensure that the proposed project is carried out without harming environment and upon commencement of the business the proponent shall adhere to the provisions of this Act to protect the environment. In accordance to this Act, in case of any pollution as a result of development of the proposed project the proponent shall be responsible to pay for the said pollution.

Commitment: The proponent shall be bound by the above principles, other environmental and sustainable development principles and provisions of the Environmental Management Act 2004 at whole.

4.5.2. The Environmental Management (Hazardous Waste Control and Management) Regulations, 2021

The Act describes Classification of hazardous wastes in section 8. (1) Hazardous waste shall be classified in accordance with the criteria set out in the Third First Schedule on the basis of listed waste streams, constituents and other wastes to be controlled which are hazardous under Part I of the First Schedule, read with or combined with hazardous characteristics listed under Part II of the First Schedule. Labelling of wastes is important as stated in section 10 (1) that No person shall sell, offer for sale, use, pack or store wastes in a container or package, unless the container or packaging has label written in English or Swahili affixed onto it.

Regulations made under sections 110.128,133,135 and 230 of EMA to control all categories of hazardous waste and to the generation, stage, transportation, treatment and disposal and their movement into and out of mainland Tanzania. Any person generating handling or transporting hazardous waste or exercising jurisdiction under the regulation should be guided by principles of environmental and sustainable development; the precautionary principle; polluter pays principle and the producer extended responsibility (R.4). also, the owner or controller of a facility or premises which generates hazardous and toxic wastes are required to minimize the waste generation by through the cleaner's production principle, i.e. improvements of production process through conserving raw materials principle and energy, and monitoring the product cycle from beginning to end (R.5)

On hazardous waste management, every person living in Tanzania has a duty to safeguard the environment from adverse effects of hazardous waste and inform a relevant authority on any

activity and phenomenon resulting from hazardous waste that is likely to adversely affect environment human health (R.6)

Regulation 35 directs on electrical and electronic wastes that these wastes should be separated from other type of wastes and disposed separately into receptacles as prescribed by the council or local government and local government should ensure a person who handles these wastes are supplied with appropriate protective gears, trained in safe handling and equipped with waste handling equipment.

Commitments: During project implementation hazardous wastes container will be provided and labelled, also it is the duty of the proponent to make sure the ongoing activities shall abide to these regulations.

4.5.3. The Environmental management (Air quality standards) regulations 2007

This regulation sets baseline parameters on air quality and emissions based on a number of practical considerations and acceptable limits; enforces minimum air quality standards, directs proponents and operators of such developments as industries to keep abreast with environment from various sources of pollution.

Reg.5 (d) lists specific standards that regulate industrial activities, as prescribed by the NESC with consent on the minister responsible for environment reg. 7(1) calls upon any person in Tanzania to comply with air quality standards, furthermore, reg.8 (1) prohibits any person to emit/release any hazardous substance, chemical, gas or mixture containing gaseous and hazardous substance into the environment unless permitted under these regulations or other written law.

Reg, 21 highlights on the need of taking and analysing samples by the council and laboratories accredited or designated in accordance with the Act; and reg. 22(3) empowers the municipal environment management officer to issue compliance order to air quality standards. However, reg 25 Cleary confers environmental inspectors appointed or designated to exercise powers, thus, to comply with this regulation,

Commitment: Proponent shall have to undertake air quality monitoring so that incinerator operations do not produce pollutants beyond the given Tanzania limits.

4.5.4. The Environmental Management (water quality standards) Regulations, 2007

The regulation (regulations 16) requires any person undertaking any activity near water sources to consider safe distances of water supply systems from pollution sources. The8th schedule provides a list of those safe distances, regulation 19(1); empowers NEMC to issue permits for discharge of water polluting substances and designate such pollutants.
Sub-regulation 3, empowers LGAs environmental management officers to recommend to the council categories of human activities which they deem to be main polluting activities, regulation 34 directs local government authority to issue guidelines and standards on collection, transportation and disposal of sewage and sludge.

Commitment: Proponent shall observe these regulations by ensuring that waste is properly treated before disposal and that none of the hazardous wastes will be disposed into the environment to contaminate underground/surface water resources

4.5.5. The Environmental (Registration of Environmental Experts and Practicing certificate) Regulations of 2021

Regulations formulated under Section (Section 83) of EMA on undertaking of environmental assessments by individuals and firms registered /certified by Registrar (NEMC). Regulations 14-15 prohibit any person to conduct an environmental impact assessment, audit or related studies unless the person is certified /registered; otherwise, the Council shall not deliberate on such study, statement or audit or project brief. Qualifications of experts are stipulated and R. 24(2) allow registered person to use in any communication the title "Certified Environmental Assessor" or "Certified Environmental Auditor". Rs. 24-26 allow Firms registered under other laws to apply as consulting Firm of Environmental Experts comprised of a multi-disciplinary team. R. 22– 23 establish a Registrar of Environmental Experts at NEMC to maintain a Register.

Commitment: Therefore, this ESIA has been undertaken by PROF. ZACHARIA KATAMBARA as an Environmental registered expert by NEMC.

4.5.6. The Environmental Management (Solid Waste Management) Regulations of 2009

The Regulations requires the Proponent to:

(i) Use receptacles approved by the Council or local government authority;
(ii) Ensure that reusable receptacles are kept clean and maintained in good repair;
(iii) Ensure that each waste receptacle is used in a way which protects the contents from spillage, rain, storm water, birds, flies or other pests and vermin;
(iv) Not burn or cause to be burnt any solid waste at landfill or any other disposal site;
(v) Ensure that plastic materials are separated from non-plastic materials and deposited separately into receptacles as prescribed by local government with respect to recyclable plastic wastes that are stored outdoors ensure that they: are protected from contamination by any dirty materials or chemicals, are secured against and fire-fighting equipment shall be readily available, inform the fire-fighting department in advance of any storage of plastic wastes in a recycling facility; and plastic waste storage facilities shall be situated in areas easily accessed by fire fighting vehicles;
(vi) Not to litter in contravention with the Act and Regulations; and
(vii) Carry out environmental audit in accordance with the Environmental Impact Assessment and Audit Regulations, 2005.

Commitment: Proponent shall observe the provisions of this regulation in the execution of the proposed project by ensuring proper management of the solid waste by putting collection bin with labels for sorting and timely disposal.

4.5.7. The Environmental Management (Soil Quality Standard) Regulations, 2007

The Regulations requires proponent to comply among other things with soil quality standards that may be prescribed by the National Environmental Standards Committee. The Proponent shall not:

(i) Pollute the soil;
(ii) Discharge any hazardous substance, chemical, oil or mixture containing oil on any soils except in accordance with what is prescribed under these Regulations or any other written law;
(iii) Disobey to environmental inspectors; and
(iv) Violate guidelines or any standards made by local government authorities on collection, transportation and disposal of sewage and sludge.

Commitment: Proponent shall observe the provisions of this regulation in the execution of the proposed project by protecting the soil against any pollution.

4.5.8. Environmental Management (Air Quality Standards) Regulations of 2007

Focus areas of the Regulations include:

(i) *Hazardous substance management* - R8 prohibits the emission or release of unpermitted hazardous substances, chemicals and materials or gas or mixture into the environment;
(ii) *Permissible emission limits* for SOX, CO, black smoke and suspended particulate matters, NOX, O_3;
(iii) *Permissible quantity of emission* of SOX, CO, hydrocarbon (as total organic carbon), dust, NOX or lead;
(iv) *Permissible limits* of substances found in exhaust of motor vehicles;
(v) *Air pollutant emission permit* - owner or operator of main air polluting activity is demanded to apply for registration and obtain a permit issued by the NEMC;
(vi) *Compliance, protection and stop orders:* authorities and power vested in NEMC (environmental inspector) to issue;
(vii) Compliance order for entity bleaching these regulations or condition of a permit; o Protection order against activities likely to result in adverse effect on the air or to the environment or public health (R.23);
(viii) Stop order to any person where satisfied that further delays will occasion more serious harm to human health or living environment; and
(ix) Emergency prevention order for prevention of emission into the environment in an amount, concentration or manner that constitutes a risk to human health or environment.

Commitment: The proposed project is thus required to undertake periodic air quality sampling on construction and operations to check on the capacity of the project's compliance with emission limits.

4.5.9. The Environmental Management (Fees and Charges) Regulations, 2021

These Regulations may be cited as the Environmental Management (Fee and Charges) (Amendment) Regulations, 2021, and shall be read as one with the Environmental Management (Fee and Charges) Regulations, 2008 regarded as the Principal Regulations. These regulations were made under section 230 (2) (b) of the Environmental Management Act, 2004 (CAP) 191. The regulations apply in relation to an act or omission to which fees and charges are payable

under the Act. It requires that any person who wishes to perform any function related to the prevention, protection, promotion or conservation of environment or to carry on business related to –

(i) Environmental impact assessment, environmental audit or environmental monitoring;
(ii) Registration as environmental expert;
(iii) Environmental quality standards; or
(iv) Ozone depleting substances.

Hence shall be required to pay the fees prescribed in the Schedule to these Regulations. The fees of which will be collected by the council shall neither be refundable nor transferable.

Commitment: Proponent is aware of the regulations and will be answerable for the charges prescribed in these regulations.

4.5.10. The Urban Planning (Building) Regulations, 2018

The Urban Planning (Building) Regulations shall apply to all planning areas declared by the Minister under section 8 of the Act that means no person shall erect or begin to erect any building until he has:-The permit under sub regulation (i) shall be in Form 2 prescribed in the Fourth Schedule and shall be signed by a structural engineer who will check structural qualities and Registered Town Planner who will check use of land duly designated for that purpose by the planning authority under his hand and shall entitle the holder to erect the building in accordance with the approved plan and subject to all the conditions imposed by these Regulations.

Also, any subsequent modification or alteration that is proposed or necessary to be made in the approved plan shall be submitted to the Authority for approval in the same manner as the original plan and no such modification or alteration shall be made in the construction of the building until it has been approved by the Authority and the particulars thereof endorsed on the original building permit.

Commitment: Proponent shall comply with the regulation by acquiring the building permit from the authority before the commencement of the construction of the proposed buildings.

4.5.11. The Environmental Management (Quality Standards for Control of Noise and Vibration Pollution) Regulations (2015)

Formulated under Sections 140, 147 and 230 of EMA for the control of noise (loud, unreasonable, unnecessary on unusual) and vibration pollution that annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and of the environment. Focus areas include:

(i) *Noise management by* owner of machinery or occupier of facility or premises to control noise and to install sound level meters for the measurements and monitoring sound;
(ii) *Noise emission License issued by NEMC* Director General to owner or occupier of premises whose work or activity is likely to emit noise in excess of the permissible noise levels (Table 4.1 and Table 4.2);

(iii) *Compliance order, protection order or stop order* issued by NEMC or any other empowered authority when any condition of any license or permit has been breached;
(iv) Prevention orders and improvement notice issued by *Environmental inspector* to prevent noise and vibration pollution in an amount, concentration or manner that constitute a risk to human health or environment; and
(v) The minister may provide a reward to any person who will report an incident of incidental, concealment or inadvertent emission or noise pollution or excessive vibration.

Table 4.1: Maximum Permissible Noise Levels for General Environment

Facility	**Noise limits, dBA (Leg)**	
	Day(6.00am-10.00pm)	**Night(10.00pm -6.00am)**
Hospital, convalescence home, home for the aged, sanatorium and institutes of higher learning, conference rooms, public library, environmental or recreational sites	45	35
Residential building	50	35
Mixed residential with some commercial and entertainment)	55	45
Residential and Industry small scale production and commerce	60	50
Industrial area	70	60

Table 4.2: Maximum Permissible Noise Levels for Vehicles

Vehicles category	Maximum sound level in dBA
Passenger vehicle (nine seats)	78
Passenger vehicle (nine seats); maximum permissible mass ≥ 3.5 tones	
- Engine power of more than 150KW	80
-Engine power of less than 150KW	83
Passenger and goods vehicles –	
-Maximum permissible mass not exceeding 2T	79
-Maximum permissible mass exceeding 2T but not exceeding 3.5 T	80
Goods vehicles; maximum permissible mass exceeding 3.5T	
-Engine power of less than 75KW	81
-Engine power of not less than75KW but less than 150KW	83
-Engine power of not less than 150KW	84

At site, the generator shall be operated in case of power outrage. Apart from this, there is no other expected stationary noise emitting machines at the site considering that vehicles just pass by for neighbouring building. However, proponent comply with the provisions of these regulations by regularly maintaining the generator and air compressor and servicing its air conditions as appropriate and where applicable.

Commitment: The Management Plan for the Noise and vibration proposed as part of this EIA will be adhered to by proponent so that the related impacts are mitigated accordingly.

4.6. Relevant World Bank Environmental and Social Frameworks

4.6.1. Objective of the Environmental and Social Framework

The proposed project will be developed and implemented according to the requirements of the World Bank Environmental and Social Framework (ESF). The ESF sets out the World Bank's commitment to sustainable development. The ESF protects people and the environment from potential adverse impacts that could arise from Bank-financed projects and promotes sustainable development. The ESF enables the World Bank and Borrowers to better manage environmental and social risks of projects and to improve development outcomes. The ESF also

places more emphasis on building Borrower governments' own capacity to deal with environmental and social issues.

The ESF offers broad and systematic coverage of environmental and social risks. It makes important advances in areas such as climate change; labour standards; transparency; non-discrimination; social inclusion; public participation; and accountability including expanded roles for grievance mechanisms. The ESF codifies best practice in development policies. It brings the World Bank's environmental and social protections into closer harmony with those of other development institutions; and encourages Client countries to use, and improve, their own national environment and social policies, when these policies are materially consistent with the ESF and supported by adequate implementation capacity. The ESF provides an incentive for countries to develop and build their own environmental and social policies and capacity.

4.6.2. World Bank Environmental and Social Standards

The World Bank Environmental and Social Policy for Investment Project Financing sets out the requirements that the Bank must follow regarding projects it supports through Investment Project Financing. The Environmental and Social Standards set out the requirements for Borrowers relating to the identification and assessment of environmental and social risks and impacts and mitigation measures associated with projects supported by the Bank through Investment Project Financing.

The standards are expected to: (a) support Borrowers in achieving good international practice relating to environmental and social sustainability; (b) assist Borrowers in fulfilling their national and international environmental and social obligations; (c) enhance non-discrimination, transparency, participation, accountability and governance; and (d) enhance the sustainable development outcomes of projects through ongoing stakeholder engagement. The proposed project will apply the ESF. The proposed project will apply the ESF and Table 4.3 below describes the application of the ESSs to the project.

Table 4.3: Application of World Bank's ESSs to the Proposed Project

Environmental and Social Standards (ESSs)	Yes/No	Application
ESS 1: Assessment and Management of Environmental and Social Risks and Impacts	Yes	The site-specific environmental and social impacts will be managed through this report. The report has been prepared to recommend Environmental and Social measures to be incorporated into designs and implementation of the proposed project
ESS 2: Labor and Working Conditions	Yes	Workers will be contracted for the construction works and operation of the project. In order, to ensure fair treatment of workers, the project will ensure that terms and conditions of employment (hours, rest periods, annual leave, non-discrimination, equal opportunities and workers organizations) are aligned with the requirements of Tanzania law and ESS2. To protect workers appropriate Occupational Health and Safety (OHS) shall be applied to avoid the risk of ill health, accidents and injuries. The proponent will set labor management procedures with roles and responsibilities for monitoring primary suppliers. If child labor or forced labor cases are identified, the proponent will require the primary supplier to take appropriate steps to remedy them. Where remedy is not possible, the proponent will, within a reasonable period, shift the project's primary suppliers to suppliers that can demonstrate that they are meeting the relevant requirements of this ESSs.
ESS 3: Resource Efficiency and Pollution Prevention and Management	Yes	The project activities will involve construction works which will generate dust, pollutant gases, erosion, wastes (solid and liquid) that will be properly managed via ESMPs and EMP. More or less similar impacts are likely to be experienced during operation phases and will be managed by the same tools as well as operation and maintenance plans.
ESS 4: Community Health and Safety	Yes	The project will not have substantial risk to community health and safety. Only localized negative impacts (like dust emissions noise pollution etc.) to sensitive receptors will need to be managed along the route for collection of construction related materials.

Environmental and Social Standards (ESSs)	Yes/No	Application
		Also, community safety especially is an issue of concern due to the influx of the project workers, and later on participants of the project, which might lead to GBV/ SEA/SH, as well as transmission of HIV/AIDs and other communicable diseases. Guidance on HIV/AIDs, COVID-19, GBV/SEA/SH and HEET project GRM shall be followed.
ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	No	This ESS5 is not relevant to the proposed project as MUST is the legal owner of Plot No.1 Block 'FF' at Iyunga Ward, under Title Number 14322-MBYLR. The land use of the plots is designed for offices for educational purposes only, Use Group 'K' Use Class (b) as defined in the Town and Country Planning (use Classes) Regulations, 1960 as amended in 1993.
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	No	The project is not located inside or near protected areas and sensitive habitats. In case the project will purchase natural resources commodities such as timber, it will be important to establish the source area and to have a mechanism in place to ensure that the Primary Suppliers are not significantly impacting sensitive ecosystem or degrading natural habitats.
ESS 7: Indigenous People/ Sub- Saharan African Historically Underserved Traditional Local Communities	No	This standard is not considered relevant as the project will mainly be implemented in areas where communities that meet the requirements of ESS7 are generally not available in the area.
ESS 8: Cultural Heritage	No	This ESS is not relevant as the project area has already being developed.
ESS 9: Financial Intermediaries	No	This ESS is not relevant to the project as no other banks supporting the project.
ESS 10: Stakeholder Engagement and Information Disclosure	Yes	The proponent will provide stakeholders with timely, relevant, understandable and accessible information, and consult with them in a culturally appropriate manner, which is free of manipulation, interference, coercion, discrimination and intimidation. As part of ESIA study stakeholders' engagement has been done in line with the requirement of the ESS10.

4.6.3. Assessment and Management of Environmental and Social Risks and Impacts (ESS1)

This Environmental and Social Standard is applicable to this project due to its potential adverse social and environmental risks and impacts on site and in the areas of influence. These include impacts on natural environment such as air, water, land, human health and safety. Thus, MUST shall analyse project activities and associated environmental and social risks and impacts during construction and operation phase.

The project has prepared an Environmental and Social Impact Assessment (ESIA) and/or Environmental and Social Management Plans (ESMPs). Therefore, the project components have been screened to determine potential adverse impacts and mitigation measures for their planned activities. According to social relation that has started to develop between MUST and the nearby community of Ikuti, Inyala, Lupeta and Sisitila, the social services like playing grounds, churches, mosques and accommodation facilities within and outside the campus to be built MUST can be pressurized due to the increased students' enrolment. Thus, the current social services provision at the nearby communities needs to be rechecked in order to prevent pressure on local accommodation and rents.

4.6.4. Labour and Working Conditions (ESS2)

The standard recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. ESS2 is applicable to the project given that the project will employ/engage both skilled and non-skilled workers, including through contractors/subcontractors, and primary suppliers, to undertake various activities. In order to comply with the provisions of ESS2, MUST will take workers' safety seriously by laying out internal controls and procedures that will protect workers employed or engaged in relation to the project from occupational hazards during all relevant project phases. All works will be done in compliance with relevant environmental, health and safety standards to minimize impact on workers and the surrounding communities. The ESIA contains robust procedures for workers' safety, requiring plans for accident prevention as well as the health and safety of workers and surrounding communities, which are also part of contracts for works.

MUST will ensure that the project contractors and sub-contractors operate under policy-led objectives that promote gender equality, non-discrimination and fair treatment in recruitment and employment, respect for national laws, including prohibiting child and forced labour, and combatting gender-based violence, in particular sexual harassment.

Contractors, primary suppliers and sub-contractors shall ensure equal employment opportunities that do not discriminate anyone on the basis of colour, nationality, tribe, social origin, political opinion, religion, gender, pregnancy, marital status/family responsibility, disability, HIV/AIDS and age.

MUST will ensure zero tolerance on workplace sexual harassment of any nature by workers directly hired or project workers engaged through contracts/subcontracts companies, and those confirmed to be guilty will be subject to disciplinary action, including summary dismissal.

4.6.5. Resource Efficiency and Pollution Prevention and Management (ESS3)

This ESS sets out the requirements to address resource efficiency and pollution prevention and management throughout the project lifecycle. In order to ensure efficient use of resources, MUST projects will source construction materials from authorized sources and water from MBEYAUWSA throughout the project implementation. MUST has a total area of 490Ha (4,900,000m^2) but the developed area is approximately 10% of the total area. The proposed new buildings are expected to utilize a maximum of 0.4% (20438 m^2) of the total plot size. The CO_2 generated per year from main sources like cafeteria, vehicles and generator will be sequestered by the available green spaces. Moreover, the project will utilize the pollution prevention and emergency response plan developed as part of the ESIA to mitigate any potential source of pollution from the planned activities. The risks identified for strengthening the system for complying with ESS1 are applicable to ESS3.

4.6.6. Community Health and Safety (ESS4)

The ESS requires beneficiary to avoid or minimize safety and health risks and impacts of the project, with particular attention to people who, because of their particular circumstances, may be vulnerable. Implementation of project components has the health and safety risks and impacts on project-affected communities. These risks and impacts could include increased rates of crime, and social conflict and violence, increases in traffic accidents, increased pressure on local accommodation and rents, increased transmission of HIV/STDS, as well as increases in gender-based violence. The project will ensure compliance with laws' requirement regarding the COVID-19 situation. MUST shall work closely with street leaders to communicate to local communities' related health and safety risks and preventive measures for accidents associated transportation of materials and other human health issues including covering mitigation measures to GBV risks and prevention of HIV and AIDS during construction.

All works will be done in compliance with relevant environmental and health and safety standards to minimize impact on workers and the local area. During the project's operational phase, waste will be disposed as per instructions from the Mbeya City Council Environmental officers.

In order to ensure safety during project implementation, MUST will ensure that contractors and sub-contractors enclose all project sites in fencing for safety and security reasons. Where required, adequate safety clearance zones can be established on sites where neighbouring activities may affect project operation. Appropriate Health and safety signage shall be put in place to warn on potential dangers associated with trespassing or accessing the enclosure with no permission. The ESIA process shall contain robust procedures for accident prevention as well as the health and safety of project affected communities.

4.6.7. Stakeholder Engagement and Information Disclosure (ESS10)

Effective stakeholder engagement improves the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation. The proposed project has engaged stakeholders as per SEP developed for HEET project. The engagement will cover all phases of the project. Implementing agencies will provide stakeholders with timely, relevant, understandable and

accessible information, and consult with them in a culturally appropriate manner, which is free of manipulation, interference, coercion, discrimination and intimidation. See chapter five for comprehensive Stakeholders Engagement Plan for this project

4.6.8. World Bank Group ESHS Guidelines

The World Bank Groups Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP). EHS Guidelines are applied as required by their respective policies and standards. These industry sector EHS guidelines are designed to be used together with the General EHS Guidelines document, which provides guidance to users on common EHS issues potentially applicable to all industry sectors. Specific guidelines which will be used is Environmental, Health, and Safety (EHS) Guidelines: Environmental Waste Management. As stipulated earlier the guidelines will be used together with the Environmental, Health, and Safety General Guidelines.

The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them. The applicability of the EHS Guidelines will be tailored to the hazards and risks established for the project in accordance to the proposed project activities. The circumstances that skilled and experienced professionals may find when evaluating the range of pollution prevention and control techniques available to a project may include, but are not limited to, varying levels of environmental degradation and environmental assimilative capacity as well as varying levels of technical feasibility. The applicability of specific technical recommendations will be based on the professional opinion of qualified and experienced persons. This study will fully consider the WB guidelines to manage the project risks and impacts.

4.7. Relevant International Agreement, Convections and Treaties

4.7.1. 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, she will have to account for all sources of GHG in her 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.

Commitment: MUST project will abide with the requirements on control and prevention of greenhouse gases by emphasizing use of electronic materials copies during teaching and learning.

4.7.2. International Labor Organization (ILO) Conventions

International Labour Organisation (ILO) Conventions ratified by Tanzania include: C138 Minimum Age Convention of 1973, which prohibits child labour, and C182 Worst Forms of Child Labour Convention of 1999. Other relevant agreements include ILO Convention C148 Working Environment (Air Pollution, Noise and Vibration) Convention of 1977, which protects workers against occupational hazards in the working environment due to air pollution, noise and vibration.

Commitment: As the conventions have been adopted by the Tanzania Government, MUST project will abide by them and ensure that no child labour is practised throughout the project and workers work in safe environment.

4.7.3. Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention)

The Ramsar Convention provides a framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. A total of 2,040 wetlands sites covering over 193.4 million hectares are under Ramsar. Tanzania became a signatory to the Ramsar convention in 1999, when the country designated four wetlands under the convention. The Convention's mission is to ensure conservation and wise use of wetlands at both the national and international levels. It calls upon Contracting Party States to designate wetland sites for inclusion in the list of wetlands of international importance and to establish nature reserves in wetlands and promote their wise use. The Convention also calls upon the Party States to integrate wetland restoration into their national nature conservation, land use and water management policies.

Commitment: MUST project will ensure that the environmental resources are managed well by ensuring, among other things, that there is improved management and conservation of wetlands.

4.7.4. Convention on Biological Diversity (CBD)

The objectives of the Convention on Biological Diversity (CBD) are to conserve the biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resource. Tanzania signed the CBD in 1992 and ratified the same on 8 March 1996. On CBD, Tanzania is obliged to:

(i) Develop appropriate national strategies, action plans and programmes for the conservation and sustainable utilisation of its biological resources; and integration of these into relevant sectoral or cross-sectoral plans, programmes and policies (article 6 of the Convention);

(ii) Build capacities for research, assessment, identification, evaluation and monitoring of biodiversity at the national level with full support and participation of local communities (articles 7,12,13 and 14 of the Convention);
(iii) Collaborate internationally in transfer of technology, handling of biotechnology and other scientific linkages (articles 15,16,18 and 19 of the Convention);
(iv) Exchange information relevant to conservation and sustainable use of biological diversity as provided under Article 17 and present national reports to the conference of parties (articles 23 & 26 of the Convention); and
(v) Provide financial support and incentives for national biodiversity programmes whereby developed countries shall provide or meet incremental costs as financial topping-up of budgets for biodiversity programmes in developing countries (articles 20 & 21 of the Convention).

Commitment: MUST project in compliance to the convection ratified by the government of Tanzania shall build capacities for research, assessment, identification, evaluation and monitoring of biodiversity with participation of local communities. It will also collaborate in international transfer of technology and other scientific linkages.

4.7.5. Regional Convention on the Recognition of Studies, Certificates, Diplomas, Degrees and other Academic Qualifications in Higher Education in the African States, adopted at Arusha on 5 December 1981

Article 1 stipulates that for the purposes of this Convention the "recognition" of a foreign certificate, diploma, degree or other academic qualification of higher education means its acceptance by the competent authorities of a Contracting State and the granting to the holder of the rights enjoyed by persons possessing a national certificate, diploma, degree or academic qualification with which the foreign one is assessed as comparable. Such rights extend to either the pursuit of studies or the practice of a profession, or both, according to the applicability of the recognition.

Recognition of a foreign certificate, diploma, degree or other academic qualification with a view to undertaking or pursuing studies at the higher level shall entitle the holder to enter the higher educational and research institutions of any Contracting State under the same conditions as those applying to holders of a similar certificate, diploma, degree or other academic qualification issued in the Contracting State concerned.

Article 3 stipulates that for the purposes of the continuation of studies and immediate admission to the subsequent stages of training in higher educational institutions situated in their respective territories, the Contracting States recognize, under the same conditions as those applicable to local academic qualifications, secondary school leaving certificates issued in the other Contracting States, the possession of which qualifies the holders for admission to the subsequent stages of training in higher educational institutions situated in the territories of those Contracting States, provided the applicant satisfies or is given the opportunity to meet the requirements pertaining to the academic level prescribed for admission into those subsequent stages of training in higher education.

Commitment: MUST project in compliance to the agreement ratified by the government of Tanzania shall enrol students from different Contracting State possessing qualifications as stated by the agreement to the stage of education as per their qualifications.

4.8. Institutional Framework for the Management of Environment

4.8.1. Overall Management Responsibility

The institutional arrangement for environmental management in Tanzania is well spelt out in the EMA (2004). There are seven (7) institutions mentioned by the Act, of which the Minister Responsible for the Environment is the overall in-charge for administration of all matters relating to the environment.

Part III, Section 13(1) of EMA (2004) states that the Minister responsible for environment shall be in overall in-charge of all matters relating to the environment and shall in that respect be responsible for articulation of policy guidelines necessary for the promotion, protection and sustainable management of environment in Tanzania.

The legal institutions for environmental management in the country include;

(i) National Environmental Advisory Committee;
(ii) Minister responsible for Environment;
(iii) Director of Environment;
(iv) National Environmental Management Council (NEMC);
(v) Sector Ministries;
(vi) Local Government Authorities (City, Municipal, District, Township, Ward, Village, sub-village "Mtaa and Hamlet")

The Environment management Act cap 191 and Environmental Impact Assessment and Audit regulations of 2005 both emphasizes on administrative framework and institutional arrangement for management of environmental issues in Tanzania and thus outlines responsibilities of different relevant institutions in projects. In this regard, construction of the proposed project will involve both the central government and government agencies (such as the ministry of Lands, Housing and Human Settlements Development, the Vice President's Office particularly the Directorate of Environment, National Environment Management Council, Occupation Safety and Health Authority (OSHA) and Local Government Authorities (Mbeya Region, Mbeya City Council, and lastly Iyunga ward). Table 4.4 outlines institutions and their respective responsibilities regarding this study. Table 4.4 outlines the institutional arrangement for Environmental and Social management at MUST as guided by the World bank's ESMF.

Table 4.4: Key Institutions to the EIA Process

Level	Institution	Role and responsibility
National Level	Vice President's Office-Division of Environment	• Advices the government on issuance of EIA certificates

Level	Institution	Role and responsibility
	Vice President's Office-NEMC	• Supervise and regulate all EIA and environmental audit related matters; • Review and recommend for approval of EIA and environmental audit statements; • Enforce and ensure compliance of the national environmental quality standards; • Ensures that environmental management monitoring plans are implemented by the project proponent TOR, Review of EIA; • Initiate and evolve procedures and safeguards for the prevention of accidents which may cause environmental degradation; and • Render advice and technical supplier, where possible to different stakeholders
	Ministry of Education Science and Technology	• Issuing policy guidance • Providing legal frameworks • Issuing licenses, provisions of certificates of compliances • Enforcement of laws and regulations • Project monitoring.
	Ministry of Lands, Housing and Human Settlements Development	• Issuing of right of occupancy;
	Occupational Safety and Health Authority (OSHA)	• Issuing certificate of compliance • Monitoring Health and Safety of workers in working premises
Regional level	Mbeya Region	• Oversee and advice on implementation of national and regional policies at regional level; • Oversee enforcement of law and regulations; and • Enforcement of laws and Regulation on water and Sewage system in the proposed project site
District level	Mbeya City Council	• Chief Executive officer for all development activities in the city level; • Oversee and advice on implementation of national policies at City level; • Oversee enforcement of laws and regulations provide guidelines for management of land within project area and area of influence; and • Advice on implementation of development projects and activities at City level

Level	Institution	Role and responsibility
Ward Level	Ward Executive officer, Ward Environment and Health Committee	• Oversee general development plans for the ward; • Provide information on local situation and extension services; • Watchdog for the environment, security and other community matters; and • Project monitoring and reporting on environmental performance
Community Level	Local Community around the project site	• Information on local social, economic environmental situation; • View on social-economic and cultural value of the sites and Market operations; • Rendering assistance and advice on the implementation of the project; and • Project monitoring (watchdog for the environment, ensure wellbeing of residents and participate in project activities)
The Proponent	Mbeya University of Science and Technology	• Project concept on EIA study; • Project day-today environmental management and monitoring; • Project implementation; • Establishing UPIU; and • Environmental internal auditing.

4.8.2. MUST - Project Implementation Unit (PIU) Structure and Capabilities

MUST's Project Implementation Unit (PIU) has been established. It has a total of 242 members. Out of this, there is one environmentalist, one social and one gender experts locally known as ESS Team. At the project level both contractors and a consultant have been guided in the contracts to employ experts in environment, social and gender. The Environmental and Social Safeguard Team will make sure that this is implemented. The ESS Team is involved in SE, providing inputs in all ToR and contracts for procurement of contractors and consultants. It has also developed GRM which is operational as well as developed an ESS Office. There is also a suggestion box. The rest PIU members include Coordinator, Deputy Coordinator, infrastructural Development (41), Capacity building (8), Curricula development (144), Finance (5), ICT (9), Procurement (11), Monitoring and Evaluation (11), Industrial linkage (10) and Communication officers (3). A high proportion of PIU members have been appointed based on their expertise and thus their contribution to this project is based on their expertise.

This ESIA has consulted most of these institutions at various stages as part of this ESIA undertaking and their views and concerns have been incorporated in the report. Key institutional arrangement for HEET Project Implementation is stipulated. Table 4.6 summarizes responsibilities for each institution involved in ESIA.

Table 4.6 Institutions including MUST capabilities in implementation the project

LEVEL	INSTITUTION	ROLES AND RESPONSIBILITY
Financing Agency	World Bank	● Review sub-project screening including risk level categorization; ● Review the ESIAs, ESMPs and site specific ESMPs; ● Review quarterly reports by the implementing agencies; ● Monitor compliance with the ESMF; and ● Undertake implementation support missions.
Ministry	MoEST (NPIT)	At the national level, NPIT to oversee key project functions including: ● project coordination, ● procurement, ● financial management (FM), ● and M&E.
VPO	NEMC and Division of Environment)	● Co-ordinate Environmental Management Policy, Act and guidelines ● Approval of ToR, Review of ESIA ● Environmental monitoring and auditing ● Advises Government on all environmental matters
Project Proponent - MUST	MUST HEET Project has established a Project Implementation Unit (UPIU) Team as stipulated in POM 2021 which states that Each PIU will be headed by a Project Coordinator/Leader and have staff responsible for FM, procurement, environmental and social safeguards, and M&E. However, according to MoEST letter of 2021 14 specialists were required to be appointed to form a PIT. Accordingly at MUST 18 staff have been appointed by the Accounting Officer (VC) and issued letters of appointments including	● Overall, PIT main task is oversee Project implementation involving development of ToR for consultants and contractors, developing specifications and performing procurement process for equipment and facilities, procurement of consultant and contractors, meeting regularly for assessment of project development, providing specifications for ICT procurement and related facilities, overseeing and implementing capacity development, developing curricula, establishing and working with Industrial Advisory Committee conducting capacity building for its members and undertaking M&E of the project. **Roles and responsibilities of ESS Team** ● Capacity building for GRM focal persons and members of the Grievance Redress Integrity includes ● Oversee project implementation including mitigation measures through contractors ● Ensure environmental compliance by the environmental standards. ● Liaise with the DoE and the NEMC on matters

LEVEL	INSTITUTION	ROLES AND RESPONSIBILITY
	roles and responsibilities: They include: • Coordinator • Deputy Coordinator • Other specialists include: • Environments • Social • Gender • Infrastructure • Capacity building • Curricula (2) • ICT (2) • Communication • Industrial linkage • Procurement • Finance • Monitoring and Evaluation (2) The Environmentalist, Social sand Gender specialists, referred to as ESS Team, are part of the PIU Team. PIU Team has competence in performing the implementation of the project and ESIA duties through ESS Team acquired both through learning and practical experiences. PIU Members have attended several capacity building conducted by MoEST and WB. i.	involving the environment and all matters with respect to which cooperation or shared responsibility is desirable or required. ● Oversee the preparation of and implementation of all ESIA‟s required for the project ● Monitoring the implementation of HEET Project as per POM and PAD. ● Attend meetings and provide guidance in the bid documents developed by PMU to ascertain that the different challenges identified and duly covered from risk for each sub-project/activity ● The ESS Team also support the procurement officer in making sure that the bidding documents clearly cover the health, safety and environmental component with appropriate provisions of the same for the contractors to bid. ● The ESS Team coordinates the preparation of ESIA and environmental and social management plans (ESMPs) done by consultant and site-specific ESMPs (SSESMP). ● They ensure that contractors have an Environmental Health and Safety Officer (EHS), is familiar with the compliance requirements, including WB EHS guidelines. ● To review progress reports by the supervision engineer/consultant during civil works and conduct inspection of the sites regularly ● To make sure the Contractor complies with the WB guidance on Community Health and Safety and Gender-Based Violence

LEVEL	INSTITUTION	ROLES AND RESPONSIBILITY
	Design Consultants	● Understand the sub-project setting and site-specific requirements with discussions with the PIU; ● Incorporate the issues identified in the ESIAs, ESMPS into the project design ● Provide cost estimates for implementing the design requirements.
	Occupational Safety and Health issues	● Perform hazard identification ● Hazard assessment and management ● Risk assessment and management ● Emergency preparedness plan and Response ● Risks and crises management ● Stakeholder engagement and grievance management, including in relation to the worker grievance mechanism, for the social and environmental staff.
	Supervision Engineer/Consultant	● Assist the PIU to ensure that the necessary environmental, health and safety authorizations and permits have been obtained; ● Maintain open and direct lines of communication between the PIU and contractor(s) with regard to environmental matters; ● Review and approve the contractor's site-specific construction ESMPs (CESMP), Health and Safety, Labour Management Plans and Traffic Management Plans together with the PIU; Conduct regular site inspections of all work areas to ensure compliance with CESMPs and E&S specifications for contractors Assist the contractor in finding environmentally responsible solutions to problems; ● Instruct the contractor(s) to take remedial actions within a specified timeframe, and carry out additional monitoring, if required, according to the contractual requirements and procedures in the event of non-compliances or complaints; ● Instruct the contractor(s) to stop activities which generate adverse impacts, and/or when the contractor(s) fails to implement the ESMP requirements / remedial actions; ● Provide training to the contractor on the EHS requirements to be followed; ● Monitor the contractor's environmental awareness training program for all personnel working onsite;

LEVEL	INSTITUTION	ROLES AND RESPONSIBILITY
		● In case of any accidents or incidents, immediately notify the PIU and support the process of documenting and reporting the case to the WB; ● Prepare written reports for the PIU such as weekly report of non-compliance issues; summary monthly report covering key issues and findings from supervision activities; and consolidated summary report from contractor's monthly report.
	Contractor	● Compliance with relevant environmental and social legislative requirements (project-specific, district- and national level), including allocating adequate budget for implementation of these requirements; ● Work within the scope of contractual requirements and other tender conditions; ● Prepare CESMPs based on the ESMP in the bidding documents and contracts; ● Train workers about EHS (including relevant WBG EHS Guidelines) and the site- specific environmental and social measures to be followed; ● The EHS officer of the contractor will participate in the joint site inspections with the PIU and Environmental Supervision Engineer/consultant; ● Carry out any corrective actions instructed by the Supervision Engineer/consultant; ● In case of non-compliances/discrepancies, carry out investigation and submit proposals on mitigation measures, and implement remedial measures to reduce environmental impact; ● Propose and carry out corrective actions in order to minimize the environmental impacts; ● Send weekly reports of non-compliance to the Supervision Engineer/consultant; ● Send monthly progress reports to the Supervision Engineer/consultant.

The objective of Environmental and Social Assessment (ESIA) is to ensure that projects are environmentally sound and sustainable, and that decision-making is improved through appropriate analysis of actions and mitigation of their likely adverse impacts. ESIA is important because MUST will have environmental risks and impacts in core, immediate area and area of influence.

4.9. Summary of key players in implementing the ESMP

To ensure the sound development and effective implementation of the ESMP, it will be necessary to identify and define the responsibilities and authority of the various persons and organizations that will be involved in the project. The following entities will be involved in the implementation of this ESMP:

i) Funding Institution
ii) MUST
iii) National Environmental Management Council (NEMC)
iv) Contractor;

4.9.1. Funding Institutions

The funding organization will have an overarching responsibility to ensure that the project is carried out to the highest environmental standards strictly in accordance with the ESMF and ESIA project report and the mitigation measures set out therein. Additionally, the funding Institution requires that environmental and social impacts are managed in accordance with the World Bank ESF and its ESS.

4.9.2. MUST Main Campus UPIU

The proponent responsibility is to ensure that the implementation process of the ESMP and Mitigation measures are line with the relevant national policies and legislations and World Bank Environmental and Social Standard (ESS1). MUST has the Project implementation Team (PIT) responsible for supervision and monitoring the implementation of the project construction activities. The management of all project activities during operation is under the PIT, in collaboration with other departments and units depending on the nature of the activity. In general, the PIT falls under the management of the MUST executing day-to-day activities in the project. The PIT is guided by management meetings that are chaired by the Deputy Vice Chancellor. The management meetings provide support, guidance and oversight of the progress of the PIT. Further, the PIT will designate among PIT staffs an Environmental and Social Safeguard Specialist(s) who will monitor the implementation during the construction and operation phases of the project. The PIT team has enough staffs with capacity to undertake the required monitoring and supervision roles to include Environmental and Social specialists.

4.9.3. NEMC

NEMC is charged with the overall role of providing oversight regarding monitoring for all project activities that have potential impacts on the environment. NEMC will undertake periodic monitoring of the project during the mobilization, construction and operational phases to ensure that the mitigation measures set out in chapter 8 of ESMP are fully implemented. In respect to this project, NEMC has a specific role of monitoring and ensuring that the mitigation measures are fully implemented as per certificate conditions (to be issued). It will ensure that its Zonal staff are fully trained and equipped to perform its monitoring role. It will review the results of any monitoring and Audit reports generated as part of the project implementation phase and will issue directives based on the monitoring activities to ensure full compliance with the mitigation measures required and address any issues that may arise.

4.9.4. The Contractor

The project will be implemented by a Contractor and will be responsible to MUST for constructing the proposed project in accordance with the Technical Specifications required. The Contractor shall implement the project entirely in accordance with the ESIA mitigation measures detailed the ESMP. It is recommended that before commencement of actual construction, the Contractor should submit a work site plan that complies with the national environmental guidelines and an ESMP for the different phases of the work. The environmental plan shall specify the location of sources of materials and disposal area of construction debris as well as other related matters. The plan shall take into consideration the mitigation measures proposed in this ESIA project report.

The Contractor shall nominate a Project Environmental Site Officer (ESO) and Project Social Site Officer (SSO) who will be the Contractor's focal point for all environmental and social matters. The ESO and SSO will be routinely on-site for the duration of the construction works. Both officers will have minimum of Bachelor Degree in their respective specialization. The officers among others will be responsible for the following tasks:

i) Drafting environmental and social aspects during project implementation;
ii) Managing environmental, social, health and safety aspects at the worksites;
iii) Participating in the definition of the no working-areas;
iv) Recommending solutions for specific environmental and social problems;
v) Facilitating the creation of a liaison group with the stakeholders at the project site and shall monitor the compliance of ESMP;
vi) Organizing consultations at critical stages of the project with the stakeholders and interested parties;
vii) He/She will be required to liaise with MUST Safeguard specialist on the level of compliance with the ESMP achieved by the contractor regularly for the duration of the contract;
viii) Controlling and supervising the implementation of the ESMP;
ix) Preparing environmental and social progress or "audits" reports on the implementation status of measures and management of site works.

CHAPTER FIVE

5. STAKEHOLDERS' ENGAGEMENT

5.1. Introduction and state of the Art

Stakeholder engagement is the continuous and iterative process by which the project beneficiary, 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. It takes into account 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 construction project of MUST Main Campus was conducted for the following reasons;

(i) To identify stakeholders and build and maintain a constructive relationship with them, in particular project affected parties;
(ii) To enable stakeholders' views to be taken into account in project design and environmental and social performance;
(iii) To assess the level of stakeholder interest and support for the project and to enable stakeholders' views to be taken into account in project design and environmental and social performance;
(iv) 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; and
(v) To provide project affected parties with accessible and inclusive means to raise issues and grievances and allow MUST to respond to and manage such grievances

5.2. Stakeholder Identification and Analysis

The study identified stakeholders to be consulted and involved throughout the project life cycle. Stakeholders' identification in this study was done through a continuous and comprehensive brainstorming process to collect an exhaustive list of people/ groups or institutions that are likely to be affected by the project, affect the project, and influence the direction of the project or those having interest over the project. Table 5.1 shows stakeholders identified and level of interest.

5.3. Stakeholder engagement Approach during Preparation Phase

During this period the consultations, presentations and discussion with the above-identified stakeholders were conducted. In the presentations, the team shared with these stakeholders timely, relevant, understandable and accessible information in a culturally appropriately manner free of manipulation, interference, coercion, discrimination and intimidation. During this stage, the team collected the views and opinions on project design, risk, and impact and mitigation measure associated with the Project. The stakeholders view and concerns are summarized in Table 5.1 and Table 5.2 while details in terms of minutes and signature of the attendants are presented in Appendix IIII and IV.

5.3.1. Concerns Raised by Stakeholder

5.3.1.1. Government Officials

Table 5.1: Detailed Stakeholders Concerns from the Government Officials

NAME OF INSTITUTION	Concern Raised	Response / Comment
Occupational Safety and Health Authority (OSHA)	Safety of workers should be considered as priority in all project stages.	The project will not only be registered with OSHA but will abide will all issues required to maintain the safety of the workers and users as well.
	The project has been registered with relevant authorities and permits secured.	The project will be registered with relevant authorities including ERB, CRB, AQRB, OSHA, Fire and Rescue Brigade, City Council.
	Availability of safe and clean drinking water for workers.	The contractors will ensure that safer and clean water is available all the time for workers during the implementation of the project.
Mbeya City Council	The area will be prone to increase in population due to influx of job seekers and students these will put pressure in social services like water, electricity, residence and health services	Health staff will be employed whose duty among other will include awareness will be created to workers through a series of seminars/workshop at work place.
	Community Development Officers and Ward Councillors should participate in the process of creating awareness to the communities in respect to HIV/AIDS and other infectious diseases and appropriate utilization of construction material etc.	The campus has dean's office which is responsible for sensitization programme in cooperation and officials at health centre
	There will be an Increase in solid waste generation by the workers and students	Wastes are collected by Mbeya City Council. However, the campus has solid waste collection points
	Due to the increase in the population especially during operation phase of	The campus has wastewater management system connected to Sewer

NAME OF INSTITUTION	Concern Raised	Response / Comment
	the project if waste water not properly handled might result into pollution of receiving bodies like soil and water sources	
	Construction of the tarmac road which is an all-weather road connecting the University and the TAZAM Highway.	The campus has enough coverage of tarmac roads. However, the University has deliberated efforts to increase the coverage
	Increase of storm water (surface) runoff due to increase in impervious surface area and cannot be accommodated in the existing storm water drainage system. This will cause floods in downstream areas like around Sisitila	The university has enough drainage systems for storm water draining the same away from the campus
	The client must ensure that all the required permits like building permits are secured The project area must have a perimeter protection fence to ensure security to the people passing near the site.	Permits are being secured. The security fence is planned to be built by university internal funds in the near future.
	Creation of awareness on diseases such an HIV AIDS, Covid-19, and other infectious diseases	Awareness campaigns are done by health centre at the campus in cooperation with students Deans' office
	Boundaries of the site should be protected from trespassers.	Perimeter hoarding will be erect to protect the communities and trespassers away from the site.
	Waster production will increase and all for attention	Waste generation form the site will need to be managed by the developer during the operation phase and by the contractor during the construction phase.

5.4. MUST Students Organization Government

Table 5.2: Detailed Stakeholders Concerns from MUST Students Organization

Concern Raised	Response/Comment
Internet services should be improved for students, these services should be available in their study areas such as classrooms, dormitories and other areas around students.	The design should consider internet connectivity exist when students and staff are within the building and the surrounding area.
Power supply facilities should be added in classroom to enable good studying environment	The designs and the developer should consider installing power outlets in classrooms to facilitate student to use computer and other power requiring gadgets
Projectors and their screens should be fixed in class rooms at locations that enable every learner/student to see.	The designs and the developer should install projectors and screen in every learning area (classrooms, theatres, laboratories etc.)
Designing activities in architecture studios take place at night time, so there should be enough light in those rooms.	Learning spaces such as classrooms, architecture studio should have adequate lighting to enable learn to perform their duties.
The numbers of toilets in the existing women's toilet are obsolete and do not meet the needs of the existing student population.	The Developer should ensure that water closet facilities for female and people with special needs are provided in the new buildings.
Existing lecture halls and leisure facilities do not meet the needs of the ever-increasing number of students.	The design should ensure the special design for the classrooms should reflect the large number of students in the particular class.
The campus is expanding services that offer meals and other services should be considered in the new buildings	The Developer should ensure that these services are provided at a working distance within the campus.

5.5. Stakeholders Engagement During Implementation

During Project implementation, engagement activities will be undertaken in relation to project activities. At this stage, the study will conduct a number of structured and formal meetings, focus group discussions, community meetings, one to one interview and site visits that will involve a number of stakeholders. The timing for the conducts of the above meetings will be determined by the progress of the project implementation and when seems necessary to invite stakeholders for their comments and observation. However, the sharing of information and progress with stakeholders will be subject to scrutiny with regards to the kind of information to be shared and how the same will be communicated to stakeholders. Furthermore, at this stage, the MUST will ensure equal and effective participation from project preparation to implementation stages. To ensure stakeholders' views and concerns are well captured, the SEP

will have different methods of collecting and sharing information based on their needs i.e. disadvantaged or vulnerable groups (Table 5.3).

Table 5.3: Summary of the Stakeholder Engagement During Implementation

S/N	OBJECTIVE	MESSAGES	MEANS OF COMMUNICATION
PROJECT PREPARATION			
1.	To present the draft SEP (for comment) and final versions of the instruments.	• Presentation of the Project and its implementation schedule • Present potential environmental and social impacts reports and its enhancement and mitigation plan. • Describe Grievance Redress Mechanism • Present a list of identified stakeholders and describe an approach of their engagement.	• Organized public meetings /Consultations based on Stakeholders needs and circumstances (FGD, one on one meetings etc.) • Disclosure on MUST Website • Emailing to respective stakeholders • Email copies of the instruments to Non-State Actors and other institutions. • Sharing of executive summaries in hard copy during meetings • For stakeholders who are illiterate, information will be presented verbally during meetings in local language. • Disclosure of Project documentation in appropriate and accessible manner • The instruments will be disclosed in Swahili language in project offices and hard copies will be accessible to stakeholders
2.	ESIA / ESMP Preparation and Disclosure	• To inform the preparation of the Environmental Statement/ ESMP etc. and present findings when drafted to all the identified stakeholders	• Face to Face Meetings • Community Meetings • Site Visits based on stakeholders needs and circumstances. • Disclosure on MUST Website • FGD • Disclosure of Project documentation in appropriate and accessible manner • The instruments will be disclosed in Swahili language at the University, Mbeya City council and in the offices of the identified stakeholders or public meetings.
CONSTRUCTION PHASE			
1.	Meeting to Alert stakeholders to the start of construction	• Inform stakeholders on the commencement of construction activities • Provide project Information and	• Public Meetings • Face to Face Meetings • Groups Discussions based on stakeholders needs and circumstances. • FGD, one on one meetings etc.

S/N	OBJECTIVE	MESSAGES	MEANS OF COMMUNICATION
		education on the risks and impacts, GRM, workers code of conduct etc.	
2.	Alert stakeholders of any new activities and Provide updates on project progress (every month)	• Inform public about any emerging issues; provide information on risks and impacts. GRM, workers code of conduct etc.	• Public Announcements • Focus Group Discussions • Community Meetings • Meetings with Iyunga ward Council
3.	Contact with the Project Coordination Team	• Provide phone number/WhatsApp account and email for stakeholders to submit questions and give out comments	• Meetings with Iyunga ward Council
THROUGHOUT THE PROJECT			
1.	Information dissemination	• General information on MUST Mbeya campus project implementation	• Posting on bulletin boards; Information leaflets, banners • Outreach activities with Iyunga ward communities where presentations, workshops and public meetings will be conducted. • Sharing on MUST social media and website • Information accessible at Mbeya City Council
2.	Contact with the Project Coordination Team	• Maintain website with contact box, email, social media accounts and phone number for people to submit questions, comments and concerns.	• MUST's Websites • MUST's phone number for HEET activities and concerns will be shared to project sites and all stakeholders • MUST's phone number for HEET activities and concerns will also be found at Mbeya City Council

NOTE: The face-to-face consultations with stakeholders will strictly follow national and international guidelines on health and hygiene procedures in order to avoid the spread of diseases including COVID-19 and other respiratory diseases.

5.6. Stakeholders Engagement During Implementation: Proposed Strategy for Information Engagement

Information disclosure strategies attempt to increase the availability of information on the proposed construction of the MUST Main Campus and the entire HEET project. The public disclosure of the information will be very useful in motivating and improving the performance of the project. During implementation, when new activities are being developed engagement will be undertaken to inform the development of the specific sub-project and plans. Further engagement on the frameworks will also be undertaken. Depending on the issue at hand, MUST will be developing agenda so as to ensure that key strategic and risk items can be discussed with all relevant stakeholders in order to foster decision making and address risk factors and develop enhancement measures during project implementation (Table 5.4). Thus, depending on the need of each stakeholder, MUST will use the following methods;

(i) **Focus Group Meetings/ Discussions** – MUST will employ FGD when aiming to bring together stakeholders with the same interests or common characteristics into a meeting to discuss specific topics or project components in a focused manner. FGD will be employed to explore issues that are relevant to specific groups or sub-groups of a community – such as youth, the elderly, women, students and people with disabilities. The intention of using this approach is centred upon establishing of similarities and differences among people of the same or different groups.

(ii) **Formal meetings -** These meetings will be focused to identify and discuss specific stakeholder concerns and to disclose project information. Participation in these meetings will be influenced by the issues under consideration and will include adequate representation of women as well as other marginalized and vulnerable people where possible.

(iii) **One-on-one interviews –** The interviews will aim to give chance to individuals to air concerns on project and will involve government officials depending on the issues to be addressed.

(iv) **Distribution of pamphlets –** This is a way of sharing information to a wide range of individuals.

(v) **Site visits –** These visits are focused on identifying and discussing stakeholder concerns and to disclose project information within communities.

Table 5.4: Summary of Stakeholders Communication Strategy

SN	Stakeholders group	Specific needs	Language	Communication Means
1.	Government Entities and Implementing Institutions and Agencies (TANESCO, MUWASA, FIRE, OSHA)	i. Inclusion in the decision-making processes and ii. implementation role of the project	Kiswahili	• Correspondence by phone/email • meetings • Roundtable discussions
2.	Communities and local government authorities of Kianda village	i. Sensitization as to the project, its benefits and their role. ii. Information on the Project and approach to managing environmental and social issues.	Kiswahili	• Community meetings • Outreach activities • Flyers • Banners
3	Students, Students government and people with disabilities at MUST	i. Sensitization as to the project, its benefits and their role. ii. Information on the Project and approach to managing environmental and social issues. iii. Consideration of their decision-making processes	Kiswahili	• Meetings • Roundtable discussions • Community meetings • Group discussions • Outreach activities • Flyers • Banners
4	Vulnerable Groups (women, youth, elders and the disabled) at project site surrounding areas	i. Sensitization as to the project, its benefits and their role. ii. Information on the Project and approach to managing	Kiswahili	• Disclosure of Project documentation in a culturally appropriate and accessible manner. • Community meetings. • Group Discussions

SN	Stakeholders group	Specific needs	Language	Communication Means
		environmental and social issues. iii. Efforts to ensure VGs feel that their issues will be heard and addressed.		• Outreach activities
5	Other interested parties (NSAs (NGOs, CSOs, RBO), private sector etc.)	i. Depend on stakeholder to be met.	Kiswahili	• Correspondence by phone/email • Meetings • Roundtable discussions
6	MUST staffs (Both Academic and Administrative Staff)	i. Sensitization as to the project, its benefits and their role. ii. Information on the Project and approach to managing environmental and social issues.	Kiswahili	• Correspondence by phone/email • Meetings • Roundtable discussions • Flyers • Banners
7	Students and student organization at MUST	iii. Sensitization as to the project, its benefits and their role. iv. Information on the Project and approach to managing environmental and social issues.	Kiswahili	• Correspondence by phone/email • Meetings • Roundtable discussions

5.7. Stakeholders' Engagement Plan (SEP)

The engagement plan will be reviewed and updated throughout the project implementation. During this process, the focus and scope of the SEP may change to reflect the varying stages of project implementation and to encompass any changes in project design and lessons learnt from previous phases of the Project. However, it is important to develop a guiding framework that may act as roadmap for stakeholders' engagement as shown in Table 5.5.

Table 5.5: Stakeholders' Engagement Plan

Target Stakeholders	Objective	Messages/ Agenda	Means of Communication	Schedule/frequency	Responsible person/ group
PROJECT PREPARATION AND PRE-CONSTRUCTION PHASE					
Representatives of implementing institutions and agencies (TANESCO, MUWASA, OSHA); Local NSAs; Community groups representatives from Iyunga area, MUST Students and Student organization, MUST staff, service providers and private sector surrounding project site	To present drafts and get stakeholders inputs on the following instruments: i. Environmental and Social Management Framework (ESMF); ii. Stakeholder Engagement Plan (SEP)	1. Presentation on the Project– objectives, rationale, components, benefits and beneficiaries, implementation arrangements. 2. Implementation schedule and period 3. Potential environmental and social impacts, measures for mitigation and management 4. Describe Grievance Redress Mechanism 5. Present stakeholders identified and 6. Describe approach to stakeholder engagement 7. Explain on the measures, actions, plans, and expected timelines for compliance with ESS documents	Organized public Meetings/ Consultations Disclosure of Project documentation	At least once per each stage of the project implementation	MUST Monitoring and evaluation team, E&S coordinator

Target Stakeholders	Objective	Messages/ Agenda	Means of Communication	Schedule/frequency	Responsible person/ group
		8. The LMP identifies the main labour requirements and risks associated with the project.			
Representatives of implementing institutions and agencies (TANESCO, MUWASA, OSHA); Local NSAs; Community groups representatives from Iyunga area, Students and Student organisation, MUST staff, service providers and private sector surrounding project site	To disclose finalized ESMF, SEP, LMP and ESCP and ESIA	1. Email message to advise Stakeholders of disclosure and where to access the disclosed documents. 2. Disclosure of Project documentation in an accessible manner	Organized public Meetings/ Consultations Disclosure of Project documentation Email copies to key individuals and organizations.	At least once per each stage of the project or once when there is changes or revision	MUST Monitoring and evaluation team

Target Stakeholders	Objective	Messages/ Agenda	Means of Communication	Schedule/frequency	Responsible person/ group
CONSTRUCTION PHASE					
Representatives of implementing institutions and agencies (TANESCO, MUWASA, FIRE, OSHA); Local NSAs; Community groups representatives from Iyunga area, Students and Student organisation, MUST staff, service providers and private sector surrounding project site	Meeting to inform stakeholders to the start of construction	1. Inform stakeholders that construction will commence. 2. Information and education on the risks and impacts, GRM, workers code of conduct etc. 3. Inform the stakeholders of the construction plans, builders, route for transportation of materials, water sources	Public Meetings Focus Groups Discussions. Face to Face Meetings	At least once per each stage of the project or once when there is changes or revision	E&S coordinators, MUST Monitoring and evaluation team
Representatives of implementing institutions and agencies (TANESCO,	1. To inform stakeholders of any new activities, unexpected	3. Inform on the new changes and progress	Public Meetings Focus Groups Discussions. Face to Face Meetings	At least once per each stage of the project or once when there is changes or revision	MUST Monitoring and evaluation

Target Stakeholders	Objective	Messages/ Agenda	Means of Communication	Schedule/frequency	Responsible person/ group
MUWASA, OSHA); Local NSAs; Community groups representatives from Iyunga Area, Students and Student organisation, MUST staff, service providers and private sector surrounding project site	impacts etc. during construction. 2. To Provide updates on project progress				team, E&S coordinator
Representatives of implementing institutions and agencies (TANESCO, MUWASA, OSHA); Local NSAs; Community groups representatives from Iyunga area, Students and	1. Inform stakeholders of any new activities, unexpected impacts etc. during construction. 2. Provide updates on project progress	Inform public about any emerging issues Information and education on the risks and impacts, GRM, workers code of conduct etc. Updates on project progress etc.	Public Meetings Focus Groups Discussions. Face to Face Meetings	At least once per each stage of the project or once when there is changes or revision	MUST Monitoring and evaluation team, E&S Coordinators

Target Stakeholders	Objective	Messages/ Agenda	Means of Communication	Schedule/frequency	Responsible person/ group
Student organisation, MUST staff, service providers and private sector surrounding project site					
Community groups representatives from Iyunga area, Students and Student organization, MUST staff, service providers and private sector surrounding project site	Resolve grievances received	1. To address grievances related to construction activities 2. Refer persons affected by project related GBV/SEA to services 3. To promote accountability for violations of GBV by project staff.	Face-to-face meetings Confidential and safe face to face referral for GBV survivors Meetings and aggrieved persons	Every time a grievance is received	E&S coordinators, MUST Monitoring and evaluation team, MUST Gender Unit and Gender Desk at Sumbawanga DC and police station
Representatives of implementing institutions and agencies (TANESCO, MUWASA, FIRE,	Contact with the Environmental and Social Project Experts	Sharing of phone number and WhatsApp number to submit questions and other comments.	Phone number WhatsApp number	At least once per each stage of the project or once when there is changes or revision	E&S coordinators

Target Stakeholders	Objective	Messages/ Agenda	Means of Communication	Schedule/frequency	Responsible person/ group
OSHA); Community groups representatives from Iyunga area, Students and Student organization, MUST staff, service providers and private sector surrounding project site					
THROUGHOUT THE PROJECT (ALL COMPONENTS)					
Representatives of implementing institutions and agencies (TANESCO, MUWASA, OSHA); Community groups representatives from Iyunga area, Students and Student	Information dissemination	To share general information on project, activities	Posting on bulletin boards; Information leaflets Community meetings Outreach activities – Focus groups. One to one meeting	At least once per each stage of the project or once when there is changes or revision	E&S coordinators and PRO office

Target Stakeholders	Objective	Messages/ Agenda	Means of Communication	Schedule/frequency	Responsible person/ group
organisation, MUST staff, service providers and private sector surrounding project			Sharing on MUST social media and website		
Representatives of implementing institutions and agencies (TANESCO, MUWASA, OSHA); Local NSAs; Community groups representatives from Iyunga area, Students and Student organisation, MUST staff, service providers and private sector surrounding project site	Contact with the Environmental and Social Project Experts	Sharing of phone number and WhatsApp number to submit questions and other comments.	Phone number WhatsApp number	At least once per each stage of the project or once when there is changes or revision	E&S coordinators

5.8. Disclosure

When the ESIA statement for this project will be approved and the certificate provided, MUST will disclose the approved project components information (ESIA, ESMP) to the public. The document will be made available in the institutional library, District, ward to inform the stakeholders on the response their concerns and views. A non-technical ESMP will be presented in both Kiswahili and English to make it understandable by the public.

CHAPTER SIX

6. ASSESSMENT OF IMPACTS AND IDENTIFICATION OF ALTERNATIVES

6.1. Introduction

This Chapter assesses the relevant environmental and social issues that may occur (potential impacts) throughout the project cycle that are addressed in this Environmental Impact Assessment study. The description is based on identified potential impacts through fieldwork, measurement, stakeholder's consultations, interviews and experience drawn from similar projects. The proposed project is expected to have both positive and negative impacts on environment. Covered in this Chapter are the main environmental and social impacts that are anticipated during mobilization, construction, operation and decommissioning phases of the proposed project.

6.2. Impacts Identification and Analysis

Impact identification was through the knowledge of activities involved, literature review, measurements and experience of the experts in similar projects. The prediction of impacts is based on the knowledge of the project and causes and effects and their secondary and synergetic/ cumulative effects for the natural environment and local community.

The impacts will be analysed on reversibility (i.e. reversible or irreversible), temporary or permanent and on the significance of the said impacts. Such analysis is based on the stakeholders' views and perceptions, available standards levels, measurements and the consultants experience in undertaking Environmental Impact Assessment in similar projects and nature.

The assessment and valuation of impacts for different project components is characterized based on the following parameters:

(i) **Likelihood: –**Terms to be used include unlikely, likely or certain which will refer to the level of possibility that the impact will occur. Unlikely will mean that the possibility of occurrence is limited or none because of the inherent nature of the project and design to be used; -Likely will refer to the possibility that the impact may occur and certain will mean that the impact will surely occur irrespective of the preventive measures adopted.

(ii) **Extent of the impact: -** spatial distribution – extent of an area/volume covered or to be affected.

(iii) **Nature of the impact: -** for both positive and negative impacts; it may mean direct, indirect, cumulative or synergistic.

(iv) **Magnitude of the impact: -** whether it is site specific, local or regional

(v) **Intensity: –** This parameter assesses the magnitude of the impact or violation of a certain standards.

(vi) **Degree of significance: –** this will incorporate the above-mentioned parameters (likelihood, duration and intensity) to determine how severe the impact will be. The categories of these parameters will be low, medium or high.

(vii) **Reversibility:** - whether the impact is reversible or irreversible

(viii) **Duration of the impact:** - whether it is short term/ temporary, long term/ permanent. This will refer to the life of the impact. The terms to be used include short term (0-5 years), medium term (5-10 years), long-term above 10 years and permanent which will refer to the impacts that will continue lifelong even if the mitigation measures are implemented.

The significance of impacts shall be based on their severity of the impact to the natural and social environment and their importance. Consideration will also be made to the compliance or incompliance of the existing laws, standards, conventions and treaties.

6.3. Methodology Used to Assess the Significance of Impacts

The approach used to assess the significance of the potential impacts and later assess the effectiveness of the mitigation or enhancement measures is to apply significant ratings to each impact based on objective criteria, such as magnitude, extent and duration of that impact, to yield a final evaluation of the significance of impacts before and after mitigation. The application of significance rating reduces the number of variables which need to be considered by the decision maker, whilst providing pertinent information about the implications of the proposed project. The assessment criteria are given on Table 6.1

Table 6.1: Assessment Criteria

First Step Criterion	**Categories**
Extent or Spatial influence of Impact	**Local**/**Site specific**; Regional; National; International
Magnitude of Impact at that spatial scale	**High:** natural and/or social functions and/or processes are severely altered **Medium:** natural and /or social functions and /or processes are notably altered **Low:** natural and /or social functions and/or processes are negligibly or minimally altered
Duration of Impact	**Short Term** (ST): 0-5 years; **Medium Term** (MT) 5-10 years; **Long Term** (LT): 15+ years

In addition, other criteria considered to evaluate whether or not adverse impacts are significant include:

(i) Environmental loss and deterioration;
(ii) Social impacts resulting directly or indirectly from environmental change;
(iii) Non-conformity with environmental standards, objectives and guidelines; and
(iv) Likelihood and acceptability of risk.

Criteria to evaluate adverse impacts on natural resources, ecological functions or designated areas include:

(i) Reductions in species diversity;
(ii) Depletion or fragmentation on flora and fauna habitat;
(iii) Loss of threatened, rare or endangered species;
(iv) Impairment of ecological integrity, resilience or health e.g.
(v) Disruption of food chains;
(vi) Decline in species population; and
(vii) Alterations in predator-prey relationships.

The criteria used to evaluate the significance of adverse social impacts that result from biophysical changes include:

(i) Threats to human health and safety e.g. from release of persistent and/or toxic chemicals;
(ii) Decline in commercially valuable or locally important species or resources e.g. fish, forests and farmland;
(iii) Loss of areas or environmental components that have cultural, recreational or aesthetic value;
(iv) Displacement of people e.g. transmission line or large dams and reservoirs;
(v) Disruption of communities by influx of a workforce e.g. during project construction; and
(vi) Pressures on services, transportation and infrastructure.

Environmental standards, objectives and targets to evaluate significance include:

(i) Prescribed limits on waste/emission discharges and/or concentrations;
(ii) Ambient air and water quality standards established by law or regulations;
(iii) Environmental objectives and targets contained in policy and strategy; and
(iv) Approved or statutory plans that protect areas or allocate, zone or regulate the use of land and natural resources.

6.3.1. Environmental and Social Impact Rating Scale

To ensure a direct comparison between various EIA team studies, a standard assessment methodology was used to assess the significance (The importance of the impact in the overall context of the affected system) of the identified impacts. The criteria that were considered in the determination of the impact significance are:

(i) **Severity/Benefit**: the importance of the impact from a purely technical perspective;
(ii) **Spatial scale**: extent or magnitude of the impact (the area that will be affected by the impact);
(iii) **Temporal scale**: how long the impact will be felt:
(iv) **Degree of certainty**: the degree of confidence in the prediction; and
(v) **Likelihood**: an indication of the risk or chance of an impact taking place.

To ensure integration of social and ecological impacts, to facilitate specialist assessment of impact significance, and to reduce reliance on value judgments, the severity of the impact within the scientific field in which it takes place (e.g. vegetation, fauna) is assessed first. Thereafter, each impact is assessed within the context of time and space, and the degree of certainty in the prediction is indicated.

The impact is then assessed in the context of the whole environment to establish the "significance" of the impact. This assessment incorporates all social, cultural, historical, economic, political and ecological aspects of the impact. Thus, the severity or benefit of an impact within a specialist discipline is first assessed before the significance of the impact is evaluated in a broader context. Consequently, two rating scales are required, one to determine the severity or benefit, and one to determine environmental significance.

6.3.2. Severity / Benefit

Severity is based on the professional judgement of the various specialists to evaluate the extent to which negative impacts would change current conditions, or how beneficial positive impacts would be on a particular affected system (for ecological impacts) or a particular affected party (for social impacts). This method assesses priority on the basis of the potential severity of environmental effects and the likely consequences of those potential effects if unmanaged.

6.3.3. Spatial Scale

The spatial scale defines the extent or area over which the impact will take place (Table 6.2).

Table 6.2: Spatial Scale

Individual	Individuals in the area could be affected
Household	Households in the area could be affected
Localised	A few hectares in extent. The specific area to which this scale refers is defined for the impact to which it refers.
Study Area	Includes the entire Mbeya University of Science and Technology – main campus
Ward	The impacts will be of such a nature that it may affect Iyunga ward
District	The impacts will be of such a nature that it may affect the entire Mbeya city council
Regional	The impacts will be of such a nature that it may affect the Mbeya region
National	The impacts will be of such a nature that it may affect the entire Tanzania.
International	The impact would affect resources and processes outside the border of Tanzania

6.3.4. Temporal Scale

The temporal scale defines the times over which the impacts would continue to occur.

Table 6.3: Temporal scale

Temporal scale	Explanation
Short term	Less than 5 years.
Medium term	Between 5 and 20 years
Long term	Between 20 and 40 years, and from a human perspective essentially permanent
Permanent	More than 40 years, and resulting in a permanent and lasting change.

6.4. Environmental Impact Assessment Methodology

The impact assessment procedure starts with a focusing process to identify the key environmental and social features from the baseline information detailed in Chapter 4. This focusing identifies the key biological, physical and human components of the project area. The process then defines the project activities that are likely to interact with the baseline. The potential positive and negative changes resulting from the defined project activities are predicted for the project area and for the entire project cycle. These predicted changes (impacts) are then evaluated using a significance ranking process.

The complete impact assessment procedure is comprised of four stages:

(i) Identification of the valued receptors;
(ii) Identification of key project activities (likely impact sources);
(iii) Impact evaluation; and
(iv) Significance ranking.

6.4.1. Valued Receptors

A Valued Receptor (VR) can be defined as any part of the environment or society that is considered important by stakeholders involved in the assessment process including the proponent, operator, government (through legislations) or non-government organization or general public. Its Importance is determined on the basis of cultural values and /or scientific and public concern or political repercussions of the project.

a) VR identification

The VRs were selected depending on the identification of pathways linking important environmental components with the totality of the project's activities. The VRs were also selected based on the list of Environmental Sensitive Areas as provided in the EIA and Audit Regulations

2005 and its amendments of 2018 and also following consultations with stakeholders, local discussions and based on the expertise of the project team.

b) VR categorization

Each VR is categorized in terms of its perceived environmental and social value, taking into account local, national, and international designations and legal protection status. The environmental and social value is allocated a category of low, medium or high (Table 6.4)

Table 6.4: Valued Receptor (VR) Categorization

VRs Categories	L	M	H
Environmental and social values	1	2	3

(Source; Consultant; 2023)

- Low (L) – VR containing no designations or features of public value;
- Medium (M) – VR containing local designations and/or features of local public value; and
- High (H) – VR containing national/international designations and/or legally protected features.

6.4.2. Project Activities / Environmental Aspects

Project environmental aspects are the elements of the project's activities that can interact with the environment. They are also referred to as impact sources.

Some of the planned operations at Mbeya University of Science and Technology include activities (and their sub-activities or aspects) that are potential sources of impacts that cause direct environmental and/or social effects. Accidental or unplanned events also present a different set of environmental risk scenarios.

The project environmental aspects were systematically identified following a project cycle approach, by examining all phases: i.e. mobilization, construction, operation and demobilization and/or decommissioning. A similar approach was used to identify sources of impacts related to accidental or unplanned events, such as fire outbreaks, major fuel spills, etc.

The EIA team formulated a list of environmental aspects (project activities) based on literature investigations, Tanzania regulations (EIA Regulations 2005), and VRs suspected to be of concern (Table 6.5). The analysis takes into account benefits of experiences from similar fuel retail operations, locally and from other parts of the world, and identifies presents the key project activities associated with the establishment and operation of commercial building that will occur throughout the life of the project.

Table 6.5: VRs Identified for Proposed Project

Category	VR	Importance	VR-Categorization
Air and Climate	Air quality	Required for good health	Medium
	Climate	Effect on climate change	Medium
Land	Soil quality	Effect on water quality	Medium
	Land based features	Sustainability issues, local use, cultural value; health implications for all users	High
Water	Surface/Fresh water quality	Health implications for all users	High
Land and Landscape	Visual Quality	Aesthetic Value	Medium
	Arable land for grazing	Land use/ user rights for grazing	Low
	Land for settlement	Suitable for dwellings and settlements	Medium
Project operations	Project structures/facilities	Meeting project objectives and schedules	High
Terrestrial Ecology an Biodiversity	Arthropods	Biodiversity value	Low
	Soil organisms (Earthworms)		
	Birds		
Human Environment	Local Labour Force	Employment opportunities	Medium
	Personnel (construction crew, site manager and operators)	Health and safety of workers avoiding injuries or loss of lives	High
	Population (community/ public)	Health and safety of people avoiding injuries or loss of lives	High

Category	VR	Importance	VR-Categorization
	Transportation	Source of National and International revenue	High
	Economic activities	Community welfare	Medium
	Social, health, cultural	Community welfare	Medium
	Interactions		

(Source; Consultant; 2023)

Impact Prediction

Impact prediction is a simple correlation between the identified impacts and project activities as shown in chapter six and the corresponding summary of the identified impact in Table 6.6.

Table 6.6: Correlation Matrix for the Identified Environmental Impacts

IMPACTS	PHASES			
	Mobilization	Construction	Operation	Decommissioning
Water Contamination	-1	-2	-3	-1
Air Pollutions (Fugitive Dust and Exhaust Emissions)	-2	-2	-1	-1
Soil contamination	-1	-2	0	0
Pollution from poor management of Liquid Waste	-1	-2	-2	-1
Vibration	-1	-1	0	0
Erosion of exposed surface	-2	-1	0	-2
Land Degradation from Extraction and Use of Building Materials	0	-1	-1	0
Spread of diseases i.e. HIV/AIDS	-1	-1	-2	-1
Increased Waste Generation	-1	-1	-2	-1
oil spills of the standby generator	0	-1	-1	0
Noise Pollution	0	0	0	-1
Abandoned structures	0	0	0	-1
Key:	Value	Meaning		
	0	No significant impact		
	-1	Low negative impact		
	-2	Medium negative impact		

IMPACTS	PHASES			
	Mobilization	**Construction**	**Operation**	**Decommissioning**
	-3	High negative impact		
	+1	Low positive impact		
	+2	Moderate positive impact		
	+3	High positive impact		

Table 6.7. Correlation Matrix for the Identified Social Impacts

IMPACTS	PHASES			
	Mobilization	**Construction**	**Operation**	**Decommissioning**
Worker's accidents and hazards	-1	-1	-2	-1
Spread of diseases i.e. HIV/AIDS	-1	-1	-2	-1
Increased traffic flow - Increased accidents	0	-1	-1	0
Occupational Health and Safety Hazards	0	-1	-1	0
Loss of life and property due to Fire outbreak and Other Related Environmental Disaster	0	-1	-1	-1
Noise Pollution	0	0	0	-1
Loss of employment	0	0	0	-1
Employment opportunities	+1	+1	+2	0
Local and National Economic Gains	0	+1	+2	0
Provision of Market for Supply of Building Materials	0	+1	+2	0
Informal Business Growth	0	+1	+3	0
Key:	Value	Meaning		
	0	No significant impact		
	-1	Low negative impact		
	-2	Medium negative impact		
	-3	High negative impact		
	+1	Low positive impact		
	+2	Moderate positive impact		
	+3	High positive impact		

6.5. Potential Impacts During Mobilization and Construction Phase

Construction phase shall begin with the site preparations for construction works to take place. Construction Impacts have the potential to create nuisance for students and residents in the neighbourhood, however these shall be managed within acceptable limits. In addition, the construction impacts are also temporary in nature.

6.5.1. Negative Environmental Impacts during Mobilisation and Construction phase

6.5.1.1. Air Pollutions (Fugitive Dust and Exhaust Emissions)

Particulate matter pollution is likely to occur during the site excavation and loading of the top soil, loading and transportation of the construction materials. There is a possibility of suspended particles affecting the site students, workers and even neighbours' health. Exhaust emissions are also likely to be generated by the construction equipment and machines during the construction phase. Motor vehicles used to mobilize the work force and materials for construction would cause a potentially significant air quality impact by emitting pollutants through exhaust emissions.

The air quality will be most affected during the demolition and construction phase with the emission of dust particles from machinery like excavators, electric grinders and mixer. For the reconstruction phase, air quality will be mostly affected from heavy plant, cement mixer, logistic of workers and other equipment. These might be associated with suspended particulate matters that might cause direct public health hazard and also create considerable nuisances to the public. Therefore, the potential for the mobilization and construction activities to cause adverse environmental effects to Ambient Air Quality due to vehicle exhaust emissions and fugitive particulate matter emissions is expected to be low. The impact significance is small. Mitigation measures will reduce or eliminate the impact.

6.5.1.2. Increased Waste Generation

During construction of the proposed project solid wastes will be generated. These include papers used for packing cement, Plastics and timber remains among others. Dumping around the site will interfere with the aesthetic status of the area. This has a direct effect to the surrounding community. Disposal of the same solid wastes off-site could also be a social inconvenience if done in the wrong places. Moreover, the construction workers will generate human waste during their day- to-day operations. The generated waste needs proper handling to prevent disease, for example diarrhoea, outbreak on site.

This impact is of medium significance and confined to the property boundaries. Appropriate mitigation measures and waste management plans need to be in place during both construction and operation to reduce the impact. With the mitigation measures in place, the residual impact is none to insignificant.

6.5.1.3. Noise Pollution

The construction works will most likely be a noisy operation due to the moving machines (mixers, tippers, communicating workers) and incoming vehicles to deliver construction materials and workers to site. However, the site workers are likely to be affected since noise beyond some level is itself a nuisance and need to be avoided. The main noise receptors will be neighbouring community located at a distance of 100m-200m from construction works. The noise level of heavy equipment and trucks is expected to range from 69dBA to 85dBA (Terminal, 2012).

Taking into consideration the technological growth in construction industry, it is expected that available modern machineries are versatile, quieter than the old ones and employ only a small number of skilled and unskilled workers. Therefore, the levels of noise and vibrations are anticipated to be within the tolerable limit. In view of the above and the fact that construction will concentrate on non-residential area, no significant impact is anticipated and the impact can be highly mitigated. Any unwanted sound ("noise") produced as a result of construction activities is expected to be intermittent and of relatively short duration, and will be limited to those periods during which construction activities are occurring. All construction related sound emissions are expected to remain at levels that are typical of industrial operations.

6.5.1.4. Soil and Water Quality Contamination

Project related excavation could lead to soil and ground water quality degradation. Contaminated soil or ground water in the path of the project could be disturbed by excavation resulting in a potential transfer of the contamination to surface waters. The excavated area, if linear could act as a conduit to extend groundwater contamination to new areas. Spills of hazardous materials in excavated areas during construction could introduce contaminants to ground water. The machines on site may be containing moving parts which will require continuous oiling to minimize the usual corrosion or wear and tear. Possibilities of such oils spilling and contaminating the soil and water on site are real. Likewise, moving vehicles on site may require oil change. However, the impact will be small and local. Appropriate handling of materials prone to contamination and waste management are likely to reduce the impact. It is expected that the impacts will be mild, local, and they will occur mostly during the construction stage (short term).

6.5.1.5. Land Degradation from Extraction and Use of Building Materials

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

6.5.1.6. Pollution from Poor Management of Liquid Waste

Lack or inadequate provision of toilets for use by workers can lead to defecation in secluded areas or structures on the site, thus creating unsanitary conditions and sources of fly infestation. This can threaten the health of neighbours and workers themselves. Indiscriminate sewage disposal can also result to contamination of underground water resources. With appropriate mitigation the impact is considered to be indirect, short term and insignificant.

6.5.1.7. Erosion of Exposed Surface

Site preparation for construction involves resurfacing the land scape compounded to inadequate compaction, trampling and vegetation clearance which led to soil erosion and consequently sedimentation in water bodies. Proper mitigation measures will reduce the impact, which is considered to be medium level, indirect and of short term.

6.5.1.8. Increased Traffic Flow and Accidents

The number of vehicles within the project area is likely to increase during mobilization and construction and this may lead to congestion and accidents along the road leading to the site. With proper mitigation measures, this impact which is of short term, direct and significant will be reduced.

6.5.1.9. Loss of Life and Property Due to Fire Outbreak and Other Related Environmental Disaster

It is expected that, minor welding works will be carried out on site, to save for repair of broken-down machines or vehicles. This poses a risk of fires if proper management are not put in place. Other sources of fire risks will be from various electrical uses. Proper mitigation measures will reduce the impact, which is considered to be medium level, indirect and of short term.

6.5.1.10. Occupational Health and Safety Hazards

During construction of the proposed project, it is expected that construction workers are likely to have accidental injuries and hazards as a result of handling hazardous waste. Because of the intensive engineering and construction activities including erection and fastening of roofing materials, metal grinding and cutting, concrete work, steel erection and welding among others, construction workers will be exposed to risks of accidents and injuries. At times, such injuries may be from accidental falls from high elevations, injuries from hand tools and construction equipment cuts from sharp edges of metal sheets and collapse of building sections among others. Furthermore, during construction phase, workers are also likely to be exposed to diseases from building materials. It is therefore recommended that before the construction commences, there is need for the materials to be well inspected according to the occupational health and safety standards.

With clear instructions, safety measures, awareness training and protective equipment in place there are no features of the Project that would result in a higher potential for accidents,

malfunctions, and unplanned events resulting in harm to workers, the public, or the environment to occur.

6.5.1.11. Loss of life and property due to Risks of Fire and Explosions

There are potential impacts to worker and community safety as well during the operation phase due to the risk associated with fire eruption due to electric shock. Fire and explosion hazards at retail sites may result from the presence of combustible gases and liquids, oxygen and ignition sources. Possible ignition sources include sparks associated with the build-up of static electricity, lightning, and open flames.

The impact is then considered to be negative of high significance.

6.5.2. Negative Social Impacts during Mobilisation and construction Phases

6.5.2.1. Occupational Health and Safety Hazards

The most significant occupational health and safety issues occur during the operational (mainly related buildings are very prone to fire hazards because of different types of combustible materials and machines which, are used and installed, respectively. Electrical fault is by large the main culprit in fire accidents in buildings in Tanzania. The components of a fire are fuel (combustible substance), heat and oxygen. Unless all three are present fire will not occur. Fire can cause the following effects:

- Loss of lives;
- Serious Injuries; and
- Loss of properties

Therefore, the impact is then considered to be negative of long-term duration and high significance.

6.5.2.2. Increased traffic jam

The number of vehicles within the area is likely to increase and this may lead to congestion and road accidents along the road leading to the site.

Therefore, the impact is then considered to be negative of long-term duration and low significance.

6.5.2.3. Increased in level of crimes

It is expected that the operation phase will recruit more staffs and enrol the students from the communities around and other from within and outside the country. In addition, the project will attract people from various areas to come and invest the provisions of good and services. The increase in Population increase will stimulate the growth of the trading centres around the project site. Experience and sociological point of view show that where there is a big concentration of people from various backgrounds and behaviour, levels of crimes and changes in norms and

behaviour are common. This is also is likely to be the case of the trading cen tres around the project site and other nearby areas.

Therefore, the impact is then considered to be negative of long-term duration and medium significance.

6.5.2.4. Prevalence of Communicable Diseases

Influx of students and employees from different part of the country will increase interaction, consequently increasing the risk of getting HIV/AIDS infections and other communicable diseases. That, the growth of trading centres in the area will attract different businesses and different people to the extent that the level of prostitution will also increase in the area provided that there will be employees from other areas of the country. Increased prevalence of communicable diseases like HIV/AIDS will likely to happen and consequently result to the increased number of orphans and single parenting in the project area as well as increased level of communicable diseases. This impact will be high and its effect will go internationally due to the fact that currently the world is like a village and that the Campus will attract both local and international students and will be a long-term impact.

Therefore, the impact is then considered to be negative of long-term duration and high significance.

6.5.2.5. Increased Incidence of GBV/SEA/SH

Projects like this can be a high-risk environment for GBV affecting community members, workers and service users. GBV risks can intensify within local communities when there are large influxes of male workers from outside the area. Such workers often come without their families and have large disposable incomes relative to the local community, and can pose a risk in terms of sexual harassment, violence and exploitative transactional relationships. These risks are higher where workers come into close contact with the local community, for example on access routes or when living together in remote areas. Addressing gender-based violence in construction projects improves workers' physical and emotional wellbeing and strengthens occupational health and safety also builds relationships and social license to operate in communities.

This negative impact is considered high and are likely to affect the local communities for a mid-term.

6.5.3. Positive Environmental Impacts during Mobilisation and Construction phase

There will be no significant positive environmental impact predicted during Mobilisation and Construction phase

6.5.4. Positive Social Impacts during Mobilisation and Construction phase

6.5.4.1. Employment Opportunities

Both direct and indirect forms of employment shall arise from the project initiation. Direct employment will be mainly through skilled and unskilled labourers whose workforce shall be needed to build the proposed project and accompanying building. Employment opportunities will be a benefit both in economic and social sense. In the economic sense it means abundant unskilled labour will be used in economic production. Several workers including casual labourers, masons, carpenters, joiners, electricians and plumbers are expected to work on the site for a period that the project will start to the end. Apart from casual labour, semi-skilled and unskilled labour and formal employees are also expected to obtain gainful employment during the period of construction.

6.5.4.2. Local and National Economic Gains

Both the local and national economy shall gain much from the project in those materials for building shall be sourced locally within the country and that all the materials are charged VAT hence increasing revenue collection in the country.

6.5.4.3. Provision of Market for Supply of Building Materials

The project will require supply of large quantities of building materials most of which will be sourced locally within the vicinity of the surrounding areas. This provides ready market for building material suppliers such as quarrying companies, hardware shops and individuals with such materials.

6.5.4.4. Informal Business Growth

During construction period the informal sector will benefit from the operations. This will involve people selling their products to be used on site. Such a move shall promote entrepreneurs in the local areas. Food business will also emerge as most of the workers who will be working on the proposed project site will be buying food from the informal business owners who shall be operating in the vicinity.

6.6. Potential Impacts During Operational Phase

6.6.1. Negative Environmental Impact During Operational Phase

Operational activities of the proposed project will associate with education, offices and workshops. These activities if managed improperly might have adverse impacts to the environment and human health. The impacts that might associate with the operation of the project are described in detail below:

6.6.1.1. Environmental Pollution from poor management of Solid Waste

The principal sources of waste may include the most significant source of solid waste includes papers, cardboards, boxes and food wastes and office solid waste. This waste would negatively impact the site and surrounding environment if not properly managed and disposed of at an

approved dumpsite. Solid waste, if allowed to accumulate in drainage ways, could cause localized pooling and flooding. Pooling of water, in turn, would create conditions conducive to the breeding of nuisance and health-threatening pests such as mosquitoes.

Poor solid waste management constitutes negative impacts, of short-term duration and of high significance.

6.6.1.2. Increased Surface/Storm runoff generation

The surface runoff from the building roof and paved ground will lead to increased volume and velocity of storm water or run-off flowing from the proposed project site. This will in turn lead to increased amounts of storm water entering the drainage system potentially resulting to additional flow.

Therefore, the impact is then considered to be negative of long-term duration and high significance.

6.6.1.3. Air Pollution (Dust, Noxious Gases) From Equipment and Machinery

Potential impacts on air quality resulting from operation of the proposed project and the respective facilities, (e.g., dust, fumes, CO_2, etc. from stand by generator, Air condition and other equipment).

Therefore, the impact is then considered to be negative of long-term duration and high significance.

6.6.1.4. Noise Pollution

During Operation, sound emissions are not expected to differ greatly from that associated with other nearby activities on the area. Residential properties are situated approximately 100-200 meters from the site boundary, and thus any sound emissions associated with the Operation of the Project should be attenuated to near background levels by the time they reach the nearest residential receptor. Therefore, the potential for sound emissions from the Project to adversely affect nearby residences or the general public is expected to be very low, and likely largely confined to the Project site.

The principal sources of noise at the building will be traffic movement and diesel generator running only during power outage. It is, therefore, concluded that the existing noise level, beyond the premises, will remain practically unaffected and would be within educational purpose areas' noise level standards. Mitigation measures will be required to reduce the impact for those who are potential for a prolonged exposure above allowable limits and for protection of other people working around the proposed project.

The impact is then considered to be negative of short-term duration and low significance.

6.6.2. Negative Social Impacts during operational Phase

6.6.2.1. Loss of life and property due to Risks of Fire and Explosions

There are potential impacts to worker and community safety as well during the operation phase due to the risk associated with fire eruption due to electric shock. Fire and explosion hazards at retail sites may result from the presence of combustible gases and liquids, oxygen and ignition sources. Possible ignition sources include sparks associated with the build-up of static electricity, lightning, and open flames.

The impact is then considered to be negative of high significance.

6.6.2.2. Occupational Health and Safety Hazards

The most significant occupational health and safety issues occur during the operational (mainly related buildings are very prone to fire hazards because of different types of combustible materials and machines which, are used and installed, respectively. Electrical fault is by large the main culprit in fire accidents in buildings in Tanzania. The components of a fire are fuel (combustible substance), heat and oxygen. Unless all three are present fire will not occur. Fire can cause the following effects:

- Loss of lives;
- Serious Injuries; and
- Loss of properties

Therefore, the impact is then considered to be negative of long-term duration and high significance.

6.6.2.3. Increased Traffic Jam

The number of vehicles within the area is likely to increase and this may lead to congestion and road accidents along the road leading to the site.

Therefore, the impact is then considered to be negative of long-term duration and low significance.

6.6.2.4. Increased In Level of Crimes

It is expected that the operation phase will recruit more staffs and enrol the students from the communities around and other from within and outside the country. In addition, the project will attract people from various areas to come and invest the provisions of good and services. The increase in Population increase will stimulate the growth of the trading centres around the project site. Experience and sociological point of view show that where there is a big concentration of people from various backgrounds and behaviour, levels of crimes and changes in norms and behaviour are common. This is also is likely to be the case of the trading centres around the project site and other nearby areas.

Therefore, the impact is then considered to be negative of long-term duration and medium significance.

6.6.2.5. Prevalence of Communicable Diseases

Influx of students and employees from different part of the country will increase interaction, consequently increasing the risk of getting HIV/AIDS infections and other communicable diseases. That, the growth of trading centres in the area will attract different businesses and different people to the extent that the level of prostitution will also increase in the area provided that there will be employees from other areas of the country. Increased prevalence of communicable diseases like HIV/AIDS will likely to happen and consequently result to the increased number of orphans and single parenting in the project area as well as increased level of communicable diseases. This impact will be high and its effect will go internationally due to the fact that currently the world is like a village and that the Campus will attract both local and international students and will be a long-term impact.

Therefore, the impact is then considered to be negative of long-term duration and high significance.

6.6.2.6. Increased Incidence of GBV/SEA/SH

Projects like this can be a high-risk environment for GBV affecting community members, workers and service users. GBV risks can intensify within local communities when there are large influxes of male workers from outside the area. Such workers often come without their families and have large disposable incomes relative to the local community, and can pose a risk in terms of sexual harassment, violence and exploitative transactional relationships. These risks are higher where workers come into close contact with the local community, for example on access routes or when living together in remote areas. Addressing gender-based violence in construction projects improves workers' physical and emotional wellbeing and strengthens occupational health and safety also builds relationships and social license to operate in communities.

This negative impact is considered high and are likely to affect the local communities for a mid-term.

6.6.2.7. Environmental Pollution from Poor Management of Wastewater

Waste water to be generated includes grey and black water from toilets. This wastewater would negatively impact the site and surrounding environment if not properly managed and disposed at an approved site. Wastewater, if poorly managed will result into eruption of waterborne diseases as it may contaminate clean water sources.

Therefore, the impact is then considered to be negative of long-term duration and high significance.

6.6.3. Positive Environment Impacts during operational phase

6.6.3.1. Improved environmental amenity

The scenery of the project site is expected to be more attractive as different plant species which include grasses, trees and herbs will be planted for the purpose of greening the open spaces to prevent soil erosion.

6.6.3.2. Conservation of plant and animal species

Establishment of botanical gardens and animal zoos for case studies at the institution will provide an opportunity for conservation of some plant and animal species that are threatened in the wild.

6.6.4. Positive Social impacts during operational phase

6.6.4.1. Employment Generation

Employment opportunities are one of the long-term major impacts of the proposed project that will be realized after construction and during the operation and maintenance of the proposed project as per proposed development.

6.6.4.2. Increase in Revenue

There will be positive gain for the revenue system arising from paying the Government Tax. This is in addition to the annual rates to be paid to the government.

6.6.4.3. Improved Security

Sufficient security arrangements at the proposed development project will ensure higher the level of security enhancement around the project area.

6.6.4.4. Diversification of MUST University

The proposed new campus will definitely make MUST a bigger university, with more learning facilities. More student's enrolment and an *increase diversity of courses* offered. This will bring both social and economic benefits to the nation. Also, the proposed project components shall provide adequate and conducive space for training, seminars, workshops etc. This impact is of high significance, and could be felt national level. The project will leave its mark, even after decommissioning, (those who gained knowledge will continue to benefit the nation).

6.7. Potential Impacts During Decommissioning Phase

6.7.1. Negative environmental Impacts during decommissioning Phase

6.7.1.1. Pollution from Increased Solid Waste

Demolition of the proposed development and related infrastructure will result in the accumulation of huge amounts of solid waste. This consists of materials used in construction including concrete, metal, drywall, wood, glass, paints, adhesives, sealants and fasteners. Large quantities of such

waste may lead to release of certain hazardous chemicals into the environment. In addition, even the generally non-toxic chemicals such as chloride, sodium, Sulphate and ammonia which may be released as a result of leaching of demolition waste, are known to lead to degradation of groundwater quality.

6.7.1.2. Air Pollution from Dust

Large quantities of dust will be generated during demolition works. This will affect demolition staff as well as the neighbouring residents. Personal Protective Equipment (PPE) should accordingly be provided.

6.7.1.3. Noise and Vibration

The demolition works will lead to significant deterioration of the acoustic environment within the project site and the surrounding areas.

6.7.2. Negative Social Impacts During Decommissioning Phase

The Project will be designed, built, and maintained to operate efficiently for several decades. The expected life span of the Project is approximately 99 years. However, in case of decommissioning the following negative impacts may happen:

6.7.2.1. Loss of Aesthetics due to Abandoned Project Facilities

In closure of the project, the proponent may decide to demolish the facilities including all other temporary structures. Loss of aesthetics may result from the demolished waste remaining on site for a long time to the extent of becoming an eyesore.

6.7.2.2. Loss of Employment Due to Closure of The Project

If for whatever reason the project is closed down, the people employed by the project will lose their jobs. This will have significant impact to these people and their families. Other groups of people who are dependent on the project, such as suppliers of various services (e.g., Security Company) will lose the market.

6.7.2.3. Loss of Revenue to Both Government and The Proponent

As discussed above both local and Central government will be receiving revenue from the project. In case of the decommissioning of the project, the revenue generated will cease.

6.7.2.4. Abandoned Infrastructure

If the proponent ceases operations there will remain behind machinery and structures which will need proper disposal. If proper decommissioning process is not done proponent may abandon buildings and other project facilities which may permanently render the project land useless.

6.7.3. Positive Environmental impacts during decommissioning Phase

6.7.3.1. Reduced waste generation

Termination daily operations of the institution will be followed by the reduced generation of gases waste from incineration, solid waste and liquid waste from all sources because of the depopulation.

6.7.3.2. Soil and Water Quality Contamination

During this phase, there will be minimal contamination of the water sources caused by the degradation of the land and discharge of waste from the project site.

6.7.4. Positive Social impacts during decommissioning Phase

6.7.4.1. Minimized Occupational Health and Safety Hazards

The is likely to experience minimal cases of occupational Health and safety risks are minimised as the process may involve a few individuals in activities pertaining to decommissioning. The most significant occupational health and safety issues are not expected in this phase because of minimal use of machines and materials some of which could be combustible.

6.7.4.2. Reduced traffic jam

The number of vehicles within the area is likely to decrease due reduced operational activities at the institution which will result into reduced traffic jam.

6.7.4.3. Increased in Level of Crimes

It is expected that the decommissioning phase may involve a few individuals if the phase will involve changes in the use of buildings from being education institution to other uses. In addition, the decommissioning will not attract people from various areas that being the case, the area will have low population that might experience low levels of crimes.

6.7.5. Consideration of Alternatives

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. The following alternatives have been considered and are examined hereunder:

6.7.6. Alternative Site

The action of using another site apart from that of the proposed one was also considered. However, the proposed site was observed to have the following advantages over others,

(i) The place is owned by proponent (No need to buy a new piece of land);
(ii) The plot is located on a favourable piece of land;
(iii) The site is easily accessible from many parts of the City and MUST, and is connected to all utilities needed such as electricity and potential water services infrastructure including public sewerage system (MBEYA UWSA);
(iv) Soil is suitable for construction;

(v) Land is general flat therefore allow economical construction and design of building.

6.7.7. Energy Alternative

The use of other alternative energy sources apart from power from TANESCO and diesel generators was considered. As it is the case in most of developing countries, supply of electricity from national grids is not reliable as it mostly originates from hydroelectric power generators, which depend on rainfall frequency, intensity and pattern. On the other hand, diesel generators, which are mainly used during power interruptions, emit a lot of greenhouse gases especially when they are feasibility of using this alternative. In this case, solar energy was considered as a viable alternative; therefore, the proponent will use solar energy as an alternative source in case of power outrage.

6.7.8. Waste Water Management Alternatives

Alternative one: Use of stabilization ponds/lagoons

This refers to the use of a series of ponds/lagoons which allow several biological processes to take place, before the water is released back to the water body. Speaking of space this method requires a large field for natural treatment to take place which is not available at the proposed building site. Furthermore; lagoons will present vulnerable situations due to tress passers. They are usually a nuisance to the public because of smell from the lagoons/ponds. However, with strict and professional management, they are the most economical and environmentally sound in the long term.

Alternative two: Constructed wetland

Constructed wetlands are engineered system designed and constructed to copy natural processes taking place in the natural wetlands. Constructed wetlands remove pollutants in wastewater through the combination of physical, biological and chemical processes. They are either subsurface flow where the flow is below the surface of soil or surface flow where the flow of wastewater is above the soil.

Conclusion: Proponent will opt the use public sewage system of Mbeya region.

6.7.9. Water Supply Alternative

Water is becoming a scarce resource by the day in the area and generally in the City. Therefore, the proposed buildings looked into methods of sustaining water supply.

Alternative one: Water Supply from the operating water utility company

Water supply from the operating water utility company (MBEYA UWSA): - the option is considered to be appropriate as the water supply network is connected to the site and therefore can guarantee reliable, clean and safe water supply to the proposed buildings.

Alternative Two: Groundwater Extraction

Statistics from Mbeya City Council and within the vicinity of the proposed project area suggest that ground water is another alternative option for water supply and can supplement the water supply at the project site at such times of water shortage and scarcity. It has to be noted that before establishing the groundwater as sources of water supply, an investigation in terms of groundwater quantity and quality has to be thoroughly carried out and ascertained.

Alternative three: Rainwater Harvesting

This is another option that has to be looked at. The rainwater will be harvested from both roof and land catchment. It will entail the design of rainwater harvesting system.

Conclusion: The proponent chooses to connect to the MBEYA UWSA and Rain water harvest supply system as the most reliable service since it has been the most consistent service. However, to cope with the infrequent supply, underground water storage tanks with capacity of 200,000 litres will be installed.

6.7.10. Solid Waste Management Alternatives

The proposed project will generate some quantities of solid waste from lecture rooms, staff offices, workshops, conference room and dining areas.

Alternative one: Integrated solid waste management system

Source reduction: Proponent will give priority to reduction at source of the materials. This option will demand solid waste management awareness program.

Recycling, Reuse and Composting of the waste will be the second alternative in priority. This will call for a source separation program to be put in place. The recyclables will be sold to authorised buyers and among them include Selutech Company Limited, P. O. Box 1130, Mbeya located in SIDO area Mbeya City.

Alternative two: Transportation of waste

- Transfer the collected amount of waste from the special designated equipment and machines into lager skip-type containers. The containers have to be placed at well-accessible, strategically chosen sites.
- Transport of the loaded containers to the Nsalaga dumpsite and exchange of containers, so as to guarantee permanent disposal capacity at the container sites. The containers are exchanged and the transport vehicles operate continuously between different sites and the dumpsite.

Conclusion: Proponent will opt the use of an integrated solid waste management system.

6.7.11. The ‘‘No Action Alternative’’

The ‘‘No action’’ alternative is required to ensure the consideration of the original environment without any development. This is necessary for the decision makers in considering all possibilities. The selection of the ‘‘No Action’’ alternative would mean the discontinuation of the project designs and result in the site being retained in its existing form.

The ‘‘No action’’ alternative is difficult to consider as a viable option due to the pre-existing investments which have been incurred by the proponent**.** One of the costliest investments that have been incurred prior to project approval is land purchase, the design costs and Environmental Assessment costs. Moreover the “The No Action” alternative if adopted has negative implication as it leads to the loss of the opportunities to access education in a diversified manner with new fields of specialization for the surrounding communities and the nation at large.

CHAPTER SEVEN

7. MITIGATION MEASURES

7.1. Introduction

This part provides measures or interventions that shall be implemented for minimizing the potential negative impacts and enhancing the positive impacts identified in the preceding chapter. Many of the mitigation measures put forward are engineering practice that shall have to be adhered to in all project phases.

7.2. Mobilization / Construction Phase

7.2.1. Benefits to Communities Resulting from Employment

(i) The proponent shall be encouraged to employ local, unemployed yet willing to work hard, manpower to the extent viable subject to a maximum of 50% unskilled labour. This will ensure that local people are more benefited out of the project;
(ii) Employment should be on equal opportunities for both gender;
(iii) Proponent shall provide on job and safety training; and
(iv) Proponent shall not cause children under the age eighteen (18) to be employed or be engaged in any project activities.

7.2.2. Noise Pollution

(i) Noise levels in the project area and receptors communities shall be monitored and recorded to ensure that activities at the site are not exceeding standards;
(ii) Workers will be provided with personal protective equipment (PPE) such as ear plug/muffins/masks during construction and especially workers working in noisy areas;
(iii) Concrete mixing will be done away from existing buildings area;
(iv) Additionally, work will be carried out only during the day;
(v) Vehicles and equipment will be maintained and serviced as required to ensure they do not generate excessive noise;
(vi) Trucks carrying construction materials shall be restricted during day hours;
(vii) Operators of machines with significant noise levels in various sections shall be provided with noise protective gears;
(viii) Construction equipment shall be selected, operated and maintained to minimize noise;
(ix) The workforce shall be educated on the issue of maintaining tranquillity;
(x) Strict instructions should be given for drivers of heavy equipment; and
(xi) Communication line must be ensured in between workers and drivers of heavy equipment.

7.2.3. Air Pollution

(i) Regular maintenance of all equipment on site will be conducted as a way of reducing emissions of noxious gases. Equipment maintenance will be undertaken in accordance with manufacturer's instructions and at the specified maintenance interval;

(ii) Adequate training and use of personal protective equipment (PPE) such as eye goggles and dust masks will be ensured in order to reduce risks associated with dust. Also, during material transport, trucks used for that purpose will be fitted with tailgates that close properly and with tarpaulins to cover the materials so that there is no loss of dust visible more than 2m from the emission source;

(iii) Also, on loading one inch will be left on top of the truck to avoid accidental spillage of materials;

(iv) Stockpiles of soil and vegetative debris generated during site clearing activities shall be monitored and maintained to eliminate generation of fugitive dust.

(v) These materials will be kept at designated area that will be secured and material covered with water proof nylon material to avoid dust generations;

(vi) Equipment and vehicles shall be properly maintained in a fully serviceable condition to further Minimize gases pollution; and

(vii) Inspect roads daily for dust generation and sprinkle for dust suppression when needed.

7.2.4. Pollution from poor management of solid wastes from Construction/Installation Activities

- Wastes which are difficult to dispose will be minimized and where practicable avoided such as plastic wastes i.e. container/bottles and bags at the area or sell to recyclers for those which are recyclable;
- Contractor will reduce-reuse-recycle;
- All of the solid wastes that will be remain after reduction-reuse-recycling will be collected, accumulated and sent to Disposal site at City dumpsite/landfill.

7.2.5. Occupational Accidents at the Work Place

Slips and Fall

(i) Implementing good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths

(ii) Cleaning up excessive waste debris and liquid spills regularly

(iii) Locating electrical cords and ropes in common areas and marked corridors

(iv) Use of slip retardant footwear

(v) The contractor will prepare a Health and safety Plan for mitigation of the accidents and prevention of electrocution hazards

Work in Heights

(i) Training and use of temporary fall prevention devices, such as rails or other barriers able to support a heavy load, when working at heights equal or greater than two meters or at any height if the risk includes falling into operating machinery, into water or other liquid, into hazardous substances, or through an opening in a work surface. The BS EN 12811-1:2003, Temporary works equipment Part 1: Scaffolds — Performance requirements and general design will be considered when designing scaffolds and temporal support structures;

(ii) Training and use of personal fall arrest systems, such as full body harnesses and energy absorbing lanyards able to support heavy loads (also described in this section in Working at Heights above), as well as fall rescue procedures to deal with workers whose fall has been successfully arrested;

(iii) The tie in point of the fall arresting system should also be able to support heavy loads; and

(iv) Use of control zones and safety monitoring systems to warn workers of their proximity to fall hazard zones, as well as securing, marking, and labelling covers for openings in floors, roofs, or walking surfaces.

Struck by Objects

(i) Using a designated and restricted waste drop or discharge zones, and/or a chute for safe movement of wastes from upper to lower levels;

(ii) Conducting sawing, cutting, grinding, sanding, chipping or chiselling with proper guards and anchoring as applicable;

(iii) Maintaining clear traffic ways to avoid driving of heavy equipment over loose scrap;

(iv) Use of temporary fall protection measures in scaffolds and out edges of elevated work surfaces, such as hand rails and toe boards to prevent materials from being dislodged;

(v) Wearing appropriate PPE, such as safety glasses with side shields, face shields, hard hats, and safety shoes; and

(vi) Institute good site practices including prevent public access to the construction site by securing equipment and demarcate excavate, using warning signs with appropriate text (local language) and graphic displays;

Moving Machinery

(i) Planning and segregating the location of vehicle traffic, machine operation, and walking areas, and controlling vehicle traffic through the use of one-way traffic routes, establishment of speed limits, and on-site trained flag-people wearing high-visibility vests or outer clothing covering to direct traffic;

(ii) Ensuring the visibility of personnel through their use of high visibility vests when working in or walking through heavy equipment operating areas, and training of workers to verify eye contact with equipment operators before approaching the operating vehicle;

(iii) Ensuring moving equipment is outfitted with audible back-up alarms; and

(iv) Using inspected and well-maintained lifting devices that are appropriate for the load, such as cranes, and securing loads when lifting them to higher job-site elevations.

Disease prevention

(i) Awareness campaigns /Education on HIV and STDs shall be provided to workers;
(ii) A well-stocked First Aid kit (administered by medical personnel) shall be maintained at construction site. The medical personnel shall also be responsible for primary treatment of ailments and other minor medical cases as well as providing health education to the workforce;
(iii) Reporting mechanisms for the public to register concerns or complaints regarding perceived risks to their health Emergency contact details in the event of an accident shall be provided;
(iv) Training all contractor staff in emergency planning and management; and
(v) Developing a detailed health and safety plan and training all contractor staff on the plan.

Over-exertion, and ergonomic injuries and illnesses

(i) Training of workers in lifting and materials handling techniques in construction projects, including the placement of weight limits above which mechanical assists or two-person lifts are necessary;
(ii) Planning work site layout to minimize the need for manual transfer of heavy loads;
(iii) Selecting tools and designing work stations that reduce force requirements and holding times, and which promote improved postures, including, where applicable, user adjustable work stations; and
(iv) Implementing administrative controls into work processes, such as job rotations and rest or stretch breaks.

7.2.6. Contamination from poor management of liquid Wastes

(i) During construction phase the workers will be told to use the constructed sanitation facilities (toilets) constructed by the contractor within the project area, to minimize environmental pollution that could occur. There will be located signs to give directions to the existing washrooms; and
(ii) During construction, the contractor shall ensure that the construction site is fenced and hygienically kept with adequate provision of facilities including waste disposal receptacles, sewage, fire fighting and clean and safe water supply.

7.2.7. Possible Intensification of HIV/AIDS and Other Standards

(i) Workers will be sensitized on the issue of HIV/AIDS and STDs and on the usage condoms etc;
(ii) Establishment and implementation of HIV/AIDS awareness and prevention programs;
(iii) HIV/AIDS testing will be conducted and counselling services will be done; and
(iv) Providing protection gears where needed such as condoms.

7.2.8.21Traffic jam along main and adjoining road

(i) The contractor will prepare a Traffic Management Plan
(ii) Construction activities that might substantially disrupt traffic e.g. delivery of materials should not be performed during peak travel periods to the maximum extent practicable;
(iii) Warning signs should be used as appropriate to provide notice of road hazards and other pertinent information to motorists and the general public;
(iv) Signage and barricades should be used as part of the typical construction traffic controls; and
(v) It is recommended that to further mitigate the negative impacts due to traffic, the contractor and the proponent are expected to adhere to By-Laws and Tanzania Traffic Laws.

7.2.9. Contamination from hydrocarbons

(i) The generator must be keenly observed not to leak oils on the ground; and
(ii) Maintenance must be carried out in a designated area and where oils are completely restrained from reaching the ground. Such areas should be covered to avoid storm from carrying away oils into the soil or water systems. Secondary containment will be constructed in case of leaks in the containers. Waste water/ wash water from these areas should be properly disposed.

Negative Social Impacts

7.2.10. Community health, safety risks and security from the handling, transport, and disposal of construction wastes

(i) Institute good site practices including prevent public access to the construction site by securing equipment and demarcate excavate, using warning signs with appropriate text (local language) and graphic displays;
(ii) Appropriate working gear (such as nose, ear and mouth mask and clothing) and good construction site management shall be provided;
(iii) A well-stocked First Aid kit (administered by medical personnel) shall be maintained at construction site. The medical personnel shall also be responsible for primary treatment of ailments and other minor medical cases as well as providing health education to the workforce;
(iv) Reporting mechanisms for the public to register concerns or complaints regarding perceived risks to their health and safety due to the construction operation should be put in place;
(v) Emergency contact details in the event of an accident shall be provided;
(vi) Develop and implement an emergency plan including spill response;
(vii) Training all contractor staff in emergency planning and spill response; and
(viii) Developing a detailed health and safety plan and training all contractor staff on the plan.

7.2.11. Gender Based Violence

The project will prepare a GBV Action Plan that ensures project awareness raising strategy (for workers and community members), a list of GBV service Providers to which GBV survivors will be referred, revisions to the GRM to ensure it can address GBV complaints, and information on GBV allegation procedures in the workplace.

7.2.12. Gender Discrimination

This project will ensure that there is involvement of women in project activities.

7.2.13. Child Labour

(i) MUST will conduct regular monitoring of project workers in relation to health, working conditions, hours of work, minimum age, and the other requirement of national law.
(ii) Work with local authorities and schools in the area to control school drop out
(iii) Cooperate with relevant authorities like Ministry of Labour to control child labour
(iv) Create awareness raising to the communities on the importance of education to the children
(v) The local authorities should develop bylaws to control the engagement of children in petty business or work in project related activities

7.2.14. Increased level of crimes

The following measures are very vital in minimizing the problem of crime:
(i) Establish community-based security in collaboration with village/ward leaders;
(ii) The contractor shall establish his own security to protect his properties and should establish community policing to support insufficient police force;
(iii) The community should be encouraged to participate in security matters by providing information on suspects; and
(iv) The cooperation of local people together will help to lessen criminal incidents and maintain security of people and their properties.

7.3. Operation Phase

7.3.1. Increased Revenue

- Project activities shall pay Taxes including Property tax, city Levy, VAT, loyalty etc. on time.

7.3.2. Employment Opportunities

- Recruitment of skilled and non-skilled labours will be done with priorities to people from the area surrounding the project area.
- Proponent shall not cause children under the age eighteen (18) to be employed or be engaged in any proposed project activities.

7.3.3. Air Pollution

- Institution management will conduct regular maintenance of all equipment on site as a way of reducing emissions of noxious gases and improve working mechanisms and thus reduce emission of the moving parts;
- Proper aeration within the premises; and
- Conduct air quality monitoring quarterly.

7.3.4. Contamination from Poor Management of Solid Waste

(i) Waste bins will be provided in the area for waste segregation in the project area;
(ii) Waste management by reduction reuse and recycling will be implemented by the institution management.
(iii) Wastes which will be inadvertently dumped in unauthorized locations will be removed immediately and disposed at an approved site;
(iv) Hazardous waste will be separated from non-hazardous waste for appropriate disposal of non-hazardous waste and selling to the authorized dealers; and
(v) Workers' training will include instructions on how to dispose of food and drink containers emphasizing the need to protect the environment.

7.3.5. Safety and Health risks

(i) Institution management will provide formal training in safe work practices for all personnel in the Institution and related areas;
(ii) Available good designated and labelled emergency assembly area for any emergency escape for the employee and students;
(iii) There will be a good placed safety warning signs designated in the strategic area;
(iv) Conduct basic occupational training programs and specialty courses as needed, to ensure that workers are oriented to the specific hazards of individual work assignments. Training should generally be provided to management, supervisors, workers, and occasional visitors to areas of risks and hazards;
(v) Conduct statutory assessments i.e., risk assessments, fire safety audits and Occupational Safety and Health audits annually;
(vi) Conduct statutory trainings under OSHA, 2003;
(vii) Provide adequate lighting in all workrooms;
(viii) Passageways for pedestrians and vehicles within and outside buildings should be provided segregated and for easy, safe, and appropriate access;
(ix) Provision of fire fighting equipment in strategic and well labelled sites;
(x) Conduct drills at reasonable intervals to test the disaster preparedness level at the workplace, using the results to improve the response mechanisms;
(xi) Materials handling operations should follow the instructions of use given by the manufacturer (Material Safety Data Sheets);
(xii) Train workers on safe work practices, and provide appropriate PPE;

(xiii) Restriction of access to high-risk areas to authorized personnel only i.e. high voltage area;
(xiv) Train staff on how to prevent and manage incidences. This should involve proper handling of electricity, water etc. and sensitization on various modes of escape, conduct and responsibility during such incidences;
(xv) Regular safety drills to constantly follow on various possible incidences;
(xvi) Use signage to warn staff and/ or visitors of dangerous places. The signage must be visible and placed strategically; and
(xvii) Develop evacuation procedures to handle emergency situations.

7.3.6. Disruption of Traffic Flow

(i) Provide clear entry, exit ways, indicate relevant traffic signs "give Way"
(ii) Provide adequate parking within the proposed project
(iii) Parking strategy: there will be 11 parking lots in the project that will accommodate many cars; and
(iv) There are dedicated exits and entries for cars and ambulance.

7.3.7. Noise Pollution

- Install gen-sets whose noise levels are within the noise generating equipment limits; and
- Import generators with minimum noise level generation.

7.3.8. Loss of Life Due to Fire Outbreak/Fire/Electrical Hazards

(i) Install an automatic fire hydrant system which will trigger automatically during fire eruption/outbreak;
(ii) Provide fire hazard signs such as 'No Smoking' signs, direction to exit in case of any fire incidence and emergence contact numbers should be provided;
(iii) The compound should be kept clean and free from fire hazards and litter;
(iv) Install fire control appliances (portable fire extinguisher; both CO_2, dry powder and water type,) and employees should be adequately instructed periodically in the use of the various fire appliances.
(v) Conduct regular drills/simulations to sensitize the workers once a year;
(vi) Regular repair and maintenance program for all equipment;
(vii) Make sure better lighting arrester are installed in a right place; and
(viii) Workers will be trained on fire emergency response by authorized officers from Fire and Rescue Force Office. The training program will be in every year to keep the workers up to dated. Also, the proponent has adopted its own Emergency preparedness plan for handling emergency such as fire.

7.3.9. Increased Surface/Storm Runoff

(i) Proper drainage channels will be constructed to drain rain water run off to the drainage channels of the road nearby;

(ii) Ensure that sewerage discharge pipes are not blocked or damaged since this can lead to release of the effluent, resulting in land and water contamination. This will be done through continuous and regular inspection and maintenance of the system. Blockage or damages will be fixed expeditiously;
(iii) Monitor effluent quality regularly to ensure that the stipulated discharge rules and standards are not violated; and
(iv) Harvest rainwater from roof for non-portable uses e.g. cleaning and watering plants.
(v) The design will include provisions to enhance infiltrations and reduction of water runoffs

7.3.10. Contamination from Poor Management of Liquid Waste

All liquid wastes will be properly directed to the public sewerage system of Mbeya city.

7.3.11. Increased Incidences of Diseases and Ill Health

(i) A safety, health and environment induction course shall be conducted to all students and workers, putting more emphasis on HIV/AIDS, which has become a national disaster as well as other emerging pandemics such as COVID 19 and dengue fever;
(ii) The project shall include information education and communication component (IEC) in its budget. This will help to raise more awareness on HIV/AIDS, and means to suppress its incidence;
(iii) Environmental sanitation systems shall be regularly improved; and,
(iv) Adequate medical services shall be made available at the University dispensary for meeting the population demand.

7.3.12. Gender Based Violence

The project will prepare a GBV Action Plan that ensures project awareness raising strategy (for workers and community members), a list of GBV service Providers to which GBV survivors will be referred, revisions to the GRM to ensure it can address GBV complaints, and information on GBV allegation procedures in the workplace.

7.3.13. Increased Incidence of GBV/SEA/SH

The project will prepare a GBV Action Plan that ensures project awareness raising strategy (for workers and community members), a list of GBV service Providers to which GBV survivors will be referred, revisions to the GRM to ensure it can address GBV complaints, and information on GBV allegation procedures in the workplace.

7.3.14. Child Labour

(i) MUST will conduct regular monitoring of project workers in relation to health, working conditions, hours of work, minimum age, and the other requirement of national law;
(ii) Work with local authorities and schools in the area to control school dropout;
(iii) Cooperate with relevant authorities like Ministry of Labour to control child labour;

(iv) Create awareness raising to the communities on the importance of education to the children; and
(v) The local authorities should develop bylaws to control the engagement of children in petty business or work in project related activities.

7.3.15. Increased Level of Crimes

(i) Establish community-based security in collaboration with village/ward leaders;
(ii) The contractor shall establish his own security to protect his properties and should establish community policing to support insufficient police force;
(iii) The community should be encouraged to participate in security matters by providing information on suspects; and
(iv) The cooperation of local people together will help to lessen criminal incidents and maintain security of people and their properties.

7.3.16. Prevalence of Communicable Diseases

(i) Provide awareness to public on pathways of communicable diseases;
(ii) Provide Voluntary Counselling and Testing (VCT) centres for HIV/AIDS;
(iii) Work close to government and private institutions that deal with the spread of communicable diseases;
(iv) A safety, health and environment induction course shall be conducted to all students and workers, putting more emphasis on HIV/AIDS, which has become a national disaster as well as other emerging pandemics such as COVID 19 and dengue fever;
(v) The project shall include information education and communication component (IEC) in its budget. This will help to raise more awareness on HIV/AIDS, and means to suppress its incidence;
(vi) Environmental sanitation systems shall be improved; and,
(vii) Adequate medical services shall be made available at the campus and surrounding communities of Iyunga for meeting the population demand.

7.4. Decommissioning Phase

7.4.1. Loss of Employment Opportunities

- For decommissioning to take place properly and in good time, several people will be involved. As a result, several employment opportunities will be created for the demolition.

7.4.2. Livelihoods and Economic Loss

- Businesses associated with the development should be notified of intention of decommissioning in good time, so as to adjust;
- Redeployment of the affected workers where feasible.

7.4.3. Solid Waste Generation

(i) All solid waste to be collected at a central location, and be stored temporarily until removal by a licensed solid waste handler;
(ii) Contractor should adopt the method of selective demolition as far as practicable to enable the removal of wastes of the same category one at a time thus facilitating recycling of wastes for beneficial reuse and minimizing the burden on dumpsites;
(iii) No dumping within the surrounding area is to be permitted. Where potentially hazardous substances are being disposed of, a chain of custody document should be kept with the environmental register as proof of final disposal. General waste is to be collected either by the town council or via a licensed waste disposal contractor. The frequency of collections should be such that waste containment receptacles do not overflow;
(iv) Waste generated at the site should be categorised by the contractor and disposed of in a suitable manner into different waste streams (including general and hazardous waste). Wherever possible recycling should be carried out;
(v) Litter generated by the construction crew must be collected in rubbish bins and disposed of weekly at registered waste disposal sites;
(vi) All rubble must be removed from the site to an approved disposal site as approved by the Engineer. Burying rubble on the site is prohibited;
(vii) Ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on the premises is placed, dumped or deposited on adjacent/surrounding properties during or after the decommissioning period of the project; and
(viii) These have to be disposed of at dumping site as approved by the Mbeya City Council.

7.4.4. Pollution from Excessive Noise

(i) Demolishing machinery shall be kept in good condition e.g. greasing to reduce noise generation from friction of movable parts;
(ii) Generators and heavy-duty equipment be insulated or placed in enclosures to minimize noise levels during demolition works;
(iii) Obtain special permit from NEMC to undertake demolitions works; and
(iv) Ensure that noise and excessive vibration from construction activities are within permissible levels as per the provision of the Environmental Management (Air Quality Standards) Regulations, 2007. This includes among others adhering to permissible noise and vibration level.

7.4.5. Pollution from Dust and Exhaust Emissions

(i) Strict enforcement of onsite speed controls as well as limiting unnecessary traffic within the demolition site;
(ii) Demolition site will be fenced off using tarpaulins;
(iii) Friable loads of construction debris being transported must be watered to reduce dust;

(iv) All areas disturbed during closure of the site that are not required for a specific activity must be re- vegetated; and
(v) Diesel exhaust emissions from heavy machinery on site (excavators, front end loaders and hauling trucks) must be controlled and minimized by regular checks and servicing of vehicles. Any construction vehicle found to be emitting excessive smoke should be withdrawn from the operations and accorded the necessary mechanical attention before it can continue.

7.4.6. Occupational /Public Health and Safety Hazards

(i) Decommissioning works workers be issued with appropriate PPEs and the decommissioning contractor to enforce their use;
(ii) Restrict onlookers/scavengers from site;
(iii) Develop safe work procedures for demolition works;
(iv) Ensure that pits left behind by the project are backfilled or slopes evened out and re-vegetated using indigenous vegetation species;
(v) Identify, clear and mark all excavations in the area that cannot be covered and that are not being used by the project so that they can be clearly identified from far; and
(vi) Erect barrier fencing around all excavations identified and regarded as posing danger to human and animal life as well as the placement of danger signs.

7.4.7. Contamination from Accidental Spills

(i) Ensure employees are aware of the procedure for dealing with spills and leaks;
(ii) The source of the spill should be isolated and the spillage contained using sand berms, sandbags, sawdust and/or absorbent material;
(iii) The area should be cordoned off and secured;
(iv) Notify the relevant authorities of any spills that occur; and
(v) Ensure that the necessary materials and equipment for dealing with the spills and leaks is available on site at all times

CHAPTER EIGHT

8. ENVIRONMENTAL AND SOCIAL IMPACT MANAGEMENT PLAN

8.1. Impact Management Plan

Plans for the implementation of mitigation measures for the proposed project are provided below. The Plans indicate institutional responsibilities, time to take the action and estimated costs. The proposed costs are only indicative, should the proposed development proceed with the suggested changes, the proponent will work out on actual costs and include them in the overall cost of the project. Based on the EMA, (URT 2004), NEMC is required to ensure compliance of all the agreed conditions for authorization. The measures are given in table 8.1. Proponent is committed to implement the mitigation measures suggested by the Environmental and Social Impact management Plan (ESMP).

8.2. 123Implementation of the Management Plan

The environmental and social mitigation measures incorporated in the detailed engineering design shall be handed over to the contractor during construction period. The Contractor shall take stock of the contents of the Environmental and Social Management Plan of the Project. The contractor shall prepare and implement the Contractor's Environmental & Social Management Plan (C-ESMP) during the construction period. During the Operation Phase, proponent and the real estate department will manage the proposed buildings to implement the ESMP.

Table 8.1: Environmental and Social Management Plan

No.	Nature of Negative environmental/Social Impacts	Mitigation Measures	Responsibility	Cost per year (TZS)
1	**Construction Phase**			
A)	**Environmental Impact**			
(i)	Noise Pollution	• Noise levels along the perimeters of the project area and other affected communities beyond the project site shall be monitored and recorded to ensure that activities at the site are not exceeding standards; • Workers will be provided with personal protective equipment (PPE) such as ear plug/muffins/masks during construction and especially workers working in noisy areas; • Concrete mixing will be done away from residential area; • Additionally, work will be carried out during the day; • Vehicles and equipment will be maintained and serviced as required to ensure they do not generate excessive noise; • Construction equipment, with noise sinks, shall be used; • Trucks carrying construction materials shall be restricted during day hours; • Operators of machines with significant noise levels in various sections shall be provided with noise protective gears;	MUST and the Contractor	2,000,000.00

		• Construction equipment shall be selected, operated and maintained to minimize noise; • The workforce shall be educated on the issue of maintaining tranquillity;		
(ii)	Health and safety hazards	• Accidents will be minimized through proper maintenance of the machines, protecting or guarding the cutting edges, and awareness of the people including workers on the dangers and make them understand how to protect themselves and others; • Supervisors will ensure that safety measures are in place and are enforced (implemented) including safety equipment; • Also, the contractor shall provide adequate training to construction workers on the health impacts of the construction and shall provide protective gears to construction workers; • Contractor shall prepare Health and safety Plan as a free-standing document • Approved working hours shall be observed in order to avoid careless mishandling due to fatigue; • Appropriate working gear such as ear mask and good construction site management shall be provided; • During construction the contractor shall ensure that the construction site is fenced and hygienically kept with adequate provision of facilities including waste disposal receptacles,	MUST and the Contractor	4,000,000.00

		sewage, and firefighting equipment, clean and safe water supply to the building; • A well-stocked First Aid kit (administered by qualified medical personnel)		
(iii)	Traffic jam	• Construction activities that might substantially disrupt traffic e.g. delivery of materials should not be performed during peak travel periods to the maximum extent practicable; • The contractor shall prepare a Traffic Management Plan • Warning signs should be used as appropriate to provide notice of road hazards and other pertinent information to motorists and the general public; • Signage and barricades should be used as part of the typical construction traffic controls; and • It is recommended that to further mitigate the negative impacts due to traffic, the contractor and the proponent are expected to adhere to By-Laws and Tanzania Traffic Laws.	MUST and the Contractor	1,000,000.00
(iv)	Pollution from poor management of Solid Waste	• Segregate waste onsite; • Ensure that waste is disposed of according to EMA 2004 and solid waste management regulation of 2009 • Contracted waste handlers should be licensed to transport and dispose waste at approved dumpsites only • Wastes which are difficult to dispose will be minimized and where practicable avoided such as plastic wastes i.e. container/bottles and bags at the	MUST and the Contractor	1,000,000.00

		area or sell to recyclers for those which are recyclable; • The contractor will also put in place different waste bins for segregation on site and to discourage uncontrolled waste disposal; • Contractor will reduce-reuse-recycle; • All solid wastes remaining after reduction-reuse-recycling will be collected, accumulated and sent to Disposal site at City dumpsite/landfill.		
(v)	Pollution from poor management of liquid Waste	• Provide adequate sanitary (toilets and bathroom) facility during construction with signs to give directions to the existing washrooms	MUST and the Contractor	1,500,000.00
(vi)	Air Pollution	• Regular maintenance of all equipment on site will be conducted as a way of reducing emissions of noxious gases. Equipment maintenance will be undertaken in accordance with manufacturer's instructions and at the specified maintenance interval; • Adequate training and use of personal protective equipment (PPE) such as eye goggle and dust masks will be ensured in order to reduce risks associated with dust. Also, during material transport, trucks used for that purpose will be fitted with tailgates that close properly and with tarpaulins to cover the materials so that there is no loss of dust visible more than 2m from the emission source;	MUST and the Contractor	3,000,000.00

		• Inspect roads daily for dust generation and sprinkle for dust suppression when needed; • Equipment and vehicles shall be properly maintained in a fully serviceable condition to further Minimize gases pollution; and • Locate haul – roads, and stockpiles away from sensitive receptors; considering prevailing wind directions		
(vii)	Possible Intensification of HIV/AIDS and Other Standards	• Workers will be sensitized on the issue of HIV/AIDS and STDs and on the usage condoms. • Establishment and implementation of HIV/AIDS awareness and prevention programs. • HIV/AIDS testing will be conducted and counselling services will be done; and • Providing protection gears where needed such as condoms.	MUST and the Contractor	2,500,000.00
(viii)	Soil erosion	• Divert surface runway water away from structure • Maintaining gravel fill and/or re-vegetate around the structures or as specified by the consultant • Construct drainage system all around the buildings and along the roads.	MUST and the Contractor	10,000,000.00
2	**Operational Phase**			
A)	**Environmental Impact**			

(i)	Increased Surface/Storm runoff generation	• The design will include provisions to enhance infiltrations and reduction of water runoffs • Ensure that sewerage discharge pipes are not blocked or damaged since this can lead to release of the effluent, resulting in land and water contamination. This will be done through continuous and regular inspection and maintenance of the system. Blockage or damages will be fixed expeditiously; • Monitor effluent quality regularly to ensure that the stipulated discharge rules and standards are not violated; and • Harvest rainwater from roof for non-portable uses e.g. cleaning and watering plants	MUST	10,000,000.00
(ii)	Pollution from poor management of liquid wastes	• All liquid wastes will be properly directed to the public sewage system of Mbeya region.	MUST	10,000,000.00
(iii)	Pollution from poor management of solid wastes	• Waste bins will be provided in the area for waste segregation in the project area; • Waste management by reduction reuse and recycling will be implemented by the institution management • Hazardous waste will be separated from non-hazardous waste for appropriate disposal by selling to the authorized dealers	MUST	5,000,000.00
(iv)	Air pollution	• Observes ambient quality guidelines and standards by applying national legislated standards (the Environmental Management (Air Quality Standards) Regulations, 2007, the current WHO Air Quality Guidelines;	MUST	5,000,000.00

		• Project proponent will conduct regular maintenance of all equipment on site as a way of reducing emissions of noxious gases and improve working mechanisms and thus reduce emission of the moving parts; • Proper aeration within the premises; and • Conduct air quality monitoring quarterly.		
(v)	Noise pollution	• Install gen-sets whose noise levels are within the noise generating equipment limits; and • Import generators with minimum noise level generation.	MUST	10,000,000.00
(vi)	Increased traffic volume	• Parking strategy: there will be 11 parking lots in the project that will accommodate many cars; • Provide clear entry, exit ways, indicate relevant traffic signs "give Way" • There are dedicated exits and entries for cars and ambulance	MUST	50,000,000.00
(vii)	Loss of life due to Fire outbreak/Fire/Electrical hazards	• Install an automatic fire hydrant system which will trigger automatically during fire eruption/outbreak; • Provide fire hazard signs such as 'No Smoking' signs, direction to exit in case of any fire incidence and emergence contact numbers should be provided; • The compound should be kept clean and free from fire hazards and litter; • Install fire control appliances (portable fire extinguisher; both CO_2, dry powder and water type,) and employees should be adequately instructed periodically in the use of the various fire	MUST	15,000,000.00

		appliances. • Conduct regular drills/simulations to sensitize the worker- once a year; • Regular repair and maintenance program for all equipment; • Make sure better lighting arrester are installed in a right place; and Workers will be trained on fire emergency response by authorized officers from Fire and Rescue Force Office. The training program will be in every year to keep the workers up to dated.		
(viii)	Increased Risk to Safety and Health	• Project proponent will provide formal training in safe work practices for all personnel in the proposed project and related areas; • Available good designated and labelled emergency assembly area for any emergency escape for the employee, students and customers. • There will be a good placed safety warning signs designated in the strategic area. • Conduct basic occupational training programs and specialty courses as needed, to ensure that MUST community is oriented to the specific hazards of individual work assignments. • Conduct statutory assessments i.e. risk assessments, fire safety audits and Occupational Safety and Health audits annually; • Conduct statutory trainings under OSHA, 2003; • Provide adequate lighting in all workrooms; • Provision of firefighting equipment in strategic	MUST	5,000,000.00

		and well labelled sites; • Conduct drills at reasonable intervals to test the disaster preparedness level at the workplace,		
B)	**Socio-economic impact**			
(i)	Employment Creation and revenue	• Project activities shall pay Taxes including Property tax, City Levy, VAT, loyalty etc. on time. • Recruitment of skilled and non-skilled labours will be done with priorities to people from the area surrounding the project area. • Proponent shall not cause children under the age eighteen (18) to be employed or be engaged in any proposed project activities.	MUST	NONE
3)	**Decommission phase**			
A)	**Environmental effects**			
(i)	Solid waste generation	• All solid waste to be collected at a central location, and be stored temporarily until removal by a licensed solid waste handler; • Contractor should adopt the method of selective demolition as far as practicable to enable the removal of wastes of the same category one at a time thus facilitating recycling of wastes for beneficial reuse and minimizing the burden on dumpsites; • No dumping within the surrounding area is to be permitted. Where potentially hazardous substances are being disposed of, a chain of custody document should be kept with the environmental register as proof of final disposal. General waste is to be collected either by the town council or via a licensed waste disposal	MUST and the Contractor	6,000,000.00

		contractor. The frequency of collections should be such that waste containment receptacles do not overflow; • Waste generated at the site should be categorised by the contractor and disposed of in a suitable manner into different waste streams (including general and hazardous waste). Wherever possible recycling should be carried out; • Litter generated by the construction crew must be collected in rubbish bins and disposed of weekly at registered waste disposal sites; • All rubble must be removed from the site to an approved disposal site as approved by the Engineer. Burying rubble on the site is prohibited; • Ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on the premises is placed, dumped or deposited on adjacent/surrounding properties during or after the decommissioning period of the project; and • These have to be disposed of at dumping site as approved by the Mbeya City Council		
(ii)	Waste Water generation	• Ensure that any wastewater generated during decommissioning is exhausted by a licensed exhauster; • Storm water should be managed in such a way that no overland flow is possible onto the site from any adjacent area; • Storm water drains in the area should be routinely inspected for solid waste to avoid blockages and	MUST and the Contractor	1,000,000.00

		associated problems.		
(iii)	Soil erosion	• Re-vegetate the site with grass and trees of indigenous tree species.	MUST and the Contractor	5,000,000.00
(iv)	Pollution from dust and exhaust emissions	• Strict enforcement of onsite speed controls as well as limiting unnecessary traffic within the demolition site; • Demolition site will be fenced off using tarpaulins; • Friable loads of construction debris being transported must be watered to reduce dust; • All areas disturbed during closure of the site that are not required for a specific activity must be re- vegetated; and • Diesel exhaust emissions from heavy machinery on site (excavators, front end loaders and hauling trucks) must be controlled and minimized by regular checks and servicing of vehicles. Any construction vehicle found to be emitting excessive smoke should be withdrawn from the operations and accorded the necessary mechanical attention before it can continue	MUST and the Contractor	20,000,000.00
(v)	Noise pollution	• Demolishing machinery shall be kept in good condition e.g. greasing to reduce noise generation from friction of movable parts; • Generators and heavy-duty equipment be insulated or placed in enclosures to minimize noise levels during demolition works; • Obtain special permit from NEMC to undertake demolitions works; • Ensure that noise & excessive vibration from	MUST and the Contractor	5,000,000.00

		construction activities are within permissible levels as per the provision of the Environmental Management (Air Quality Standards) Regulations, 2007. This includes among others adhering to permissible noise and vibration level.		
(vi)	Accidental leaks spillages	• Ensure employees are aware of the procedure for dealing with spills and leaks; • The source of the spill should be isolated and the spillage contained using sand berms, sandbags, sawdust and/or absorbent material; • The area should be cordoned off and secured; • Notify the relevant authorities of any spills that occur; and • Ensure that the necessary materials and equipment for dealing with the spills and leaks is available on site at all times	MUST and the Contractor	5,000,000.00
B)	**Social impacts**			
(vii)	Safety and Health risks	• Decommissioning works workers be issued with appropriate PPEs and the decommissioning contractor to enforce their use; • Restrict onlookers/scavengers from site; • Develop safe work procedures for demolition works; • Follow mitigations measures given for construction phase	MUST and the Contractor	5,000,000.00
(viii)	Livelihood and economic Loss	• Businesses associated with the development should be notified of intention of decommissioning in good time to relevant adjustment; and	MUST	NONE

		• Redeployment of the affected workers where feasible should be undertaken.		
	TOTAL COST			182,000,000.00

CHAPTER NINE

9. ENVIRONMENTAL AND SOCIAL MONITORING PLAN

Monitoring refers to the systematic collection of data through a series of repetitive measurements over a long period of time to provide information on characteristics and functioning of environmental and social variables in specific areas over time. There are four types of monitoring that are also relevant to this EIA.

- **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 establishment, operation and decommissioning phase in order to detect and quantify environmental and social change, which may have occurred as a result of the project. This monitoring provides experience for future projects and lessons that can be used to improve methods and techniques;
- **Compliance monitoring**: takes the form of periodic sampling and continuous measurement of levels of compliance with standards and thresholds – e.g. for waste discharge, air pollution; and
- **Mitigation monitoring** aims to determine the suitability and effectiveness of mitigation programs designed to diminish or compensate for adverse effects of the project.

To ensure that mitigation measures are properly done, monitoring is essential. Table 9.1 provides details of the attributes to be monitored, frequency, and institutional responsibility and estimated costs. These costs are only approximations and therefore indicative. Costs that are to be covered by the proponent should be included in the project cost.

Table 9.1: Environmental and Social Monitoring Plan

Potential impact	Parameter to be monitored	Monitoring frequency(duration)	Monitoring area	Measurement Units	Target level standard	Responsibility for monitoring	Estimates cost (TZS)
Mobilization Phase							
Deteriorated / impairment of local air quality	Dust (PM_{10})	Mid of the mobilization phase	Project site	Ng / Nm^3	Not to exceed 250mg/Nm 3 (24h mean value)	MUST and the contractor	1,000.000
	CO			Mg/Nm3	120 For 8 Hours		
	CO_2			Mg/ Nm3	10 for 8 hours		
	NOX_2			mg/Nm3	450 mg/Nm3		
Noise pollution and vibration vehicles transporting construction materials	Vibration	Mid of the mobilization phase	Project site	Hz/ mm/s	(TBS, WHO Standards)	MUST and the contractor	1,000.000
	Noise level			dBA	Below 60 (WHO Standards)		
Construction Phase							
Air pollution (Dust and Exhaust emissions)	Dust (PM10)	Twice during construction phase	Project site	Ng / Nm^3	Not to exceed 250mg/Nm 3	MUST and the contractor	1,000.000

		And daily inspection for dust generation			(24h mean value)		
	CO, CO_2			Mg/Nm3	100 mg/Nm3 for 15 minutes, 60 mg/Nm3 for 30 minutes; 30 mg/Nm3 for 60 minutes 10 mg/Nm3 for 8 hours		
	SO_X			Mg/ Nm3	0.5 mg/Nm3 for 10 minutes		
	NOX_2			mg/Nm3	450 mg/Nm3		
Noise pollution and vibration	Noise level	Daily inspection for noise pollution and vibration	Project site and surrounding community (noise receptors)	dBA	85(TBS, WHO Standards)	MUST and the contractor	1,000.000
	Vibration			Hz/ mm/s	(TBS, WHO Standards)		
Environmental pollution from poor management of solid waste	Facilities for disposal of solid wastes	Twice during construction phase	Project site	Visual	No hazards disposal of waste	MUST and the contractor	1,000.000

Health hazards associated with construction work	Availability of PPEs: types of people employed with their training background: working conditions	Continuous phase	Project site	Incidences	No hazards disposal of waste	MUST and the contractor	4,000.000
Operation Phase							
Air pollution	Dust (PM10)	Continuously during the institution operation	project site	Ng / Nm^3	TZS 837 Parts (1, 2, and 4).0/10	MUST	3,000,000
	CO, CO_2			Mg/Nm3	100 mg/Nm3 for 15 minutes, 60 mg/Nm3 for 30 minutes; 30 mg/Nm3 for 60 minutes		

					10 mg/Nm3 for 8 hours.		
	SO_X			Mg/ Nm3	0.5 mg/Nm3 for 10 minutes		
	NOX_2			Mg/kg	50.1hourly		
Pollution due to accumulation of solid waste	Quantity of solid wastes	Every day	Project area	kg	As minimum or zero pollution	MUST	2,000,000
Health and Safety hazards	Number of accidents	During operation	Project site		No or minimum accidents	MUST	4,000,000
Increased fire risks	fire incidences occurred or reported number of serviced fire extinguisher	During operation	Project site	N/A	Minimum or no Leakage	MUST	6,000,000
Pollution due poor management of Liquid waste(sanitary)	waste water	Daily monitoring of the sewerage system	Project site	litre	No Leakage	MUST	2,000,000
Decommission							
Air pollution	Dust (PM10)	during the decommission	Project site	Ng / Nm^3	0/10	MUST	5,000,000.00

	CO			Mg/Nm3	120 For 8 Hours		
	CO_2			Mg/ Nm3	10 for 8 hours		
	NOX_2			Mg/kg	50.1hourly		
Contamination/impaired quality of receiving body	sanitary effluents	Continuously during the project cycle	Offloading bay and at island pump	Mg/1	As minimum as possible	MUST	6,000,000
Loss of Revenue and	number of workers	Continuously during the project cycle	Project site	Mg /Nm3	As minimum as possible	MUST	None
Occupational health and safety risks	No of PPE	Continuously during the project cycle	Project site			MUST	4,000,000
TOTAL COST							**40,000,000**

CHAPTER TEN

10. COST BENEFIT ANALYSIS OF THE PROJECT

10.1. Introduction

This section addresses financial analysis, economic analysis of the project and an extended cost-benefit analysis for the proposed project. However, lack of information on aspects such as cost and units for various materials that will be used in the construction process, cost of rent per square meter of floor area, overall running costs, cost of labour, etc. (cannot be disclosed at this stage as they are required to be confidential in accordance to the Procurement Act) have prevented a detailed cost benefits analysis to be undertaken. Therefore, what is presented in this section is rather an indicative and elementary description of the costs and benefits. It is based on the indicative costs for implementation of mitigation measures as well as the cost of monitoring.

10.2. Financial Cost Benefit Analysis to the Project

Cost-benefit analysis is normally done in the framework of feasibility study of an activity. The aim of cost-benefit analysis is to inform and assist the project proponent to decide on:

- Whether it makes economic sense to continue with the project;
- Whether the chosen option is cost effective alternative;
- The estimate of the size of a project.

In this project the costs will include:

(i) Capital expenditures;
(ii) Operating and Maintenance costs;
(iii) Staff costs;
(iv) Materials;
(v) Environment, Health and Other social costs.

Benefits of this project include the following: -

(i) Better, understanding of the target resource;
(ii) Accurate targeting of the resource to avoid unnecessary costs to extract the resources;
(iii) Potential for additional revenues generated from new resources (jetty facility);
(iv) Protection of environment and health; and
(v) Provision of other social benefits.

10.3. Quantifiable and Non-Quantifiable Benefits to Communities

There will be direct and indirect benefits to the communities as follows:

(i) The project will employ about 300 people for the construction and lessor during operation plus security and cleaners. The majority of the non-skilled labour will be recruited from the communities around the project; a good number of staffs will be recruited will be within Tanzania, Mbeya City Council particular;

(ii) Through taxes to the Government, proponent will be indirectly contributing to development projects such as roads, medical care and education services; and
(iii) The presence of project in the area will drastically increase business opportunities in the area, hence increase revenue.

10.4. Quantifiable and Non-Quantifiable Benefits to Developer

The Developer will benefit directly from the business operations through income generation.

10.4.1. Quantifiable and Non-Quantifiable Benefits to Government

The Government will directly and indirectly benefit from taxes from the investor who run educational different businesses and services. Apart from tax generation, the investment will also enhance the economic growth and ancillary public sector development spurred by the operations and activities associated with the operation of the proposed project. The image of the government in investment sector will also be enhanced nationally and that will increase attractions from other local and foreign investors and ensure continued market growth.

10.4.2. Possible Costs to Communities

It is a fact that the proposed project will entails social and environmental impacts. These have been more elaborated in Chapters 6 – 9. There will be individuals in the communities who will be affected more than others. Moreover, the proponent is committed to mitigate the negative social and environmental impacts.

10.5. Resources Evaluation

10.5.1. Benefits Related to the Project

Several benefits are associated with the proposed development both at local and national level in terms of revenue of generation and the multiplier effects associated with linkages of local and national economy. The proposed project will generate employment opportunities during construction and operational phases, which may be filled by local people with relevant skills. This opportunity will be supporting government initiatives to create employment opportunities for Tanzania and to meet the government target of creating about 1 million jobs per year. At the moment salaries are yet to be specified, it is envisaged that from employment, workers will get incomes, which will improve their quality of life and those of their dependents.

Nevertheless, employment opportunities and the benefits will depend on suitably qualified local personnel that can take up available positions. Capacity building therefore is a prerequisite for these benefits to be realized. In realizing aforementioned benefits, deliberate policies need to be in place and implemented to compel proponent in the real estate economic sector to generate revenue to the government in the form of rents, taxes and levies including VAT during different phases of the projects.

10.5.2. Costs Related to the Project

The project aims at constructing the facilities. The project is aimed at increasing the enrolment of student at the University and therefore increasing manpower in the country in various fields

of specialization. The facilities will have the capacity of accommodating about 7,000 students at once and academic staff.

In this context, the proposed project will be implemented at University area that has already been set aside and already compensated. The area is about 489 hectares of which only about 10% of the area has been developed. For the purpose of implementing this business plan, the University has established the following construction cost (Table 10.1):

Table 10.1: Project Costs

S/N	Type of Block	Description	Construction Cost	Number of Blocks	Total Costs
1	Academic Block	Construction	38,927,500,000.00	2	38,927,500,000.00
2	New Workshops	Construction	2,300,000,000	1	2,300,000,000.00
3	Centre of Innovation and Technology Transfer	Construction	1,150,000,000	1	1,150,000,000
TOTAL					42,377,500,000.00

For the purpose of smooth start-up of the operation of the buildings once the construction is over, the University has considered the component of equipping the buildings so as to be ready for use once construction is complete. The estimates for equipping the buildings plus the construction cost are as shown in the below Table 10.2.

Table 10.2: Furniture and Office Equipment Expense

SN	ITEM	TOTAL
1	Laboratory equipment purchased or upgraded	6,440,000,000.00
2	Chairs and tables for staff	644,000,000.00
Total		**7,084,000,000.00**

Therefore, the total cost for the facilities is approximately TZS 49,461,500,000.00

10.5.3. Revenue Projections of the Project

Cost-benefit analysis is normally done in the framework of feasibility study of an activity. The aim of cost benefit analysis to assist the project developer to make decision on:

(a) Whether it makes economic sense to continue with the project:
(b) Whether the chosen option is cost effective alternative;
(c) The estimates of the size of a project

Considering a lifespan of 30 years (reinforced concrete structures) of the project, the costs od construction activities will include:

- Capital expenditures based on market estimates. The present value cost is TZS 49,461,500,000.00
- Operating and maintenance
- The present value operating cost has been estimated to be TZS 279,833,300.00 per month
- Revenue collection from students' fees is TZS 828,566,670.00 per month (this is assumed to be from the current student population of 7000)

The discounted rate for 2022 is 0.10 and the breakeven for the Net Present Value is on 15th year. The estimated project lifespan is 20 years and the benefit cost ratio is 2:40. Therefore the project is feasible.

10.6. Environmental Cost Benefit Analysis

Environmental cost benefit analysis is assessed in terms of the negative versus positive impacts. Furthermore, the analysis is considering whether the impacts are mitigatable and the costs of mitigating the impacts are reasonable. As it has been mentioned in Chapters 8 – 9, 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.

CHAPTER ELEVEN

11. DECOMMISSIONING PLAN

The project operation may end when there are no economic or financial benefits of continuing operate the university. It is anticipated that the project planning life span is 99 years from 2022 which taken from Tanzania government. In this case MUST may decide to decommission the project in 2121.

In accomplishing the decommissioning, MUST will hire a consultant to prepare a decommissioning plan to ensure that environmental and social impacts due to decommissioning of the project are minimized in order to comply with environmental legislations and policies requirements. It is also required to ensure that the land used for installing university facilities is rehabilitated and returned to the state that will be usable by others after the project decommissioning.

Decommissioning will involve the removal of the following project components; these include but are not limited to:

- Machinery,
- Buildings,
- Standby generators,
- Storage facilities,
- Roofing materials,
- Polluted soil (when applicable)
- Other project plants and equipment

11.1. Purpose and Content

11.1.1. Purpose of the Plan

The preliminary plan serves to establish decommissioning as an important consideration from the inception of project, during design and throughout the operation of the academic block, workshops and CITT. The plan aims to:

- Identity the ultimate decommissioning options and final facilities status.
- These options would be evaluated and narrowed to the decommissioning method of choice at the end of academic block, workshops and CITT and its support facilities life is approached.
- Demonstrate to regulatory agencies that important aspects of decommissioning are considered as early as possible during the initial design of the academic block, workshops and CITT.
- The plan serves as the starting point to demonstrate that areas such as decommissioning methods, costs, schedules, and operating impact on decommissioning will be reviewed and refined throughout the operating life of the academic block, workshops and CITT.

11.1.2. Content of the Plan

This preliminary plan provides a general description of decommissioning methods considered feasible for the academic block, workshops and CITT and its support facilities. The description demonstrates that the methods considered are practical and that they protect the health and safety of the public and decommissioning personnel. Design personnel should study the proposed decommissioning methods and take steps to ensure that the design incorporates features that will facilitate decommissioning.

Considerations include:

(i) Provisions for adequate material-handling equipment;
(ii) An estimate of manpower, materials, and costs anticipated to support decommissioning;
(iii) A description of the anticipated final disposition and status of the academic block, workshops and CITT and support structures and site;
(iv) A discussion demonstrating that adequate financing will be planned for decommissioning; and
(v) Identification of records that should be maintained during academic block, workshops and CITT Construction and operation which might facilitate decommissioning, including a set of "as built" drawings.

11.2. Preliminary Plan

11.2.1. Project Removal Methodology and Schedule

Proponent shall fund and implement all aspects of project decommissioning, including but not limited to, all engineering, environmental assessment, permitting, construction, and mitigation activities associated with the removal of the academic block, workshops and CITT and its support structures, in accordance with this plan. The Proponent shall monitor environmental impacts during and after project removal to respond to defined events during the monitoring phase.

The proponent shall remove the academic block, workshops and CITT and additional structures safely and in a manner that:

(i) Minimizes environmental impacts;
(ii) Satisfies Proponent's obligations under the EMA CAP 191;
(iii) Restores the site to a condition suitable for multiple use; and
(iv) Pays all dues (workers, government, suppliers etc.).

Project removal will begin six months after closure and continue for six months. Within the six months from closure, proponent shall inventory of all components that need to be removed and or disposed. This inventory will include building structures to be demolished and machinery to be disposed of. This information will assist in the preparation of the final decommissioning plan, for approval by NEMC.

After the approval of the decommissioning plan the metal parts will be removed first within the first month (this is important to ensure that they are not vandalized). The second month of

the decommissioning will be used to remove concrete structures. Debris will be used as road fills for earth roads or disposed of in a manner as shall be advised by relevant authorities.

Project decommissioning shall have five phases: (i) pre-removal monitoring; (ii) permitting; (iii) interim protective measures; (iv) project removal and associated protective actions; and (v) post-removal activities, including monitoring of environment and socio-economic activities.

The first three phases will occur prior to removal of the project (i.e. within the first six months). The fourth phase — project removal and associated protective actions — will take place six months after closure. The fifth phase will begin after complete removal and due to the nature of the project (medium scale, with relatively moderate impacts) should continue for at least one year.

The description that follows outlines the activities that will occur in each phase and provides reference to detailed descriptions of each activity elsewhere in this Plan.

(i) Pre-removal monitoring

Pre-removal monitoring includes environmental and socio-economic status of the academic block, workshops and CITT and the surroundings. This monitoring is essential to identify if there is any environmental or social liability that needs to be settled before the permit for closure is given. This period will also be used to inventory all assets and facilities that need to be disposed of and to prepare a final decommissioning plan for approval by NEMC.

(ii) Permitting

Proponent shall obtain all permits required to undertake removal of the academic block, workshops and CITT. This basically will include NEMC, CRB, ERB, Social Security Funds, and Local Government Authorities etc.

(iii) Project Removal

As noted above, the removal of the academic block, workshops and CITT will be completed within six months.

(iv)Post-Removal Activities

Post-project removal monitoring will continue for one year.

11.2.2. Decommissioning Impacts and Mitigation

Decommissioning activities, particularly the removal of project components and grading could cause negative environmental effects similar to those of the construction phase. For example, there is the potential for disturbance (erosion/sedimentation/oil spills) to the environment. Mitigation measures similar to those employed during the construction phase of the project will be implemented. These will remain in place until the site is stabilized in order to mitigate erosion and silt/sediment runoff and any potential effects on the features located adjacent to the project location especially residences.

Road traffic will temporarily increase due to the movement of decommissioning crews and equipment given the location of the site being adjacent the road. There may be an increase in localized particulate matter (dust) in adjacent areas during the decommissioning phase. Additionally, there will be emissions from the diesel engines of deployed machinery and equipment which may cause minor localized impacts to air quality. Decommissioning activities will lead to temporary elevated noise levels from heavy machinery and an increase in trips to the project location. Likewise, mitigation measures similar to those employed during the construction phase of the project will be implemented.

There will also be a loss of employment during the closure phase. As a mitigation measure, adequate advance notice will be provided to workers and service providers. The closures will finally result into generation of wastes from obsolete and unwanted materials. Mechanisms of identifying, collecting and disposal to ensure all wastes have been collected, removed and safely disposed will be put in place as described in Table 11.1.

Table 11. 1: Waste Generation and Management Measures During Decommissioning

Type of waste	**Management procedure**
Overburden materials	-Avoid unnecessary excavation of land - Stockpile and store most of overburden produced for site rehabilitation -Use rest of overburden materials for land reclamation activities at the project sites
Debris	-Temporary collect the waste materials at the site; - Distribute the recyclable and re-usable materials (i.e. containers; timber, pipes, etc.) to local community members in Mbeya City Council and through their local governments; - Dispose the waste materials at an authorized and certified facility
Liquid wastes from sanitary facilities	-Disinfect wastewater from the onsite sanitary facilities with chlorine or any other approved disinfectant; - Empty the liquid wastes (including slurry and sludge) in the existing sanitary facilities; - Safely dispose the wastewater (including slurry and sludge) at authorized and official wastewater treatment facilities in Mbeya City Council or Mbeya Region
Steel / metal structures and piping materials Concrete from civil structures	-These materials will be transported to recyclers in Mbeya City Council where the metals and steel parts will be recycled and re-used. -Concrete materials will be broken down and transported by the contractor to landfill or site rehabilitations

(Source; Consultant, 2021)

CHAPTER TWELVE

12. SUMMARY AND CONCLUSION

12.1. Summary

For this project, we summarized as follows to ensure the project is sustainable and bring the economic benefit to Tanzanians.

- The implementation of ESMP and involved independent monitors whenever possible to verify compliance of environmental certificate conditions. Project proponent should ensure that they comment financial resources as required to implement the ESMP; and
- Monitoring is long term process which should begin at the start of the project. Its purpose is to establish benchmarks so that the nature and magnitude of anticipated environmental impacts are continually assessed and continuous improvement is done. For this case project proponent should be set aside budget to implement the monitoring plan.

12.2. Conclusion

The proposed construction of an academic block, workshops and CITT on Plot No. 1 Block 'FF' Iyunga Ward, Mbeya City Council, Mbeya Region, Tanzania has enormous socio-economic benefits to both the MUST and Mbeya town council at large. The project as such, entails minimal adverse environmental impacts of which adequate mitigation measures have been proposed and incorporated in the project design.

It is therefore, concluded that the proposed buildings for educational purposes will entail no significant impacts provided that the recommended mitigation measures are adequately and timely implemented. The identified impacts will be managed through the proposed mitigation measures and implementation regime laid down in this detailed project brief. MUST is committed in implementing all the recommendations given in this detailed project brief and further carrying out the environmental auditing and monitoring as scheduled.

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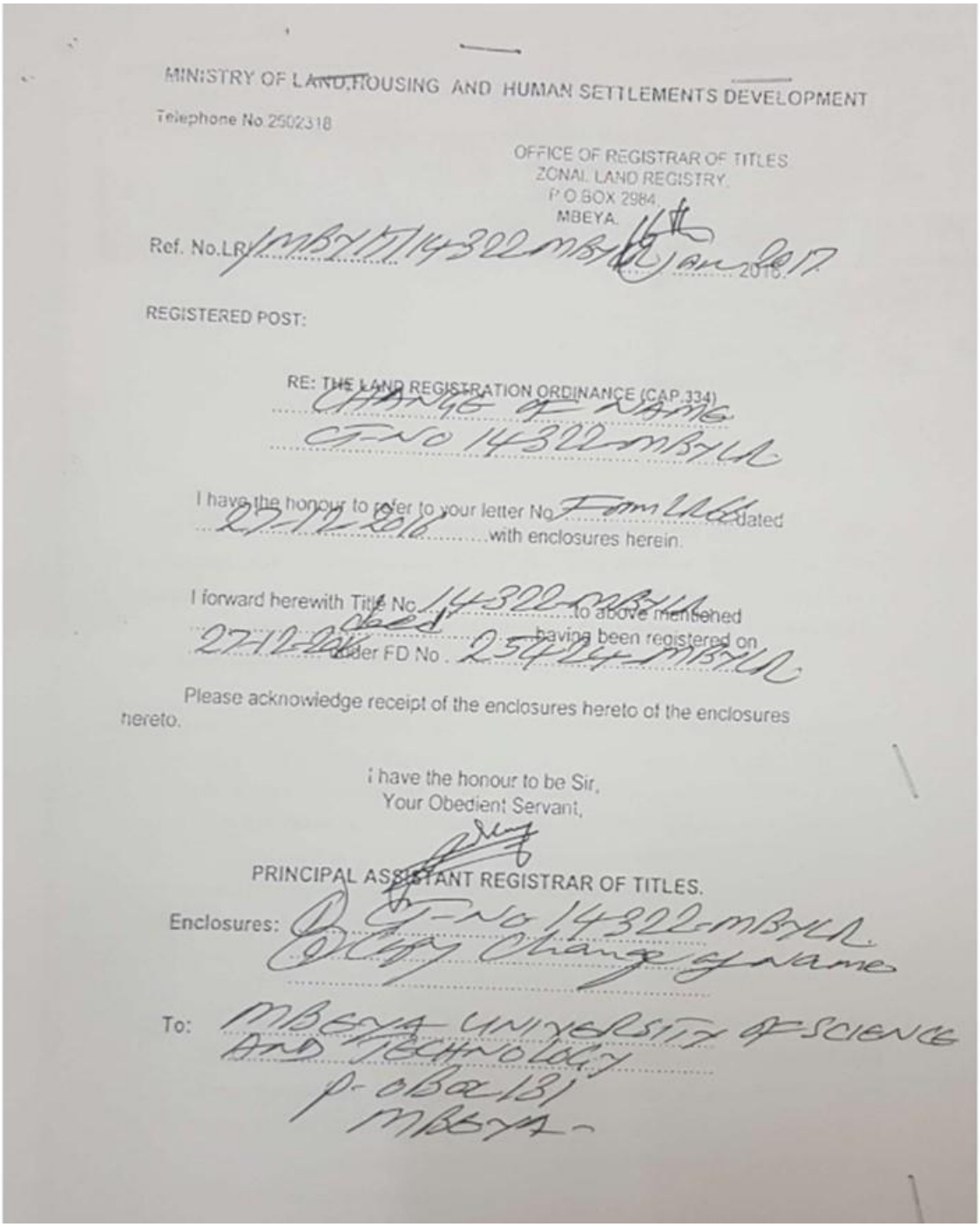
APPENDICES

Appendix I: TITLE DEED



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P.O.BOX 2984
MBEYA.

Ref. No.LR/MBY/17/14322/MBY/LL 16th Jan 2017

REGISTERED POST:

RE: THE LAND REGISTRATION ORDINANCE (CAP.334)
CHANGE OF NAME
CT-NO 14322-MBY/LL

I have the honour to refer to your letter No. Form LL66 dated 27-12-2016 with enclosures herein.

I forward herewith Title No. 14322-MBY/LL to above mentioned Deed having been registered on 27/12/2016 under FD No. 25424-MBY/LL

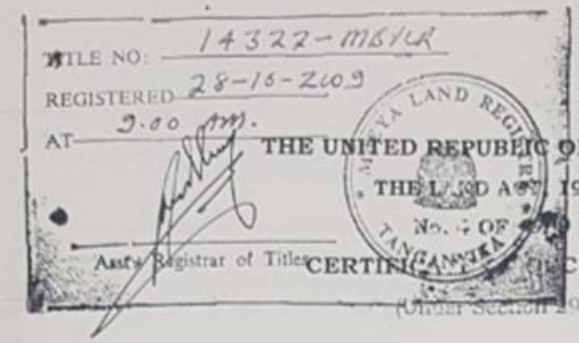
Please acknowledge receipt of the enclosures hereto of the enclosures hereto.

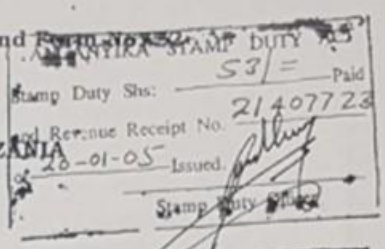
I have the honour to be Sir,
Your Obedient Servant,

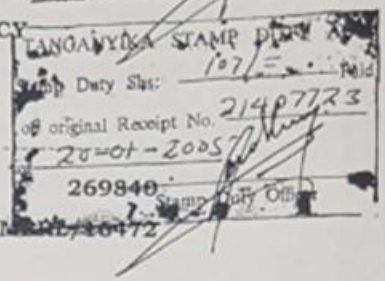
PRINCIPAL ASSISTANT REGISTRAR OF TITLES.

Enclosures: CT-No 14322-MBY/LL.
Deed Change of name

To: MBEYA UNIVERSITY OF SCIENCE AND TECHNOLOGY
P.O.Box 131
MBEYA.







THE UNITED REPUBLIC OF TANZANIA

THE LAND ACT, 1999

CERTIFICATE OF OCCUPANCY

(Under Section 29)

Title No:

L.O. No: 269840

L.D. No:

The 19th day of October, 2009

THIS IS TO CERTIFY that **MBEYA INSTITUTE OF SCIENCE AND TECHNOLOGY Established Under the Government Notice No. 535 Published on 10th December 2004 by The National Council for Technical Education (Mbeya Institute of Science and Technology) Establishment Order, 2004** of **P.O. Box 131, Mbeya.**

(hereinafter called "the Occupiers") **are** entitled to a right of Occupancy (hereinafter called the Right) in and over the land described in the Schedule hereto (hereinafter) called "the Land") for a term of **Ninety nine** years from the **First** day of **October** Two thousand **and Four** according to the true intent and meaning of the Land Act and subject to the provisions thereof and to any regulations made there under and to any enactment in substitution therefore or amendment thereof and to the following special conditions:-

1. The Occupiers having paid rent up to the thirtieth day of June **2005** shall thereafter pay rent of shillings **One million Two hundred and three Thousand Five hundred twenty five (1,203,525/=) only** a year in advance on the first day of July in every year of the term without any deduction PROVIDED that the rent may be revised by the Commissioner for Lands.

2. The Occupiers shall:-

(i) Be responsible for the protection of all beacons on the land throughout the term of the Right. Missing beacons will have to be re-established at any time at the Occupier's expenses as assessed by the Director responsible for Surveys and Mapping.

(ii) Do everything necessary to preserve the environment and protect the soil and prevent soil erosion on the land and do all things which may be required by the authorities responsible for environment and to achieve such objective.

(iii) Maintain on the land buildings (hereinafter called "the buildings") in permanent materials designed for use in accordance with the conditions of the Right and which conform to the building line (if any) decided by the **Mbeya City Council** (hereinafter called "the authority");

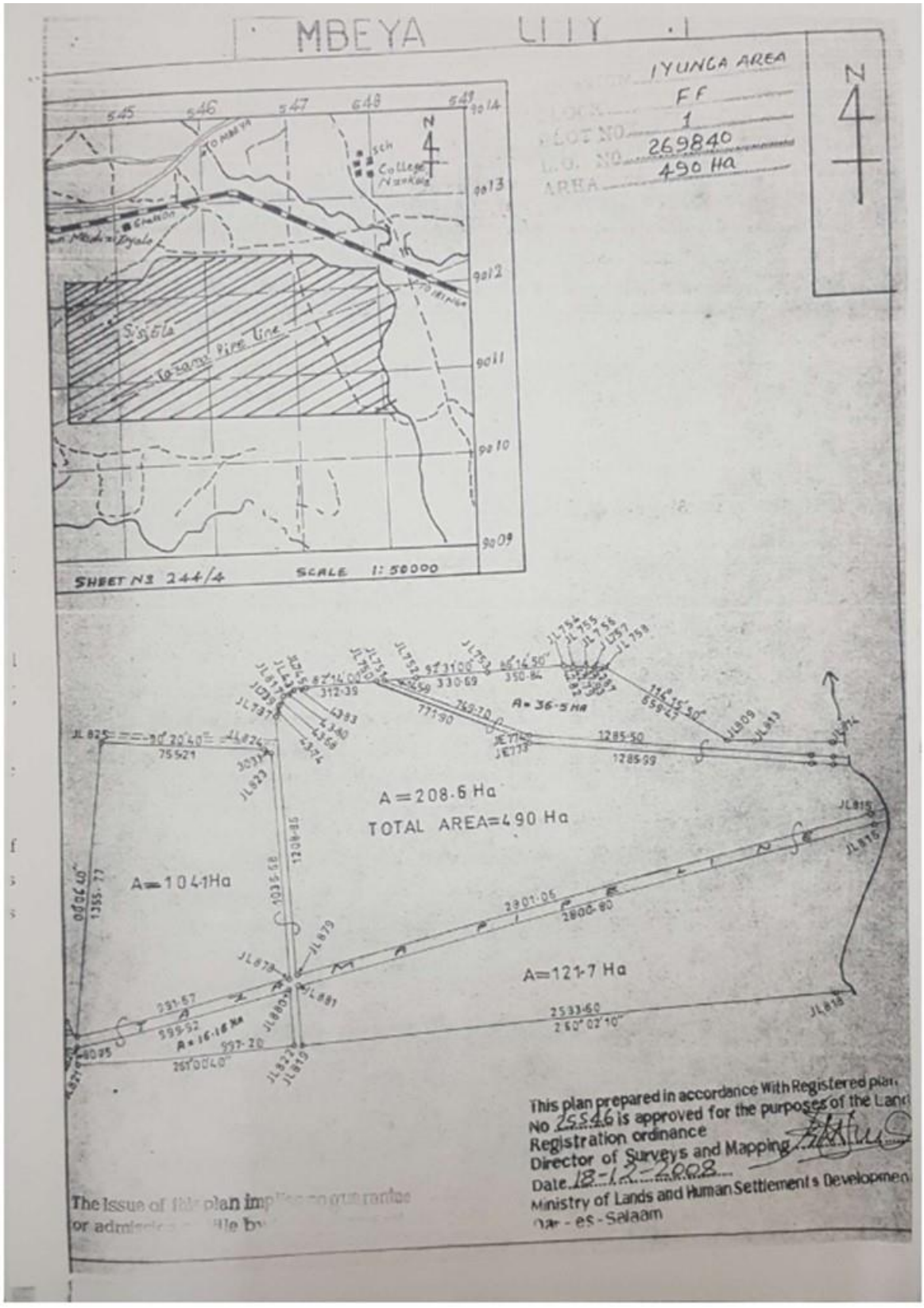
(iv) At all times during the term of the Right have on the land buildings as approved by the Authority and maintain them in good order and repair to the satisfaction of the Commissioner for Lands (hereinafter called "the Commissioner");

3. **USER: The land and the existing buildings erected thereon shall be maintained and shall be used for Educational purposes only. Use Group 'K' use class (b) as defined in the Town and Country Planning (Use Classes) Regulations, 1960 as amended in 1993.**

4. The Occupiers shall not assign the right within three years of the date hereof without the prior approval of the Commissioner.

5. The Occupiers shall deliver to the Commissioner notification of disposition in prescribed form before or at the time the disposition is carried out together with the payment of all premia, taxes and dues prescribed in connection with that disposition.

6. The President may revoke the right for good cause and in public interest


MBEYA
IYUNGA AREA
FF
1
269840
490 Ha
SHEET NO 244/4
SCALE 1:50000
A=208.6 Ha
TOTAL AREA=490 Ha
A=104.1Ha
A=121.7 Ha
A=36.5Ha
This plan prepared in accordance with Registered plan
No 25546 is approved for the purposes of the Land
Registration ordinance
Director of Surveys and Mapping
Date 18-12-2008
Ministry of Lands and Human Settlements Developmen
Dar-es-Salaam

SCHEDULE

All that land known as Plot No. **1** Block **'FF'** Situated at **Iyunga Area** in **Mbeya City** containing **four hundred ninety (490) Hectors** shown for identification only edged **red** on the plan attached to this Certificate and defined on the registered Survey Plan Number **25546** deposited at the Office of the Director for Surveys and mapping at Dar es Salaam.

Given under my hand and official seal the day and year first above written.

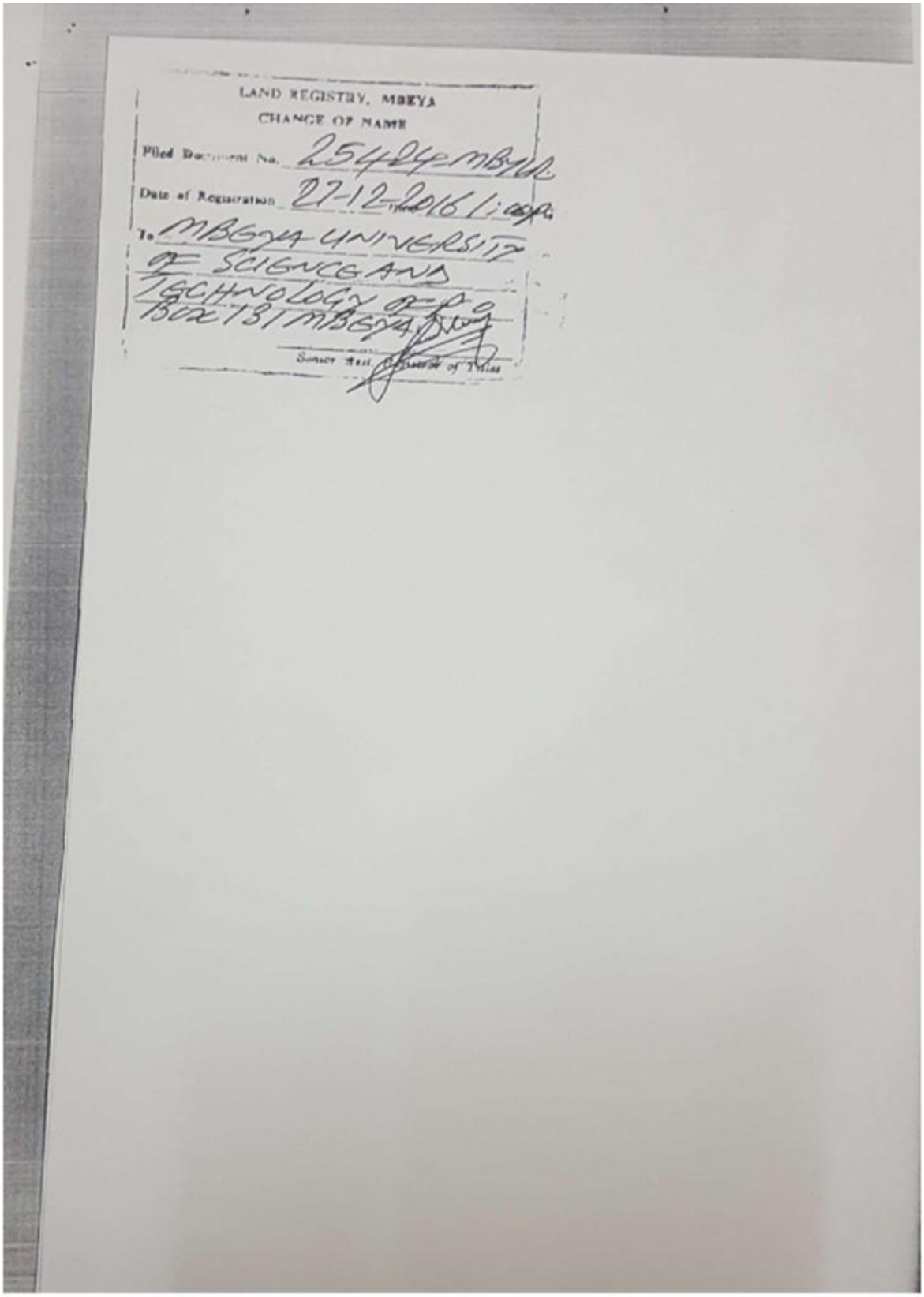
ASST. **COMMISSIONER FOR LANDS**

The within named **MBEYA INSTITUTE OF SCIENCE AND TECHNOLOGY** hereby accept the terms and conditions contained in the foregoing Certificate of Occupancy.

SEALED with the **COMMON SEAL** of the said **MBEYA INSTITUTE OF SCIENCE AND TECHNOLOGY** and **DELIVERED** in the presence of us this 13th day of August **2009**.) CIK/LOII

Name PROF JOSEPH J. MSAMBICHAKA)
Signature:----------)
Postal Address: P.O. BOX 131)
MBEYA)
Qualification: PRINCIPAL)

Name ALOYS JOSEPH MWAMANGA)
Signature:----------)
Postal Address: P.O. BOX 1320)
MBEYA)
Qualification: CHAIRMAN)



LAND REGISTRY, MBEYA

CHANGE OF NAME

Filed Document No. 25424-MBYA

Date of Registration 27-12-2016

To MBEYA UNIVERSITY OF SCIENCE AND TECHNOLOGY P.O BOX 131 MBEYA

Senior Asst. Registrar of Titles

Appendix II: Site Layout

Appendix III: EVIDENCE ON THE EXISTANCE OF SEWER SYSTEM

Re: Request for information.

From <barnabas.konga@mbeyauwsa.go.tz>
To <zacharia.katambara@must.ac.tz>
date 2023-12-21 15:24

Dear Prof. Katambala

Below are the responses;-

(a) What is the capacity of the existing stabilization ponds = 28,000m3/day (Consisting of 7 ponds i.e. 2 Anaerobic, 4 Facultative and 1 Maturation)

(b) What is the current wastewater generation in the city = we receive 14,000m3/day of w/w from its 2,845 customers

(c) What is network coverage in the Mbeya City; 30%

(d) What is the usage of the network with the City. 14%

Regards'

Eng. Barnabas Konga [CEng. MSc]
Director of Water Supply and Sanitation- DWSS
Mbeya UWSA
0712 301 714/0767 133 536

-------- Original Message --------

Subject: Request for information.
date : 2023-12-19 09:28
From: zacharia.katambara@must.ac.tz
To: barnabas.konga@mbeyauwsa.go.tz

Dear Eng. Konga,

The Mbeya University of Science and Technology is implementing a HEET project which involves the construction of three buildings. In this regard, the buildings will be connected to the existing sewer network. The University is also responding to the World Bank's comments on the same issue.

The comments are:

(a) What is the capacity of the existing stabilization ponds;

(b) What is the current wastewater generation in the city;

(c) What is network coverage in the Mbeya City; and

(d) What is the usage of the network with the City.

In advance, the University appreciates for timely your response.

Yours,

Prof. Zacharia Katambara

Principal College of Engineering and Technology.