UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

SOKOINE UNIVERSITY OF AGRICULTURE

SOLOMON MAHLANGU COLLEGE OF SCIENCE AND EDUCATION

ENVIRONMENTAL AND SOCIAL IMPACT STATEMENT FOR THE PROPOSED DEVELOPMENT OF STUDENT HOSTEL AND ACADEMIC BUILDINGS AND REMODELLING OF TWO WAREHOUSES WITHIN SOKOINE UNIVERSITY OF AGRICULTURE (SUA) - SOLOMON MAHLANGU CAMPUS, (MAZIMBU), MINDU WARD IN MOROGORO MUNICIPALITY, MOROGORO REGION

PROPONENT

SOKOINE UNIVERSITY OF AGRICULTURE

SOLOMON MAHLANGU CAMPUS.

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EXECUTIVE SUMMARY

1. Introduction

Sokoine University of Agriculture (SUA) is a public university located along the slopes of Uluguru Mountains in Morogoro, Tanzania. The history of SUA dates since 1965 when it started as an Agricultural College offering diploma training in disciplines of agriculture. After the dissolution of the University of East Africa and the subsequent establishment of the University of Dar es Salaam (UDSM) in July 1970, the Agricultural College was transformed into a Faculty of Agriculture of the University of Dar es Salaam (UDSM) and thereby started offering Bachelor of Science in Agriculture degree. In 1974, the Division of Forestry was established and hence the Faculty of Agriculture became the Faculty of Agriculture and Forestry. The introduction of Bachelor of Veterinary Science in 1976 and the establishment of the Division of Veterinary Science, the Faculty of Agriculture and Forestry was re-named as the Faculty of Agriculture, Forestry and Veterinary Sciences. On the 1st of July 1984 by the Parliamentary Act No. 6 of 1984, the faculty was transformed into a full-fledged University known as University of Agriculture which was thereafter renamed Sokoine University of Agriculture (SUA) in honour of the Late Prime Minister of the United Republic of Tanzania, Edward Moringe Sokoine who passed away in Morogoro in a car accident on 12th April 1984. In 2005, the Universities Act No. 7 repealed Parliamentary Act No. 6 of 1984 and paved a way to the establishment of University Charters. Hence, SUA has been operating under its Charter and Rules, which were signed on 28th March 2007. The Charter and Rules were amended and published on 28th August 2020 as a Government Notice No. 683.

The College of Natural and Applied Sciences (CoNAS) started as Solomon Mahlangu College of Science and Education (SM-CoSE) which was approved by the University Council on 30th March, 2017 after merging the former Faculty of Science and the Directorate of Solomon Mahlangu Campus. In July 2021, the College became the College of Natural and Applied Sciences.

Despite its historical significance, Solomon Mahlangu Campus at SUA faces infrastructure challenges due to increased staff, student's enrolment, and programs. To address this, SUA, Solomon Mahlangu Campus has received financial support from the World Bank (WB) for Higher Education for Economic Transformation (HEET) Project (P166415). The HEET project is supported by the Government of the United Republic of Tanzania (GoT) under ministry of Education, Science & Technology through the World Bank. The main Project Development Objective (PDO) is to strengthen the learning environments and Labour market orientation of Programs in priority disciplines and the management of the higher education system.

In order to increase enrolment capacity in different programs and to promote applied research and innovation capacity, SUA (Solomon Mahlangu Campus) is planning to use the HEET funds to improve academic infrastructures and academic facilities for good training and learning environments through the construction of academic building, hostel and remodelling of existing warehouses into Multi-purpose Agro-processing Unit to address population growth and aging infrastructure. This initiative aims to ensure the campus can meet modern educational needs effectively. The construction and rehabilitation activities will be conducted within SUA premises situated at Solomon Mahlangu Campus in Mazimbu which have total area of 1050 ha. Out of which 1ha will be used for the establishment of the project. The project life span is expected to be 100 years, with total investment costs estimated at TZS 9,177,388,130.

The World Bank's Environmental and Social Framework (ESF) outlines policies and standards to counteract anticipated environmental and social impacts in investment projects. ESS1 within

ESF specifies requirements for Borrowers regarding the identification, assessment, and mitigation of project risks. In line with these guidelines, SUA conducted and submitted an Environmental and Social Impact Assessment (ESIA) to NEMC, including a Scoping Report and Terms of Reference (TOR). Prior to conduct full ESIA here are the procedure that was followed to entail the project registration with project reference No. EC/EIA/2023/3511 with approved terms of reference (ToR) for a comprehensive ESIA study, aligning with the Environmental Management Act, Cap 191, Environmental Impact Assessment and Audit (Amendment) Regulations, 2018, and the project-specific Environmental and Social Management Framework (ESMF).

2. Project description

The proposed project shall deal with construction of one academic building (4 storey) one hostel building (3 storey) and Remodelling of two warehouses into Multi-purpose Agro-processing Unit. Activities under this proposed project will be implemented in four phases namely mobilization, construction, demobilization, and operation and maintenance phases.

The proposed project emphasizes eco-friendly design across its academic and hostel buildings as well as the Agro-processing unit. By integrating passive design techniques, sustainable materials, and renewable energy sources during construction, the project aims to significantly reduce its environmental footprint while promoting long-term sustainability.

3. Project main activities

Activities under this proposed project will be implemented in four phases namely Mobilization construction, demobilization, and operation and maintenance phases.

The Contractor will also employ more skilled and unskilled workers. Skilled Labour will include engineers, technicians, foremen, etc. Contractor shall comply with all relevant laws as guided by the Constructor Registration Board (CRB); Engineers Registration Board (ERB) and Architect and Quantity Survey Registration Board (AQRB) as well as NEMC (EMA 2004, Environmental Impact Assessment and Audit 2015 with its amendment of 2018 and World Bank requirement (ESF, ESMF) as well as relevant international laws on construction, safety, and climate change.

4. Project Location

Sokoine University of Agriculture, Solomon Mahlangu campus is located in Mindu ward, Morogoro Municipality, Morogoro Region. Solomon Mahlangu campus is located at Mazimbu area that located about 10 Km north of the SUA Main Campus, 4 Km off the Dar es Salaam to Iringa Highway.

The project site can be assessed through tarmac road from Morogoro town 4 Km off the Dar es Salaam to Iringa Highway. There is another alternative road (feeder road) to access the project area through the Dodoma Road via Kihonda. Adjacent to project sites there is various infrastructures that have been used by the University to support its core activities of teaching and research. Upon completion, the university is expected to accommodate many numbers of students.

5. Legal Frameworks

There are numbers of policies and legislations set out the legal and regulatory requirements which are relevant to the proposed project at SUA. Additionally, there are pertinent standards governing environmental management and protection, health, and safety. Relevant policies and legislations pertaining to development of the project mainly environmental management in terms of quality, health and safety, pollution of ground and surface water, pollution of soil, land, and land use control among others, were examined to ensure that the proposed development project meets and abides by these regulations.

The policies and legal frameworks include.

i. Environmental Management Act No. 20 of (2004), Cap. 191
ii. The Water Supply and Sanitation Act No. 12 of 2009
iii. Land Act no 4 (1999)
iv. The Urban Planning Act (2007)
v. Occupation Health Safety (2003)
vi. Employment and Labour Relations Act No. 6 of 2004
vii. Engineers Registration Act and its Amendments 1997 and 2007
viii. The Contractors Registration Act (1997)
ix. The Architects and Quantity Surveyors Act (1997)
x. The HIV and AIDS (Prevention and Control) Act of 2008
xi. The Local Government Laws (Miscellaneous Amendments) Act (1999)
xii. The Tanzania 2025 Development Vision
xiii. Environmental Impact Assessment and Auditing (amendment) Regulations (2018)
xiv. The National Health Policy of 2008.
xv. The Tanzania 2025 Development Vision
xvi. The Employment and Labour Relations Act No. 6 of 2004

Also, the Environmental Impact Statement has assessed the general compliance with the following regulations and guidelines; The Tanzania Development Vision 2025, The Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations 2018, The Environmental Management (Air Quality Standards) Regulations, 2007, The Environmental Management (Soil Quality Standards) Regulations, 2007, The Environmental Management (Water Quality Standards) Regulations, 2007 and The Environmental Management (Standards for Controls of Noise and Vibration Pollution) Regulations, 2015

Furthermore, this ESIA study has complied with the World Bank Environmental and Social Framework which supports green, resilient, and inclusive development by strengthening protection for people and the environment and making important advances in areas such as Labour, inclusion and non-discrimination, gender, climate change, biodiversity, community health and safety, and stakeholders' engagement. The following are five (5) out of 10 Environmental and Social standards of the World Bank which are relevant to the project.

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

6. Baseline Information

The project site is within the area characterized by sandy clay loams and sandy clay soils, different natural vegetation i.e. (short and long grasses), tree species, and artificial tree species cover the surface land. No sensitive ecological sites are found near the proposed sites. The general area is characterized by flat alluvial plains with homogenous sedimentation pattern and the specific area has a largely flat topography and gentle slope. About three quarter of total land at SUA constitutes undeveloped land. This undeveloped land is currently used for farming activities and is suitable for construction of all kinds of development required in spatial expansion of SUA. Hence, the proposed establishment under HEET project will be done at the least developed area.

Additionally, project site is very accessible to social services include road networks, water supply and electrical supply from TANESCO. Financial services like Mobile money and bank services are available at Solomon Mahlangu Campus and surrounding communities so during construction and operation phase, the Labours who will be working at Solomon Mahlangu Campus will assess all services easily. Also, in Solomon Mahlangu Campus there is hospital which will be used for health services during construction and operation phase.

7. Stakeholders Engagement and Public Consultation

Stakeholders' consultation process was carried out based on EIA and Environmental Audit Regulation 2005 (amended 2018) and Word Bank Environmental and Social Standards (ESS 10) and Stakeholders Engagement Plan (SEP).

Public consultation entailed sharing information and knowledge about the project, seeking to understand key stakeholders' concerns and building relationships with the community.
Identification of key stakeholders was based on the role, relevance, and influence of an organization; group or individual has on the proposed project. It was based also on how he/she will be affected by the project.

The Stakeholders Engagement Plan (SEP) was developed. It covered both national and sub-national engagement, although a greater focus was placed on sub-national stakeholders. This focusing mainly on regional, district and surrounding communities. The SEP provided details on the engagement needed associated with project activities with a concept of inclusiveness by involving women, vulnerable people as well as people with special needs. The purpose of consultation was to get their views throughout the project lifespan. In addition, a mechanism was put in place to address grievances; Gender based Violence (GBV), Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH).

Stakeholders' identification considered all aspects of stakeholders that may be affected or have interest with project activities whether positively or negatively and/or based on their roles in implementation of the project.

The main stakeholders consulted included all individuals or groups that might be affected or might affect (positively or negatively) the proposed development in one way or another. They are found at the Zonal, Regional, Municipal, and local levels. At the Zonal level, OSHA was consulted. At the Regional level, the following stakeholders were consulted SUA (Staff, Students, and Service Providers), Morogoro Fire and Rescue Force, Morogoro Water Supply Authority (MORUWASA), Wami/Ruvu Basin Water bodies (WRBWB), TANESCO and Morogoro Municipal Council. At the local level, the ward executive officer (WEO) from

Mindu ward and their street/ Mtaa executive officers (MEO) as well as community members around Solomon Mahlangu project site were consulted.

8. Impact Assessment and Identification of Alternative

The impact assessment for Solomon Mahlangu Campus's proposed project underscores potential environmental effects throughout various stages. During mobilization, machinery movement might compact soil, disrupting vegetation and drainage, while construction activities such as noise, dust, and disruption could affect the community. Excavation runoff could harm aquatic ecosystems, and emissions might contribute to air pollution.

In the operational phase, the remodelled warehouse's activities, including producing baked goods, *maandazi,* biscuits, juices, and mineral water, could have resource consumption implications. Continuous emissions into the air and water may pose ongoing concerns. Proper waste disposal during closure is vital to prevent soil and water contamination. To ensure sustainability, effective monitoring, waste management, and community engagement are crucial.

The Environmental and Social Impact Assessment (ESIA) report explores potential alternatives to mitigate these impacts and encourage responsible development, considering the construction of new academic building and hostel building, and the transformation of two warehouses into a Multi-purpose Agro-processing Unit.

Impacts associated with the proposed project.

A. Physical environmental Impacts

Positive environmental impacts

i. Increase physical outlook of the new modern buildings and student's hostel.
ii. Improved waste management from the existing that will be integrated into new facilities.
iii. Will improve safety to university environments such as walkways, road lights and assembly points.

Negative environmental impacts

i. Vegetation clearance
ii. Impact on climate change
iii. Generation of solid waste
iv. Generation of liquid waste (human sanitary waste)
v. Soil and water quality contamination
vi. Noise nuisance and Vibration
vii. Soil erosion
viii. Air pollutions (fugitive dust and exhaust emissions)
ix. Generation of hazardous waste

B. Impacts on Social Environment

Positive social impacts

i. Employment opportunities

ii. Increase income to community around project site.
iii. Benefit to local suppliers of construction materials.
iv. Increased human capital.
v. Increase students' admission to university.
vi. Increase of revenue to SUA
vii. Production of skilled labour force for nation development
viii. Increased commercial and social activities around project locations.
ix. Increased revenues to local authorities

Negative social impacts

i. Population influx (labour influx)
ii. Increased risk of Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH)
iii. Disruption of traffic Flow
iv. Occupational health and safety hazards to workers
v. Possible Spread of HIV/AIDS, COVID-19, and other infectious diseases.
vi. Child labour and forced labour.
vii. Unplanned pregnancies
viii. Risk of construction materials vandalism
ix. Public health hazards due to wastes

9. Mitigation Measures

The report contains plans and a monitoring strategy to minimize or prevent any negative social and environmental consequences from this nature of project. The Environmental and Social Management Plan (ESMP) described in the report outlines the schedule for implementing the suggested strategies to address these impacts, as well as plans for ongoing monitoring. It clearly establishes the roles and responsibilities of the parties involved in mitigating and monitoring the adverse environmental and social effects.

SUA is responsible for project execution and fulfilling environmental and social management responsibilities. The authorized Environmental and Social Impact Assessment (ESIA) report will act as a reference for SUA to implement and monitor the social and environmental impacts of the proposed project. Identified impacts and mitigation measures are presented in chapter 7.

10. Environmental and Social Management Plan (ESMP)

This report proposes strategies to reduce or avoid the negative social and environmental effects that have been identified. These strategies, along with a monitoring plan, are outlined in the ESMP (Environmental and Social Management Plan). Further World Bank Environment and Social Framework (ESF) and the project's Environmental and Social Management Framework (ESMF) were observed in the study. Most of these measures align with well-established engineering and social practices. The ESMP also defines the roles and responsibilities of various stakeholders involved in the plan. During the construction phase, the primary actors responsible for implementation are the contractor and SUA. However, once the operation phase begins, SUA will take on the key role in implementing the mitigation measures. The estimated environmental costs for these actions amount to TZS 198,000,000.

11. Environmental and Social Monitoring Plan (ESMP)

The Contractor's safeguard team, consisting of environmental, social, and safety experts, will conduct the monitoring of environmental and social parameters during the construction phase, supervised by the Consultant's safeguard team. Once the operation phase begins, the responsibility for mitigation and monitoring will shift to the SUA. To assess the progress and address any emerging environmental issues, OSHA and/or NEMC will conduct annual EHS reviews, examining environmental concerns alongside the project implementation status and sensitivity. The estimated cost for implementing the proposed environmental monitoring program is TZS 75,000,000

12. Cost Benefit Analysis

The Environmental Impact Statement (EIS) assesses the project by examining the detrimental effects it may have, considering the socio-economic advantages that would be lost if the project did not proceed. The evaluation of the environmental cost-benefit ratio considers both the negative and positive impacts. Despite the project potential financial and social benefits, the environmental consequences can be effectively alleviated. The financial resources necessary for mitigating the adverse effects are relatively minimal in comparison to the overall investment required.

13. Decommissioning

This is the final demise of the buildings and services use value. The decommissioning entails demolition of the structures and other appurtenances. However, with regard to this type of project not soon closure plan can prompt to decommissioning as this project operation has very longer life span.

14. Summary and Conclusion

1.4.1 Summary

Sokoine University of Agriculture is embarking on a transformative development plan, focusing on three pivotal projects. Firstly, they are constructing an Eco-Friendly Academic Building that blends advanced learning spaces with sustainable design, championing innovation and research while conserving energy and resources. Secondly, they are creating an eco-friendly hostel complex, aiming for sustainability by incorporating energy-saving technologies, efficient water use, and reduced waste generation. This not only enhances student living conditions but also promotes eco-awareness.

Additionally, the university is repurposing a warehouse into a versatile Agro-processing Unit, which will contribute to agricultural advancement by processing and adding value to farm products. This endeavour reflects the university's commitment to practical agricultural innovation, aligning theory with real-world application. These projects collectively underscore the institution's dedication to excellence, sustainability, and hands-on learning. By merging modernity with eco-responsibility, Sokoine University of Agriculture strives to enrich education, foster innovation, and promote lasting environmental and economic benefits.

1.4.2 Conclusion

The consultant has looked the environmental aspects in different perspective as far as the nature and scope of the project at this university. Even though a lot of environmental effects have been found and evaluated, none are thought to be so serious as to preclude their mitigation. The

development's location and character lead to the conclusion that, with the right mitigation measures in place, the potential effects of the planned development are manageable in terms of their scope and nature. In addition, the expert believes that putting the suggested ESMP and EMP into practice will protect the environment's integrity and the welfare of the local population.

1.5 Recommendation

The Consultant suggests that the proposed project be approved as long as the Sokoine University complies with the ESMP and EMP suggested in this ESIA Report, as well as any additional requirements that NEMC/TCU may impose after consulting with lead agencies like World Bank group and other relevant parties.

The following recommendations are made to enhance the viability of the project:

- The project shall be continued as planned as it is economically and socially viable.
- Implementation of appropriate solid waste management practices will eliminate risk of environmental pollution by haphazard dumping.
- The proposed mitigation and enhancement measures (the ESMP) should be implemented to minimize and/ or avoid the identified adverse environmental and social impacts of the proposed project. The ESMP should be provided as part of the Contractor ‘s contract.
- The EMP should also be implemented to track the effectiveness of mitigation and enhancement measures and hence further improvement of the mitigation plan. Monitoring will be used as a means of ensuring compliance with national or international standards.

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AIDS	Acquired Immune Deficiency Syndrome
ANC	Africa National Congress
BMP	Best Management Plan
BoQ	Bill of Quantity
CBD	Central Business District
CITES	Convention on International Trade and Endangered Species of Wild Fauna and Flora
CNG	Compressed natural gas
COEBS	College of Economics and Business Studies
CONAS	College of Natural and Applied Sciences
COVID	Corona Virus Disease
CRB	Contractors Registration Board
DCDO	District Community Development Officer
DED	District Executive Director
DLO	District Land Officer
DoE	Division of Environment
E&S	Environmental and Social
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental management Plan
ERB	Engineers Registration Board
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESS	Environmental Social Standards
FYDP	Five Year Development Programme
GBV	Gender Based Violation
GHG	Green House Gases
GOT	Government of Tanzania
GRM	Grievance redress mechanisms
HEET	Higher Education for Economic Transformation
HEI	Higher Education Institution
HIV	Human Immune Deficiency Virus
ILO	International Labour Organization
IUCN	International Union for Conservation of Nature
IUCN	International Union for Conservation of Nature
KPH	Kilometer Per Hour
LGA	Local Government Authority
MEO	Mtaa Executive officer
MoEST	Ministry of Education Science and Technology
MORUWASA	Morogoro Water Supply and Sanitation Authority
NACP	National HIV/AIDS Control Programmes
NAFORMA	National Forest Resources Monitoring And. Assessment
NEMC	National Environment Management Council
NEP	National Environmental Policy
NESC	National Environmental Standards Compendium
NGO	Non-Governmental Organization
OHS	Occupation Health and Safety
OSHA	Occupation Safety and Health Authority
PAD	Project Appraisal Document

PIT	Project Implementation Team
PIU	Project Implementation Unit
PLHAS	People Living with HIV/AIDS
POM	Project Operational Manual
PPE	Personal Protective Equipment
SEA	Sexual Exploitation and Abuse
SH	Sexual Harassment
STD	Sexually Transmitted Diseases
SUA	Sokoine University of Agriculture
SUAHAB	Sokoine University of Agriculture Housing and Accommodation Bureau
SUASO	Sokoine University of Agriculture Student Organization
TAC	Technical Advisory Committee
TANESCO	Tanzania Electricity Supply Company
TBS	Tanzania Bureau of Standards
TCU	Tanzania Commission for Universities
ToR	Terms of Reference
UASB	Up-flow anaerobic sludge blanket
UN	United Nation
UNFCCC	United Nations Framework Convention on Climatic Change
URTC	United Republic of Tanzania
VAT	Value Added Tax
VPO-DoE	Vice President ‘s Office – Division of Environment
WEO	Ward Executive Officer

ACKNOWLEDGEMENTS

Sokoine University of Agriculture extends sincere gratitude to the World Bank, Ministry of Education, Science, and Technology (MoEST), and the National Environmental Management Council (NEMC) for their unwavering cooperation throughout the formulation of this ESIA report. Special appreciation is also extended to all stakeholders in Morogoro Municipal Council, particularly the communities of Mindu Ward for their extensive contributions and support during this project consultations. The names, signatures and designations of all stakeholders consulted are appended to this ESIA report.

Additionally, thanks are also directed to Experts who formed ESIA team, including Shabani M. Mssanzya, and Pendo Z. Nassary. Recognition is also extended to Francis K Magesa, Anderson Rwela, Mariam Emmanuel, Henry Muya, Elihuruma Mlay, Hamduni Hamza and Maureen Mumba for their invaluable guidance. Their collective efforts significantly contributed to the preparation of this comprehensive report.

CHAPTER 1: BACKGROUND INFORMATION

1.1 Introduction

Sokoine University of Agriculture (SUA) is a public university located on the slopes of Uluguru Mountains in Morogoro, Tanzania. The history of SUA dates back since 1965 when it started as an Agricultural College offering diploma training in disciplines of agriculture. After the dissolution of the University of East Africa and the subsequent establishment of the University of Dar es Salaam (UDSM) in July 1970, the Agricultural College was transformed into a Faculty of Agriculture of the University of Dar es Salaam (UDSM) and thereby started offering Bachelor of Science in Agriculture degree. In 1974, the Division of Forestry was established and hence the Faculty of Agriculture became the Faculty of Agriculture and Forestry. The introduction of Bachelor of Veterinary Science in 1976 and the establishment of the Division of Veterinary Science, the Faculty of Agriculture and Forestry was re-named as the Faculty of Agriculture, Forestry and Veterinary Sciences. On the 1st of July 1984 by the Parliamentary Act No. 6 of 1984, the faculty was transformed into a full-fledged University known as University of Agriculture which was thereafter renamed Sokoine University of Agriculture (SUA) in honour of the Late Prime Minister of the United Republic of Tanzania, Edward Moringe Sokoine who passed away in Morogoro in a car accident on 12th April 1984. In 2005, the Universities Act No. 7 repealed Parliamentary Act No. 6 of 1984 and paved a way to the establishment of University Charters. Hence, SUA has been operating under its Charter and Rules, which were signed on 28th March 2007. The Charter and Rules were amended and published on 28th August 2020 as a Government Notice No. 683.

The Solomon Mahlangu Campus (SMC) initially started in April 1979 as an educational facility for the African National Congress (ANC) of South Africa being known as ANC School, Mazimbu. Following the execution of a famous ANC freedom fighter, Solomon Kalushi Mahlangu by the then apartheid regime in South Africa, the ANC School was renamed Solomon Mahlangu Freedom College (SOMAFCO) in honour of the freedom fighter's contribution to the liberation struggles. The SOMAFCO facility was handed over to the Tanzanian Government in 1992 by the ANC following the collapse of apartheid regime in South Africa. The Tanzanian Government handled part of the campus to Sokoine University of Agriculture (SUA) on 23/7/1998. In March 1999, the SUA Council during its 60th meeting, renamed the Campus, Solomon Mahlangu Campus in honour of the historical role the Campus played in the liberation struggle of the Republic of South Africa. On March 13th, 2000, the Ministry of Science Technology and Higher Education (MSTHE) officially handed over the Campus to SUA with all the facilities. After the handing over, the SUA Council appointed a Director in April 2000 to oversee the administration and transformation of the campus.

On 30th March 2017 Solomon Mahlangu College of Science and Education (SM-CoSE) transformed to The College of Natural and Applied Sciences (CoNAS) which was approved by the University Council after merging the former Faculty of Science and the Directorate of Solomon Mahlangu Campus. In July 2021, the College became the College of Natural and Applied Sciences. College of Natural and Applied Sciences (Solomon Mahlangu College) is located Mazimbu area that located about 10 Km north of the SUA Main Campus, 4 Km off the Dar es Salaam – Iringa Highway. Despite its historical significance, Solomon Mahlangu Campus at SUA faces infrastructure challenges due to increased staff, students, and programs. A construction and renovation project are ongoing, construction of academic building, Student hostel and remodelling of existing warehouses into Multi-purpose Agro processing Unit to

address population growth and aging infrastructure. This initiative aims to ensure the campus can meet modern educational needs effectively.

To address this, SUA, Solomon Mahlangu Campus has received financial support from the World Bank (WB) for Higher Education for Economic Transformation (HEET) Project (P166415). The HEET project is supported by the Government of the United Republic of Tanzania (GoT) through the World Bank. The main Project Development Objective (PDO) is to strengthen the learning environments and Labour market orientation of programs in priority disciplines and the management of the higher education system. Generally, it is done under seven (7) strategic focus areas namely.

i. Increasing enrolment capacity in degree programs in priority disciplines
ii. Upgrading Learning Resources and Equipment
iii. Promoting applied Research and innovation capacity
iv. Building functional linkages with private sector/industry
v. Strengthening use of digital technology
vi. Promote self-generated income.
vii. Building capacity of academic staff and university leadership

In strengthening the learning environments and Labour market orientation of programs in priority disciplines the University plans to focus on seven strategic focus areas under HEET project. However, three strategic focus areas (Increasing enrolment capacity in degree programs in priority disciplines, promoting applied Research and Innovation capacity and developing options for self-generating income) will involve construction of one academic building one Student hostel and remodelling of two existing warehouses into multipurpose Agro processing Unit for training purposes, producing breads, biscuits, juices, and mineral water for training purposes. These buildings will be constructed within SUA premises situated at Solomon Mahlangu Campus in Mazimbu which have total area of 1050 ha.

According to the Environmental Management Act of 2004 of Tanzania, before undertaking these activities project developers are required to carry out an Environmental and Social Impact Assessment (ESIA) prior to project implementation. Also, 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. SUA has consulted Earth Environmental Expert Limited located at Kibo Complex, Post Box 35413, Dar Es Salaam to carry out the Environmental and social impact assessment (ESIA) for the proposed development project according to Environmental Management Act, Cap 191, Environmental Impact Assessment and Audit (Amendment) Regulations, 2018, and the World Bank Environment and Social Framework (ESF) as well as the HEET project's Environmental and Social Management Framework (ESMF).

1.2 Project Rationale

According to the 2021 Environmental and Social Management Framework (EMSF), Tanzania has made significant improvement in basic education, with primary enrolment increasing by 24.5% from 8,116,488 in 2015 to 10,111,671 pupils in 2018 (10,601,616 in 2019). The positive trend extends to secondary education, indicating a growing number of students transitioning to post-primary education in 2013/14. However, with a projected surge in demand for higher education by 2030, both public and private tertiary education systems must enhance capacity and quality (PAD, 2021). Despite progress in basic education, policymakers recognize the challenge of absorbing graduates into higher education. Immediate priorities include expanding

infrastructure, facilities, and quality assurance systems, particularly in Engineering, Medical Science and Technology, Agriculture, Energy, Minerals, Forestry, and Natural Resource Management. Gender issues also warrant attention.

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

- 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.
- University graduates struggle to find jobs, at least in part due to skills mismatches.
- 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.
- Shortage of well-trained lecturers, and the majority of academic staff use traditional teaching methodologies.
- Most of higher education institutions are not currently able to access or use modern technologies to deliver training.
- 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 aims to fund the enhancement of infrastructure, faculties, and quality assurance systems within higher education. This initiative, led by the Government of the United Republic of Tanzania, seeks to empower public universities with the operational capacity to serve as reliable catalysts for economic transformation. The HEET project aligns with each university's institutional vision, mission, objectives, and core values, fostering a collaborative approach for sustainable economic growth.

1.3 Objectives of the SUA HEET Project

1.3.1 Main Objective

According to the HEET's 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.

1.3.2 Specific Objectives

The objective of the project is to create a vibrant educational and operational setting by

- Constructing an academic building,
- Construction of Student hostel
- Converting an existing warehouse into a versatile Agro-processing Unit.

1.4 Objectives of ESIA

The objective of conducting the Environmental and Social Impact Assessment (ESIA) for the Solomon Mahlangu Campus is to thoroughly assess the potential environmental and social implications of the project's key facilities. The specific objectives of conducting the Environment and Social Impact Assessment study with respect to the project was following.

i. To carry out environmental screening and scooping study to identify social and environmental risks and impacts in the project site and nearby environment.
ii. To identify, analyse and assess environmental and social risks and impacts of the proposed construction project.
iii. To describe the pertinent regulations and standards governing, environmental quality, health and safety, protection of sensitive areas, protections of endangered species and land use control at international, national regional and local levels.
iv. To recommend cost-effective measures for minimizing or eliminating adverse impacts of the proposed design, construction, operation, and maintenance of the project; and
v. To prepare Environmental and Social Management Plan, including and Health and Safety Management for design, construction, operation, and maintenance phases of the Project

1.5 Methodology

The ESIA being a multidisciplinary field involved a team of experts, the key ones being EIA Expert (Team Leader), Environmental Engineer, Civil Engineer, Air quality, pressure noise level expert, HSE specialist and Sociologist.

The ESIA study for the project was carried out in accordance with the Terms of Reference that were provided by SUA as client. The study was undertaken between April and May 2023 included the following methodology.

1.5.1 Document review

The document review conducted as part of the Environmental and Social Impact Assessment (ESIA) process involved examination of various relevant documents to complement the data gathered during scoping and ESIA activities. These encompassed reports addressing ecological, economic, financial, and social aspects relevant to both the project site and the broader Morogoro Municipality.

By analysing documents such as environmental regulations, socio-economic profiles, strategic plans, and population statistics, the consultant aimed to establish a comprehensive understanding of the project's context and potential impacts.

Additionally, essential documents from the World Bank, including the Project Operation Manual (POM), Project Appraisal Document (PAD), and Environmental and Social Management Framework (ESMF), were carefully reviewed to ensure alignment with international best practices.

1.5.2 Site visits

The main objective of the site visit was to gather information relevant for the study. Field studies involved walking on the project site for assessing the existing situation of the proposed site and the nearby surroundings. The ESIA study team visited and did the physical assessment on the proposed site and their core impact areas. The fieldwork was carried out in April 2023. Activities carried out during field studies included:

i. Interviews and consultation with stakeholders,

ii. Indoor Mtaa consultation meetings,

iii. Appraisal of environmental conditions of the project site and areas that might be impacted by the project (hydrology, animal, and plant life's), and

iv. Appraisal of land use and assessment of other relevant socio-economic parameters.

During the field visits, consultation with relevant stakeholders was also conducted. Particular attention was paid to the impact on the livelihood of the people living within or in the immediate vicinity of the proposed project.

1.5.3 Stakeholder Consultations

The process of identifying and engaging stakeholders adhered to the Environmental Impact Assessment (EIA) and Audit Regulations of 2005, as amended in 2018, along with compliance with the World Bank Environmental and Social Standards (ESS10). The stakeholder engagement approach included the preparation and disclosure of a Stakeholders Engagement Plan (SEP) guided by the UNDP's EIA Training Manual Resource from 2002. Public consultation was a pivotal component, involving the dissemination of project information, knowledge sharing, and active solicitation of insights from key stakeholders. This process aimed to comprehend stakeholders' concerns while fostering meaningful relationships within the community.

The ESIA team visited Morogoro Municipality where the projects will take place and later on went to neighboring community of Mindu ward. Stakeholders' interviews were conducted in order to collect baseline data and issues of concerns. The EIA study applied different participatory methods to involve all the relevant stakeholders. Public meeting dominated in the discussion.

One to one interview with government Agencies such as TANESCO, OSHA, MORUWASA, Wami/Ruvu Basin Water bodies, Morogoro Municipal Council, Student at Solomon Mahlangu Campus, SUA staff's Local community around Solomon Mahlangu Campus where Construction will take place. Consultation with Local community leaders of Mindu was conducted with special focused group example Boda-boda, Mama-ntilie and service providers around Solomon Mahlangu Campus in order to gather information about this coming construction and rehabilitation project.

The key objective was to

i. Inform the different stakeholders about the project.

ii. Provide an opportunity for the stakeholders to discuss their opinions and concerns.

iii. Manage their expectations and misconceptions regarding the project.

iv. Verify the significance of environmental, social and health impacts identified.

v. Disseminate concepts of the Project activities with a view to provoking Project interest amongst the stakeholders.

vi. Inform the process of developing appropriate mitigation measures.

The stakeholders pointed out several issues and concern, all these were taken on board with ESIA team. Details of stakeholders consulted names and signatures as well as contacts were recorded and attached in appendices part of this report.

1.5.4 Baseline Data and Information

Baseline data measurement is a crucial step in the Environmental Impact Assessment (EIA) process which undertaken after defining the project's scope. It involves gathering primary and secondary data to evaluate environmental and social conditions around the project site. Primary data is collected through direct measurements, observations, and semi-structured interviews with relevant parties, while secondary data is sourced from various information repositories like district profiles.

Baseline measurements encompass air quality, noise, and vibration levels, providing essential insights into the current state of the environment before construction activities commence. Air quality assessments monitor pollutant concentrations, such as particulate matter and nitrogen oxides, while noise measurements quantify existing sound levels, including construction or transportation-related noises. Vibration measurements assess ground vibrations from natural factors and human activities, establishing a reference point for monitoring potential impacts from construction activities.

1.5.5 Impact Identification

The proposed development at Solomon Mahlangu Campus potentially leading to various environmental and social impacts. These impacts are identified through an assessment of interactions between project activities and the surrounding environment, considering factors such as construction activities, increased vehicular traffic, and changes to land use patterns. Potential impacts include air quality degradation due to construction emissions, noise pollution from machinery and increased activity, water quality deterioration from runoff and pollution, and temporary disruptions to social cohesion within the campus community. Through this comprehensive identification process, stakeholders gain insight into the potential consequences of the project, facilitating informed decision-making and the development of appropriate mitigation measures.

1.5.6 Impact Evaluation

The evaluation of potential impacts associated with the proposed development at Solomon Mahlangu Campus considers the extent, duration, magnitude, and significance of each identified impact. Assessing air quality impacts reveals a moderate extent with high magnitude due to construction emissions, requiring short-term mitigation measures. Noise impacts are characterized by a low extent but moderate magnitude, necessitating long-term management strategies. Water quality impacts are determined to be of high extent, magnitude, and significance, demanding stringent long-term mitigation efforts. Social cohesion impacts, while low in extent and magnitude, require attention to maintain community harmony during the project's implementation and beyond. By systematically evaluating these impacts, stakeholders can prioritize mitigation actions to minimize adverse effects and promote sustainable development.

1.6 Structure of the report

To clearly highlight and understand environmental and social issues that will occur due to project implementation, operation, and decommissioning process, the ESIA project report is presented in accordance with 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:

- **Executive summary**: summary of entire ESIA report
- **Chapter one**: outlines the development and structure of the ESIA report including the Project background, objectives, Impact Assessment scope and the report structure.
- **Chapter two**: provides a concise description of the Project and its geographical and temporal context. It includes a site description, an overview of the Project Facility design and details of Project inputs and outputs.
- **Chapter three**: analyses policy, legal and institutional framework in which the ESIA study has been conducted was discussed in this Chapter. National regulations are summarized along with relevant international agreements, as well as applicable international best practice guidelines and standards.
- **Chapter four**: summarizes the available baseline data on the biological resources, physical environment, socio-economic conditions, and receptors within the Project Study Area. It based on both primary and secondary data sources and will consider changes in the baseline condition without the development in place.
- **Chapter five**: summarizes comments and concerns received from stakeholders and how these comments have been addressed.
- **Chapter six**: summarizes the predicted impacts of the Project, proposed mitigation/enhancement measures, and analysis of alternatives.
- **Chapter seven**: presents ESMP and draws together the possible mitigation measures; define the specific actions required, institutional roles and responsibilities for implementation.
- **Chapter eight**: presents a monitoring program and estimate the costs of the measures.
- **Chapter nine**: describes the cost-benefit analysis to determine whether a project will deliver net economic benefits to society.
- **Chapter ten**: describes potential environmental and social impacts that need to be considered during the decommissioning phase.
- **Chapter eleven**: summarizes conclusions that are made based on the assessment as well as outline any further recommendations.
- **References**
- **Appendices**

CHAPTER 2: PROJECT DESCRIPTION

2.1 Project Location and Accessibility

2.1.1 Project location

The proposed projects shall be located at Solomon Mahlangu College of science and Education of Sokoine University of Agriculture. Solomon Mahlangu Campus is located at Mazimbu area, Mindu ward, Morogoro Municipality, Morogoro Region which is about 10 Km north of the SUA Main Campus, 4 Km off the Dar es Salaam – Iringa Highway

2.1.2 Accessibility

The project site can be assessed through tarmac road from Morogoro town 4 Km off the Dar es Salaam to Iringa Highway. There is another alternative road (feeder road) to access the project area through the Dodoma Road via Kihonda. Adjacent to project sites there is various infrastructures that have been used by the University to support its core activities of teaching and research. Upon completion, the university is expected to accommodate many numbers of students.

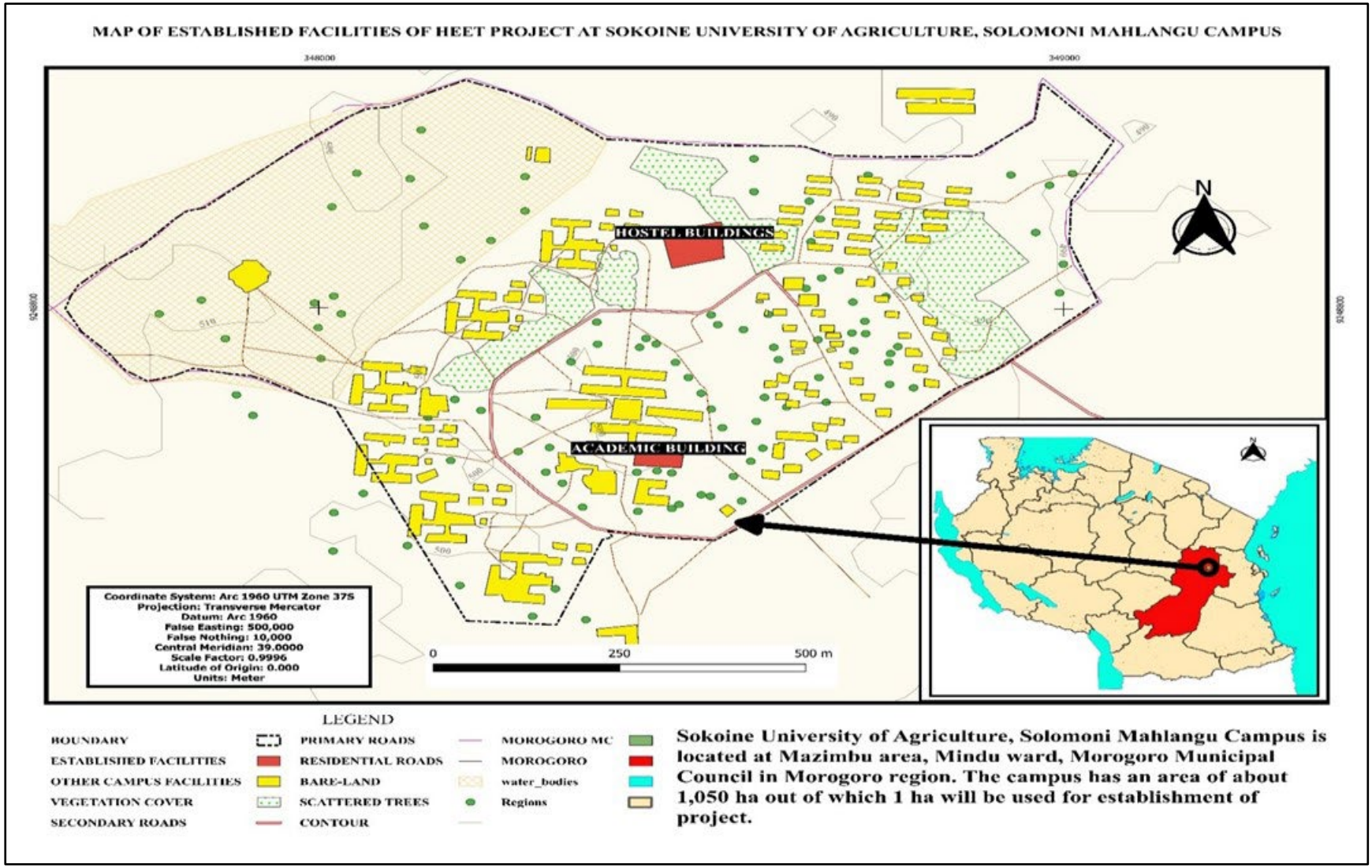

Figure 2.1: Location of the proposed project at SUA- Solomon Mahlangu Campus

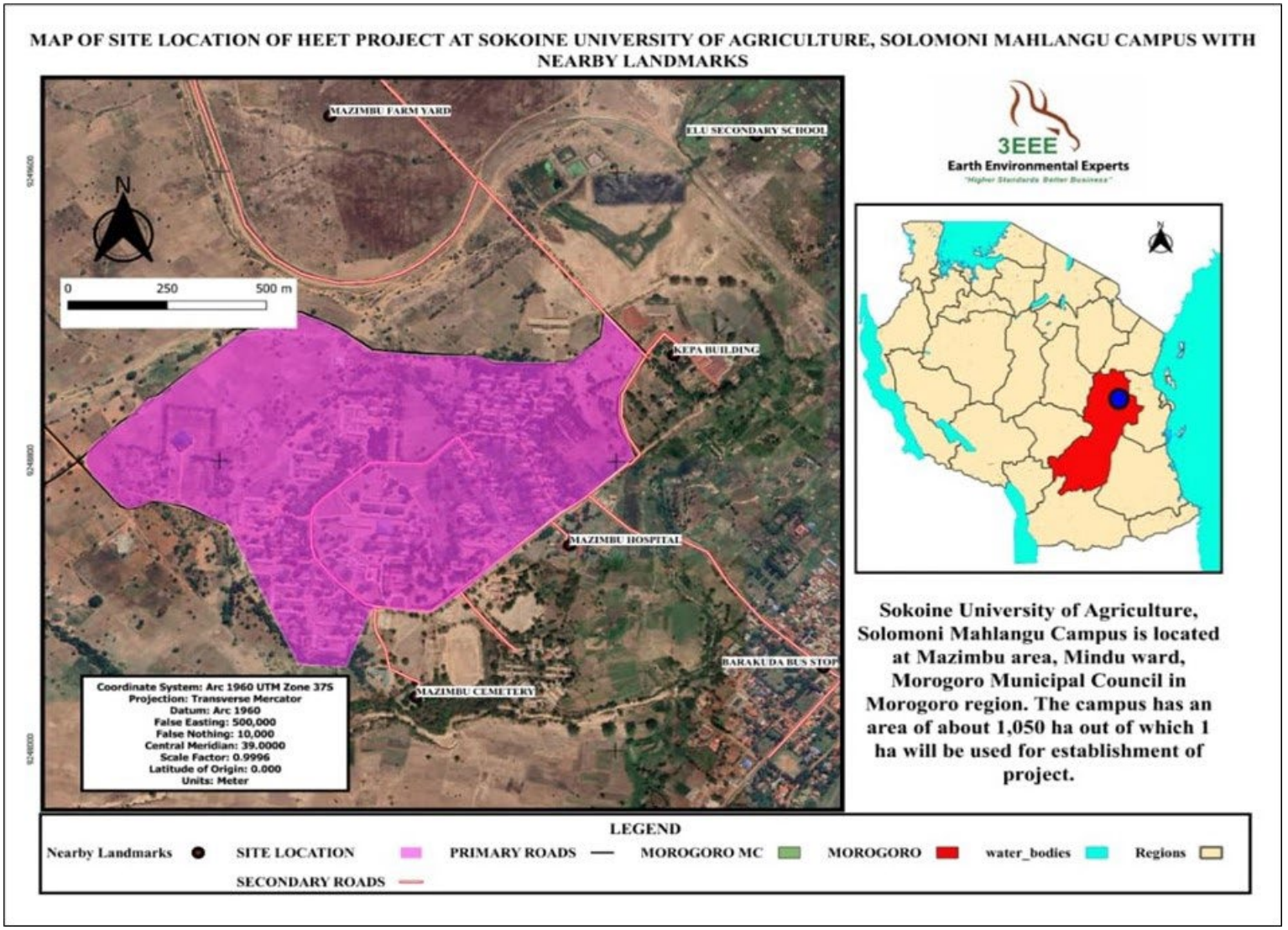

Figure 2.2: Map of proposed project site at Solomon Mahlangu Campus with Existing Landmarks

2.2 Land Ownership

The Solomon Mahlangu Campus (SMC) project will exclusively utilize land owned by Sokoine University of Agriculture (SUA), covering approximately 1,050 hectares, with a dedicated 10,000 square meters for its development. This strategic use of SUA's existing land eliminates any need for additional land acquisition, resettlement, or compensation, ensuring a seamless project within the university's property boundaries. Furthermore, the absence of external stakeholders directly impacted by the land allocation simplifies the project's environmental and social considerations.

It is essential to note that while the Solomon Mahlangu Campus may not possess a formal Certificate of Occupancy issued by the Morogoro Municipal Council, it proudly holds a Certificate of Interim Handing since Wednesday, April 12th, 2000. This historical certificate recognizes the campus's established operational history and the local authorities' acknowledgment of its presence and role in the region.

2.3 Project Site Description and Features

The existing Land Use Plan at SUA is categorized in 11 zones: Estate Management, Livestock Development, Food crops and Experimental farms, Student hostels, Primary and Secondary schools, Playing fields, University mixed farming, Agro–forestry, teaching, Staff housing and farms.

The proposed Land Use plan generally makes provision for about Ten Land Use components namely, Forestry and Beekeeping, Irrigation Farming, Horticulture Farming, Trade and Shopping Zone, Hostel and Recreation Centers, Research Zone, Academic Zone, Staff Housing, Hostel, Research and Training livestock farming. The proposed land coverage for each of the component is within the zones provided with and belongs to the Sokoine University of Agriculture.

The University area lies in a slightly sloping land with plants and natural vegetation. Existence of trees especially in the developed and undeveloped land enhances the landscape quality. These landscape qualities are potential elements that should be taken into consideration in the design of buildings so as to achieve enhanced aesthetic characteristics of both buildings and the space between them. Further, existing trees and vegetation as landscape elements can enhance the microclimate and visual characteristics of the site.

Also, the proposed site characterized soils that can support diverse land use functions including but not limited to farming, livestock, and gardening. It has both planted and natural vegetation surrounding the University boundaries. The vegetation creates green scenery throughout the year. According to the Tanzania Meteorological Agency, Morogoro lies within a low-risk degree earthquake zone. This means all constructed buildings and infrastructure should take this into account to avoid possible future damages to structures.

Additionally, project site is very assessable to social services include road networks. Other social services like financial services like Mobile money and bank services etc. are available at Solomon Mahlangu Campus and surrounding communities so during construction and operation phase people will be working at SMC will assess all services easily. Also, in SMC there is hospital which will be used in case of accident or illness during construction and operation phase.

2.4 Adjacent development

The academic building project site, located on undeveloped land, necessitates only minor demolition, specifically limited to a small shop, to create space for the new construction. Surrounding structures like lecture rooms, offices, hostels, and canteens are nearby but not

within the project site boundaries, ensuring minimal disruption to existing buildings. Furthermore, the hostel building project site and the warehouse project site entail no demolitions, with existing structures remaining intact.

Upon evaluating the entire site, it has been determined that there are no pristine environments that would support the thriving of species of conservation concern according to IUCN and CITES standards. Furthermore, there are no sensitive ecological receptors in the vicinity of the project area, and no cultural or archaeological objects were identified during the preliminary feasibility study.

2.5 Project design considerations

The overall design of the buildings will promote use of construction materials, which are environmentally friendly, durable, and vandal-proof and those, which require minimal periodic maintenance. The general design considerations will incorporate aspects of modern architecture, the current local government building policy guidelines and the latest standards developed by (Contractor registration board) CRB and the Tanzania Commission of Universities (TCU) Architectural Metric Handbook, which will include:

a) Ventilation

The design will cater for natural ventilation with features that encourage natural air circulation (including use of permanent air vents above all doors and windows).

b) **Lighting**

General lighting for public areas such as staircases, corridors, carparks, and staff circulation areas will be provided with LED luminaries for energy-saving purposes and supplied with solar PV (photovoltaics). All luminaries in all potentially wet areas and exterior installation shall be minimum. Lighting for the garden, landscape, lift lobbies, restaurants and general Offices will take into consideration both functional and aesthetic aspects. Lighting System for function room, corridor, Offices, and other front of house area will be designed in collaboration with the specialist and interior designer.

c) **Sanitary**

The number of toilets and wash hand basins will be selected according to the number of students and workers who will be using these facilities.

d) Wastewater management.

Wastewater will be treated in Wastewater stabilization ponds located at Solomon Mahlangu Campus. The proposed new buildings will exert pressure to the existing treatment facilities. Once completed, the proposed new buildings will use the existing ponds for discharge of wastewater. Therefore, the existing ponds required to be managed well.

e) Sustainable resource use

The design of the buildings will incorporate landscaped gardens which will be planted with suitable species of trees / shrubs and grass to prevent ecological deterioration and improve aesthetic value of the site. Part of the excavated soil will be used for landscaping therefore reducing the amount of soil to be transported away from the site.

f) Solid waste management

The waste generated during operation phase of the project shall mainly include waste from classrooms, office and kitchen, and waste from operation and maintenance of facilities. The waste shall be managed through an authorized and licensed waste handler.

Sensitization and awareness creation among the user of buildings on the significance of waste separation as well as provide for waste sorting bins at the premises with clear labelling.

g) Climate Change (Temperature and Rainfall)

The construction of new facilities brings climate change risks due to vegetation clearance, pavement installation, and warehouse emissions. Clearing vegetation disrupts climate balance, pavement creates heat islands, and poor stormwater management leads to flooding.

To counter these risks, the project design incorporates climate resilience strategies for each facility. The eco-friendly academic building, hostel, and warehouse conversion prioritize advanced stormwater management to prevent floods and use energy-efficient materials to combat rising temperatures. These measures empower the facilities to address climate challenges while fostering sustainability.

Moreover, emissions from activities within Multi-purpose Agro-processing Unit contribute to greenhouse gases that trap heat in the atmosphere, leading to global warming and more extreme weather events. However, adopting energy-efficient equipment, waste management practices, and renewable energy sources can mitigate these emissions and contribute positively to climate change mitigation.

h) Safety

The design prioritizes safety by adhering to relevant building codes and standards. Fire safety measures, emergency exits, and fire suppression systems are incorporated into the facilities. Structural integrity is ensured to withstand potential earthquakes or other hazards, reducing risks to occupants.

i) Disaster Preparedness

The project design considers disaster preparedness by incorporating disaster-resistant construction techniques and materials. The facilities are designed to be resilient to natural disasters such as earthquakes, floods, and storms. Emergency response plans are developed to guide actions in case of unforeseen events.

j) Gender and special need Inclusivity

The University buildings shall be developed to be smart and friendly to gender, including considerations of persons with special needs. The project design promotes inclusivity by incorporating features that cater to people with special needs. The installation of lifts in the new buildings ensures accessibility for individuals with mobility challenges. Moreover, in the remodelling of the warehouse into a multi-purpose Agro-processing unit, considerations for inclusivity encompass block wall partitioning with clear and wide passages, the installation of accessible windows and doors, slip-resistant flooring, contrasting colours for visibility, accessible electrical and plumbing systems, and thoughtful wastewater management, as well as accommodating chain-link fencing, gates, walkways, and landscaping to ensure accessibility for all users, culminating in a comprehensive approach to fostering inclusivity within these facilities. Universal design principles are applied throughout the facilities to ensure that they are usable by everyone, regardless of their abilities.

2.6 Project Components and description

The proposed project will involve construction of academic building, which will be of 4 storeys and each floor will be of 1400 m^2 and hostel building which will be of 3 storeys and each floor will be of 1400 m^2. Additionally, the project involves renovating an existing warehouse into a Multi-purpose Agro-processing Unit.

2.6.1 Academic building

This building will be of 4-storey. The ground floor will consist of two (2) Lecture theatres with a capacity of at least 500 students each, Multi-disability Resource Center, Toilets, Ramp, stairs. The first floor will consist of one lecture theatre (collapsible) with a capacity of at least 500 students and toilets. Second floor will consist of two (2) lecture theatres with flexible dividers at the middle with a capacity of at least 500 students and toilets. Third floor and fourth floors will consist of one computer Laboratory with a capacity of at least 200 computers, One Video Conference facility with a capacity of at least 200 people, 18 Staff Offices (Senior staff), Office space – pool office (Junior staff), Tea Room/Kitchen and Toilets. Additionally, the building will consist of parking space while the capacity of parking space will be determined after completion of structural and architectural drawings.

This proposed site is nearby the existing administration building. The site is covered by grasses and trees such as, *Deronix regia, Syzygium cumini, Senna siamea, Fraxinus Americana, Polyalthia longifolia and Mango tree.*

2.6.2 Student hostel building

The building will be of 3-storey. Ground floor will consist of Warden's Office, Tea room, Janitor's office, hired services supervisor's office, Maintenance store, Toilets, bathrooms, and laundries, 33 rooms each with capacity of 4 students and reading space, Staircases, ramps, and elevator. First, second and third floor will consist of 35 rooms with capacity of 4 students each floor with a reading space in each room, Staircases, ramps, and elevator. Additionally, the building will consist of parking space while the capacity of parking space will be determined after completion of structural and architectural drawings. This proposed site is adjacent to the existing student hostel called unit 6. The site is covered by grasses like *Miscanthus x giganteus*, and it is surrounded by different trees.

2.6.3 Warehouses

The proposed facility involves the remodelling of two warehouses into a versatile Multi-purpose Agro-processing Unit. The project encompasses various aspects, including block wall partitioning, window and door installation and repair, finishing of floors, walls, and ceilings, as well as painting. The renovation also involves electrical installations, plumbing systems, wastewater management, chain-link fencing, and the installation of gates. The external works consist of creating walkways, both soft and hard landscaping, and the addition of a standby generator along with a generator house. This transformation aims to turn the warehouse into a functional space that supports Agro-processing activities and innovation.

2.6.4 Other support facilities and services

The project will continue to use the existing wastewater stabilization ponds (WSP) located at Solomon Mahlangu Campus. The new facilities will be connected to the existing Wastewater stabilization Ponds and the specific number of toilets to be built in each building will be determined after completion of the design phase. However, it is important to note that the existing WSP has the capacity to accommodate the additional facilities without any adverse impact on its operational efficiency.

2.7 Project technology

During construction, the project will employ light mechanization and high Labour inputs. Locally available equipment's, construction materials and Labour will be used, which will be provided by a locally registered contractor. Light earth moving equipment will be used at the

initial stages especially in the excavation, removal, and transportation of soils from project site. Transportation of building materials and waste debris into the site will also involve sizeable trucks.

Concrete mixing and mobile elevator equipment will be installed during the construction. Other equipment will include dump trucks and an assortment of hand tools. As such, dust and noise will arise from the operations of the equipment and are likely to be issues of concern.
This requires the contractor to undertake the use appropriate technology that will reduce the impact of both noise and dust at the construction site.

The project will employ considerable number of workers at various stages of construction. This will include manual Labourers, technicians, foremen and supervisors and a host of professional involved in various fields. Minimal staff will remain during the operation phase. A registered contractor and several sub-contractors will undertake the construction process. All the construction process will be under the close supervision of the project engineer, county building inspectors and the project architect.

2.8 Description of main project activities

Activities for the project shall be implemented in four phases namely planning, construction, demobilization, and operation and maintenance phases. Details of each of the phases are provided in the sections that follow.

2.8.1 Mobilization/Preconstruction/Planning Phase

Planning phase for the project commenced in April 2023 and will be concluded in August 2023. Activities during mobilization phase will include.

a) Topographical Survey

In project planning phase, a topographical survey will be conducted to define property boundaries and assess ground elevations accurately. This survey involves mapping natural and man-made features and is crucial for informed decisions on site layout, infrastructure placement, and environmental considerations. It ensures compliance with property boundaries and aids in identifying and addressing potential environmental and social impacts in the ESIA report.

b) Geotechnical Soil analysis

The geotechnical investigation for this project is a critical phase that entails drilling into the ground to assess the soil profile and underlying geological formations. This process is essential for understanding the site's geological characteristics, including soil types, composition, and stability, which are pivotal in designing a structurally sound and safe construction. While the geotechnical survey is currently underway, its findings will be detailed in the appendix of the final Environmental and Social Impact Assessment (ESIA) report once the investigation is completed. This comprehensive data will inform engineering decisions, foundation design, and environmental considerations, ensuring that the construction aligns with safety standards and environmental responsibility.

c) Architectural and Structural Designs

Architectural design emphasizes the visual appeal and functional layout of the SUA project, while structural design ensures the building's safety. These aspects are integral to the ongoing SUA project. Approved drawings will be incorporated into the Environmental and Social Impact Assessment (ESIA) report. This inclusion will provide stakeholders with a comprehensive understanding of both the project's visual aesthetics and structural integrity, enabling well-informed decision-making prior to the commencement of construction.

d) Acquisition of various permits/ certificates.

The acquisition of various permits and certificates for construction projects based on ESIA studies at SUA involves obtaining an Environmental Impact Assessment (EIA) certificate, a building permit, a land use permit, a water resource use permit, a waste management permit, occupational health, and safety certificates.

2.8.2 Construction phase

The proponent will contract private construction company to construct the project site. The contactor will be responsible for sourcing of materials, Labour recruitment and actual construction work. Construction phase will include the following structures.

i. Construction of four storey academic building
ii. Construction of three storey Student hostel
iii. Remodelling of two warehouses into Multi-purpose Agro-processing Unit

2.8.2.2 Description of the Project's Construction Activities

Construction activities will take 18 months after completion of designing stage. Approximated 50 people will be employed to work at the site when construction activities begin and most of them will be community living near project site. The construction activities will encompass various tasks, including site preparation, transportation of building materials, establishment of a workers' camp, erection of buildings, and installation of service infrastructure like access roads and parking facilities. Additionally, the project will involve the construction of drainage systems and utility networks to ensure efficient operation.

a. Site preparation

Activities under site preparation will include land clearing, grading and excavation, construction of auxiliary structures such as access roads etc., levelling and earth marking. The vegetation cover including grass, and few trees on the site will be cleared. The proponent shall ensure as many indigenous trees as possible are used for re-vegetation as well as conserving the trees along the plot boundary.

b. Construction of the workers' camp

The project contractor will build a workers' camp at the project site which will be used to provide residence for workers as well as act as project administration offices, storage facilities for different building materials and equipment, workshop for servicing the vehicles and construction machinery. Several factors will be considered when selecting the camp site. The factors shall include topography of the site, accessibility of project site and availability of water and wastewater system.

Toilets as well as bathrooms shall be constructed on the site for use by the workforce. The ground shall be covered with aggregate stone to minimize dust and prevent mud when it rains. Retention bunds shall be constructed around fuel and oil storage areas and all drainages and effluents from the workers' camp shall be treated before being discharged into the drainage system.

c. Construction of buildings

Main activities of the proposed project during construction of academic building and student hostel will include but not limited to the following:

- **Excavation and Foundation Works**

Excavation of trenches and topsoil will be carried out using hand tools/local tools. Most of soil will be utilized in backfilling to the foundation as well as general land scaping of the project site.

The depth of a building's foundation is typically determined after the completion of the design phase, during the detailed engineering and construction planning stage. This determination relies on factors such as site-specific soil assessments, structural calculations, and local regulatory requirements. Engineers, in collaboration with geotechnical experts, analyse the finalized design to ascertain the precise foundation depth needed to ensure structural stability and compliance with safety standards. This determination is a critical step that occurs after the design is complete and serves as a foundation for the construction phase.

The foundation will be built using stones, concrete, cement, and steel bars. This process will generate some noise, smoke, and dust especially from the operating machineries and cement, respectively. However, workers will be sensitized on the use of personal protective equipments and management of air pollution from construction machinery.

- **Masonry, concrete Work, and related activities**

The project activities will involve a lot of masonry work and related activities including stone and crushing, mixing by use of both manual and mechanical means. These activities are known to be Labour intensive and a source of air pollutants.

- **Structural Steel Works**

The building will be reinforced with structural steel for stability. Structural steel works will involve steel cutting, welding, and erection.

- **Electrical Work**

Electrical work during construction of the premises will include installation of electrical gadgets, devices 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. All the electrical works will be carried out by a licensed electrician to the satisfaction of the Tanzania Electrical Supply Company (TANESCO).

- **Civil works**

The mechanical works shall be done by qualified technicians under the supervision of the Project Mechanical Engineer and shall follow the set standards. The works will include the following:

(i) Plumbing and drainage Service ducts accessible from all floor levels
(ii) Soil vent pipes (SVP) provided on doors and windows.
(iii) Storm drains pipes.
(iv) Inspection chamber covers and framing.
(v) Underground foul and waste drainpipes

- **Construction equipments**

Different machinery will be used to construct the project facilities. These will include:

- Bull Dozers for clearing the site, removal of topsoil and vegetation materials, and pushing out stumps.
- Graders for grading and levelling land for buildings and access road formation.
- Trucks for transporting construction materials.
- Light machinery like pedestrian rollers for access road compaction.
- Front end loader for loading materials onto trucks.

- Several light equipment-like shovels, picks.
- Concrete mixers.
- Compactor.
- Wheelbarrow; and
- Hammers and bolt and nut fasteners, hand saw, electric and gas welders, electric saws and grinders, load roller, trucks, hand drills and drill bits, wire cutters, trucks, wheel loader, forklift, excavator etc.

➢ **Construction materials**

Different raw materials will be required during construction phase. Materials such as sand, gravel and quarry stone will be outsourced from different places. The building materials such as quarry stone, gravel and sand will be collected from approved sites.

Other materials such as cement, concrete block, paints, timber, roofing materials, windows, doors and other joinery, tilt and roller doors, wallboard and plasterboard, light fittings, fuel and oil, electricity, water, ceramic tiles, steel, pipes, adhesives, copper wires, gas (acetylene and oxygen), cardboard will also be outsourced for the project.

Local quarries will be inspected and aggregates which will be used will be tested and certified. Care shall be taken not to use admixtures containing calcium or chlorides, as these will increase the risk of reinforcement corrosion. Plasticizers will be considered, as increased workability is advantageous when working with complex shaped structures and structural forms.

Whoever contractor that will be awarded the construction bid will adhere to Health, safety and Environmental (HSE) standards as per construction regulations. SUA will have the Key personnel who will be responsible for checking the HSE Standard operation procedures (SOP) to comply with the legal requirement.

➢ **Sourcing of materials**

The materials for construction will be derived from authorized areas whereby only licensed person will be allowed to collect materials. The authorized quarries include Mvomero quarry for sand, and Lugoba quarry for Gravel. The Contractor is not responsible to extract construction materials rather than purchasing only to licensed suppliers. Types and sources of project requirements during the construction phase are shown in Table 2.2 whilst the quantities of materials will be indicated in the Bill of Quantities (BOQ)

➢ **Transportation of materials**

Materials (Sand and gravel) from quarries will be transported by trucks to the construction site. Water will be supplied by Morogoro Water Supply and Sanitation Authority (MORUWASA) while Electricity will be supplied by TANESCO. Other materials like cement, timber, aluminium sheets, steel tress, and reinforcement bars will be transported by trucks to the construction site from authorized local vendors/suppliers**.**

The contractor will be responsible for the transportation of all construction materials and equipment from point of sourcing to the site mainly by using well established road network from Morogoro town to Solomon Mahlangu Campus across Dar es Salaam to Iringa Highway. There is another alternative road (feeder road) to access the project area through the Dodoma Road via Kihonda. The transportation of materials shall consider the Environmental and Social Standards (ESS4): Community health and safety.

Construction work is Labour intensive and requires skilled and unskilled manpower consisting of management, technical personnel, and labourers. Skilled Labour may include engineers, technicians, foremen, etc. The Contractor shall comply with the Employment and Labour Relation Act No. 6 of 2004 and develop a recruitment and termination strategy to ensure the right skills required by the project can be sourced locally and give equal opportunities for all.

The contractor shall also comply with the Labour Institution Wage Order (2013) by paying there as per guiding Labour laws to avoid unnecessary conflicts during the construction stage. Draft contracts shall be prepared by the Contractor, client and approved by WB and Labour Officer. Also to avoid child Labour these laws as provided in POM 2021 were provided to the contractor.

- United Nations Framework Convention on Climate Change (1992)
- Relevant International Labour Organization (ILO) Conventions ratified by Tanzania including:
    - C138 Minimum Age Convention of 1973.
    - C182 Worst Forms of Child Labour Convention of 1999.

During this period, there will be significant adverse impacts such as solid and liquid waste generation, generation of hazardous waste, deforestation, noise dust production and so forth.

Storage of Materials

Some of the materials from borrow sites will be used directly after delivery and as such no piling up is expected. Other materials like aggregates and sand will be stored at the specific designated area with all safety hazards pre-cautions prior to be used. Cement and reinforcement bars will be stored in special storage rooms. Timber will directly be used and consequently there will be no stockpiling of timber at the project site area.

Types, Amounts and treatment/disposal of waste

Type's quantity and treatment/disposal of wastes during the construction phase are shown in table 2.1.

Table 2.1: Types, amounts and treatment/disposal of wastes during the construction phase

Waste	Types	Quantity	Treatment/ Disposal
Solid Waste (Degradable)	Vegetations (Trees, Grasses) and remaining timber	About 250 m^3 of biomass	Source of energy for coking for resident's neighbour to project site
	Food remains, cardboards and papers	17.5 kg/day (based on generation rate of 0.25 kg/day/ person for 50 people)	To be collected in the large skip bucket at site then to be composed and used as manure
Solid Waste (Non-Degradable)	Demolition waste and Topsoil	30-40 m^3	Backfilling materials in cut sections
Liquid waste	Sewage	1m^3/day (based on 50 people, water consumption rate of 40L/capita/day and wastewater discharge factor of 80%, 50% of the workers shall use the Site Toilet)	All liquid waste should be discharged to the water stabilization ponds located at Solomon Mahlangu Campus for treatment before discharged to the environment

Source: *Consultant Analysis, 2023*

2.8.3 Remodelling/Rehabilitation Phase

The Rehabilitation Phase involves the transformation of an existing warehouse into a Multi-purpose Agro-processing Unit, encompassing a range of critical modifications and improvements to ensure the functionality, safety, and sustainability of the facility.

2.8.3.1 Description of the Project's activities during Remodelling of warehouses

a) Site Assessment and Planning

The project begins with a thorough assessment of the existing warehouse and its surroundings. This includes evaluating the structural integrity, identifying any environmental considerations, and planning for the layout of the Agro-processing unit. Accessibility and safety assessments are also conducted to ensure compliance with relevant standards.

b) Block Wall Partitioning

This activity involves dividing the existing warehouse into distinct processing areas using block walls. These partitions help organize activities such as cleaning, sorting, processing, and packaging. The goal is to create a well-structured layout that optimizes workflow and ensures efficient use of space. Importantly, clear, and accessible passages are designed within the partitions to facilitate the movement of personnel, equipment, and materials, making it easy for everyone to navigate within the facility.

c) Windows and Doors Installation/Repair

The installation or repair of windows and doors is crucial for several reasons. Windows provide natural light and ventilation, while doors ensure security. Windows are strategically placed to optimize airflow and illumination within the facility. Moreover, accessible doors with user-friendly mechanisms are installed or repaired to accommodate individuals with diverse mobility needs, ensuring that everyone can enter and exit the facility comfortably.

d) Floor, Wall, and Ceiling Finishing

This activity focuses on the finishing touches to create a safe and hygienic processing environment. The flooring is finished with materials that are slip-resistant, reducing the risk of accidents. Walls and ceilings are finished with easy-to-clean materials, meeting sanitation standards and contributing to the overall cleanliness of the workspace. These finishes not only enhance safety but also simplify maintenance.

e) Painting

Painting serves both functional and aesthetic purposes. A suitable paint scheme is applied to the interior to create a pleasant and functional workspace. Importantly, contrasting colours are used for door frames, signage, and other essential elements to aid individuals with visual impairments in navigation. This thoughtful use of colour enhances accessibility within the facility.

f) Electrical Installation and Fixation

This activity involves the installation of the electrical system required to power machinery and equipment used in Agro-processing activities. Light switches, outlets, and controls are placed at appropriate heights and locations to ensure accessibility for all users, including those with mobility limitations. This ensures that everyone can operate equipment and access electrical features without difficulty.

g) Plumbing Systems

Plumbing systems will be installed to support water supply and sanitation needs within the facility. Accessible sinks and restroom facilities are incorporated, adhering to accessibility standards and regulations. This ensures that individuals with special needs have access to sanitary facilities, promoting inclusivity.

h) Wastewater System

A wastewater system is designed to efficiently manage wastewater generated during agro processing. Considerations are made for compliance with environmental regulations and ease of maintenance. Proper wastewater management is critical for both environmental sustainability and the facility's functionality.

i) Fencing and Gates installation

Chain-link fencing is installed around the facility's perimeter for security purposes. Wide gates with accessible opening mechanisms are included to accommodate wheelchairs and ensure ease of access. This enhances both security and inclusivity.

j) External Works, Walkways, and Landscaping

External enhancements include the creation of accessible walkways with smooth surfaces and appropriate slopes, conforming to accessibility standards. Soft and hard landscaping elements are thoughtfully designed to create an inviting and aesthetically pleasing outdoor space. Accessibility considerations extend to seating areas and other amenities, making the external environment welcoming for all users.

k) Standby Generator and Generator House

A standby generator will be installed to ensure uninterrupted operations. The generator house is designed with accessibility in mind, providing ease of maintenance and emergency access. This ensures that the facility can continue its operations even during power outages, maintaining productivity.

2.8.3.2 OHS During construction and Rehabilitation phase

SUA 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 sign boards 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 traffic hazard management will be provided to students especially through SUASO Leaders so that each student will not be affected with traffics during construction. The speed limits for vehicles shall not exceeding the default speed limit (not exceeding 50 km/h), except within a speed zone in which a higher speed is permitted. The speed limit in the shared zone that should not exceed 10 km/h. Signals that a driver shall not turn right or left, or stop or suddenly decrease speed, without giving warning of his or her intentions. Contractors shall make sure that all of these issues are well known to their employed drivers to prevent unnecessary complications and accidents during project execution. However, the

entrance and exit points have been provided. The entry point at Solomon Mahlangu Campus main gate will be properly used to avoid interference with normal university routine.

2.8.4 Demobilization Phase

After completion of all construction and rehabilitation activities, contractor has to demobilize and leave the site clean and neat for operation phase. Contractor ‘s demobilization phase will involve clearing of all site activities in terms of tying up of all site facilities, demobilization of all construction equipment, landscaping, backfilling, and vegetating quarry sites.

Disposal off any remaining unwanted material and wastes will also be carried out during this demobilization phase. After the demobilization, the contractor will hand over the works to the project Proponent for the operation and maintenance phase.

2.8.4.1 Products and by-products from construction, Rehabilitation, and demobilization phase

This section addresses the expectations regarding the production of different products, by-products, and wastes throughout both the construction, rehabilitation, and demobilization stages of the project. Detailed information about the attributes of these products and by-products is provided herein.

- **Products**

During the project implementation, the construction phase will deliver key facilities, including an academic building, hostel, and a multipurpose Agro-processing unit through the remodelling of two existing warehouses at the Solomon Mahlangu Campus. These facilities represent tangible products that contribute to the expansion and enhancement of the campus infrastructure. The academic building and hostel will provide essential spaces for education and accommodation, respectively. Simultaneously, the remodelled Agro-processing unit will serve as a specialized training facility, producing various products such as bread, biscuits, juices, and mineral water for educational purposes. These tangible outputs underscore the project's commitment to creating modern and multifunctional spaces that align with the educational and training needs of the Solomon Mahlangu Campus.

- **By products**

By-products generated during the project are materials or items that are produced as a result of construction or other project activities but are not part of the project's main objectives. Proper management of these by-products is essential to minimize waste, reduce environmental impact, and, in some cases, realize cost savings. Here is an explanation of the by-products and how they will be disposed of:

i. Soil

Soil can become a by-product during construction when excavation and earth-moving activities generate excess soil. Proper management involves retaining usable soil for potential future use within the project area to reduce the need for importing new soil, promoting cost-effectiveness and environmental responsibility. However, any soil deemed unsuitable for project purposes, often due to quality issues or contamination, will be transported to designated dumping sites or landfills for proper disposal, ensuring compliance with environmental regulations and minimizing environmental and health risks. Effective soil management during construction is essential for safety, waste reduction, and adherence to environmental standards.

ii. Excess Sand, Ballast, and Stockpiles

Excess construction materials like sand, ballast, and stockpiles, which accumulate during the project, are not wasted but rather stored for future use. The contractor will transport these materials to a suitable yard, allowing for their potential reuse in upcoming projects or renovations. This sustainable approach minimizes the demand for new materials, aligning with eco-friendly construction practices and optimizing resource utilization.

iii. Construction and Rehabilitation Debris

Construction and rehabilitation debris at SUA encompass materials such as broken concrete, bricks, wood, cement bags and various other building materials that are generated during demolition, renovation, or construction activities within the campus. These materials may result from the removal of old structures, damaged components, or the installation of new infrastructure. An essential aspect of managing this debris is to recognize its potential for recycling or repurposing. For instance, concrete rubble from demolished structures can often be crushed and reused as aggregate for new construction projects, reducing the demand for new raw materials. Similarly, bricks and wood can be salvaged, refurbished, or repurposed, contributing to sustainability goals, and minimizing waste generation during the construction and rehabilitation phases at SUA.

iv. Unused Construction and Rehabilitation Materials

During the rehabilitation phase at SUA, surplus construction materials that remain unused at the end of the project, which may include bricks, tiles, insulation, or piping, should be properly managed. This includes storing them for potential future use in rehabilitation or construction projects within the SUA campus, donation to charitable organizations, or sale to minimize waste and maximize cost-effectiveness.

Additionally, as part of the rehabilitation activities, ceiling and painting renovations may generate materials like old ceiling panels and unused paint, which should also be managed efficiently. Furthermore, toilet rehabilitation may involve the replacement of fixtures and plumbing components, resulting in by-products like old toilets and plumbing fixtures. Proper management of these surplus materials during the rehabilitation phase at SUA is essential to promote sustainability, reduce unnecessary waste, and ensure the effective reuse or disposal of these items.

v. Temporary Structures and Facilities

Temporary structures like construction trailers, portable offices, and temporary fencing are typically used during the construction phase and need to be disassembled and removed. These materials can often be repurposed or recycled.

2.8.4.2 Types 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 iron sheets will be sold to people in the nearby communities for reuse while the rubbles will be used in reinstating nearby roads or being disposed in a dump site.

2.8.5 Operational and Maintenance Phase

The actual usage of the new university buildings, rehabilitated buildings and its ancillary facilities is expected to commence immediately after the construction works. The completed project will be directly managed by Sokoine University of Agriculture. During this time SUA will carry out routine maintenance and regular rehabilitation.

2.8.5.1 Description of the Project's activities during operational and Maintenance Phase

i. Regular Monitoring and Reporting

Regular monitoring involves tracking the condition of building systems, infrastructure, and utilities. This includes routine checks on electrical, plumbing, and HVAC systems to identify any potential issues before they escalate. Regular reporting ensures that campus administrators are informed of maintenance needs and can take proactive measures to address them promptly.

ii. Energy Efficiency Management

Energy efficiency management focuses on monitoring and optimizing energy consumption within the buildings. This includes using advanced energy-efficient lighting systems, regulating heating and cooling systems based on occupancy, and implementing smart technologies to reduce energy waste. Such measures not only lower operational costs but also contribute to the campus's environmental sustainability goals.

iii. Waste Management and Recycling

Waste management will involve implementing effective waste segregation, disposal, and recycling systems. Proper waste management practices ensure that different types of waste are disposed of appropriately, minimizing environmental impact. Recycling initiatives help reduce landfill waste and promote a culture of sustainability among the campus community.

iv. Safety and Security Measures

Safety and security measures encompass the installation of fire detection systems, emergency exits, and surveillance systems. These measures ensure the safety of students, staff, and visitors. Fire detection systems provide early alerts in case of emergencies, while strategically placed emergency exits facilitate swift evacuation. Surveillance enhances campus security and reduces potential risks**.**

v. Food Processing and Hygiene Standards

Within the Agro-processing Unit, stringent hygiene and food safety standards are upheld. This involves maintaining a clean and sanitary environment for food processing activities, ensuring that the processed products meet quality and safety requirements. Adhering to these standards is essential to provide safe and high-quality food products.

vi. Regular Facility Maintenance:

Regular maintenance activities involve conducting scheduled inspections, repairs, and upkeep of the facilities. This ensures that all components, from electrical systems to plumbing, are functioning optimally and any potential issues are addressed promptly. Proper maintenance contributes to the longevity and efficiency of the facilities, creating a conducive learning and working environment.

Types and quantities of materials for rehabilitation/maintenance will be determined by nature of the problem at the site. Fine and coarse aggregates will consistently be sourced from the designated quarry sites and will be transported by trucks to the site. Water will be sourced from MORUWASA depending on the volume required for rehabilitation or maintenances. Other materials like cement, timber and reinforcement bars will be supplied by nearby local vendors.

Some of the materials will be used directly after delivery while the bulk materials like aggregates, sand, etc. will be stored at the designated area within the premise with precautions to HSE.

2.8.5.4 Waste Management during Operation Phase

a) Solid Waste Management

During the operation phase of university facilities, a key aspect of solid waste management is promoting sustainable practices among occupants. This involves implementing effective recycling programs, minimizing packaging waste, and encouraging responsible waste disposal. Regular waste collection and disposal routines must be established to ensure proper waste management. Specialized Laboratories should maintain waste segregation protocols to safely dispose of non-hazardous Laboratory materials. Offices within these buildings should also prioritize recycling and waste reduction.

b) Waste water Management

Efficient liquid waste during the operation phase will be managed through the septic and soak away pit, MORUWASA sewerage system and existing university wastewater stabilization ponds within the university facilities. This includes capturing and treating wastewater from sinks, drainage systems, and restroom facilities. Sustainable buildings, such as academic building and Hostel should continue to recycle non-potable water and minimize wastewater. SUA required to ensure that liquid waste generated at Agro processing unit during operation is treated and disposed of according to environmental regulations.

The proximity of Ngerengere river, situated just 1.5 kilometers from the project site, accentuates the need for stringent measures to prevent any potential contamination of the river and protect the surrounding environment. To achieve this, strict compliance with environmental regulations and responsible waste disposal practices is imperative to safeguard the water quality of Ngerengere river.

Concurrently, the management of wastewater stabilization ponds (WSP) is rigorously executed to prevent contamination of nearby water sources, notably Ngerengere river. Effective oversight involves regular monitoring, maintenance, and adherence to environmental regulations to ensure these ponds efficiently treat wastewater and meet stringent discharge standards. Proper maintenance procedures, including sludge removal and structural integrity checks, are vital, along with ongoing training for personnel responsible for wastewater management. Additionally, the establishment of emergency response plans to address accidental spills or system failures is crucial to prevent any adverse environmental impacts.

c) Stormwater Management

During the operation phase, the sustainable design features academic buildings, the Innovation Centre, and other facilities should continue to be maintained. This involves ongoing care for rainwater harvesting systems and the upkeep of permeable surfaces to control and reuse stormwater effectively. Specialized Laboratories should regularly inspect and maintain proper drainage and containment measures to prevent potential contamination of stormwater by Laboratory chemicals. Routine checks of drainage systems in office and academic buildings are crucial to ensure that stormwater runoff is managed efficiently.

d) Hazardous Waste Management

Hazardous waste management during the operation phase, especially in specialized Laboratories within the university facilities, is critical. Strict protocols for the handling, storage, and disposal of hazardous materials must be consistently followed, adhering to relevant regulations. This includes proper labelling of hazardous waste containers and regular training for Laboratory personnel on safe handling practices. Continuous monitoring and

oversight are essential to maintain compliance with hazardous waste regulations. Disposal of hazardous wastes will be conducted by certified dealers.

2.8.5.6 OHS During operation phase

Occupational health and safety considerations during the operation of the constructed and rehabilitated facilities at Sokoine University of Agriculture (SUA) are paramount. As detailed in the project's design and emergency response plans, proactive measures are in place to address various potential emergency situations. These measures include the allocation of emergency assembly points and the development of comprehensive emergency procedures to prevent and mitigate the consequences of incidents. The project places a strong emphasis on addressing Occupational Health and Safety (OHS) hazards inherent in daily operations. These hazards encompass risks such as disease outbreaks, fire, explosion, and security concerns.

To mitigate these risks, the facilities will be equipped with essential safety measures, including powder foam fire extinguishers, fire hose reels, and fire detectors strategically placed throughout the site. Regular servicing of these safety features ensures their effectiveness in safeguarding the well-being of SUA's staff, students, and visitors during the operational phase of the newly constructed and rehabilitated facilities, reinforcing a commitment to a safe and secure learning and working environment.

2.8.6 Decommissioning Phase

This is the final demise of the building, and its services use value. The decommissioning entails demolition of the structures and other appurtenances. However, decommissioning of the project is not anticipated to be done in the near future.

2.8.6.1 Activities during Decommissioning Phase

i. Demolition Works

Upon decommissioning, the project components including buildings, pavements, drainage and electrical systems, and perimeter fence and a lot of solid waste will be produced. Some of the waste will be reused for other construction works or if not reusable, disposed of appropriately by licensed waste disposal company.

ii. Dismantling of Equipment and Fixtures

All equipment including electrical installations, finishing fixtures partitions, among others will be dismantled and removed from the site during decommissioning of the project. Priority will be given to reuse of this equipment in other projects. This will be achieved through resale of the equipment to other building owners or contractors.

iii. Site Restoration

Once all the waste resulting from demolition and dismantling works is removed from the site, the site will be restored through refilling of the topsoil and revegetation using indigenous plant species. This will be done after acquiring demolition permit from relevant authority and experts.

2.9 Gender analysis and mainstreaming

The constitution of Tanzania, Act No. 15 of 1984 clearly stipulates equal rights for both men and women and prohibits any form of discrimination based on gender, colour, tribe, religion, or station in life. Tanzania has signed and ratified both international and Regional Instruments such as the Elimination of All Forms of Discrimination against Women in 1987; the African Charter on Human and Peoples' Rights on the Rights on Women in Africa in 2005. Currently,

Tanzania has achieved gender parity at primary school enrolment rates, this can be attributed by free education policy introduced through the Circular 5 of 2015 which implements the Education and Training Policy of 2014. This circular was responding to strategies of eliminating discrimination based on gender.

In the same context, SUA has a deliberate policy to encourage equal employment opportunity for both men and women. The contractor of the project will also align with the policies to ensure equal employment opportunities for both.

2.10 Project boundaries

Identification of boundaries within which the EIA study is undertaken is an important component of the environmental and social assessment study. There are three types of boundaries that are considered in this ESIA study: institutional, temporal, and spatial boundaries.

2.10.1 Spatial boundaries

Spatial boundaries relate to a consideration of the extent to which the proposed project will affect the surrounding environment and to the way, the environment is likely to impact on the project activities. Thus, spatial boundaries were considered in terms of the core impact area, the immediate impact area and area of influence. The core impact area constitutes the area that will be immediately and directly be affected by the actions undertaken during the project implementation, this includes all the areas covering the project and area where other associated infrastructure (e.g., transmission lines and storage facility) will be constructed.

The immediate impact area will comprise of areas outside the core zone where human or natural activities are likely to affect directly on or be impacted by the activities taking place in the core area. In the proposed project, the immediate impact area will include the existing settlements around SUA.

The area of influence refers to the greater area that is not subject to direct contact with the project but is directly or indirectly affected by or affecting the project. This includes activities taking place outside of the geographical core area and area of immediate impact but will still have influence on the project or vice versa.

2.10.2 Institutional boundaries

Institutional boundaries refer to those institutions and sectorial boundaries in which the project lies or mandated. These can be determined from political boundaries, Acts, regulations and institutional mandates and administrative structures. The proposed development is about the construction of new SUA buildings. Many institutions and administrative units in Tanzania are of interest:

i. Morogoro Municipal Council
ii. Ministry of Education, Science and Technology (MoEST)
iii. Tanzania Commission of Universities (TCU)
iv. Fire and Rescue Force
v. Occupational Safety and Health Authority (OSHA)
vi. MORUWASA
vii. TANESCO
viii. Wami/ Ruvu Basin Water Board (WRBWB)
ix. Mindu ward
x. Mindu ward

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

2.10.3 Temporal boundaries

Temporal boundaries refer to the lifespan and reversibility of impacts. For example, the impact of construction work for the affordable housing project may be short-lived, but the presence of these buildings in the selected site may have implications that stretch far into the future until when decommissioning is undertaken. Also, temporal boundaries extend into the past if there are unresolved land acquisition issues, but For SUA project there is no acquisition of land because the project will utilize the SUA land which is already set for the project. In addition, consideration needs to be given to what happens when the project ends, where there is a need for site restoration and decommissioning of the water supply system.

Therefore, some of the impacts that may occur during construction and rehabilitation activities, e.g., noise caused by bulldozers will disappear as soon as the construction phase will be completed. The construction period will last for eighteen months while the operational phase is designed for more years (Approximately 100 years) unless unforeseen event occurs.

2.11 The project cost and duration

The project has been granted a substantial budget of TZS **9,177,388,130**, generously provided by the World Bank through the Ministry of Education, Science, and Technology as part of the Higher Education for Economic Transformation initiative. The construction and rehabilitation works are planned to be complete within 18 months period and approximately 50 people will be working on site.

The anticipated project lifespan extends significantly into the distant future approximately 100 years, emphasizing a long-term perspective. This foresight is integral to engineering design, where structures are meticulously planned to remain operational and effective for an extended duration. Engineers prioritize resilience and sustainability, ensuring that the facilities can withstand the tests of time while considering adaptability to evolving needs. Provisions for ongoing maintenance and upkeep further underscore the commitment to enduring and functional infrastructure.

CHAPTER 3: POLICY ADMINISTRATIVE AND LEGAL FRAMEWORK

3.1 Introduction

Tanzania has several policies, laws, and administrative framework for the management of environmental and social issues enshrined in the National Constitution. Tanzania has various Acts, Regulations, and guidelines on environmental and social issues relevant to the projects under the HEET project. Tanzania is also a signatory to and has ratified various international conventions on environmental and social sustainability. Some of the policies, laws, regulations, and guidelines that are relevant to the environmental and social management of the proposed HEET project are briefly described in the succeeding subsections.

3.2 Policies relevant to the HEET project

The following are relevant sectoral and cross–sectoral policies which provide directives on how the project should be operated in relation to environmental, social, and economic issue. SUA will need to observe these policies while designing and implementing the proposed construction and rehabilitation project activities. The relevant policies have been summarized in a tabular form as indicated:

Table 3.1 Policies Relevant to the Project

	Policy	Description	Compliance
1	The National Environment Policy for Mainland (NEP 2021)	Aims at ensuring development projects are implemented sustainably, addressing environmental challenges like land degradation and water quality. Mandates EIA for projects with potential significant impacts	By conducting this EIA, SUA adheres to NEP 2021 requirements, promoting environmentally sound technologies and sustainable project development.
2	The National Land Policy (2019)	Focuses on secure land tenure, optimal land resource use, and conservation of ecologically sensitive areas.	The project aligns with the policy by ensuring the protection of cultural heritage and conservation areas, located on institutional land, highlighting responsible land use.
3	The Construction Industry Policy (2003)	Encourages the application of cost-effective and environmentally friendly technologies in socio-economic development activities	The project uses ultra-modern, sustainable construction techniques, aligning with the policy's emphasis on minimizing resource wastage and environmental harm.
4	The National Gender Policy (2002)	Aims to ensure gender-sensitive planning and equal opportunities for women and men in all sectors	This project promotes gender equality by providing equal employment opportunities and involving women in all planning to implementation stages
5	The Energy Policy (2015)	Recognizes energy as critical for economic development, promoting efficient and environmentally sound energy use	The project aligns with this policy by planning energy-efficient building designs and systems, supporting national economic development through sustainable energy use.
6	The National Water Policy (URT, 2002)	Advocates for sustainable water resource management,	The project is designed to minimize water use through efficient fixtures and ensure that water pollution is

	Policy	Description	Compliance
		emphasizing conservation and minimizing use.	avoided, complying with the policy's directives
7	The National Health Policy (URT, 2008)	Emphasizes community involvement in health development, access, and equity in health services.	Ensures a safe project environment and promotes health safety measures, aligning with the policy's objectives to improve health service access and equity.
8	Education Training Policy (2014)	Stresses the need for quality education improvement through modernized training and infrastructure	The project directly supports this policy by increasing accommodation, teaching, and learning infrastructure to boost student enrolment
9	The Urban Planning and Space Standards Policy (2018)	Provides guidance on space utilization for sustainable development, influencing the design and construction of buildings under the project	By considering urban planning and space standards in the project's design phase, it adheres to the policy's requirements for proper space utilization and sustainable development.
10	National Mineral Policy (2009)	Addresses sustainable mining activities and land reclamation post-mining.	Relevant to the project in terms of sustainable sourcing of construction materials, ensuring that aggregates are purchased from authorized vendors.
11	National Women and Gender Development Policy (2000)	Focuses on improving opportunities for all genders to participate fully in societal roles, aiming to eradicate poverty and improve living standards.	The project ensures equal opportunities in employment during both development and operation phases, supporting gender equality and addressing environmental degradation impacts on women
12	National Employment Policy (2008)	Promotes employment of Tanzanian nationals, focusing on industry, trade, and special groups like women and youth.	The project adheres to this policy by prioritizing employment for local and special groups, contributing to national employment goals.
13	The National Occupational Health and Safety Policy (2010)	Promotes safe and healthy working conditions to safeguard workers' wellbeing across all sectors	The project complies with occupational health and safety standards throughout its cycle, ensuring a safe work environment
14	National Policy on HIV/AIDS (2001)	Provides a framework for the multisectoral response to the HIV/AIDS epidemic, emphasizing non-discrimination and the involvement of various sectors in HIV/AIDS efforts	The project adheres to this policy by ensuring non-discrimination in employment and education related to HIV/AIDS status and integrating HIV/AIDS information and education in the workplace.
	National Research and Development Policy (2010)	Highlights the importance of science and technology in national development, aiming to strengthen research and development activities.	Aligns with the policy by facilitating teaching, research, technology, and innovation through

3.3 Legal Framework

Table 3.2 summarizes the legal framework, each act's relevance to the Solomon Mahlangu Campus project, and how compliance is achieved.

Table 3.2 Legal Framework

	Policy	Description	Compliance
1	Environmental Management Act (EMA), 2004	Governs all environmental matters in Tanzania, mandating EIA before project commencement.	The project complies by preparing an EIA in accordance with EMA requirements
2	The Land Act, 1999, CAP 113 R.E. 2019	Determines land ownership and procedures for land development	The project adheres to procedures, despite SUA holding a Certificate of Interim Handing-Over.
3	The Urban Planning Act (2007)	Ensures orderly and sustainable urban land development.	Compliance through seeking planning consent and adhering to regulations.
4	Water Resources Management Act of 2009	Provides a framework for sustainable water resources management.	SUA conducts an ESIA in line with this Act, though currently lacks a discharge permit for Water Stabilization Ponds.
5	The Water Supply and Sanitation Act No. 12 of 2009	Aims for sustainable management and regulation of water supply and sanitation services.	The project aligns with this law to manage increased water demand during construction and operation.
6	Occupational Health and Safety Act (2003)	Requires a safe working environment for workers.	The project implements safety measures and complies with all procedures.
7	Engineers Registration Act 1997 and its Amendments 2007	Regulates engineering practice in Tanzania.	Foreign engineers involved in the project must register with ERB.
8	The Contractors Registration (Amendment) Act 2008	Requires contractor registration with the Contractors Board before practicing.	The project complies with law requirements during contractor recruitment.
9	The Architects and Quantity Surveyors Act (2010)	Regulates the practice of architects and quantity surveyors.	All architectural drawings for the project are prepared by registered architects.
10	The Public Health Act 2009	Promotes public health and requires approval for construction projects based on health standards.	The project will comply with public health requirements.
11	Fire and Rescue Act (2015)	Mandates fire safety measures in buildings.	The project design considers fire safety requirements.
12	Employment and Labour Relations Act (No. 6), 2004	Prohibits forced labour and discrimination; establishes labour rights.	SUA ensures compliance with labour standards.
13	Workers Compensation Act (No. 20), 2008	Provides compensation for workers who suffer occupational injuries or diseases.	The project will operate within the requirements of this legislation.

	Policy	Description	Compliance
14	Prevention and Control of HIV/AIDS Act (No. 28), 2008	Promotes awareness and prevention of HIV/AIDS.	The project complies with HIV/AIDS education and prevention requirements.
15	Standard Act of 2009	Establishes national environmental standards.	The project will adhere to these standards during implementation.
16	Universities Act No. 7 of 2005	Regulates higher education and accreditation.	The project will be regulated by TCU, ensuring quality education.
17	Roads Act No. 13 of 2007	Governs road construction and safety.	The project will utilize public roads and observe this Act.
18	Local Government (Urban Authorities) Act, Cap. 288 R.E 2009	Establishes urban authorities and their functions.	SUA will observe relevant provisions and by-laws.
19	Local Government Law (Miscellaneous Amendment) Act, 2006	Empowers local governments to formulate bylaws for environmental management.	The project will observe bylaws set by Morogoro Municipal Council.
20	Child Act, 2010	Sets minimum age for employment and protects children from exploitation.	The project proponent will ensure adherence to this Act.
21	Persons with Disability Act, 2010	Advocates for the rights and needs of persons with disabilities.	The project will fulfil legal requirements in all phases.

3.4 Relevant Regulations and Guidelines

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 presented in Table 3.3

Table 3.3 National Regulations and Guideline

	Regulation	Description	Compliance
1	Environmental Impact Assessment and Audit (Amendment) Regulations (2018)	Amendments to the regulations governing environmental impact assessments, including procedures for assessment and audit.	Mandatory for all projects requiring an EIA, ensuring environmental impacts are assessed and mitigated.
2	Environmental Management (Registration and Practicing of Environmental Experts) Regulations, 2021	Regulates the registration and practice of environmental experts in Tanzania, ensuring quality and standards in environmental management services.	Required for all environmental experts practicing in Tanzania, ensuring services meet national standards.
3	Environmental Management (Fee and	Revises fees and charges related to environmental	Applicable to all entities subject to environmental fees and charges,

	Regulation	Description	Compliance
	charges) (Amendment) Regulations, 2021	management, aimed at ensuring compliance and facilitating administrative processes.	ensuring financial compliance with environmental management requirements.
4	Environmental Management (Air Quality Standards) Regulations, 2007	Sets air quality standards to control pollution and protect public health and the environment.	Applies to industries and activities emitting air pollutants, enforcing compliance to maintain air quality.
5	Environmental Management (Soil Quality Standards) Regulations, 2007	Establishes soil quality standards for the management and protection of soil resources in Tanzania.	Relevant to agricultural, industrial, and developmental activities affecting soil quality, enforcing sustainable soil management practices.
6	Environmental Management (Water Quality Standards) Regulations, 2007	Defines water quality standards for the conservation, management, and sustainable use of water resources.	Essential for water resource management, including industrial discharges and municipal water treatment, to ensure water safety and quality.
7	The Environmental Management (Standards for Control of Noise and Vibration Pollution) Regulations, 2015	Provides standards for controlling noise and vibration pollution to minimize their adverse impacts on the environment and public health.	Applicable to industries, construction sites, and other activities generating noise and vibration, requiring measures to minimize disturbances.
8	Environmental Management (Solid Waste Management) Regulations, 2009	Outlines regulations for the management of solid waste to ensure proper collection, transportation, treatment, and disposal.	Mandatory for municipal and private entities managing solid waste, ensuring environmentally sound waste management practices.
9	Environmental Management (Hazardous Waste Control and Management) Regulations, 2019	Regulates the control and management of hazardous waste to prevent pollution and protect human health and the environment.	Required for handlers and producers of hazardous materials, ensuring safe management and disposal practices.
10	Fire and Rescue Force (Safety Inspections & Certificates) amendment Regulations, 2014	Amends regulations for fire safety inspections and certification to enhance fire safety standards and prevention measures.	Necessary for all buildings and facilities to comply with fire safety standards, including regular inspections and certifications.
11	Environmental Management (Control and Management of Electrical and Electronic Equipment Waste) Regulations, 2021	Addresses the management of electrical and electronic equipment waste, promoting safe disposal and recycling practices to minimize environmental hazards.	Applicable to producers, importers, and distributors of electrical and electronic equipment, promoting responsible end-of-life management.

3.5 Relevant National Plans and Strategies

Table 3.4 presents the National regulations with an understanding of each regulation's purpose and the compliance requirements associated with the Solomon Mahlangu Campus.

Table 3.4 Relevant Regulations and Guidelines

	Relevant Plans	Description	Compliance.
1	The Tanzania Development Vision 2025	Aims to achieve a high-quality livelihood for its citizens, peace, stability, and unity, good governance, a well-educated and learning society, and a competitive economy capable of producing sustainable growth and shared benefits.	The project aligns with the vision's emphasis on sustainable development and educational advancement, contributing to the creation of a well-educated society through improved infrastructure at the Solomon Mahlangu Campus.
2	Third National Five-Year Development Plan (FYDP III; 2021/22 – 2025/26	Focuses on industrial development for economic transformation and human development, aiming to enhance the country's competitiveness through industrialization that contributes to employment and income generation	Supports the plan by contributing to human capital development, especially in education and research, thereby supporting the nation's economic transformation goals.
3	National Plan of Action to End Violence against Women and Children (NPA-VAWC) 2017/18-2021/22	Targets the eradication of violence against women and children in Tanzania. It outlines strategic areas of intervention across multiple sectors to protect the rights and welfare of women and children.	By ensuring safe and conducive learning environments, the project contributes to the protection and welfare of students, aligning with national efforts to combat gender-based violence and protect children.

3.6 World Bank - Environmental and Social Framework (ESF)

The World Bank Environmental and Social Management Framework 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 Safeguard Standards define what is expected of Borrowers in terms of identifying, evaluating, and mitigating environmental and social risks, impacts, and measures in connection with projects that the Bank supports through Investment Project Financing. In that context, the World Bank has set out the E&S standards that must complied with in the implementation of any project.

Table 3.5: World Bank Environmental and Social Standards Applicable to HEET Project at Solomon *Mahlangu Campus*

Environmental and Social Standards (ESS)	Objectives	Applicability	Requirement
ESS1: Assessment and Management of Environmental and Social Risks and Impacts.	• To identify, evaluate and manage the environment and social risks and impacts of the project in a manner consistent with the ESSs. • Enable screen and follow-up of remedies achieved through application of prevention, mitigation, and compensation measures. • Enable allocation of responsibilities and resources to implement required mitigation measures	YES	The standard focuses in helping project beneficiaries to manage and reduce both environmental and social risks and enhance project positive impacts. The proposed project at SUA will use this requirement to strengthen the environmental and social framework for the assessment, development, and implementation of World Bank-financed projects where appropriate.
ESS2: Labour and Working Conditions	• To promote safety and health at work. • To promote the fair treatment, non-discrimination, and equal opportunity of project workers. • To protect project workers, including vulnerable workers such as women, persons with disabilities, children (of working age, in accordance with this ESS) and migrant workers, contracted workers, community workers and primary supply workers, as appropriate.	YES	The standard focuses on the adoption of standard labour practices that consider the acceptable working conditions for the people to be employed in the execution of the project activities. It requires the Borrower to prepare and adopt labour management procedures. Among others the standard call for provisions on the treatment of direct, contracted, community, primary supply workers, and government civil servants. It further calls for fair terms and conditions of work, non-discrimination and equal opportunity and workers organizations. Provisions on child labour and forced labour. Requirements on occupational health and

Environmental and Social Standards (ESS)	Objectives	Applicability	Requirement
	• To prevent the use of all forms of forced labour and child labour. • To support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law. • To provide project workers with accessible means to raise workplace concerns		safety, in keeping with the World Bank Group's Environmental, Health, and Safety Guidelines (EHSG).
ESS3: Resource Efficiency and Pollution Prevention and Management	• To promote the sustainable use of resources, including energy, water, and raw materials. • To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities. • To avoid or minimize project-related emissions of short and long-lived climate pollutants. • To avoid or minimize generation of hazardous and non-hazardous waste. • To minimize and manage the risks and impacts associated with pesticide use.	YES	The standard aims at enhancing effective use of resources and control of pollution. It further requires an estimate of gross greenhouse gas emissions resulting from project (unless minor), where technically and financially feasible. Requirements on management of wastes, chemical and hazardous materials, and contains provisions to address historical pollution. ESS3 refers to national law and Good International Industry Practice, in the first instance the World Bank Groups' EHSGs.
ESS4: Community Health and Safety	• To anticipate and avoid adverse impacts on the health and safety of	YES	The standard aims at protecting local communities against any health risks and

Environmental and Social Standards (ESS)	Objectives	Applicability	Requirement
	project-affected communities during the project life cycle from both routine and no routine circumstances. • To promote quality and safety, and considerations relating to climate change, in the design and construction of infrastructure, including dams. • To avoid or minimize community exposure to project-related traffic and road safety risks, diseases, and hazardous materials. • To have in place effective measures to address emergency events.		ensures their safety against project activities. It requires infrastructure to consider taking safety and climate change, and applying the concept of universal access which are technically and financially feasible. It requires further on traffic and road safety, including road safety assessments and monitoring. It calls for addressing risks arising from impacts on provisioning and regulating ecosystem service. Measures to avoid or minimize the risk of water-related, communicable, and non- communicable diseases. Requirements to assess risks associated with security personnel, and review and report unlawful and abusive acts to relevant authorities.
ESS5: Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement	• To avoid involuntary resettlement or, when unavoidable, minimize involuntary resettlement by exploring project design alternatives. • To improve living conditions of poor or vulnerable persons who are physically displaced, through provision of adequate housing, access to services and facilities, and security of tenure.	NO	This ESS is not relevant to the project because the project is carried out within the university land.

Environmental and Social Standards (ESS)	Objectives	Applicability	Requirement
ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	• Protecting and conserve biodiversity and ensure the sustainable management of living natural resources. • Safeguarding habitats critical for conservation; maintaining the benefits derived from ecosystem services; promoting the sustainable management of living natural resources through the adoption of practices that are consistent with international conservation and management standards.	NO	The ESS6 is not applicable because the project sites are occupied by mainly grasses and few trees.
ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	identifying any Indigenous Peoples or historically underserved local communities within or near the project area, assessing the project's impacts on these communities, and developing strategies to address these impacts.	NO	With this nature and location of project does not entail to have this category
ESS8: Cultural Heritage	To protect cultural heritage from the adverse impacts of project activities and to promote the preservation of cultural heritage for future generations. This includes avoiding damage to cultural heritage, mitigating adverse impacts, and ensuring that any found cultural	YES	Is applicable at SMC because of accidental discovery of archaeological, historical, or cultural artifacts during project execution.

Environmental and Social Standards (ESS)	Objectives	Applicability	Requirement
	artifacts during project activities are handled appropriately.		
ESS9: Financial Intermediaries (FIs)	To facilitate the efficient allocation of resources in the financial system, connecting savers (those who have excess funds) to borrowers (those who need funds) in an efficient manner.	NO	This ESS is not relevant to the project
ESS10: Stakeholders' Engagement and Information Disclosure	• To establish a systematic approach to stakeholder engagement that will help Borrowers identify stakeholders and build and maintain a constructive relationship with them, in particular project affected parties. • To assess the level of stakeholder interest and support for the project and to enable stakeholders' views to be considered in project design and environmental and social performance. • To promote and provide means for effective and inclusive engagement with project-affected parties throughout the project life cycle on issues that could potentially affect them. • To ensure that appropriate project information on environmental and	YES	The standard aims at making stakeholders part of the project through continuous sharing of information and updates. The standard call for stakeholder engagement throughout the project life cycle, and preparation and implementation of a Stakeholder Engagement Plan (SEP). It requires early identification of stakeholders, both project-affected parties and other interested parties, and clarification on how effective engagement takes place. Stakeholder engagement to be conducted in a manner proportionate to the nature, scale, risks and impacts of the project, and appropriate to stakeholders' interests.

Environmental and Social Standards (ESS)	Objectives	Applicability	Requirement
	social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible, and appropriate manner and format. • To provide project-affected parties with accessible and inclusive means to raise issues and grievances, and allow Borrowers to respond to and manage such grievances		

3.7 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 with 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.

3.8 Institutional Framework for the Management of Environment

Tanzania is among countries in East Africa with an Act for environmental management legislation. The legislation, Environmental Management Act (EMA) (2004), provides a legal and institution framework that guides the implementation of environmental management activities. The framework provides a pre-requisite for effective implementation of Environment Policy at all levels (National, Region, Council, and Village/Mtaa/Hamlet). According to the Environmental Management Act (EMA) (2004), there is the Environmental Management Committee established at the Hamlet/Village/Mtaa, Ward, Municipal and National level with the responsibility for the proper management of the environment in respect of the area in which they are established. The functions and responsibility of these committees are well explained in the Act.

Table 3.6: Key Institutions to the ESIA process

Level	Institution	Role and responsibility
National Level	Vice President's Office (Division of Environment)	• Authorisation of a ESIA certificate
	Vice President's Office (NEMC)	• Coordination of the ESIA Process • Approval of ToR, Review of ESIA reports • Issuing an ESIA Certificate • Environmental Auditing and Monitoring

Level	Institution	Role and responsibility
	Ministry of Education, Science and Technology (MoEST)	• Project Monitoring • Issuing policy guidelines • Providing legal framework • Capacity building to project implementors
	Tanzania Commission for Universities (TCU)	• Provide regulation which sets standard for academic buildings and Learning environment.
	Occupation Safety and Health Authority OSHA	• Approval of building plans for the proposed project in regard to health and safety • Monitoring Health and Safety of workers in working premises.
Project Funding Institutions	World Bank	• Project financing • Provide regulations and standards for environmental management. • Provide capacity building to project implementers. • Provide project Monitoring
Project Proponent	Sokoine University of Agriculture SUA	• Project investment and project cycle implementation, monitoring, and auditing; Conducting ESIA study and follow-up on ESIA certificate. • Paying of applicable taxes and charges. • Project operation and decommissioning.
Local Governments Authorities and Communities	Morogoro Municipal Council	• Oversee general development plan. • Oversee enforcement of laws and regulations. • Advice on implementation of development projects and activities at Municipal level
	Ward Offices (Mindu ward)	• Project monitoring (as watchdogs for the environment, ensure the well-being of residents) and participate in project activities. • To extend administrative assistance and advice on the implementation of the project • Managing the community's relation
	Local communities, NGOs, CSOs and FBOs	• Project monitoring (as watchdogs) • Aids and advice on the implementation of the project. • Part of the project beneficiaries through employment opportunities, income generation and CSR projects.
	Fire and Rescue Force	• To provide training and workers on fire and safety • Review and approval of building design for the proposed project with regards to fire and safety
Institutional level/SUA	• UPIU-SUA	**Environmental expert** • Advise HEET project on environmental approaches, policies, and technical issues during the preparation and implementation of the HEET project activities.

Level	Institution	Role and responsibility
		• Under the supervision of the project coordinator, monitor compliance of HEET project activities on environmental safeguards. • Participate in conducting design reviews to meet environmental safeguards standards and supervision of projects, preparing reports, and disseminating lessons learned. • To ensure all contractors/subcontractors and primary suppliers comply with all applicable provisions of ESSs and other relevant sections of the ESF and national law. • Ensure contractor's compliance to the C-ESMP • Regular monitoring and reporting of the progress on the implementation of the ESMP. • Promptly notification of any significant environmental, health and safety incident related to the project, which has, or is likely to have, a significant adverse effect • To ensure the contractor has prepared C-ESMPs) ; Code of Ethical Conduct (CEC) ; Health and Safety Plans (HSE) ; and Emergency Response Plan (ERP) ; HIV/AIDS Management Plan and Traffic Management Plan **Social expert** • To ensure the contractor's employees and laborers have signed the Code of Ethical Conduct and have been trained on gender, SEA/SH and HIV/AIDS awareness. • Under the supervision of the project coordinator, monitor compliance of HEET project activities on social safeguards. • Participate in conducting design reviews to meet social safeguards standards and supervisions of projects, preparing reports, and disseminating lessons learned. • In collaboration with other specialists ensure labour and working conditions of labourers in the HEET project related activities follow the agreed national standards. • To prepare Grievance Redress Mechanism (GRM) and report progress on the grievances reported. • Promptly notification of any significant social incident related to the project, which has, or is likely to have, a significant adverse effect • To prepare and disclose the SEP, LMP and stakeholders' engagement reports.
	ESIA Consultant	**Environmental expert** • Work with the PIU to understand the requirements of the environmental and social assessment.

Level	Institution	Role and responsibility
		• Conduct initial site visits with the PIU to understand the sub-project setting and site-specific requirements. • Prepare the ESIAs and ESMPs based on the procedures described in the ESMF including carrying out an alignment walk, alternatives analysis and baselines studies, identifying the E&S risks and impacts, developing mitigation measures and monitoring plans incorporating EHS requirements. • Cost all the mitigation and management measures proposed in the ESMPs and SSEMPs • Propose a capacity building plan for the implementation of the sub-projects for all actors involved with cost estimates and schedule; vi. Carry out public consultations; vii. Conduct trainings as needed. • Assist the PIU in preparing documentation to obtain certification from NEMC for the ESIAs and ESMPs. **Social expert** o Carry out public consultations and stakeholder consultations o Prepare the ESIAs and ESMPs based on the procedures described in the ESMF including carrying out social baselines studies, identifying the social risks and impacts, developing mitigation measures and monitorings plans. o Conduct initial site visits with the UPIU to understand the sub-project social setting and site-specific requirements **Health and safety Expect.** o Carrying out health and safety baselines studies, identifying the health and safety risks and impacts, developing mitigation measures and monitorings plans. o Propose health and safety alternatives to the HEET project activities o Conduct initial site visits with the UPIU to understand the site-specific requirements for health and safety
	Design Consultant	**Environmental specialist** o Ensure compliance with the Environmental Impact Statement (EIS) and the Construction-Environmental and Social Management Plan (C-ESMP). o Ensure the design complies with the environmental safeguards requirement as per the ESMP and ESMF

Level	Institution	Role and responsibility
		○ Routine supervision of all environmental issues and compliances on site throughout the construction period **Social specialist** ○ Ensure the design complies with the social safeguards requirement as per the ESMP and ESMF ○ Routine supervision of all social issues and compliances on site throughout the construction period ○ Prepare, review and approve Code of Conduct of the contractor. **Health and Safety specialist** ○ Ensure the design complies with the health and safety requirement as per the ESMP ○ Ensure the contractor complies with the OHS plans ○ Routine supervision of all health and safety issues and compliances on site throughout the construction period ○ Ensure the labourers are provided with safety gears throughout the construction period
	Contractor	**Environmental Expert** • Ensure the project is in full compliance with the Environmental and Social Impact Assessment (ESIA) mitigation measures outlined in the Environmental and Social Management Plan (ESMP) • Prepare and submit a comprehensive work site plan that adheres to national environmental guidelines, along with C-ESMP tailored for various phases of the work. • Routine supervision of all environmental issues and compliances on site throughout the construction period • Regular reporting on the progress of the implementaion of the C-ESMP • Report promptly any environmental risk or incident which has, or is likely to have, a significant adverse effect **Social Expert** • Organize consultations with stakeholders at critical project stages, establish a liaison group at the project site, and monitor contractor compliance with the ESMP. • Organise and conduct awareness campains on HIV/AIDS, SEA/SH to the labourers and project affected persons. • Make sure the contractors labourers and employees signs the Code of Conduct.

Level	Institution	Role and responsibility
		• Maintain regular communication and collaboration with the Sokoine University of Agriculture (SUA) Safeguard specialists to ensure the contractor's adherence to the ESMP throughout the contract duration. • Report promptly any social incident which has, or is likely to have, a significant adverse effect **Health and Safety specialist** • Prepare and submit a comprehensive C-OHS plan tailored for various phases of the work. • Organise and conduct awareness campains on health and safety to the labourers and project affected persons. • Ensure the project complies with the OHS plans • Maintain regular communication and collaboration with the Sokoine University of Agriculture (SUA) Safeguard specialists to ensure the contractor's adherence to the ESMP throughout the contract duration. • Report promptly any health and safety incident which has, or is likely to have, a significant adverse effect

CHAPTER 4: BASELINE ENVIRONMENTAL AND SOCIAL CONDITIONS

4.1 Introduction

Baseline environmental data is important to understand the physical, biological, and socio-economic and cultural characteristics of the project's environment. Baseline environmental survey is conducted to assess the present status of the physical environment (Topography, climate setting, temperature, hydrology, geology, soil characteristics); Biological environment (fauna and flora, biodiversity, vegetation, protected areas, etc.) Human and Socio-economic environment (land use and planning, demographics, energy, employment, culture and tradition, livelihood, transportation, health care, education, infrastructure, and population of the project area of influence.

4.2 Components and Parameters for Baseline Environment Study

The various components studied as a part of the baseline study are discussed in the following sections components.

- Physical Environment
- Biological Environment
- Baseline Environment (Air, Noise, Vibration and Water Environment)
- Socio-Economic Environment

4.3 The Physical Environment

4.3.1 Temperature

Morogoro experiences average daily temperature of 30 °C degrees centigrade with a daily range of about 5 °C (degrees centigrade). The highest temperature occurs in November and December, during which the mean maximum temperature is about 33 °C (degrees centigrade). The minimum temperature is in June and August when the temperatures go down

to about 16°C (degrees centigrade). During data collection the average temperature at Solomon Mahlangu Campus was ranged between 25.5°C to 26°C during the day and night.

4.3.2 Rainfall

The trend of rainfall reveals a similar influence of altitude on rainfall. Rainfall is higher in areas of high altitude and tends to be low at low altitude areas. Areas on the leeward receive relatively lower rainfall than those on the positive side.

The total average annual rainfall in Morogoro ranges between 821mm to 1,505mm. Long rains occur between March and May and short rains occur between October and December each year. The long rain season lasts for roughly 120 days between March and June every year. The rains are usually heavy and spread throughout the Municipality. This is also the main crop planting season for all crops, but especially so for the seasonal crops such as maize, paddy and beans. The short rain season lasts for about 60 days between October and December each year. The rains are not evenly distributed, and they are not very reliable. They are most suitable for short-term crops such as pulses. (Morogoro region Profile, 2018)

4.3.3 Humidity and Wind

During the field visit to Morogoro Municipal Council, several areas within the municipality experienced relatively cool conditions, with wind speeds averaging less than 12 kilometers per hour (KPH). The wind predominantly blew from the east to the west. In the west of the project site, wind conditions occasionally reached maximum speeds of approximately 10 KPH. The majority of Morogoro Municipal Council witnessed gentle winds, generally below 10 KPH. These weather observations may have implications for local agriculture and environmental conditions within Morogoro Municipal. The average relative humidity is around 66%, but it can decrease significantly to as low as 37%.

4.3.4 Topography and Drainage

Sokoine University of Agriculture lies on the slopes of the Uluguru Mountains, at an altitude of about 500 - 600 meters above sea level.
Topography of Morogoro Municipal's is captivating, shaped prominently by the Eastern Arc Mountains, notably the Uluguru Mountains. These mountains play a significant role in creating the area's steep slopes and drainage patterns. The peaks of these mountains are lush and green, indicating an untouched forest ecosystem. Meanwhile, the fertile slopes boast pleasant weather and are utilized for agriculture and human habitation. This distinctive topography also impacts the landscape's features, soil characteristics, and depth. The steep slopes are marked by rocky outcrops and shallow soils, in contrast to the flat flood plains.

4.3.5 Soils and Geology

The geology of Morogoro Urban District comprises four major rock/lithology types. These include hornblende-pyroxene granulites, muscovite-biotite gneiss and migmatites, colluvium and alluvium. The hornblende-pyroxene granulites are the dominant rock types and occupy a major part of the Uluguru Mountains and foothills. The dominant minerals in these rocks are calcium rich plagioclase, hypersthene ((Mg,Fe)SiO3) and diopside (Ca,MgSi2O6). The muscovite-biotite gneisses and migmatites are dominant in the Mindu-Lugala hills and a bigger part of the Tungi Mkonowamara peneplains. They are of a high metamorphic grade containing equal amounts of potassium-feldspars (microcline) and sodium-rich plagioclase (oligoclase).

Quartz is present in high amounts. Colluvial materials of diverse mineralogical composition dominate most of the piedmont slopes and peneplains. Alluvial materials are dominant in the river terraces and flood plains.

Soils in the region vary according to topographical and ecological zones. In the mountainous and hilly areas, the common type of soils found are mainly oxisols, which are generally low in nitrogen and phosphorus. Valley and lowlands are generally characterized by alluvial soils, which are fertile in nature. Sandy and clay soils are common in woodlands and grasslands. Soil condition in the region favors production of various crops like maize, paddy, beans, cassava, species, sweet and Irish potatoes, amaranths, vegetables, sugarcane, simsim, cocoa, cotton, cashew nuts, etc.

4.3.6 Hydrology

Morogoro Municipality is a part of the Ngerengere catchment, which originates from the Uluguru Mountains and is located in the middle of the Wami–Ruvu basin. The Ngerengere River is fed by four tributaries, namely Mgeta river, Mlali river, Mzinga river and Lukumeni river, which also originate from the Uluguru Mountains. The major surface water source in the municipality is the Mindu dam, which receives water from three major river tributaries originating from Kasanga hill. Many activities such as irrigation, Fishing and domestic use are undertaken by the people surrounding Mazimbu areas depending on the river Ngerengere.

During high rainfall season, floods occur and destruct people settlements. This flood also leads to the destruction of infrastructures like road across the river, for example last year at Mazimbu, the road was highly destroyed by the water which settled on the road, for a number of days. Destruction of the physical appearance the river due to activities like cultivation, fishing which are done depending on this river result to siltation within Ngerengere river and hence result to the flooding and also can poison river due to the chemical fertilizers washed from agriculture activities near Ngerengere river. Monitoring of water quality along Ngerengere river required to be conducted during construction and operation phase in order to determine the quality of water for human activities and for aquatic organisms.

4.4 Baseline Environment

4.4.1 Methodology for baseline data on air quality, noise, and vibrations

The measured two stations were established/selected based on the norms prescribed by local standards (Environmental Management (Air Quality Standard) Regulations, 2007) and international guidelines. The norms include predominant wind direction (leeward and windward) at the area during the study, direction to the nearest local communities as possible receptors, size of the area to be covered, the areas where generated air pollutants, noise and vibrations were expected, as well as areas that pollutants from proposed project are likely to disperse to.

The measured parameters include: (i) Dust as particulate matter in terms of TSP, PM10 and PM2.5; (ii) Ambient pollutant gases i.e., Sulphur dioxide (SO2), Nitrogen dioxide (NO2), Carbon monoxide (CO), Hydrogen Sulphide (H2S) and Volatile Organic Compounds (VOCs); (iii) ambient noise, and (iv) ground vibrations.

4.4.1.1 Dust as particulate matter in terms of PM10 and PM2.5

Dust levels were measured by using Aeroqual series 500 monitors (S-500). Particulate matter (PM10 and PM2.5) were measured in accordance with manufactured procedure that meets ISO

9835:1993 and ISO 9835:1993 Protocols for PM10 and PM2.5. During measurements, the device was fixed at a breathing height of about 1.5 meters from the ground, which is assumed to be the breathing zone of people at their respective locality or working environment. Dust levels were measured at the established station during the daytime and night-time hours. The recorded data were then averaged and compared with National Environmental (TBS) and WB Group guidelines to check for their compliance.

The highest daily average concentration of 11.5 µg/m³ for PM10 and 6.1 µg/m³ for PM2.5 were measured at station AQMS1 at Somolon Mahlangu Campus (Table 4.1 in appendix 2). However, none of the measured PM10 and PM2.5 values were found to be above the prescribed TBS limit and WB Group guidelines criteria.

4.4.1.2 Ambient Gaseous Pollutants levels

Ambient gases concentrations (i.e. CO, NO2, SO2, H2S, and VOC) were measured using "Aeroqual series 500 monitors (S-500)". The ambient gases were measured in accordance with the manufacturer's procedure that meets ISO 9001:2008 protocol. The device was elevated at a height of 1.5 meters above the ground; once the device is switched ON, it performs an automatic calibration for three minutes by pumping in fresh air into the sensors so as set the toxic sensors to zero. Ambient pollutant gases were measured during the day and night hours. The measured gases levels were then compared with their respective TBS-NES limits and WBG guidelines to check their compliance.

The measured Sulphur dioxide (SO2), Volatile Organic Compounds (VOCs), and Nitrogen dioxide (NO2) concentrations were minimal and in conformity with their respective prescribed TBS and WB limits. Similarly, the recorded CO concentrations found complying with both TBS limit of 15 mg/m3 and WB guideline value of 30 mg/m3. However, Hydrogen sulphide (H2S) concentrations were very low with its impacts considered insignificant, considering that H2S has no limit specified in WB guidelines. Generally, the ambient air quality in the area can generally be characterized as good most of the time, with no exceedance recorded against the provincial ambient air quality standards or WB-wide objectives (table 4.2 in appendix 2).

4.4.1.3 Noise Levels

Baseline noise data were recorded the established station during the daytime (Lday) in accordance with ISO 1996 -1:2003 using a digital sound level meter. On taking measurements, the meter was set to the "A" weighed measurement scale, which enables the meter to respond in the same manner as the human ear. The meter was held approximately 1.5 m above the ground and at least 0.5 m away from hard reflecting surfaces such as walls. Periodic measurements were taken to grasp the mean daytime hours noise values at the established station. The averaged Lday values were calculated and compared with their respective local standards and international guidelines.

The recorded noise levels were 46.5 dBA and 41.3 dBA for AQMS1 and AQMS2, respectively (Table 4.3 in appendix 2). These measured levels are acoustically safe for people residing nearby the project site as the recorded noise levels are found to be well outside the WBG General EHS Guidelines level of 55 and TBS limit of 52 dB(A) prescribed for institutional areas.

4.4.1.4 Ground Vibration

Ground vibrations were measured using a vibrometer data logger, which is designed to measure ground vibrations according to European standard EN 14253:2003. On taking measurements, the accelerometer transducer was mounted on the ground vibrations to record vibrations. To produce accurate results, the transducer was secured in direct contact with the ground. The levels of vibrations were recorded in terms of Peak Particle Velocity (PPV) in millimeters per second in the vertical direction to secure data associated with proposed project. Periodic measurements were taken during the day and night hours. The mean value of all recorded data was calculated and used to represent that particular station. The average value recorded at the station was then compared with National Environmental (TBS), Human detection level for vibration, and British vibration standard to check for their compliance.

The recorded vibration levels at measured two stations are considered insignificant as the measured levels do not exceed 0.15 mm/sec PPV criteria established to evaluate the extent that can easily be detected by human, TBS, and British Standard limits (table 4.4 in appendix 2). In that regard, the measured ground vibration levels are very minimal and thus is not likely to negatively impact any sensitive receptors.

4.5 Biological Environment

The biological environment includes living things such as plants and animals, and non-living things such as rocks, soils, and water. The biological and ecological investigations were conducted with emphasis on Vegetation and animal life. Fauna biodiversity focused on large mammals, small and medium sized mammals, birds, and reptiles (reptiles and amphibians) within and around the project areas. Flora biodiversity emphasized on trees, shrubs, herbs, sedges, and grasses.
A baseline survey of the project site was carried out for the purpose of investigating the Status of vegetation and animal life in the project area. This report focused on the process that shape the landscape through the movement of water and wind (climate) and through extreme disturbances generated by drought, flood, and human activities such as settlement pattern, agricultural practices, and bush fire.

4.5.1 Flora

The proposed project site is in a typical urban setting environment. Generally, the project area is developed and currently occupied by education and commercial infrastructures.
There are few and scattered exotic vegetation covers within the project site. Indigenous vegetation has long been cleared off to pave way for human developments. This suggests that there will be less damage of the native/ natural vegetation type during construction phase. It is expected that during construction there will be very minimal or no clearance of vegetation. Because all operations will be confined to the premises already utilized by existing buildings, and no expansion beyond the current project area boundaries is intended, this accounts for the absence of any need for vegetation clearance during the construction activities. Dominant tree species such as mango trees (*Mangifera indica ssp.*), *Eucalyptus ssp.*, Neem trees *(Azadirachta indica)* and short grasses will be cleared off from the site to allow construction activities to be commenced if the project will occupy large area. The consultation with the local community and the inventory of the trees species available onsite both revealed that, there are no vegetation species that are of conservation interests to stop implementation of the project, thus, withdrawing the project because of conservation purposes is less viable. The contractor is advised to confine all its activities only in the specified area for facility location.

4.5.2 Fauna

The field survey revealed that there were different mammals' species around the proposed project area across various taxonomic categories. These included Vervet Monkey (*Chlorocebus pygerythrus,* Blue Monkeys *(Cercopithecus mitis)* and Uluguru Bushbaby (*Paragalago orinus*). Also, five different birds were observed during biodiversity study on the project area which are Lilac-breasted roller (*Coracias caudatus*), Long tailed fiscal (*Lanius cabanis*), Common Bulbul (*Pycnonotus barbatus*), Sparrow- Weaver (*Plosepasser mahali*) and Lasser Striped Swallow (*Cecropis abyssinica*).

There were four reptiles that were recorded during the survey. These included (Bearded pygmy Chameleon (*Rieppeleon brevicaudatus*), Common Dwarf Gecko *(Lygodactylus capensis*), African striped Skink (*Trachylepis striata*) and Painted Dwarf Gecko (*Lygodactlus picturatus*) Four amphibian species were also recorded during the survey. These included Shovel-nosed Frog (*Hemisus marmoratus*), *Artholeptides yakusini,* Spackle-lipped Mabuya (*Trachylepis maculilabris*), Rough-scaled Plated Lizard (*Broadleysaurus major*)

4.5.3 Unique and Endangered species

There are neither unique nor endangered species of concern that were observed during site assessment.

4.6 Existing Infrastructures and Social issues at SUA

4.6.1 Health Services

There is Mazimbu hospital at Solomon Mahlangu Campus which serves both the university community and the neighboring community. Mazimbu hospital offers a wide range of medical services, including specialized care for skin and sexually transmitted infections, dental and oral health, surgeries, and Laboratory investigations. Additionally, it provides clinics for people living with HIV/AIDS and tuberculosis, reproductive and child health, family planning, and COVID-19 vaccination.

Also, that there is also a private health center near Mazimbu Primary School, which serves SUA students and the surrounding community. This health center provides healthcare services to the university students and the local population.

Moreover, the proximity of Mazimbu to Morogoro CBD allows easy access to Morogoro Hospital for more specialized medical needs. This accessibility ensures that individuals in the area have access to comprehensive healthcare services, ranging from basic medical care to more specialized treatments available at larger facilities.

Mazimbu hospital complies with students' hand to hand in terms of their health issues and the community, the university health center is also concern with different health issues caused by gender violence issues (GBV) that may occur, some of the issues like early pregnancy and rape of young girls within the university and the community around the university community.

4.6.1.1 Common Diseases at SUA campus

a) Outpatients (2022)

In 2022, a significant number of people sought medical care at SUA Hospital as outpatients. These individuals presented with a variety of health concerns. Notably, 13,806 patients visited the hospital for outpatient services. The most prevalent health issues included upper respiratory tract infections, affecting 2,072 patients, followed closely by hypertension with 1,581 cases.

Urinary tract infections were also a common problem, accounting for 1,134 visits. Additionally, there were cases with symptoms that did not lead to a specific diagnosis, as well as instances of malaria, skin conditions, and various gastrointestinal problems. Among the patients, children under the age of five, especially girls, were significantly affected by these health conditions.

b) Inpatients (2022)

Within the same year, SUA Hospital admitted 3,190 patients for inpatient care. The leading causes for hospitalization included hypertension with 188 cases, upper respiratory tract infections with 151 admissions, and diabetes mellitus affecting 102 individuals. Urinary tract infections led to 72 admissions, while malaria required hospitalization for 62 patients. Acute diarrhea, lasting less than 14 days, was the reason for 41 admissions, and there were 26 cases of pneumonia, encompassing both severe and non-severe forms. Other cardiovascular diseases, bronchial asthma, and anemia contributed to the remaining admissions, with 22, 20, and 19 patients, respectively. The high incidence of hypertension underscores its prevalence in the region, potentially due to its endemic nature.

c) COVID-19 Vaccination (2021-2023)

In response to the global COVID-19 pandemic, SUA Hospital actively participated in vaccination efforts. Between 2021 and 2023, a total of 5,022 individuals attended COVID-19 vaccination services at the hospital. This included 5,000 vaccinations throughout this period, with an additional 22 individuals receiving vaccinations from May to July 2023. These vaccination efforts played a crucial role in protecting the community from the virus and were part of the broader global response to the pandemic. SUA Hospital adapted to the challenges posed by COVID-19, implementing measures such as handwashing stations, sanitizers, and innovative management strategies to combat the ongoing threat of the corona virus.

4.6.2 Gender Issues at SUA

In the Tanzanian society, gender inequity is a major problem. To ensure proper handling of gender issues, SUA has the Centre for Gender Studies. This Centre is the ultimate destination and hub for the gender based academic, research, debates, and discussions. The Center for Gender Studies (CGS) was established in the College of Social Sciences and Humanities (CSSH) following the university wide restructuring processes. The center aims at creating an intellectual locus for gender focused research, teaching and academic debates related to gender equality. The center also organizes and coordinates gender debates of both national and international interests as well as linking up with national and international gender affiliate people, institutions, and organizations in order to strengthen the capacity of students and researchers to respond to the gender related challenges in development issues. SUA Gender policy is currently being revised in-order to pro-actively promote gender equity and mainstreaming by admitting talented students without gender bias.

Taking affirmative action to increase the number of students among the disadvantaged groups in all priority programs, ensuring gender balance, equality and equity in University's policies, programs and regulations relating to teaching, research, consultancy, and public services, ensuring equality, diversity and equity in student enrolment, staff recruitment and development, and Advancing equality in the governance and management structure.

4.6.3 Sports, Games and Recreation

All sports and games facilities are coordinated by the Department of Sports and Games. The sports grounds are used for various sports and games including football, netball, volleyball, basketball, tennis, cricket, and athletics. The University also has an open gym. These sports

facilities provide a conducive social environment to students and staff. All students and staff are encouraged to participate in various sports and recreational activities to boost their talents and physical fitness. The university also supports students' participation in interinstitutional games if and when resources are available. Through the Corporate Strategic Plan, SUA intends to improve the standards of the facilities and associated services to match with increasing demands and importance.

4.6.4 Security

SUA has an Auxiliary Police Department located in Edward Moringe campus and its sub-office at Solomon Mahlangu Campus. This Department in collaboration with the Tanzania Police Force which also has an office at Edward Moringe campus is responsible for the maintenance of peace, order and the safety of people and property.

4.7 Social Cultural Environment

The Socio-economic aspects that were studied in the project area included.

4.7.1 Population

Per 2022 Population and Housing Census report, Morogoro municipal had a population of 3,197,104. It is indicated further in the NBS report that the annual growth rate of Morogoro Municipal Council's population in 2022 was at 3.7% compared to 2012 population Census.
The proposed SUA project is envisaged to increase the total current population within and around SUA campus. Based on population census of 2022, Mindu ward had a total population of 22,447 in the ratio of 51.8%, Female (11623) and 48.2% Male (10824)

4.7.2 Ethnic Groups

Originally, the primary inhabitants of the area were predominantly from the Luguru tribe. However, the demographic makeup of the current population is becoming more diverse due to the influx of individuals from various regions within Tanzania, as well as from outside the country, including workers, businessmen, and those seeking opportunities. Nevertheless, the local Council recognizes three main ethnic groups: Waluguru, Wapogoro, and Wakutu. Among these, the Waluguru form the majority and occupy the largest portion of the Municipal territory, spanning all wards. The Wapogoro, on the other hand, inhabit specific parts of the Municipal wards. Additionally, the district is home to various other ethnic groups such as the Wazaramo, Wakwere, Wachaga, Wasukuma, Wanyakyusa, and Maasai

4.7.3 Education

4.7.3.1 Primary Education.

Primary school education is a basic right of every Tanzanian child of school age going (7-13). Data from Morogoro Social Economic Profile (2020) indicated that there was a slight increase in the number of private primary schools in the region in four years from 2016 to 2019.The number of primary schools increased from 880 in 2016 to 904 in 2019 (2.7 percent increase). Morogoro

At Mazimbu area there is the primary school near university known as Chief Albert Luthuli primary school and another school outside the campus known as Mazimbu Primary where children living in this community acquire primary education at those school. The university and local government are very concerned with the academic and social wellbeing at those schools to ensure there is equal enrolment of boys and girls so as to promote gender balance between a boy and a girl child in the community. The university also is engaged to promote

indolence's education to both girls and boys through seminar education via their primary teacher but also their primary teachers are concerned to go against gender-based violence (GBV) especially to inferior groups of students such hand caped students and girl who are subjected for early marriage and the hand caped student are subjects as unwanted in the society.

4.7.3.2 Secondary Education

In Morogoro Municipal there is several secondary schools where the students get their secondary educations. Most people who residing at Mazimbu area use nearby secondary known as Kihonda secondary schools. Other students from Mazimbu community get secondary education from other schools located at Morogoro CBD such as Morogoro secondary.

4.7.3 Universities and Colleges

Morogoro Municipal is home to several notable universities and colleges, including Sokoine University of Agriculture, Muslim University of Morogoro, St. Joseph University College, and Jordan University College. . The municipality also houses renowned institutions such as Ardhi Institute Morogoro, Morogoro Teachers College, and LITI (Livestock Training.

4.7.4 Water and Sanitation

Water consumption at Solomon Mahlangu Campus (SMC) is directly influenced by the growth of the population and the various activities conducted within the campus premises, including domestic activities, gardening, medical services, dining facilities, construction projects and cleaning. With the ongoing rise in population and development at SMC, there is a concurrent increase in the demand for water. Currently, the water supply at SMC is sourced from the Morogoro Water Supply and Sanitation Authority (MORUWASA), necessitating SUA to pay government bills for water usage on a monthly basis. To address the escalating demand for water, SUA must explore options to augment the water supply, either through increasing the capacity of the current supply from MORUWASA or by seeking alternative water sources such as stormwater harvesting or developing their own water sources like in Edward Moringe Campus in order to mitigate potential water shortages and reduce overall water costs on campus.

The issue of sanitation at SUA is equally pressing, given its direct correlation with water supply and campus activities. Inadequate sanitation infrastructure and practices pose significant challenges to maintaining a clean and hygienic environment within the university premises. Insufficient sanitation facilities can lead to improper waste disposal, unsanitary conditions, and potential health hazards for students and staff. Additionally, concerns raised by community members about the quality of water supplied by MORUWASA further exacerbate sanitation issues, as access to clean water is fundamental to proper hygiene and sanitation practices. Addressing sanitation challenges requires a comprehensive approach, including the improvement of existing sanitation facilities, implementation of proper waste management systems, and raising awareness about the importance of sanitation and hygiene practices among the university community.

4.7.5 Religion

SUA is a non-religious institution, nevertheless, it has provided land and facilities to allow students and staff to participate in various religious activities. Facilities and services are available to various Christian and Muslim staff, students, and members of the surrounding communities on all the Campuses. There is a Chaplain for the Catholics, Protestants, Seventh

Day Adventists, Assemblies of God, and Pentecostals. The Muslims have an Imam/Executive Officer appointed by the Sokoine University of Agriculture Muslim Community Trust (SUAMCT). Additionally, the Muslim Students Association of Sokoine University of Agriculture (MSASUA), which is affiliated to SUAMCT caters for the interests of Muslim Students.

4.7.6 Energy and Power Supply

The Sokoine University of Agriculture gets its supply of electricity from the TANESCO National Power Supply Grid. It has however been experiencing frequent power cuts which disrupts University activities both academic and administrative. In order to alleviate this problem, standby generators have been procured and installed to supply electricity to some buildings, which is an expensive exercise. Since the problem of power cuts is a nation-wide issue, the University should look for more economic and reliable source of power supply, such as installation of Solar Power Panels to some of the buildings especially new structures. In addition, the University should continue with efforts to rehabilitate faulty generator(s). During consultation with TANESCO, SUA is recommended for a direct high tension 33 KVA supply and at least 2x1000 KVA Transformers for each of the Campuses in order to prevent power outage problem at university.

4.7.7 Transport

SUA, Solomon Mahlangu Campus has buses used for shifting students to Edward Moringe Campus for studying. These buses are also used for excursions and field tours. Solomon Mahlangu Campus can be accessed through the tarmac road from Morogoro Center to Mazimbu across Dar es salaam- Iringa Highway. There are also other paved roads within the University that enable accessibility from one zone of the campus to another.
Students can easily commute from campus to town centres using readily available public transport known as *daladala, Bajaji, bodaboda*, and taxis.

4.8 Economic Activities

This Section describes the economy of Morogoro Region. The economic indicators used include Gross Domestic Product (GDP), Per Capita Gross Domestic Product and main source of income for the residents.

The non-income poverty indicators cover demographic characteristics, health, and education status, access to drinking water, food security and housing condition.

4.8.1 Agriculture

About 65% of the workforce of the Municipality are engaged in urban agriculture and 30% keep livestock (NETWAS et al, 2018).
Most people engaged in agriculture are smallholder farmers who grow a wide variety of annual and perennial crops such as paddy, maize, sorghum, beans, cowpeas, sunflower, sweet potato, yams etc. In addition to that, farmers also grow wide varieties of fruits and vegetables such as tomatoes, onion, amaranth, banana, watermelon etc. Cash crops including cotton, sunflower, simsim, cocoa, sisal, cashew nuts, coffee**.**

The peri-urban agriculture was observed at Mindu ward during site visit. The large-scale farms are cultivated in Mindu Ward where rice is grown during wet seasons and vegetables during dry seasons by using traditional irrigation. Cultivation of banana, oranges and upland or

lowland rice are grown in Bigwa and Kingolwira Wards. The cultivation of rice and vegetables is also carried out in Mwembesongo, Kihonda, Kichangani, and Mazimbu Wards. There are sisal farms owned by institutions like prison department and Tungi Sisal Estate. The Sokoine University of Agriculture is another institution that owns a farm for growing horticultural crops, pastures, and livestock grazing.

4.8.2 Livestock keeping

The Morogoro Municipality had the lowest percent of households involved in livestock keeping. The urban nature of the municipality has made livestock keeping not a big economic activity. Also, the shortage of grazing land and by laws introduced by municipalities in the country have prevented massive livestock keeping in the area. However, cattle, goat, sheep, pigs, and poultry are some of the livestock kept under zero grazing in the Morogoro Municipality and Mindu ward as well.

During the ESIA study, it was observed there is a number of families residing in Mindu ward engaged in livestock farming. According to the data available, only a few households keep livestock and many of them practice indoor livestock keeping or zero grazing. In recent years, the number of livestock, especially dairy cattle, has increased. However, free grazing is a serious problem for cattle keepers.

4.8.3 Natural resource

The natural resources sector is comprised of various sub-sectors including forestry, hunting, tourism, fisheries, beekeeping, wildlife, and mining. The sector is very important through its contribution to the social and economic development of the region. Apart from economic gains, the sector also plays an important role in the maintenance of climate stability, conservation of water sources and soil fertility, controlling land erosion, and as a source of wood fuel, industrial materials, and non-wood products such as honey and bee-wax (Source: Morogoro Social Economic Profile, 2020).

4.8.3.1 Forestry

Forestry plays an important role in economic growth and environmental conservation through maintaining ecological balance; protect soils from erosion and conserves water and wildlife. In addition, forests are sources of domestic energy, industrial raw materials and provide useful non-wood products mainly honey and bee wax. In addition to that, forest products such as timber, poles and charcoal earn revenue to the region through permits and taxes and facilitate economic growth of people engaged on those activities.

4.8.3.2 Beekeeping

Beekeeping is one of the economic activities in Morogoro Municipal. Natural forests and forests plantations available in most parts of the Municipal have great potential for beekeeping. Morogoro Municipal has a potential area suitable for beekeeping involving both the agricultural and forestlands. Apart from catchments forest reserves, beekeeping activities can be carried out all over the remaining. Due to the beekeeping observed during site visit at other campus of Edward Moringe indicate that Morogoro municipal is good place which beekeeping can used a source of income.

4.8.3.3 Mining

Existing and new quarries and borrow pits will be used for stone and gravel extraction. Currently, no specific sites have been identified yet, except that there are sources that are used

for the sand and Gravel materials. These sites include borrow pits at Mvomero (in Morogoro) and Lugoba in Pwani region that are currently being used by the contractor for the as a source of construction materials in Morogoro Municipal

Transporting construction materials from Mvomero and Lugoba quarry Sites to the project area on Solomon Mahlangu Campus will be extremely expensive and time consuming. Therefore, there will be need to investigate in detail the availability new quarry near the project site.

Prior to commencement of use of the borrow pits and quarries an environmental and social management plan shall be prepared and a rehabilitation plan shall also be prepared and implemented after completion of construction works. As good environmental practices, it is proposed that existing borrow pits and quarries should be managed well.

4.8.4 Tourism

No major tourism attractions recorded in project site, but SMC has a number of historical sites, which have been attracting a number of visitors. The Nelson Mandela Freedom square, where (used for mass meetings during the ANC time), the Heroes square, where some of the ANC freedom fighter and their relatives were laid in peace, the ANC- Holland solidarity Hospital, the Vuyisile Mini Furniture Factory and the farm are some of places one people wish to visit if interested in knowing a variety of activities the ANC people were involved in during their presence.

4.9 Economic Infrastructure

4.9.1 **Road network**

The road from Morogoro town center to SUA University, Solomon Mahlangu campus is in tarmac level. Maintenance of University internal roads and landscaping are undertaken by the Estate Department of the Sokoine University of Agriculture. This road has few traffic signs that increases the risk of students, teachers, and other road users to traffic accident. Furthermore, as the number of teachers and students increases at the university the campus experiences high influx of vehicles and motorcycles at the campus.

4.9.2 Telecommunication facilities

Morogoro Municipal is best served in terms of communication facilities. The telephone companies currently giving communication services include Tanzania Telecommunication Cooperation Limited (TTCL), Vodacom, Airtel, Tigo, Zantel and National Fiber Optical Network. Other services such as Fax, Television, Internet services and Radio Broadcasts are also available in Morogoro Municipal.

4.9.3 Financial Institutions

Morogoro Municipal has a mix of financial institutions, like NMB Bank, NBC Bank, CRDB Bank, Exim Bank, and Tanzania Postal Bank (TPB), as well as a local one called Morogoro Community Bank (MCB). These banks offer a wide range of financial services for people, businesses, and entrepreneurs in the area.
The district is also keeping up with modern trends by using mobile money platforms such as Tigo pesa, Halo pesa, Mpesa, and Airtel money. This makes it easier for everyone to access financial services, helping the financial services in Morogoro Municipal to improve and grow.

Apart from banks, there are also financial cooperatives called Savings and Credit Cooperatives (SACCOs) that help people save, borrow, and invest. This comprehensive strategy supports the development of financial services in Morogoro Municipal, making sure that everyone can benefit.

CHAPTER 5: STAKEHOLDER ENGAGEMENT PLAN

5.1 Introduction

Stakeholder's participation and involvement is an important part in the EIA study as well as general environment assessment process. Section 89 of the EMA No. 20 of 2004 emphasizes the importance of stakeholder's involvement, provides guidance on public participation issues, and states its importance in the assessment studies. Regulation 17 of the EIA and Audit Regulations provides further directives and procedures for public participation in decision-making processes and management of the proposals undertaken. Meaningful interactive participation provides opportunity for cooperation and coordination within and between government and other actors. It helps to harness traditional knowledge, improve information flow between actors, and contributes to understanding, empowerment and ownership of a project. It improves the implementation process for example quality of mitigation and monitoring plans, as well as enhancing transparency, capacity building, and good governance principles.

Also, ESS10 "Stakeholder Engagement and Information Disclosure", emphasizes that effective stakeholder's engagement can significantly improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation. During the EIA study, stakeholders involved includes different government institutions and agencies, beneficiaries, private sector, individuals, and all other formal and informal groups associated with the project.

5.2 Objectives of Stakeholder Engagement

The general objective of the Stakeholder Engagement Plan (SEP) is to guarantee a consistent, thorough, coordinated and culturally suitable approach to engaging stakeholders and disclosing project information. The objective is to highlight the commitment of the SUA to following internationally recognized best practice in engagement. Following the standards of current international best practices, the stakeholder engagement for this project seeks to ensure that the engagement process is conducted without manipulation and interference. SUA is fully dedicated to adhering to Tanzania national environmental policy and legislation, and World Bank Environmental and Social Policy.

This Stakeholder Engagement plan identifies the key stakeholder and establishes effective mechanisms for obtaining stakeholder feedback and demonstrates how it will be integrated into the broader ESIA process. The plans ensures that concerns raised by key stakeholders are addressed both in the ESIA and during project decision making and design phase. It also serves as a documentation of the engagement process and outlines the responsibilities of the project proponent in accordance with Tanzania legislative requirements and international best practices. Considering this context, the specific objectives of this stakeholder's engagement plan are as follows.

- Provide relevant, timely, accessible, and appropriate information regarding SUA development project, in an appropriate manner and understandable format to all stakeholders. Information will be disclosed as early and as comprehensively as possible.
- Consult stakeholders on their opinions, concerns, preferences and perceived gains and risks with respect to the project planning and implementation, including the design and proposed management and mitigation measures to reduce potential impacts and to enhance possible benefits.

- Provide all stakeholders with the means to address concerns and grievances with the project, in a structured, reliable, and responsive manner.

5.3 Stakeholder Identification and Analysis

The study identified stakeholders to be consulted and involved throughout the project duration. Stakeholders' identification in this study was done through a continuous and comprehensive active 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

i. Public and private institutions who have interest on the project- The identified stakeholders under this study were, Tanzania National Electric Supply company (TANESCO), Wami/Ruvu Basin Water Body (WRBWB), MORUWASA, Morogoro Municipal Council (MMC), Tanzania Commission for Universities (TCU), Occupation and Safety Authority (OSHA), Fire and Rescue Army, Local government authorities of Mindu ward, Service providers within and outside the University that provide goods and services to the Sokoine University of Agriculture community

ii. Project Affected Communities-Sokoine University Students including Students Organization (SUASO), Academic and Administrative staffs through their respective organizations, and local communities of Mindu ward.

5.4 Requirement of Stakeholder Engagement

According to the Environmental Management Act Cap 191, the Environmental Management (Environment Impact Assessment and Audit) (Amendment) Regulations of 2018, EIA and Audits Regulations of 2005 and the World Bank ESS10 (Stakeholder Engagement and Information Disclosure), its necessary to include Stakeholder Engagement and Information Disclosure as integral parts of project planning and implementation in order to develop good relationships and gather their views on issues that could affect the project throughout the project life.

The Environmental Management (Environment Impact Assessment and Audit) (Amendment) Regulations of 2018 along with the ESIA emphasize the importance of stakeholder engagement and provide the guidelines on when and how the public should be notified during key stages of the ESIA process. Specifically, stakeholder engagement is required during the ESIA Scoping stage and after the completion of impact analysis. The project proponent is also obligated to inform the public at the commencement of scoping activities and upon submission of the Draft ESIA to NEMC (National Environmental Management Council).

5.5 Stakeholders Engagement and Disclosure Methodologies

Various communication techniques are employed during stakeholder engagement. Essentially, community meetings serve as the primary methods for involving the public, other method are focus group discussion and interview. These methods are utilized to generate initial awareness, encourage participation, and facilitate long-term information sharing. However, the selection of specific methods depends on the level and purpose of engagement, as well as the specific stakeholder group being targeted. In the ESIA process, the ESIA Consultants employed the following methods to engage the public.

5.5.1 Semi-Structured Interviews with Key Informants

Semi structured interviews were conducted with key informants at the Street/Mtaa, district and regional levels.

At district level semi structured interviews were conducted with District Executive officer and functional departmental staffs namely District Executive Director (DED), District environmental Officer, Community development officer and land officer, Wami/Ruvu Basin Water Bodies Engineers (WRBWB engineers), District Structural Engineers, Fire and Rescue Force- District office and all other related Departments at district level.

At the Street level semi structured interviews were conducted with Street/Mtaa chairperson, Street/Mtaa Executive (ME), Ward Executive (WE) and other nearby communities. These interviews enabled the consultant to have in depth information on social economic, political, and cultural conditions of the people in proposed project area. The knowledge gained from the interviews helped the consultant to make evaluation of the social economic and cultural impacts.

5.5.2 Indoor Street/Mtaa Consultation Meetings

In Street/Mtaa, with the proposed project, the consultant made an indoor meeting with the Street/Mtaa council members and Street influential persons. Subjects of discussion included the Street/Mtaa social, economic, political, and cultural aspects including lifestyles of the community people and main ethnic groups of the community around the project site.

5.5.3 Public Street/Mtaa Consultation Meetings

Before conducting meeting, letters were sent to the selected Street/Mtaa in Mindu ward where the proposed project is going to take place. These letters were sent prior to the commencement of the study. The main aim of the Street stakeholder consultation meetings was to inform the stakeholders about the proposed project and incorporate their views in the design of the mitigation measures. The specific aim of the consultation process was to reduce problems of institutional coordination, provide precise information about the project to the communities, obtained main concerns and perception of the stakeholder regarding the projects and obtaining opinions and suggestion directly from the affected communities on their preferred mitigation measures.

The public stakeholder consultation Street/Mtaa meetings were also intended to collect information regarding source of livelihood, living standards and views and perceptions of the communities regarding the proposed projects.

5.5.4 Disclosure

- SUA will made accessibility of ESIA report, along with other pertinent project documents to the public.
- The complete set of documents will be physically accessible in local offices and project offices. Electronically copies will be available on the SUA website.
- Summary information will also be provided at Ward and Streets/Mtaa offices situated in the project area.

Table 5.1: Methodology for Stakeholder engagement

S/N	Stakeholders Group	Language	Communication means
1	Government Institutions and Agencies (TCU, OSHA, TANESCO, MORUWASA, WRBWB, FIRE)	Kiswahili & English	▪ Phone and Email ▪ Meetings ▪ Roundtable discussions
2	Local government (Morogoro Municipal Council, Mindu ward)	Kiswahili	▪ Community Meeting ▪ Roundtable discussions
3	SUA students	Kiswahili & English	▪ Roundtable discussions
4	SUA Staff (Administrative and Academic staff, and Service provider)	Kiswahili & English	▪ Phone and Email ▪ Meetings ▪ Roundtable discussions
5	Vulnerable Groups (women, youth, and elders)	Kiswahili	▪ Community Meeting ▪ Roundtable discussions
6	Others (NGOs, CBOs, and private sector etc.)	Kiswahili and English	▪ Phone and Email ▪ Meetings ▪ Roundtable discussions

5.6 Stakeholders Concerns

Generally, all stakeholders consulted had no objections regarding the proposed project and appeared to be content with its objectives leading to its initiation. They all urged the proponent to abide by the relevant rules and regulations guiding her project operations. All raised issues from selected consulted stakeholders are pointed and noted as explained on Table 5.2. Detailed information is found in appendixes 1).

Table 5.2: Selected stakeholders' concerns related to the construction and operation phases.

	Level	Organization/Institution	Comment	Response section
	National Level	Tanzania Commission of Universities (TCU)	i. Construction activities will create employment opportunities. ii. Increase in noise, dust, and vibration during implementation. iii. Pressure on available water supply by MORUWASA. iv. Increase in student accommodation and business opportunities. v. Increase in building materials market supply. vi. Increase in student enrolment and academic performance.	Contractor to adhere to OSHA standards for noise and dust control. Details on enhancing water availability included in the report.
	Regional Level	Tanzania Electric Supply Company (TANESCO)	vii. Consideration for renewable energy sources. viii. Early consultation for electricity supply to new buildings. Recommendation for power system automation.	Adherence to architect designs. Stakeholder consultations conducted as part of the project.
		Occupation Safety and Health Authority (OSHA)	ix. Project registration under WIMS before construction. x. Availability of First Aid and Health and Safety Officers. Conduct Risk Assessment and safety training. xi. Sufficient water supply and sanitation facilities. Provision of PPEs and portable toilets.	Report addresses OHS concerns. Environmental management and monitoring provided.
		Wami/Ruvu Basin Water Board (WRBWB)	xii. Support for the construction project with a focus on water conservation. xiii. Concerns about agricultural activities and settlements in catchment areas. xiv. Need for environmental compliance and renewal of water permits. xv. Requirement of an effluent treatment plant.	Report includes details on enhancing water availability. Responsible management of liquid and sanitary waste.
		Fire and Rescue Force	xvi. Provision of fire drills and consultation for fire equipment. xvii. Emergency exits and fire detection systems in new buildings. xviii. Approval of architectural drawings.	Compliance with architect designs and safety standards. Incorporation of feedback into design improvements.

5.7. Stakeholders Engagement Plan (SEP)

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 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.

Table 5.3: Stakeholders Engagement Plan

Stakeholder Name	Stakeholder Type	Engagement Objective	Engagement Method	Frequency/Timing	Expected Outcome
SUA (Administrative & Academic staff)	Internal	Ensure project aligns with university goals and objectives.	Meetings Regular progress update	Throughout project duration	▪ Clear communication channels, support for project objectives
SUA Students	Internal	Provide a safe and conductive learning environment	Information sessions & surveys	Mobilization phase	▪ Awareness of potential disruption
Local community (Mindu ward)	External	Minimize construction related inconvenience	Community meeting	Mobilization and Construction phase	▪ Mitigation measure for dust, noise, and traffic. ▪ Responsiveness to concerns
Construction Contractor	External	Efficient and timely project delivery	Regular progress meeting. Site visits	Throughout construction phase	▪ Clear project requirement. ▪ Adherence to construction schedule
Government Authorities (TCU, TANESCO, WRBWB, OSHA, FIRE, MORUWASA, Morogoro Municipal Council)	External	Comply with regulations and obtain necessary permits.	Project registration. Permit application process. Regular updates	Mobilization phase	▪ Timely approval of permits, adherence to regulations
Environmental Agencies (Division of Environment, and NEMC)	External	Minimize Environmental and Social Impact	Environmental and Social Impact Assessment, consultation sessions	Mobilization phase	▪ Mitigation measure for Environmental concerns. ▪ Compliance with regulation
Donors/Funding Agencies (World Bank)	External	Accountability and transparency in fund utilization	Reporting mechanisms. Project presentations	Throughout project duration	▪ Clear financial reporting, alignment with World Bank requirement.

CHAPTER 6: IMPACTS ASSESSMENT, MITIGATION MEASURES AND PROJECT ALTERNATIVES

6.1 Introduction

Assessment of environmental, social, and economic impacts in this report are conducted to help determine the acceptability of the project, and to make sure that adverse impacts are properly addressed and mitigated accordingly. The assessment process during mobilization, construction, demobilization, operation, and decommissioning phase involves looking at:

- The environmental baseline features.
- Uniqueness of the project and project design features.
- Potential vulnerabilities and the nature.
- Location of the project, and
- Duration of activities.

Chapter seven details the suggested steps for mitigation, which MoEST, through SUA, is dedicated to implementing. The objective is to avoid or minimize the adverse effects identified. This study aims to ensure that the investments funded by this project adhere to both the World Bank Environmental Standards (ESS) and the Government of Tanzania (GoT) legislations in an environmentally and socially responsible way. The assessment of environmental risks and impacts encompassed several aspects:

i. Adhering to the Environmental Health and Safety Guidelines (EHSGs) outlined by the WB, evaluating risks concerning community safety.
ii. Addressing issues linked to climate change.
iii. Considering any potential threats to the preservation, conservation, maintenance, and restoration of natural habitats and biodiversity; and
iv. Examining the impacts on ecosystem services and the utilization of living natural resources.

The assessment of social risks and impacts involved.

i. Identifying potential threats to human security, such as crime or violence.
ii. Analyzing risks that could disproportionately affect specific individuals or groups due to their unique circumstances, making them more disadvantaged or vulnerable and
iii. Evaluating negative economic and social consequences related to the involuntary acquisition of land or restrictions on land use.
iv.

6.1.1 Nature of Impact

There are two basic natures of impacts; impacts that tends to be beneficial or useful to the environment or social-economic aspects are termed as Positive Impacts and those which tends to affect the environment or social-economic aspects in a negative way are termed as Negative Impacts.

6.1.2 Duration of Impact

The duration of impacts defines the period by which the impact will be felt or the time by which the positive or negative impacts related to the project will continue to occur. In other writings, they are termed as temporal scale. This duration can either be short term, medium term, long Term or permanent.

6.2 Environmental Impact Rating Scale

In order to guarantee a fair and accurate comparison among different studies conducted by ESIA teams, a uniform assessment approach was employed to evaluate the significance of the

identified impacts. The assessment of impact significance, which refers to the importance of the impact within the larger context of the affected system, was based on specific criteria.

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

The impact assessment involves analysing of the overall effect within the surrounding environment to determine the significant of the impact. This assessment considers various factors such as social, cultural, historical, economic, political, and ecological aspects. As a result, the severity or benefit of an impact is initially assessed within a specific field of expertise before evaluating its significance on a larger scale. This requires two separate rating scales, one to determine the severity or benefit and another to determine the environmental significance.

6.2.1 Severity/Benefit

The severity of impacts is determined by experts who use their professional judgement to assess the degree of change that negative impact would have on the existing conditions, or the level of benefits that positive impacts would bring to a specific affected system or specific affected group.

Table 6.1: Severity rating scale

Negative Impacts	Positive Impacts
Very severe An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated. For example, change in topography.	**Very Beneficial** A permanent and very substantial benefit to the affected system(s) or party (ies), with no alternative to achieve this benefit. For example, the creation of a large number of long-term jobs.
Severe Long-term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming or some combination of these.	**Beneficial** A long-term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these. For example, an increase in the local economy.
Moderately severe Medium- to long-term impact on the affected system(s) or party (ies) that could be mitigated. For example, constructing a narrow road with an area with low conservation value.	**Moderately beneficial** A medium- to long-term impact of real benefit to the affected system(s) or party (ies). Other ways of optimizing are equally difficult, expensive and time consuming (or a combination of these), as achieving them in this way.
Slight Medium- to short term impacts on the affected system(s) or party(ies). Mitigation is	**Slightly beneficial** A short- to medium-term impact and negligible benefit to the affected system(s) or

Negative Impacts	Positive Impacts
very easy, cheap, less time consuming or not necessary.	party (ies). Other ways of optimizing the beneficial effects are easier, cheaper, and quicker, or some combination of these.
No effect The system(s) or party(ies) is not affected by the proposed development.	**Do not know/Can't know** In certain cases, it may not be possible to determine the severity of the impact.

The extent of the impacts can be assessed both with and without measures to minimize them in order to illustrate the gravity of the impact if no action is taken. The term mitigation encompasses more than just compensation and encompasses concepts of control and remedy. When it comes to positive effects, optimization refers to any approach that can enhance those benefit. Both mitigation and optimization should be realistic, technically feasible and economically viable.

6.2.2 Spatial scale

The Spatial scale defines the extent or area over which the impact will take place. Environmental Impacts due to the proposed underground transmission cables can affect the environment or social-economic aspects at Household level, Localized, at a study area, District, Regional, National or International Level. See Table 6.2.

Table 6.2: Spatial scale

Individual	Individuals in the area that could be affected
Households	Households in the area could be affected
Localized	A few hectares in extent (from the site). The specific area to which this scale refers is defined for the impact to which it refers.
Study Area	Includes the entire project area.
District	Includes areas around the project includes Mindu Ward within Morogoro Municipal Council.
Regional	The impacts will be of such a nature that it may affect the Morogoro 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 borders of Tanzania.

6.2.3 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.

- **Phase-** During which phase of the construction is the impact likely to occur. The phases included Mobilization, Construction, Demobilization and Operation.
- **Reversibility of the impact-** Every impact was checked if its effect can be reversed or not. Letter R was used to denote reversible impacts while IR was used to denote Irreversible impacts.
- **Cumulative Impacts-** These are impacts that cause changes to the environment that are caused by an action in combination with other past, present, and future human actions.
- **Residual Impacts-** These are impacts that remain after mitigation measures have been applied.
-

6.2.4 Criteria and Significance Rating

The significance of the impact, considering all the assessment criteria mentioned earlier, serve as an indication of its overall importance. The assessment of significance was conducted within the appropriate context, recognizing that an impact can be relevant to the ecological environment, the social-economic environment. This can be achieved by ensuring that all ESIA team followed the mentioned objective criteria, subjectivity was minimized to the greatest extent possible. Nevertheless, it is important to acknowledge that there will always be an element of judgement involved that cannot be eliminated from the assessment of significance.

The importance of an impact does not always correlate directly with its severity, even though one would anticipate a direct relationship, meaning that a severe impact would typically be considered highly significant. However, this is not always true. For instance, alterations to the geology could be significant in terms of their severity, but their significance is perceived as low because society does not consider the environmental changes to be important.

Table 6.4: Significance of an Impacts

Significance	Explanation
High	These impacts will usually result in long-term effects on the natural and/or social environment that will only be mitigated over very long periods of time. At times, this is not possible, and it is up to the government to decide if this is acceptable when considering the benefits of the Project.
Moderate	These impacts will usually result in medium to long term effects on the natural and/or social environment. These impacts do exist but not substantial, and usually result in moderately severe effects or moderately beneficial effects. The emphasis for moderate impact is on signifying that the impact has been reduced to a level that is as low and reasonably practicable
Minor	These impacts will usually result in medium to short term effects on the natural and/or social environment. The environmental and/or social conditions will be affected, but the impact is small enough that it is unlikely to be a concern to the government, communities, and organizations.
Negligible	There are no primary or secondary effects at all that are significant to scientists or the public. Also, this means that the existing environmental and social conditions will not be affected, or the effect is not detectable. A negligible impact is likely to be of no concern to the government, communities, and organizations.

6.3 Potential Impacts during Mobilization and Construction Phase

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

6.3.1 Positive Social Impacts

6.3.1.1 Employment Opportunities

Both direct and indirect forms of employment shall arise from the project initiation. Direct employments will be mainly through skilled and unskilled labourers whose workforce shall be needed to construct Solomon Mahlangu Campus buildings and ancillary infrastructures. Employment opportunities will benefit the community economically and socially. In the economic perspective it employs abundant unskilled and skilled labour who will be used during construction and will benefit economically

Additionally, project will provide indirect employment to the local people by selling foods and other services to the construction workforce. The utilization of local workmanship will take place for the activities that do not require a high specialization. This impact is direct, positive, short term and of moderate significance.

Enhancement Measures

i. The proponent shall be encouraged to employ local, unemployed labourers. This will ensure that local people are more benefited out of the project.
ii. Employment should be on equal opportunity to all genders.
iii. Proponent shall provide on job and safety training.
iv. Proponent shall not cause children under the age of 18 to be employed or to be engaged in any project activities.

6.3.1.2 Increased Income to surrounding community

There is an expectation that majority of unskilled labours will be employed from residents of Mindu ward. This will increase the income to local people who might have the opportunities to be employed by the contractor. The highly skilled labour such as project leader, engineers etc are most likely to come from outside Morogoro they will need to rent houses and therefore increase income to the community most likely Morogoro CBD

However, some of the surrounding community' especially women will also get opportunity to sell food and items to the construction workforce, thus increase income at the household level. This impact is considered to be direct, positive, short term and of high significance.

Enhancement Measure

i. Environmental and Social Safeguards officers from SUA shall identify, register, and prioritize local vendors from Mindu ward in liaison with the local government to ensure they are part of the vending fraternity.
ii. Encourage women especially from Mindu ward to participate in food vending business!

6.3.1.3 Benefit to local suppliers of construction materials

Construction of the University buildings and ancillary infrastructures has considered the use of local labourers and local available materials. This is economically and socially viable hence

increase the efforts to improve the standards of living for local suppliers. This impact is considered to be direct, positive, short term and of low significance.

Enhancement Measures

i. Purchasing construction materials from local suppliers
ii. Limiting unnecessary importation of construction materials which might be sourced locally.
iii. Contractor to be obliged to source aggregate and sand from registered local suppliers/ producers for aggregates and sand.

6.3.1.4 Increased Human Capital

During construction and Rehabilitation project, the influx of individuals from different areas seeking employment in the project is anticipated to result in an increase in human capital. This phenomenon is viewed as a direct, positive, and short-term impact, possessing moderate significance. As these individuals engage with the project, they are likely to acquire new skills, knowledge, and experiences, which could, in turn, contribute to enhanced workforce capabilities and potentially foster economic development in the region. The cultivation of increased human capital is a valuable aspect of the project's social and economic dimensions, underlining its potential to empower and elevate the local labour force while supporting broader community development objectives.

Enhancement Measures

i. Conducting job training to local communities when working with skilled projects personnel

6.3.2 Negative social Impacts

6.3.2.1 Population Influx (Labour Influx)

In many cases, labour influx is compounded by an influx of the other people (followers) who follow the incoming workforce with the aim of selling them goods and services, or in pursuit of job or business opportunities. The influx of workers and followers can lead to adverse social and environmental impacts on local communities. Such adverse impacts may include increase demand and competition for local social and health services as well as goods and services, which can lead to price hikes and crowding out of local consumers, increased volume of traffic and higher risk of accidents, increase demands on the ecosystem and natural resources, increase in accommodation demand at project site due to the higher number workers at project site, social conflicts within and between communities, increased risk of communicable diseases and increased rates of illicit behaviour and crime. These impacts need to be well mitigated. This impact is considered to be negative of short-term duration with high significance.

Mitigation Measures

- Establish transparent recruitment procedures to avoid loafers in form of job seekers.
- Establish a recruitment policy that gives priority to residents for less specialized service.
- Recruitment procedures to be shared with the local authorities for further dissemination.
- Opportunities for sub suppliers and sub-contractors should be awarded to local firms which in turn employ local labour.
- Conduct public health campaigns addressing issues of behavioural change, water and

sanitation, communicable and non-communicable disease, HIV/AIDS

6.3.2.2 Increased risk of GBV, SEA and sexual harassment

In the context of a university construction project, the potential for gender-based violence and sexual harassment from male workers separated from their spouses poses direct and significant short-term negative impacts on female students and other workers, compromising their safety, hindering academic performance, and contributing to mental health issues, which can disrupt classes and damage the university's reputation. Furthermore, the health consequences, such as unwanted pregnancies and sexually transmitted infections, including HIV, highlight the urgent need for comprehensive measures to protect the well-being of all individuals on campus during construction activities and foster a safe and inclusive university environment for everyone involved.

Mitigation Measures

i. Regular training for workers on required lawful conducts in the project communities.
ii. Creation of partnership with local offices of the Ministry of Women Affairs and Youth Development, NGOs, and community women groups to report workers 'misconduct and complaints/reports on gender-based violence.
iii. Gender based equal opportunities in all project phases.
iv. Create opportunities for employment of women in both management and casual placements.
v. Formulation of proper Grievance Redress Mechanism for GBV and SEA actions occurred in working area or around the local community.

6.3.2.3 Disruption of Traffic Flow

According to the project location and accessibility, Road from Morogoro CBD to Mazimbu across Iringa Road will mainly be used for the entire construction and rehabilitation period at Solomon Mahlangu Campus. During construction there will be frequent movement of vehicles and trucks from the project site. This could result into disruption of movement of traffic along the access road and if no measures are taken it could result into accidents. This impact is considered to be direct, negative, short term and of medium significance.

Mitigation Measures

- Only qualified drivers with appropriate driving license shall be engaged.
- Induction course shall be done to all drivers prior starting driving.
- Drivers shall be sensitized on maintaining speed limits for main road and on access roads/internal driveways.
- Promoting safe drive with specified hours for long drive to avoid fatigue.
- Provision of road and safety signs shall be done on site and surrounding areas that are to be followed by drivers and public in collaboration with local authority.

6.3.2.4 Occupational Health and Safety Hazards to Workers

During construction of facilities at SUA, it is expected that construction workers are likely to have accidental injuries and hazards as a result of handling hazardous waste. Engineering and construction activities including metal grinding and cutting, concrete work, steel erection and welding, among others. Construction workers will be exposed to the risk of accidents and injuries. At times, such injuries maybe from accidental falls from high elevation, injuries from hand tools and construction equipment and cuts from sharp edges of steel sheets. Personal Protective Equipment (PPE) will accordingly be provided. Furthermore, during construction

phase workers are also likely to be exposed to health hazard 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 the 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 workers, the public or the environment.

Other public health hazards could occur due to high congestion of people into a small area where diseases like TB, eye diseases, upper respiratory tract infections and spread of COVID-19 etc may occur. Moreover, community health and safety issues associated with the operation of SUA buildings and facilities are generally negligible for well-designed and managed facilities. These may include potential public exposure to spills, fires, and explosions. Also, at the workplace environment there are several issues on occupational health and safety has to be comply with which include the following.

- **Ergonomic hazards** (Long standing hours, long working hours, working in confined space and lighting hazards)
- **Biological hazards:** Physical risk factors to which workers are exposed on project site during construction include noise from vehicle, extreme air temperatures (hot and cold) during the season with extreme temperature characteristics of the project area. Risk factors include contact with bacteria, viruses, fungi which the construction workers come into contact with due to diversity of people. The impact is considered to be negative of short-term duration with high significance.

Mitigation Measures

i. Appropriate working gear (such as nose mask, earmuff, hard hats, and safety clothing) and good construction site management will be provided.
ii. The contractor will ensure that the construction site is hygienically kept with adequate provision of facilities including waste disposal receptacles, clean toilets, firefighting, and clean and safe water supply.
iii. A well-stocked First Aid kit (administered by qualified First Aider personnel) shall be maintained at the construction site.
iv. The medical personnel shall also be responsible for primary treatment of ailments and other minor medical cases as well as providing some health education to the workforce.
v. The Contractor shall strictly follow occupational health and safety procedures as required in Occupational Health and Safety Act No. 5 of 2003

6.3.2.5 Possible Spread of HIV/AIDS, COVID-19, and Other Infectious Diseases.

The main health risk associated with the project relates to the HIV/AIDS epidemic. Considering the socio-economic as well as geographical characteristics of the project area, there are exist number of factors (including poverty) that either may influence high infection rate or detect efforts to combat the epidemic. For example, the problem of low or irregular incomes among young women aged 15-45 years is the HIV/AIDS risk factor, which can influence high infection rate in the project area. It is expected that the project will increase interaction between people in the cause of social relaxation. However recently the country experiencing COVID-19 pandemic that requires great attention with proper preventive measures to be in place, especially in all congested areas. It should be noted that during construction phase the contractor employs different workers from different areas hence

increasing the potential for infectious diseases especially to students at the university during construction.

Mitigation Measures

- HIV/AIDS testing shall be conducted, and counselling services provided by the contractor.
- Workers will be sensitized on the spread of HIV/AIDS and STDs and on the usage of condoms and other protective measures.
- Establishment and implementation of HIV/AIDS awareness, control, and prevention programs
- Workers and the nearby community will be encouraged to use sanitizer and masks for protection against COVID19 infections.
- The contractor shall put in place sign boards in all visible corners for raising awareness on prevention of HIV/AIDS and STIs
- The contractor shall adopt and implement the COVID 19 contingency plan developed by Morogoro Municipal council.

6.3.2.6 Child Labour and forced Labour

Child labour, forced labour and human trafficking are results of many factors, including poverty, social norms, lack of decent work opportunities for adults and adolescents, migration, and emergencies. These factors are not only the cause but also a consequence of social inequities reinforced by discrimination. The project Proponent, Contractor, consultant engineer and other stakeholder need critical attention to abide with employment Act No.6. (2004)

Mitigation Measures

- Employment must consider Labour Act (18+ Years and above)
- Prohibit Students to engage in any contractor‘s activities.
- Spread awareness among parents and surrounding communities.
- Strict laws in place to prevent child, forced Labour s and human trafficking.
- The Consultant Engineer with Proponent shall strictly make sure the Contractor adheres to Employment and Labour Relations Act No. 6 (2004) of United Republic of Tanzania

6.3.2.7 Unplanned Pregnancies

Unplanned pregnancies are the global problem as well as Tanzania but occur most often poorer and marginalized communities. Early pregnancies reman the major contributors to maternal and child mortality whilst complications relating to pregnancy and childbirth are the leading cause of death for girls aged 15-18. Adolescent pregnancy can also have negative and social economic effects on girls, their families and community such as drop out of schools, limiting opportunities for future employment, perpetuating poverty cycle, etc. Nevertheless, the proposed project will cause high social interactions both during construction and mostly during operation phase. Contractor and his employees who are mostly Men will highly interact with local community at Mindu Ward, the state may cause sexual interaction and sexual infidelity and unplanned pregnancies with other women, outside their wedding locks and promiscuity in general.

Mitigation Measures

- Contractor shall put in place onsite rules and regulations that strictly prohibit Labourers engaging on sexual relations with teenagers.
- Contractor and client should conduct awareness campaigns to primary school students in Solomon Mahlangu Campus on reproductive health.
- Contractor shall provide counselling services on physical and psychological health and education.
- Contractor shall put in place site specific Grievance Redness Mechanism for GBV, Sexual Harassment and SEA actions occurred in working area or around the local community.

6.3.2.8 Risk of Construction Materials vandalism

Generally, construction projects experience vandalism and theft of construction materials manly by locals in conjunction with construction technicians. For the proposed project these acts of vandalism may take a number of forms including cements, blocks, fuels, theft from trucks storage tanks, theft of valuable spare parts and other accessories leading to an increase in the construction costs and state of trepidation to Contractor. Vandalism and theft acts will totally jeopardize the proposed project and subsequently cause directly great loss to the Proponent and Contractor.

Mitigation Measures

- Sokoine University shall collaborate ate with prospective communities in creating community sense of ownership.
- Security guards should be present all the time for safety of all properties within the construction site.

6.3.2.9 Public Health Hazards due to Wastes

Workers working on site during development phase will generate some wastes in solid and liquid from including human wastes. This might result into sanitary related diseases such as cholera, dysentery and alike. Depending on the number of construction workers and the seasons when work will be done the impacts might become significance. Likewise mismanaged solid wastes such as plastic bottles, food remains, used packaging material (e.g., cement bags) and like might end up into drainage system and interfere the usual flow of storm water. This might also create untidy condition in Solomon Mahlangu if waste management is not followed well. The impact is considered negative, short term and moderate significance.

Mitigation Measures

- The contractor shall regularly conduct community consultations and engagement meetings with surrounding community so as to raise health and safety awareness to the people.
- Establishment of temporarily and comprehensive sanitary facilities such as toilets, bathrooms during construction phase
- Sorting of solid waste shall be implemented, and they should be stored in well labelled designated containers to avoid surface water contamination to nearby water sources through storm water overflow.
- Ensures hygienic environment on site to avoid the outbreak of diseases such as cholera, dysentery etc.

6.3.2.10 Food Insecurity and inflation of prices on other social services

The influx of workers during the selection and design stage is expected to create pressure on existing food sources, leading to shortages. Both community members and street councils predict that the project's development will attract a significant population seeking income-generating opportunities, thereby increasing the demand for goods and services, particularly food. This surge in demand is likely to result in chaos and inflation of prices on various essential services, including food. The impact can be categorized as indirect, cumulative, short term and reversible (once the construction phase is completed, the influx of workers is likely to decrease, alleviating pressure on food sources and stabilizing prices).

Mitigation measures

- Develop a comprehensive plan in collaboration with local communities to ensure sustainable food sources during the construction phase.
- Strengthen local supply chains for food by working with local farmers and vendors to meet the increased demand.
- Implement mechanisms to monitor and control the prices of essential goods, especially food items.
- Conduct awareness campaigns to educate the community about the potential impacts on food prices and steps being taken to mitigate the situation.
- Ensure efficient construction management to complete the project within the stipulated period, minimizing the duration of increased demand for resources.

6.3.3 Negative Environmental Impacts

6.3.3.1 Air Pollutions (Fugitive Dust and Exhaust Emissions)

The proposed construction activities will involve trench and foundation excavation, transportation construction materials, as well as handling of cement bags. This is likely to generate dust in and around construction site. Exhaust emissions from trucks, machinery and construction equipment are likely to generate mixture of toxic gases such as carbon monoxide (CO), nitrogen oxides (NOx), Oxides of Sulphur (SOx), Hydrocarbons (HC) and suspended particulate matter. Dust and exhaust emission may create nuisance and in extreme cases may lead into adverse health impacts. This impact is considered to be direct, negative, long term and of high significance.

Mitigation Measures

- The contractor shall apply water spraying in dusty areas during the undertaking of construction works to minimize dust emission.
- The contractor shall provide dust protection masks to the construction workers.
- The contractor shall avoid as much as possible stockpiling of dusty construction materials or loose soils.
- The contractor shall ensure that appropriate construction machines are used for construction work.

6.3.3.2 Soil erosion

Clearance of vegetation due to construction activities will leave considerable soil surface to be exposed and can be easily eroded by runoff. Movement of heavy equipment to the site may lead into soil compaction and soil erosion. This impact is considered to be direct, negative, long term and of high significance.

Mitigation Measures

- The contractor implements erosion control measures as an on-going exercise.
- During construction, the contractor protects all areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking any other measures necessary to prevent storm water from concentrating in streams and scouring slopes, banks, etc.
- Any tunnels or erosion channels developed during the construction or maintenance period shall be backfilled and compacted and the areas restored to a proper condition.
- Areas where construction activities have been completed and where no further disturbance would take place are rehabilitated through re-vegetation.
- Ground clearance is minimized and if possible concentrated only to the specific foundation areas, and only when it is necessary.

6.3.3.3 Vegetation clearing

Construction work will involve vegetation clearing to prepare the ground for civil works and installations. However, as large part of the land is occupied with university structures and ancillary facilities, then overall loss of vegetation from land clearing will be limited. This will also affect avifauna that uses those tree species for nesting sites. However, during site clearance, any vegetation that is not properly disposed can block drains and water ways, and also spread invasive species causing environmental degradation. This can also bring about health risks by creating pools of stagnant water, encouraging vector populations. Site clearance can also lead to soil erosion, especially during the rainy season. This impact is considered to be direct, negative, short term and of low significance.

Mitigation Measures

- Confining the construction activities within the proposed project site could minimize the problem.
- The Contractor shall avoid unnecessary clearing of vegetation beyond the proposed project construction area.
- All cleared and compacted areas should be scarified and planted with natural vegetation to stabilize the soil.
- The Contractor shall always ensure that the excavated areas are reinstated whenever possible.
- Only indigenous plant species should be used for re-vegetation.

6.3.3.4 Generation of Solid Wastes

It is obvious that the proposed project construction activities will be associated with production of solid wastes. These wastes streams are likely to be generated from fabrication and domestic activities of the workers at the construction site. The type of wood, excess soil materials, cement bags, piece of bricks, plastic materials (bottles and bags), broken pipes, piece of metals and paint containers. This impact is considered to be direct, negative, short term and of high significance.

Mitigation Measures

- Waste management on site shall be strictly controlled and monitored. Only approved waste disposal methods shall be allowed as prescribed in The Environmental Management Act, 2004, Part IX (a). This section gives mandate the local government authority to choose the best method of solid waste disposal for their areas of jurisdiction in consideration to climatic conditions, economic ability, interest of the community, environmental, hygienic, and social benefits, and availability of tipping sites.
- All solid waste shall be disposed offsite at an approved dumping site located at Morogoro Municipality
- Inert construction rubble and waste materials shall be disposed at an approved site.
- Ensure that site personnel are instructed in the proper disposal of all waste.
- Ensure that all facilities are maintained in a neat and tidy condition and the site shall be kept free of litter. Measures shall be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse.
- At all places of work provide litter bins, containers and refuse collection facilities for later disposal.
- Solid waste may be temporarily stored on site in a designated area prior to collection and disposal.
- Waste storage facility shall be covered, tip- proof, weatherproof and scavenger proof. The waste storage area shall be fenced off to prevent wind-blown litter.

6.3.3.5 Generation of Liquid Waste (Human Sanitary Waste)

Contractors' workforce to be involved for construction of SUA buildings and ancillary facilities will generate liquid waste consists of grey water, urine, and faecal matters. If not properly managed, the anticipated liquid waste from construction workers can significantly impair aesthetic value of the proposed site and cause threat to public health. This impact is considered to be direct, negative, short term and of high significance.

Mitigation Measures

- Contractor shall construct new sanitation facilities to use during construction.
- All generated liquid wastes should be discharged at wastewater stabilization ponds located at Solomon Mahlangu Campus and those ponds required to be managed well.
- The local government authorities shall ensure that sewage is appropriately treated before it is finally discharged into water bodies or open land, and that it does not increase the risk of infections or ecological disturbance and environmental degradation.

6.3.3.6 Generation of hazardous waste

Repair and maintenance activities of construction machinery and equipment will produce significant quantity of hazardous waste including used oil filters, scrap metals, waste oils, grease and used batteries. However, construction of structures will result into generation of hazardous wastes including sharp objects (e.g., broken nails) and waste containers used for

material packaging. Improper handling of the generated hazardous waste can lead into soil contamination, underground water pollution and public health threat.

Mitigation Measures

- Separate all hazardous wastes from domestic waste during collection and transportation.
- All vehicle and equipment mechanical repair activities shall be conducted on proper designated space within the project site or at a nearby garage.
- All generated hazardous during construction of structures shall be temporarily stored at designated area at the site and then to be removed from site by a registered hazardous waste dealer.
- Replaced oil and brake fluid to be properly handled in a designated area with primary and secondary containments prior to be disposed by an authorized dealer.
- All storage containers will be properly sealed and monitored to avoid any possible Oil spillage and the use of oil kit.
-

6.3.3.7 Noise pollution and vibration

Noise is considered as an interference to and imposition upon comfort, health, and the quality of life. Construction activities are expected to produce point source noise, which is defined as noise that remains in one place for extended period. For example, noise will be generated from the concrete mixer, trucks, bulldozer, or motor grader working in project site. Noise from a point source spread spherically over distance, and travels in all directions equally from the source. The significant noise is expected from operation of noise creating equipment like grader machinery, bulldozer, and concrete mixture. The impact is considered to be direct, negative, short term and of low significance.

Mitigation Measures

i. Noise levels along perimeters of the project shall be monitored and recorded periodically to ensure that activities at the site are not exceeding standards.
ii. Workers will be provided with personal protective equipment (PPE) such as earmuffs/ plugs during construction and especially workers working in noisy areas.
iii. Vehicles and equipment will be maintained and serviced as required to ensure they do not generate excessive noise.

6.3.3.8 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 but excavation resulting in a potential transfer of the contamination of the surface waters. The excavated area, if linear could act as conduit to extend ground water 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. 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 scale and local. Appropriate handling of materials prone to the contamination and waste management are likely to reduce the impact. It is expected that the impact will be mild, local, and will occur mostly during the construction stage (short term). With the mitigation measure in place, the residual impacts are none to

insignificant. This impact is considered to be negative of short-term duration with high significance.

Mitigation Measures

- All machinery must be carefully observed not to leak oils on the ground.
- Maintenance of vehicles and machineries must be carried out in a designated areas where oils are completely restrained from reaching the ground.
- Designated areas for maintenance should be covered to avoid storm from carrying away oils into the soil or nearby surface run off.
- Wastewater from maintenance of vehicles and machineries should be properly disposed.
- Good industrial hygiene practices shall be maintained.
- Establishment of primary and secondary containments for waste oil storage before final disposal.

6.3.3.9 Land Degradation from Extraction of building materials

Most of the building materials such as hard core/ aggregates, rough stone and sand required for construction of the proposed project will be obtained from quarries and sand harvesters who extract such materials from natural resources 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. This impact is considered to be negative of long-term duration with high significance.

Mitigation Measures

- Implement efficient resource management practices to minimize the extraction of building materials.
- Ensure that building materials are sourced from legitimate and sustainable suppliers to prevent unauthorized exploitation of natural resources.
- Monitor and control water and energy use to minimize additional demands on these resources.
- Explore alternative sources for building supplies to reduce the impact on local plants and animal life.
- Raise awareness among local communities about the importance of preserving natural resources and involve them in conservation efforts.
- Ensure strict adherence to environmental regulations and guidelines to prevent overexploitation and degradation of natural resources.

6.3.3.10 Impacts on Climate

The clearance of vegetation and the presence of construction vehicles and machinery can lead to increased greenhouse gas emissions, transforming an area from a carbon sink to a carbon source and exacerbating climate change effects. Degraded soils may struggle to support carbon-absorbing vegetation, potentially contributing to higher temperatures in the region. This underscores the complex relationship between construction, environmental shifts, and climate change consequences,

Mitigation Measures

- Equipment must be kept in good working order, and it is forbidden to utilize any equipment that produces an excessive amount of black smoke.
- Implement energy-efficient technologies and practices in the design and operation of the academic building, Student hostel, and cafeteria to minimize carbon emissions.
- Incorporate renewable energy sources such as solar, wind, or biomass to meet a portion of the energy needs, reducing dependence on fossil fuels and lowering greenhouse gas emissions.
- Develop and implement climate change adaptation strategies to address potential climate-related challenges that may arise in the future, ensuring the long-term resilience of the campus.
- Raise awareness among students, staff, and the local community about the project's climate impact and the importance of adopting sustainable practices in their daily lives.
- Turn off engines to reduce idling.
- Green spaces shall be maximized in project areas.

6.4 Possible Potential Impacts during Demobilization Phase

6.4.1 Positive Environmental Impacts

6.4.1.1 Restored Clean Site

It is anticipated that soon after completion of construction works for proposed SUA building and other facilities, the Contractor will be required to remove all unwanted and left over materials from the site. Similarly, all loose soil found within excavated areas either within or along the project site will be backfilled and properly compacted to allow uninterrupted use of land by general public. This impact is direct, positive, long term and of medium significance.

Enhancement Measures

i. Collection and transportation of unwanted materials to the disposal site
ii. Allow community to take valuable building materials for example timber for reuse in construction of other facilities.

6.4.1.2 Vegetation Regeneration

Proper backfilling of the excavated areas within and along the project site will allow vegetation growth and thus contribute to improve scenic beauty of the surrounding hence it will support regeneration of planted vegetation which had been uprooted during project construction stage. This impact is direct, positive, long term and of medium significance.

Enhancement Measures

- Supporting vegetation growth along the project site
- Provision of training to scheme attendants in nurturing of planted vegetation around the project site

6.4.2 Negative Environmental Impacts

6.4.2.1 Dust and noise pollution from demolishing works

The proposed demolition phase at will cause short-term environmental and social impacts, including dust and noise pollution. The release of dust particles and noise pollution from

machinery like excavators, electric grinders, and mixers will affect air quality and pose health hazards to both site workers and residents in neighbouring areas. Particulate matter (PM) will be a significant contributor to air pollution, leading to reduced visibility. This impact is considered moderate, local, and short-term.

Mitigation measures

- Employ dust control technologies such as water spraying systems to minimize the release of dust particles during demolition activities. This will help maintain better air quality.
- Implement noise reduction strategies, including the use of sound barriers, noise-dampening equipment, and scheduling noisy activities during specific times to minimize disruption to nearby residents.
- Provide workers with personal protective equipment (PPE) such as masks and ear protection to mitigate health risks associated with dust inhalation and prolonged exposure to high noise levels.
- Conduct awareness programs for local residents, informing them about the demolition schedule, potential impacts, and measures being taken to mitigate dust and noise pollution. This foster understanding and cooperation
- Establish a monitoring system to regularly assess air quality and noise levels. Implement a reporting mechanism to promptly address any deviations from acceptable standards, allowing for quick corrective actions.
- Explore and utilize demolition methods that generate less dust and noise, such as mechanical methods that are more controlled and produce fewer airborne particles.
-

6.4.3 Negative Social Impacts

6.4.3.1 Loss of business opportunities by local people

The local people who will be benefiting from the project during construction phase through selling their commodities and services to the construction workers will lose the created potential market during previous phase. This situation will result into loss of household income to Mindu ward communities. This impact is direct, positive, long term and of high significance.

Mitigation Measures

- Offer training programs to local traders and entrepreneurs to diversify their products and services. This can help them adapt to changing circumstances and explore alternative business opportunities beyond construction-related activities.
- Establish clear communication channels between the construction project management and local businesses. This ensures that businesses are informed about the project timeline, allowing them to plan for potential disruptions and adjust their operations accordingly.
- Encourage collaboration among local businesses to create a network that can collectively address challenges and explore new business opportunities. This can foster resilience and community support.
- Facilitate the establishment of support services for construction workers, such as designated areas for purchasing food from local entrepreneurs. This ensures that some business activities can continue despite the temporary disruptions.
- Advocate for and facilitate access to government assistance programs for affected businesses. This could include tax relief, low-interest loans, or other financial support measures.

- Work with local authorities and businesses to develop long-term plans for economic resilience, considering potential future construction projects and identifying strategies to minimize the impact on local businesses.

6.4.3.2 Loss of Employment

Labourers who will be employed during the construction phase will lose job after decommissioning of the project phase. Some Labourers may change job and be employed to work on industries that will emerge, and some may leave the place for other jobs in other areas. In most cases most Labourers employed during construction phase are semi-skilled Labourers that move to seek for similar jobs in other areas. This impact is rated as moderate with widespread impact occurring over a short period of time.

Mitigation Measures

- Implement skill development programs to enhance the employability of the affected workers.
- Provide training in areas with high demand in the local job market.
- Informing workers, the project duration when employing them
- Establish job placement services to assist displaced workers in finding alternative employment opportunities.
- Educating the labour force on the need to save part of their wages.
- Paying severance benefit to all laid off workers according to the provision of the labour laws.
- Establish community support programs to provide financial assistance or counselling services to those facing immediate economic challenges.

6.5 Possible Potential Impacts during Operational Phase

6.5.1 Positive Social Impacts

6.5.1.1 Increase students' admission to university

The proposed project will provide adequate academic facilities to SUA, these will increase admission of students from high schools and other colleges. The increase in student admissions at due to the proposed project will have both environmental and social implications. In environmental terms, the construction of new buildings may lead to changes in local ecosystems and resource utilization. Socially, the influx of students will enhance access to higher education, benefiting the country access to higher education will be enhanced for the benefit of the country. Also, the proposed project components will provide adequate and conducive space for meetings, training, seminars, workshops etc. This impact is high, national and will be medium term.

Enhancement Measures

- Gender and disadvantaged groups will be considered during the student's selection process.
- SUA shall increase advertisement to attract more students to study the priority programmes for the Nation.
- regular maintenance of established buildings by making sure design shall conform national and international standards.

6.5.1.2 Increase of revenue to SUA

After completing the project SUA will increase students' enrolment, which in return will increase revenues through university fees. This will increase the University financial capability

for running the university. It will also be one of the Government sources of incomes. This impact is high, extensive, and long term. The project will also provide employment opportunities for many people skilled and unskilled.

Enhancement Measures

- Innovate business activities linked with academic activities for enhancing income of the University.
- Implement robust financial management practices to ensure that the increased revenue is allocated efficiently and effectively.
- Develop and expand online education programs to reach a wider audience and attract students from different geographic locations.

6.5.1.3 Job creation

Jobs to be created during the operation phase of the project can be divided into two (2) categories: direct and indirect jobs. Direct jobs are those related to employment as casual Labourers and skilled manpower, operational services, teaching. Indirect jobs are those created by the positive impacts of the institution to economic sectors. These include cleanliness, stationeries, catering and commercial activities. In addition, indirect jobs will include agriculture, livestock, and energy and water sector. This impact is high, extensive, and long term.

Enhancement Measures

- Implement skill development programs and training initiatives to enhance the employability of local residents. This could include vocational training in areas relevant to the institution's operations, such as hospitality, agriculture, and business management.
- Prioritize the hiring of local residents for various positions within the institution. This can be facilitated through collaboration with local employment agencies or community outreach programs to connect potential employees with job opportunities.
- Foster partnerships with local businesses in the cleanliness, stationery, catering, and commercial sectors to ensure a mutually beneficial relationship. This can stimulate economic growth in the community and create additional job opportunities.
- Establish initiatives or support existing programs that promote entrepreneurship within the community. This could involve providing mentorship, or resources to aspiring entrepreneurs, thereby creating new businesses and job opportunities.
- Engage with the local community through regular communication channels to inform them about job opportunities, skill development programs, and other initiatives. Educate the community on the long-term benefits of the institution and how they can actively participate in and benefit from its operations.
- Employment should be on equal opportunities for all genders.

6.5.1.4 Production of skilled Labour force for nation development

The proposed SUA project will contribute to FYDP II through generation of skilled Labour to support industrialization and increasing youth participation in business such as agriculture, fisheries, agro-processing, agribusiness, renewable energy utilization and trade thereby reducing unemployment in the country. Thus, contributing to the Tanzania economy through generation of quality graduates that are relevant to the Labour market requirements.

Enhancement Measures

- The project aims to boost student enrolment, indicating a proactive approach to meet the growing demand for skilled professionals in alignment with national development policies.
- SUA is committed to providing high-quality education to its students, ensuring that graduates possess the necessary skills and knowledge to contribute effectively to the nation's development goals.
- The project emphasizes aligning its curriculum and training programs with the priorities outlined in national development policies. This ensures that graduates are well-prepared to address the specific needs and challenges of the country.
- SUA recognizes its crucial role in supporting Tanzania's industrialization efforts. By tailoring its educational programs to meet the demands of the labour market, the institution directly contributes to the development of a skilled workforce that can drive economic growth in the industrial sector.

6.5.1.5 Increased commercial and social activities around project location

Construction of the proposed project components is anticipated to attract more businesses in the area due to increased demand of various services and goods. The University will also cause growth of the existing businesses around the project location. This impact is high, local and will be medium term.

Enhancement Measures

- Collaborate with local vocational institutions to provide specialized training in areas related to the services and goods in demand.
- Develop and implement policies that prioritize the procurement of goods and services from local businesses, thereby supporting the local economy.
- Establish platforms for ongoing dialogue between the university and local businesses to understand their needs and concerns.
- Offer training programs and workshops to local residents to enhance their skills and make them more employable in the growing market.
- Organize cultural and social events on the university campus that attract residents from the surrounding areas, fostering a sense of community and promoting local businesses.

6.5.1.6 Increased revenues to local authorities

The project will result to increase in revenue for government. Various governmental regulatory authorities, including the National Environmental Management Committee (NEMC), Morogoro Municipal Council, Morogoro Water Supply and Sanitation Authority (MORUWASA), Tanzania Electricity Supply Company (TANESCO), FIRE and Rescue Force, and OSHA, will benefit from the collected funds. The cumulative effect of sustained revenue generation will result in a long-term positive impact on the region.

Enhancement Measures

i. Strengthening revenue collection mechanisms
ii. Local authorities to conduct awareness creation for the people in the area on the importance of paying revenues.
iii. Enhanced cooperation between the project and local authorities

6.5.2 Negative Social impacts

6.5.2.1 Creation of occupational health and safety risks

Occupational exposures may be most likely related to electrocution and other minor hazards related to manual handling, fall and trips. Moreover, community health and safety issues associated with the operation of the offices are generally negligible for well-designed and managed facilities. These may include potential public exposure to fire and explosions. This impact is direct, negative, short term and of less significance.

i. Regular maintenance of university buildings
ii. Affixing safety signs to provide awareness of people while using those buildings.
iii. Stabilize and secure structural bricks wall and foundation against falling down resulted from external force such as wind and vibration by using concrete columns.
iv. Establishment of proper storm water drainage system to prevent soil erosion along the buildings.

6.5.2.2 Creation of public health risks

Solid and liquid Wastes generated from daily operations especially office papers and trash, empty water bottles, leakages from sanitary facilities like septic tanks, overflow storm water with oil contamination if not well managed may pose detrimental impacts hence public health risk. Other public health hazards could occur due to high congestion of people into the buildings where disease like TB, COVID-19, eye disease, upper respiratory tract infections and many may occur. This impact is considered negative, long term and of high significance.

Mitigation Measures

- 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.
- Introduce preventive measures to reduce the likelihood of disease transmission. This could involve promoting hygiene practices, ensuring clean water and sanitation facilities, and establishing protocols for waste disposal to minimize environmental health risks.
- Engage with local communities to raise awareness about the importance of health and hygiene. Encourage community participation in health programs and empower them to take ownership of their well-being.
- Establish a robust system for monitoring and surveillance of health conditions in the affected areas. This includes early detection of potential outbreaks, tracking disease trends, and implementing timely responses.
- Collaborate with local health authorities and organizations to leverage their expertise and resources in order to enhance the effectiveness of health interventions and ensure a coordinated response to health challenges.
- Develop and implement emergency response plans to handle any sudden increases in disease incidences.

6.5.2.3 Disruption of traffic flow

Operation of motor bikes and cars of students and lecturers will add pressure on traffic especially in the areas around the university entrances. Thus, there is a risk of traffic congestion and increased traffic safety in this area. The university will need to work with local government specifically road management authority to install additional signboards near the entrances of the University and/or coordinate and manage traffic if necessary.

Mitigation Measures

- Develop a comprehensive traffic management plan that considers the anticipated increase in vehicular and non-motorized traffic during the operational phase. This plan should outline specific measures to mitigate congestion and enhance safety in the surrounding areas.
- Implement coordinated traffic control measures to optimize the flow of vehicles and ensure smooth operation near university entrances. This may involve the deployment of traffic personnel during peak hours or special events to manage the increased traffic.
- Establish a feedback mechanism for the community to report any issues related to traffic disruption. This allows for continuous monitoring and adjustment of the traffic management plan based on feedback from the users.
- Establish a partnership with the local government and road management authority to jointly address traffic concerns. This collaboration is essential for effective coordination and implementation of traffic management solutions.

6.5.2.4 Increased risk of GBV, SEA and sexual harassment

During operational phase of Solomon Mahlangu Campus facilities gender-based violence (GBV) poses potential risks, including workplace harassment and unequal treatment among staff, students, and service providers. This could result in adverse long-term impacts such as a negative campus culture, decreased engagement, and limitations on personal and professional growth. Addressing GBV requires proactive measures, including awareness campaigns, robust policies, and an inclusive environment, to ensure the safety, well-being, and success of the campus community."

Mitigation Measures

- Develop and implement a comprehensive GBV Action Plan that includes strategies for awareness, prevention, and response.
- Conduct regular awareness campaigns to educate workers, students, and the community about GBV, its consequences, and available support services.
- Enhance reporting mechanisms for GBV incidents, ensuring a confidential and secure process for victims to come forward.
- Encourage community involvement in preventing GBV by establishing community-based security measures and fostering cooperation with local leaders.
- Provide training sessions for project workers, emphasizing respect, understanding, and zero tolerance for GBV and harassment.
- Develop swift response mechanisms to address reported GBV cases, ensuring the safety and well-being of survivors.
- Regularly review and update GBV policies and mitigation strategies, incorporating feedback from affected individuals and relevant stakeholders.
- Establish a gender desk within the project framework to handle gender-related issues promptly.

Implement programs that empower women and vulnerable groups, fostering a culture of inclusion, respect, and gender equality.

6.5.2.5 Increased Water Demand

The establishment of an Agro-processing unit for food production and the growing campus population will inevitably elevate water demand. The production processes, cleaning, cooling systems, and waste disposal associated with food processing contribute to this demand. Simultaneously, the increased population drives everyday water needs, sanitation, and landscaping requirements.

Mitigation Measures

i. Install water conserving taps that turn- off automatically when water is not in use.
ii. Encourage water reuse/recycling during occupation phases.
iii. Roof catchments of building blocks should be provided with rainwater harvesting systems (gutters, down pipes, and water storage facilities) to enhance collection and storage of the resulting run-off. Such water can be used in watering flower gardens, general cleaning etc.
iv. Provide notices and information signs to sensitize on means and needs to conserve water resource i.e., Keep/Leave the Tap Closed etc.

6.5.2.6 Increase Energy consumption

One notable negative impact during the operation of the proposed facilities is the significant increase in energy consumption. This surge in energy demand is particularly evident in the operation warehouses for food production, which involve energy-intensive processes such as equipment operation, climate control, and lighting. With a substantial number of occupants expected to utilize these spaces, the overall demand for energy resources is anticipated to escalate. This heightened energy consumption, if not effectively managed, can contribute to a greater carbon footprint and strain on existing energy infrastructure. It is imperative to address this negative impact by implementing comprehensive energy-saving measures and efficiency strategies to minimize the environmental consequences associated with increased energy consumption during the operation of these diverse facilities.

Mitigation Measures

i. Put off all lights immediately when not in use or are not needed and use energy conserving electric lamps for general lighting.
ii. Make use of alternative source of energy such as solar power. Solar panels proposed in the project should be fully utilized.

6.5.2.7 Increased pressure on social services and utilities

The University has the potential to increase pressure on the existing social services and utilities such as education, health, and water. The increase of population due to employment opportunities and students' enrolment will definitely strain the existing social services. This impact is high, local and will be medium term.

Mitigation Measures

i. Implement water conservation technologies to mitigate the strain on local water resources within the campus.
ii. Develop and implement sustainable resource management practices, considering the availability and accessibility of social services.
iii. Collaborate with local structures to alleviate the pressure on existing social services within the campus.
iv. Investigate alternative measures, such as solar energy, to reduce dependency on traditional utilities and ease the demand on social infrastructure.

v. Integrate educational programs to sensitize students on resource efficiency measures, including keeping taps closed and switching off lights.
vi. Promote the use of resource-efficient fixtures, such as energy-efficient lighting and electronic appliances, as well as water-efficient fixtures.
vii. Implement technologies like automatic pumping and pool covers to enhance the efficiency of resource use and reduce strain on services.

6.5.2.8 Risks due to fire hazards

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 fires are fuel (combustible substance), heat and oxygen. Unless all three are present fire will not occur. Fire can lead to following impacts, loss of lives, Serious Injuries, and loss of properties etc. This impact is direct, negative, short term and of high significance.

Mitigation Measures

i. Provide for fire risk and response signage where the information is short and clear.
ii. Regular fire drills for the building occupants
iii. Regular awareness and sensitization on fire safety measures and response to the building occupants

6.5.3 Negative Environmental impacts

6.5.3.1 Generation of Solid Waste

The quantities of solid wastes to be generated from the Offices and other buildings will be high which will include the waste papers, boxes, foils, food leftovers, plastic bottles and bags, voucher materials and others which if all together are not managed properly will degrade the environment and cause pollution around the project area and extend beyond the site through denudation processes such as wind and water. This impact is direct, negative, long term and of medium significance.

Mitigation Measures

i. Implement a waste segregation system to categorize waste into recyclables, organic, and non-recyclables, with clearly labelled bins for each category.
ii. Encourage the use of recycling programs for materials such as paper, plastic, glass, and metal within Laboratory spaces.
iii. Establish on-site composting facilities for organic waste generated in cafeterias and other common areas.
iv. Regularly monitor and assess waste generation patterns, adjusting waste management strategies based on the observed data to optimize efficiency.

6.5.3.2 Generation of Liquid waste

In the upcoming facilities at Solomon Mahlangu Campus, the primary sources of liquid waste are expected to include rainwater runoff, waste from sanitation systems, and water used in the Laboratories. As a result of these combined sources, the impact of this liquid waste is projected to have a negative aspect. This negative effect is anticipated to persist over a longer period, indicating a lasting presence. However, in terms of significance, this impact is expected to be relatively low, suggesting that while it might continue for a while, its overall importance is not likely to be very high. It is essential to be mindful of this and put in place plans to manage and reduce this impact as we proceed with the development of the new facilities.

Mitigation Measures

i. Regular inspection of buildings that handle chemicals and hazardous materials to make sure systems of wastewater treatment are working efficiently and does not release chemicals into domestic water system.
ii. Regular cleaning of the wastewater drainage system
iii. Regular and proper maintenance of the drainage system

6.5.3.3 Storm water generation and overflow

The proposed Expansion project at SUA will generate a lot of storm water due to presence of pavements, concrete surfaces, and buildings. Parking spaces and building roofs are the main contributors of storm water generation at the proposed site. The structures will tend to compromise the infiltration capacity of the land surface and hence rendering water free to the environment. The storm water generated might have impacts on structures downstream as well as being a factor for soil erosion and poor water quality. This impact is direct, negative, long term and of low significance.

Mitigation Measures

i. Prioritize the design of an effective stormwater drainage system for the new buildings.
ii. Incorporate greenery areas in the design to facilitate soil infiltration and reduce stormwater runoff.
iii. Implement rainwater management systems, including rainwater harvesting tanks and drainage structures, to prevent runoff and promote infiltration.
iv. Create retention areas for collecting and distributing rainwater, preventing overflow during heavy rainfall.

6.5.3.4 Impacts on surface water quality

During operation of the university facilities there will be no significant changes in the quality of surface water because there will be little or no spill of oil or storm water to the environment. However, it is anticipated that there could be flooding impacts that might result from blockage of storm water drainage system especially when the system is not cleared cleaned for long time.

Also, Concerns have been raised about potential water pollution from agro-processing unit that can affect the biological activities within Wastewater Stabilization Ponds lead to the pollution, emphasizing the need for careful containment and monitoring of hazardous liquid waste from Laboratory before being disposed into WSP. This impact is direct, negative, short term and of high significance.

Mitigation Measures

i. Establish a robust monitoring system to regularly assess the quality of wastewater discharged from SUA facilities.
ii. Implement strict compliance measures to ensure that the hazardous liquid waste meets acceptable environmental standards before disposal.
iii. Conduct educational programs within SUA to raise awareness among Laboratory staff and students about the potential environmental impact of improper wastewater disposal.
iv. Promote responsible Laboratory practices and waste management to reduce the generation of hazardous liquid waste.
v. Collaborate with local communities to create awareness about the environmental consequences of water pollution. And involve community members in monitoring activities and reporting any observed anomalies in water quality.
vi. Develop and implement emergency response plans to address any accidental spills or releases of hazardous substances into the wastewater system.

vii. Upgrade the Laboratory wastewater containment systems to prevent unproper discharge of hazardous liquid waste.
viii. Implement advanced treatment technologies to ensure that wastewater, especially from Laboratories, undergoes proper treatment before being released.

6.6 Potential Impacts during Decommissioning Phase

The project will be designed, built, and maintained to operate efficiently for several decades. The decommissioning of the project is not expected at the near future. Decommissioning may involve excavation and other activities that will lead to temporarily increase in noise and vibrations as well as air pollution due to dust emission. The deconstruction of the building and dismantling of sewerage and drainage systems, uninstallation of electrical system will also result in the creation of both hazardous and non-hazardous waste which needs to be handled according to waste management regulations.

The earth moving works during topsoil replacement will lead to significant deterioration of the environment within the site and the surrounding areas. This will be as a result of the noise and vibration that will be experienced from machines and workforce being utilizes. Dust will also be emitted affecting the surrounding environment. People working on the proposed project will inevitably be laid off or replaced in other Government institutions, but decommissioning works create short term jobs.

The decommissioning works will involve occupational health and safety risks similar to those of the construction phase. However, in case of decommissioning the following impacts may be happened.

6.6.1. Negative Environmental Impacts

6.6.1.1 Air pollution due to dust and exhaust emission

As noted above the demolition process will entail breaking of building using sledgehammer and jack hammers, which utilize compressed air and lowering of materials from high to low levels. The exercise will inevitably generate dust into the atmosphere. Furthermore, the land levelling and grading while reinstating the area close to its nature condition will also generate dust to the atmosphere as well as transportation of debris and other unwanted materials from the site. Dust generated will impair local atmospheric condition.

Additionally, trucks and earth moving equipment will be used for demolition works that will emit fumes which are unwanted atmospheric pollutants. Atmospheric pollutants from engines of vehicles/ machinery include SO_2, NO_X, CO_2, and particulate matters. Main impact is impairment of local air quality, the extent of which will be dependent on quantities emitted, duration and prevailing atmospheric conditions. However, for demolition works the equipment to be involved will be fewer compared to construction period.

The impact receptors are likely to include site workers and nearby community as well as people/community centers along the route where the spoil will be disposed. The like hood for public health concern for onsite activities is minimal due to the distance to the nearby settlement. The impact is considered negative, short term and of low moderate significance.

Mitigation Measures

i. Employ dust control technologies such as water spraying systems to minimize the release of dust particles during demolition activities. This will help maintain better air quality.
ii. Provide workers with personal protective equipment (PPE) such as masks to mitigate health risks associated with dust inhalation.

iii. Conduct awareness programs for local residents, informing them about the demolition schedule, potential impacts, and measures being taken to mitigate dust pollution.

6.6.1.2 Noise Pollution from Demolishing Works

The demolition process will entail removal of buildings using crowbars and hummers, breaking of facilities will use sledgehammers and jack hammers, which utilize compressed air and lowering of materials from high to low levels. The exercise will inevitably result into generation of noise. The aspect of which might create hazard condition for the receptors (both nearby communities and workers within the project site). This is considered to be negative, short term and of negligible significance.

Mitigation Measures

i. Personal protective Equipment (PPE) shall be properly selected, used and maintained to minimize noise level.
ii. Standard operation procedures will be developed and strictly observed.
iii. Implement noise reduction strategies, including the use of sound barriers, noise-dampening equipment, and scheduling noisy activities during specific times to minimize disruption to nearby residents and students.
iv. Light machineries shall be used during demolition activities to reduce noise. while operators/ workers in various sections with significant noise levels shall be provided with PPE for noise protection

6.6.1.3 Water pollution from Stockpiling and hydrocarbons

The debris resulting from the demolition will be required to be transported for disposal at an approved site or used as base materials for new construction work. Unplanned disposal of demolished waste may cause contamination or impaired quality of receiving body, especially land and water resources.

Also, if servicing and maintenance of vehicles and machines will take place at the demolition site there will be fuel and lubricants to be involved. This will create the opportunity for accidental spills of hydrocarbons and contaminants could be washed into environment. Furthermore, the hydrocarbons that might remain at the site if not handled properly might leak or spill on site and thus contaminating the site and eventually could be washed by rainwater to the nearby water bodies. The impact is considered to be negative irreversible, short-term duration and of moderate significance.

Mitigation Measure

i. All excavated unwanted materials will be stockpiled away from drainage features.
ii. Prior instructions to contractor on handling of hazardous waste such as oils, lubricants and gasoline during decommissioning process will be provided.
iii. A site waste management plan shall be prepared by the contractor prior to commencement of the works. This will include designation of appropriate waste storage areas, collection and removal schedule, and a system for supervision and monitoring.
iv. All refuelling for vehicles will be done on dedicated area that has been provided with concrete structure to retain any leaks.
v. Emergency response measures will be put on site in case of accidental oil spill that will include having absorbent materials and sand kits.

6.6.1.4 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 aesthetic may result from the demolished waste remaining on site for a long time to the extent of becoming an eyesore. This impact is considered to be negative of short-term duration with high significance.

Mitigation Measures

- The contractor shall ensure that demolished waste is removed from the site and properly disposed of in designated location.
- The site will be rehabilitated to its original state, whereby will be handled over to project proponent who is the owner of the plot. Before handling over, the proponent will conduct internal environmental audit and the report will be submitted to NEMC for approval.

6.6.2 Negative Social Impacts

6.6.2.1 Traffic accidents

The demolition activities as indicated in previous sections will involve transportation of demolition materials from the site to the disposal sites away from the source. Traffic accidents involving both the workers and the general public can be expected to occur if precautions are not taken. Drivers might cause accident to children in the residential areas along the route. The impact is indirect (offsite), negative, short term and of high significance.

i. Develop a comprehensive traffic management plan that includes designated routes for transporting demolition materials. Ensure coordination with local authorities to minimize disruption and avoid congested residential areas.
ii. Schedule transportation of demolition materials during off-peak hours to minimize the impact on regular traffic flow. This can help reduce the likelihood of accidents and mitigate congestion.
iii. Employ escort vehicles to accompany transportation trucks, providing advance notice to other road users. Clearly mark the vehicles carrying demolition materials with appropriate signage to alert drivers and pedestrians
iv. Conduct public awareness campaigns to inform residents along the transport route about the decommissioning activities. Provide information on alternative routes and the timing of material transportation to minimize inconvenience.
v. Ensure that workers involved in transportation activities are adequately trained on safety protocols. Emphasize the importance of adhering to traffic regulations and maintaining vigilance during transportation.
vi. Develop a robust emergency response plan in case of accidents. This includes training personnel on immediate response measures, establishing communication protocols with local emergency services, and providing necessary equipment for rapid intervention.
vii. Implement a system for regular monitoring of transportation activities, with mechanisms for reporting any incidents or near misses. This allows for proactive identification of potential issues and prompt corrective action.

6.6.2.2 Occupational Health and Safety Hazards to workers

The demolition works and reinstating the site closure to its natural condition will definitely results into various occupation health and safety hazards which if precautions are not taken might result into long term health effects, injuries, fatal and loss of life as well as damage the properties. Some of hazards are obvious which require some management issues like excessive

noise level from machinery, excessive dust emission from earth works. Injuries to construction workers may results from moving equipment's.

According to OHS Act of 2003 causes of accidents in construction sites includes but not limited to poor site layout, poor erection, and improper use of scaffolds, falling objects from high level such as poles, improper method of lifting, sharp edges, improper use of Personal Protective Equipments (PPE), inadequate provision of PPE, falling through uncovered opening especially at upper floor levels and carelessness of workers. This impact is considered to be negative, short term and of high significance.

Mitigation Measures

i. Comprehensive Decommissioning Plan shall be established to guide prior to undertake any activities.
ii. Workers at the site should use appropriate protective gears such as boots, respiratory masks etc.
iii. The contractor shall insist on their workers to use the gears properly.
iv. Fatal accidents shall be reported to OSHA within 24 hrs of occurrence so as to prevent further recurrences by doing investigation.
v. All respective government authorities should be involved prior to decommissioning activities.

6.6.2.3 Loss of Employment due to Closure of the Project

If for whatever reason the project is closed down, the people employed permanently will secure same jobs in other Government institutions whilst those temporarily employed 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 supplier of various services will lose their vital market. This impact is then considered to be negative of short-term duration with high significance.

Mitigation Measures

i. Transfer of permanent employees to other Government institutions
ii. Provision of training that can make temporary workers competent for jobs elsewhere shall be provided.
iii. Ensuring that Social Security contributions are remitted to the applicable fund at the right time.
iv. Create a severance package in the event of abrupt closure of the facility.
v. Assist with re-employment and job seeking of the involved workforce.
vi. Compensate and suitably recommend the workers to help in seeking opportunities elsewhere.
vii. Offer advice and counselling on issues such as financial matters potential dust area within the project area.

6.7 Analysis of project alternatives

Consideration of project implementation alternatives is crucial in ensuring that the developer and decision-makers have a wider base from which they can choose the most appropriate option. The planning stage of this project considered the No project alternative site, alternative energy sources, alternative waste management technologies alternative.

6.7.1 No project alternative

The no project alternative entails retaining the current status quo (No construction of the proposed buildings structures at SUA Campus). Adopting the No Project alternative, this option would mean avoiding the predicted impacts of the project implementation and missing the predicted positive impacts of the project. The HEET project at SUA is designed to revitalize and expand the capacity of the University to contribute to key areas for innovation, economic development, and Labour market relevance. The proposed modern infrastructure is expected to enable effective teaching and research and produce graduates who could become a catalytic force for the new industrial based economy of Tanzania.

Based on the enormous benefit of the proposed project at national level, the No project alternative was abandoned. Identified impacts associated with project implementation are mostly temporary, shorter, and are manageable at the University level.

6.7.2 Alternative Site Location

As presented in Chapter 2 of this report, the proposed buildings will be located within the Solomon Mahlangu Campus. The option of utilizing an alternative site out of the campus was considered but over-weighted by the existing land at the university due to the following advantages over other.

i. The site is within SUA campus (No need to buy a new piece of land).
ii. The selected area is compatible with the land use proposed by the SUA master plan.
iii. The site is located on a favourable piece of land, large area with a clear view.
iv. The site is well served with road network, and it is easily accessible to public transport; and
v. Availability of water and electricity mains supply.

Even within the campus, several locations were considered against provision/availability of services such as waste management, water, and power supply: location with respect to location of other structures and environmental protection. The following are the advantages of the selected sites over any other location within the campus.

i. The selected corridor allows integrated management of generated solid and liquid wastes (both onsite and offsite).
ii. Accessibility to water and energy: the existence of MORUWASA water supply and availability of electricity from national grid (TANESCO) at the Solomon Mahlangu project site.
iii. There is only demolition of building which used as a shop at Solomon Mahlangu Campus academic building project site in order to pave the way for erection of building and no other demolition because at all sites where the construction will take place there is no existence of other buildings, but existing buildings are near the project site and not within the project sites.
iv. Site selection considered areas, which have less vegetation cover, to avoid more vegetation clearance during construction.

6.7.3 Design Alternatives

The suggested layout for the university, as outlined in the proposed project development, is strongly recommended to optimize the university operational efficiency. The primary guiding

principle in the university design adheres to the guidelines specified in the Public Investment Management Operational Manual.

Additionally, each university comprises distinct functional units, each with its unique design and purpose. Consequently, the entire university cannot have a singular design that can be universally applied or omitted. Unlike a straightforward acquisition like a firefighting truck, the concept of a design alternative does not translate effectively to the overall university setting. Therefore, considering a design change for the entire university is not a feasible option.

6.7.4 Technology Alternatives

In the realm of construction activities for the Solomon Mahlangu Campus, the project emphasizes the endorsement of environmentally responsive and user-friendly technologies for both internal and external stakeholders. This commitment extends to engaging local contractors and consultancies, as well as incorporating suitable local technologies and building materials. While external contractors may be involved when deemed appropriate, the focus is on fostering a connection with the local environment. The distinctive nature of the proposed University programs revolves around innovative learning outcomes, program delivery emphasizing practical training and skill development.

Addressing potential changes in technology during the implementation of the Solomon Mahlangu Campus project, it aligns with the multi-unit concept, where each unit inherently possesses its own design and technology. Consequently, a universal change in technology for the entire system is not preferred rather adjustments may be made at the level of individual units. This perspective is an integral part of the technology alternative proposed for the Solomon Mahlangu Campus within the broader context of the Environmental and Social Impact Statement for the development of academic and Student hostels and the remodelling of warehouses at the Campus.

6.7.5 Alternative Energy Sources

The main source of energy for the university is Electricity, supplied by the national grid. For the proposed infrastructure, Sokoine University of Agriculture considered three alternative sources of energy namely, power from TANESCO, diesel power generators and solar energy.

- ***Alternative one - Electricity:*** 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.
- ***Alternative two - Diesel generators:*** These utilize fossil fuels, which tend to emit greenhouse gases especially when operated for a long time. As such, diesel generators are used as standby power supply during outages.
- ***Alternative three - Solar energy****:* the last alternative considered was the installation of solar panels to harvest solar energy. It is intended that the solar energy be used for lighting within the buildings. It is also intended to install solar lights in various locations along the streets.

Conclusions: an evaluation of the three alternatives based on capital costs, availability of adequate supply, reliability, and environmental protection revealed that at least three options could be used together. Therefore, it is planned to connect the proposed infrastructure to electricity from the National grid as a basic power supply.

However, since some machines and Laboratory equipment require high voltage, which could not be supplied by solar energy, standby generators will also be provided, especially for the Laboratories.

6.7.6 Water supply Alternative

Alternative one: Water Supply (surface water) from the operating water utility company

Morogoro Water Supply and Sanitation Authority (MORUWASA) is the leading water supplier at Mindu Ward. MORUWASA water supply network is near the proposed site, and therefore can guarantee reliable, clean, and safe water supply to the proposed Solomon Mahlangu Campus. This water can be used during construction and can be safe to use for other domestic and office activities.

Alternative two: Rainwater Harvesting

The project considered rainwater-harvesting potential as alternative source of water. It is proposed to harvest rainwater from both roof and land catchment. It will entail the design of rainwater harvesting system and underground water storage tanks. Although this may demand more investment (capital), its operation costs are relatively low. Rainwater harvesting is one of the best ways to reducing surface runoff and soil erosion.

Conclusion: The University opted to use a combination of two water sources, namely, piped water supply from MORUWASA, and rainwater harvesting. MORUWASA water although relatively expensive, it is of most reliable quality. Therefore, MORUWASA water will be used for domestic purposes and in the running of Laboratory. MORUWASA water will be complimented by rainwater, which will be used for cleaning and gardens maintenance.

6.7 Impacts Assessment and Evaluation

The identified impacts above have been subjected to assessment by using matrix method, where by two types of matrices where used. These include the Impact Categorization Matrix (ICM) and Impact Evaluation Matrix (IEM)

The ICM has been used to categorize impacts according to environmental components (biophysical and socio economic) that are likely to be affected, and IEM was used for determination of the significance of impacts.

The significance of impacts was based on the following factors.

- **Type of impact**- where positive or negative
- **Its effects**- Whether direct, indirect, or cumulative
- **Intensity**- whether low, medium, or high
- **Magnitude**- whether site specific, local, or regional
- **Duration**- whether short term, long term or permanent
- **Reversibility**- reversible or irreversible
- **Significance**- whether negligible, low, moderate, or high

As demonstrated in table below proposed SUA construction project is expected to have both negative and positive impacts with minor, moderate and major significance during mobilization, construction, and operation phase.

The results of the assessment indicate that most of the impacts are negative, indirect, have moderate intensity, site specific, short term, reversible and with low to medium significance.

Table 6.5: Summary of Impact Assessment

Impact	Category	Mobilization phase	Construction Phase	Demobilization Phase	Operation Phase	Decommissioning Phase
Employment Opportunities	**S**	+2	+2	0	+2	0
Increase Income to community around project site	**S**	+2	+3	0	0	0
Benefit to local suppliers of construction materials	**S**	0	+2	0	0	0
Increase Human Capital	**S**	0	+2	0	0	0
Population Influx (Labour Influx	**S**	0	-2	0	0	0
Air Pollution	**B**	0	-3	0	0	-3
Soil Erosion	**B**	0	-2	0	0	-2
Vegetation Clearance	**B**	0	-1	0	-1	-1
Increased risk of GBV, SEA and sexual harassment	**S**	0	-2	0	0	0
Solid waste generation	**B**	0	-2	-2	-2	-2
Liquid waste generation	**B**	0	-2	0	0	0
Generation of Hazardous waste	**B**	0	-2	0	-1	-2
Noise and Vibration pollution	**B**	0	-2	0	0	-2

Soil and water Quality Contamination	**B**	0	-2	0	0	0
Land Degradation from Extraction and use of Building materials	**B**	0	-2	0	0	0
Increased Sediment Load in Water bodies due to erosion	**B**	0	0	0	0	-1
Water pollution from salvaging and stockpiling	**B**	0	0	0	0	-1
Risk of Fire and Explosions	**S**	0	-1	0	0	0
Occupational Health and Safety Hazards	**S**	0	-2	0	-2	-2
Creation of Safety Risk to local people	**S**	0	-2	0	-2	-2
Disruption of traffic flow	**S**	0	-2	0	0	0
Risk of Infrastructure vandalism	**S**	0	-3	0	-1	0
Vegetation regeneration	**B**	0	0	+3	+3	+3
Restored Clean Site	**B**	0	0	+2	0	+2
Loss of income generation opportunities	**S**	0	0	-1	0	-1
Increased in Incidence of HIV/AIDS and STIs	**S**	0	-3	0	0	0

Loss of temporary employment	**S**	0	0	-1	0	-1

KEY

S	**Social-economic impact**	**B**	**Bio-geophysical Impacts**
0	**Negligible**	**+2**	**Moderate positive impacts**
-1	**Minor negative impacts**	**+3**	**Major Positive impacts**
-2	**Moderate negative impacts**	**-3**	**Major negative impacts**

Source: *Consultant's Analysis (May 2023)*

CHAPTER 7: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

7.1 Impact Management plan

The EIA guidelines define an Environmental and Social Management Plan (ESMP) as a report or document prepared by the proponent after conduction of ESIA study to present the case for the assessment of their proposal as part of environmental and social impact assessment process. The ESMP as presented in this chapter contains recommendations and costs estimates for mitigation measures designed to address the negative impacts of the proposed project. The ESMP provides a general outlay of the environmental and social aspects, potential impacts, mitigation measures, performance indicators, monitoring means and frequency, responsibility for monitoring and associated cost estimates.

The responsibility for the incorporation of mitigation measures for the project implementation lies with Supervising Engineer, who must ensure that the contractor implements all specified mitigation measures. In order for the contractor to conduct environmental management activities during construction, the contractor should draw up an environmental management plan of his/her own to show how she/he will address the mitigation measures during the construction period. The Supervising Engineer is responsible for assessing the contractor's environmental management plan.

The methodology utilized to formulate the Environmental and Social Management Plan (ESMP) encompasses a multi-step process. This involves identifying potential impacts, crafting targeted mitigation measures, evaluating their feasibility and costs, considering long-term benefits, and validating the approach through peer reviews and expert consultations.

The objectives of the ESMP are.

i. To bring the project into compliance with applicable national environmental and social legal requirements social policies and procedures and
ii. To outline the mitigation/ enhancing monitoring consultative and institutional measures required to prevent, minimize, mitigate, or compensate for adverse environmental and social impacts or to enhance the project beneficial impacts.

Various potential adverse environmental impacts associated with the proposed project have been identified, and an ESMP was developed to guide in mitigating the negative impacts. However, the implementation of some of the ESMP actions will require a response beyond the project level. The project implementing agency, the contractor, and the project engineer are required to identify the actions and coordinate the various stakeholders appropriately.

It is upon the project proponent (SUA) and the contractor to ensure that the proposals are adhered to. Table 7.1 below shows the anticipated impacts, proposed mitigation measures, the institutions responsible, period within the project life cycle when the action is to be undertaken, and the estimated possible cost of the action. Although the cost of ESMP implementation has been provided, future dynamics during project operation and decommissioning were a limiting factor and could not be well envisioned at this point in time. Therefore, measures have been proposed to capture the realistic costs during project operation and decommissioning phases.

7.2 Implementation 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 implement the ESMP during the construction period under close supervision of SUA Management.

During implementation, the SUA Estate department shall be responsible for:

- Relocation of utility services and people is implemented and completed before the commencement of any construction works.

- Ensuring that SUA staffs and students are aware of the project implementation schedules, especially where construction might affect normal routine.
- Ensuring that the implementation of the ESMP is part of the Contractor's contractual obligations. SUA procurement entity will supervise the tendering process for all service providers.
- Ensuring that the ESMP is implemented, and approval conditions are observed during the mobilization, construction, and operation of the project.

During the Operation Phase, SUA Management will manage the building and implement the ESMP. When the project reaches a stage of decommissioning, the SUA shall prepare a decommissioning plan that will include environmental and social issues highlighted in the ESMP. Estimated Cost for implementing the mitigation measures are indicated in **Table 7.1** which makes a total cost of TZS **198,000,000**. The environmental and social costs estimates were developed based on the measured items in the contractual bill of quantities and experience of the Consultant on the projects of similar nature.

The following costs present one side of the safeguard's mitigation costs related to the proposed project and are estimated to cover the entire project construction period of 18 months from Mobilization, Construction, Demobilization and Operation phases.

Table 7.1: Proposed Environmental Social Management Plan (ESMP for planning phase, construction phase, demobilization phase and operation phase.

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
IMPACTS FROM PLANNING AND DESIGN PHASE				
POSITIVE IMPACTS				
1	Creation of employment	• Provide employment opportunities to local, unemployed yet willing to work hard. This will ensure that local people are more benefited out of the project. • Employment should be on equal opportunities for both genders. • Work with LGAs to make sure that the employment information reaches a wide range of surrounding communities	SUA /LGA	N/A
NEGATIVE IMPACTS				
1	Increased pressure on social services	• Limit the number of unskilled workers recruited from outside the direct vicinity as far as possible. • Explore alternative sources of domestic water, such as rainwater harvesting. • Link to mandated structures to support improvement of social and infrastructural services at the project site and communities surrounding project area.	SUA/ LGA	3,000,000
IMPACTS DURING CONSTRUCTION PHASE OF THE PROJECT				
POSITIVE IMPACTS				

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
1	Creation of employment	• Provide employment opportunities to local, unemployed yet willing to work hard. This will ensure that local people are more benefited out of the project. • Employment should be on equal opportunities for both genders. • Work with LGAs to make sure that the employment information reaches a wide range of surrounding communities	Contractor/ LGA	N/A
2	Increased Income to community around project site	• Ensure monitoring of Labour standards among contractors, sub-contractors, workers, and service providers • Qualified local vendors/ entrepreneurs should be given priorities to supply different goods and services to the project. • Encourage women to participate in food vending business	Contractor	N/A
NEGATIVE IMPACTS				
1	Air pollution (Fugitive Dust and Exhaust Emission)	• The contractor shall apply water spraying in dusty areas during the undertaking of construction works to minimize dust emission. • The contractor shall provide dust protection masks to the construction workers. • The contractor shall avoid as much as possible stockpiling of dusty construction materials or loose soils. • The contractor shall ensure that appropriate construction machines are used for construction work.	Contractor	7,000,000
2	Noise pollution and Vibration	• Noise levels along perimeters of the project shall be monitored and recorded periodically to ensure that activities at the site are not exceeding standards. • Workers will be provided with personal protective equipment's (PPE) such as earmuffs/ plugs during construction and especially workers working in noisy areas.	Contractor	7,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Vehicles and equipment will be maintained and serviced as required to ensure they do not generate excessive noise		
3	Soil Erosion	• The contractor shall implement erosion control measures as an on-going exercise. • During construction, the contractor protects all areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking any other measures necessary to prevent storm water from concentrating in streams and scouring slopes, banks, etc. • Any tunnels or erosion channels developed during the construction or maintenance period shall be backfilled and compacted and the areas restored to a proper condition. • Areas where construction activities have been completed and where no further disturbance would take place are rehabilitated through re-vegetation. • Ground clearance is minimized and if possible concentrated only to the specific foundation areas, and only when it is necessary	Contractor	6,000,000
4	Increased risk of GBV, SEA and sexual harassment	• Creation of partnership with local offices of the Ministry of community development, gender, women and special groups, NGOs, and community women groups to report workers misconduct and complaints /reports on gender-based violence, sexual exploitation and abuse and sexual harassment. • Regular training for workers on required lawful conducts in the project communities. • Gender based equal opportunities in all project phases. • All gender-based employment must consider Labour Act (18+ years and above) • The Consultant Engineer with Proponent shall strictly make sure the contractor adheres to Employment and Labour	Contractor/SUA	7,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		Relations Act No. 6 (2004) of United Republic of Tanzania)		
5	Generation of Liquid Waste (Human Sanitary Waste	• Contractor shall construct new sanitation facilities to use during construction. • All generated liquid wastes should be discharged at wastewater stabilization ponds located at Solomon Mahlangu Campus and those ponds required to be managed well. • The local government authorities shall ensure that sewage is appropriately treated before it is finally discharged into water bodies or open land, and that it does not increase the risk of infections or ecological disturbance and environmental degradation	Contractor	8,000,000
6	Generation of Solid Wastes	• Waste management on site shall be strictly controlled and monitored. Only approved waste disposal methods shall be allowed as prescribed in The Environmental Management Act, 2004, Part IX (a). This section gives mandate the local government authority to choose the best method of solid waste disposal for their areas of jurisdiction in consideration to climatic conditions, economic ability, interest of the community, environmental, hygienic, and social benefits, and availability of tipping sites. • All solid waste shall be disposed offsite at an approved dumping site located at Morogoro Municipality • Inert construction rubble and waste materials shall be disposed at an approved site. • Ensure that site personnel are instructed in the proper disposal of all waste. • Ensure that all facilities are maintained in a neat and tidy condition and the site shall be kept free of litter. Measures shall	Contractor	8,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse. • At all places of work provide litter bins, containers and refuse collection facilities for later disposal. • Solid waste may be temporarily stored on site in a designated area prior to collection and disposal. • Waste storage facility shall be covered, tip- proof, weatherproof and scavenger proof. The waste storage area shall be fenced off to prevent wind-blown litter		
7	Generation of hazardous Waste	• Separate all hazardous wastes from domestic waste during collection and transportation. • All vehicle and equipment mechanical repair activities shall be conducted on proper designated space within the project site or at a nearby garage. • All generated hazardous during construction of structures shall be temporarily stored at designated area at the site and then to be removed from site by a registered hazardous waste dealer. • Replaced oil and brake fluid to be properly managed in a designated area with primary and secondary containments prior to be disposed by an authorized dealer. • All storage containers will be properly sealed and monitored to avoid any possible Oil spillage and the use of oil kit	Contractor	4, 000,000
8	Soil and Water Quality Contamination	• All machinery must be carefully observed not to leak oils on the ground. • Maintenance of vehicles and machineries must be carried out in a designated areas where oils are completely restrained from reaching the ground.	Contractor	4,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Designated areas for maintenance should be covered to avoid storm from carrying away oils into the soil or nearby surface run off. • Wastewater from maintenance of vehicles and machineries should be properly disposed. • Good industrial hygiene practices shall be maintained. • Establishment of primary and secondary containments for waste oil storage before final disposal.		
9	Population Influx (Labour Influx)	• Establish transparent recruitment procedures to avoid loafers in form of job seekers. • Establish a recruitment policy that gives priority to local residents for less specialized service. • Recruitment procedures to be shared with the local authorities for further dissemination. • Opportunities for sub suppliers and sub-contractors should be awarded to local firms which in turn employ local Labour. • Conduct public health campaigns addressing issues of behavioural change, water and sanitation, communicable and non-communicable disease, HIV/AIDS	Contractor SUA	5,000,000
10	Vegetation clearing	• Confining the construction activities within the proposed project site could minimize the problem. • The Contractor shall avoid unnecessary clearing of vegetation beyond the proposed project construction area. • All cleared and compacted areas should be scarified and planted with natural vegetation to stabilize the soil. • The Contractor shall always ensure that the excavated areas are reinstated whenever possible. • Only indigenous plant species should be used for re-vegetation	Contractor Project Implementation Team	5,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
11	Child Labour , and forced Labour s	• Employment must consider Labour act (18+ Years and above) • Prohibit Students to engage in any contractor‘s activities. • Spread awareness among parents and surrounding communities. • Strict laws in place to prevent child, forced Labour s and human trafficking. • The Consultant Engineer with Proponent shall strictly make sure the Contractor adheres to Employment and Labour Relations Act No. 6 (2004) of United Republic of Tanzania	Contractor Project Implementation Team/ LGA$_S$	3,000,000
12	Risk of Construction Materials vandalism	• Sokoine University shall collaborate with prospective communities in creating community sense of ownership. • Security guards shall be present all the time for safety of all properties within the construction site.	Contractor Project Implementation Team	8,000,000
13	Unplanned Pregnancies	• Contractor shall put in place onsite rules and regulations that strictly prohibit Labourers engaging on sexual relations with teenagers. • Contractor and client should conduct awareness campaigns to primary school students in Solomon Mahlangu Campus on reproductive health. • Contractor shall provide counselling services on physical and psychological health and education. • Contractor shall put in place site specific Grievance Redness Mechanism for GBV and SEA actions occurred in working area or around the local community	Contractor	2,000,000
14	Public Health Hazards due to Wastes	• The contractor shall regularly conduct community consultations and engagement meetings with surrounding community so as to raise health and safety awareness to the people.	-Contractor SUA	4,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Establishment of temporarily and comprehensive sanitary facilities such as toilets, bathrooms during construction phase • Sorting of solid waste shall be implemented, and they should be stored in well labelled designated containers to avoid surface water contamination to nearby water sources through storm water overflow. • Ensures hygienic environment on site to avoid the outbreak of diseases such as cholera, dysentery etc.		
15	Creation of occupational health and safety risks to workers	• The Contractor to have a qualified health and safety officer onsite during construction phase, • Implementing good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths • Cleaning up excessive waste debris and liquid spills regularly • Training and use of temporary fall prevention devices, such as rails or other barriers able to support a heavy load, when working at heights • Training and use of personal fall arrest systems, such as full body harnesses and energy absorbing lanyards able to support heavy loads as well as fall rescue procedures to deal with workers whose fall has been successfully arrested. • 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. • Maintaining clear traffic ways to avoid driving of heavy equipment over loose scrap. • Use of temporary fall protection measures in scaffolds and out edges of elevated work surfaces, such as handrails and toe boards to prevent materials from being dislodged.	Contractor	6,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Wearing appropriate PPE, such as safety glasses with side shields, face shields, hard hats, and safety shoes • 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. • Ensuring the visibility of personnel through their use of high visibility vests when working in or walking through heavy equipment operating areas • 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. • Awareness campaigns /Education on HIV and STDs shall be provided to workers. • 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. • Emergency contact details in the event of an accident shall be provided. • Training all contractor staff in emergency planning and management; and • Developing a detailed health and safety plan and training all contractor staff on the plan. • Planning work site layout to minimize the need for manual transfer of heavy loads. • Implementing administrative controls into work processes, such as job rotations and rest or stretch breaks		

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
16	Disruption of Traffic Flow	• Only qualified drivers with appropriate driving license shall be engaged. • Induction course shall be done to all drivers prior starting driving. • Drivers shall be sensitized on maintainingspeed limits for main road and on accessroads/internal driveways. • Provision of road and safety signs shall be done on site and surrounding areas that are tobe followed by drivers and public in collaboration with local authority	Contractor	5,000,000
17	Possible Spread of HIV/AIDS, COVID-19, and Other Infectious Diseases	• HIV/AIDS testing shall be conducted, and counselling services provided by the contractor. • Workers will be sensitized on the spread of HIV/AIDS and STDs and on the usage of condoms and other protective measures. • Establishment and implementation of HIV/AIDS awareness, control, and prevention programs • Workers and the nearby community will be encouraged to use sanitizer and masks for protection against COVID19 infections. • The contractor shall put in place sign boards in all visible corners for raising awareness on prevention of HIV/AIDS and STIs • The contractor shall adopt and implement the COVID 19 contingency plan developed by Morogoro Municipal council	Contractor SUA project Implementation Team	5, 000,000
18	Impact on Climate change	• Equipment must be kept in good working order, and it is forbidden to utilize any equipment that produces an excessive amount of black smoke.	Contractor	3,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		• Implement energy-efficient technologies and practices in the design and operation of the academic building, Student hostel, and cafeteria to minimize carbon emissions. • Incorporate renewable energy sources such as solar, wind, or biomass to meet a portion of the energy needs, reducing dependence on fossil fuels and lowering greenhouse gas emissions. • Develop and implement climate change adaptation strategies to address potential climate-related challenges that may arise in the future, ensuring the long-term resilience of the campus. • Raise awareness among students, staff, and the local community about the project's climate impact and the importance of adopting sustainable practices in their daily lives. • Turn off engines to reduce idling. • Green spaces shall be maximized in project areas.		
IMPACTS FROM DEMOBILIZATION PHASE				
NEGATIVE IMPACTS				
1	Loss of employment	• Informing workers, the project duration when employing them • Educating the Labour force on the need to save part of their wages. • Paying severance benefit to all laid off workers according to the provision of the Labour laws	Contractor /Project manger	N/A Part of project cost

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
2	Dust and noise pollution from demolishing works.	• Employ dust control technologies such as water spraying systems to minimize the release of dust particles during demolition activities. This will help maintain better air quality. • Implement noise reduction strategies, including the use of sound barriers, noise-dampening equipment, and scheduling noisy activities during specific times to minimize disruption to nearby residents. • Provide workers with personal protective equipment (PPE) such as masks and ear protection to mitigate health risks associated with dust inhalation and prolonged exposure to high noise levels. • Conduct awareness programs for local residents, informing them about the demolition schedule, potential impacts, and measures being taken to mitigate dust and noise pollution. This foster understanding and cooperation • Establish a monitoring system to regularly assess air quality and noise levels. Implement a reporting mechanism to promptly address any deviations from acceptable standards, allowing for quick corrective actions. • Explore and utilize demolition methods that generate less dust and noise, such as mechanical methods that are more controlled and produce fewer airborne particles.	Contractor/Project manger	8,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
3	Loss of business opportunities	• Encourage collaboration among local businesses to create a network that can collectively address challenges and explore new business opportunities. This can foster resilience and community support. • Facilitate the establishment of support services for construction workers, such as designated areas for purchasing food from local entrepreneurs. This ensures that some business activities can continue despite the temporary disruptions. • Informing local traders of the project duration in time • Paying for all materials that were obtained on loan in time. • Incorporate youth who will participate for the project to attend training for the project. • Outsourcing some services for non-core activities for the college	Contractor Project manger	N/A
IMPACTS FROM OPERATION PHASE				
POSITIVE IMPACTS				
1	Provision of modern and adequate and affordable student academic facilities at SUA	• Sourcing funds for maintenance so that the university facilities should be in good condition and be in operation for a long time. • Providing equal enrolment opportunities for male and female students.	SUA	4,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
2	Creation of employment	• Employing more people from the communities surrounding the project area and other areas within the country for both unskilled and skilled jobs • Giving equal employment opportunities for both men and women	SUA	N/A
3	Increase in performance of students academically as most students will easily access campus facilities	• Sourcing funds for maintenance so that the academic building and Student hostel should be in good condition and be in operation for a long time	SUA	10,000,000
4	Improved access to social service by the local community	• Providing extra social services that can be accessed by the communities	SUA	3,000,000
5	Increase in economic activities.	• Sourcing funds for operation and maintenance cost for the students' academic and Student hostels to be in operation for a long time. • Traders from the project area to be given the opportunity to supply food stuffs for student meals.	SUA	5,000,000
6	Increase in revenue by government through taxes	• Remitting taxes to TRA from wages and service contracts in time	SUA	4,000,000
NEGATIVE IMPACTS				

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
1	Creation of public safety hazard due to falling of long buildings	• Regular maintenance of university buildings • Stabilize and secure structural bricks wall against leaning and bulging outwards/Inwards by using concrete columns. • Establishment of proper storm water drainage system to prevent soil erosion along the buildings	SUA	5, 000,000
2	Occupational Health and Safety Hazards to Workers during maintenance of the university buildings	• Skilled contractor shall be hired during routing building maintenance. • Provision of appropriate safety gears to protect construction workers from injuries caused by falling of objects e.g., Head injuries, etc	Contractor/ SUA	4,000,000
3	Surface Drainage	• Rainwater harvesting gutters and storage tanks should be installed to reduce the amount of rainfall reaching the surface. • Semi permeable materials should be used for construction of pavements. • After completion of construction, the proponent should embark on comprehensive landscaping to increase softscape cover on the plot.	SUA	4,000,000
4	Fire	• Hire competent and properly authorized electrical contractor to do the wiring and other electrical works. • Install fire alarm system for entire project. • Install smoke detectors in kitchens. • Installation of firefighting equipment following country Fire requirements. • Conduct regular firefighting drills within the site. • Develop and adapt an (fire) emergency response plan for the project during and occupation stage.	Proponent	8,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
5	Liquid Waste	• Construction of the wastewater system for disposal at sewerage. • The design of the internal sewerage system should consider the estimate discharges from individual sources and the cumulative discharge of the entire project i.e., it should have the capacity to consistently handle the loads even during peak volumes. • All drainpipes passing under building, driveway or parking should be of heavy-duty PVC pipe tube encased in concrete surround. All manholes on driveways and parking areas should have heavy- duty covers set and double sealed airtight as approved by specialists	Proponent	10,000,000
6	Increase in Energy Demand	• Put off all lights immediately when not in use or are not needed and use energy conserving electric lamps for general lighting. • Make use of alternative source of energy such as solar power. Solar panels proposed in the project should be fully utilized	SUA	10,000,000
7	Increase in water demand	• Install water conserving taps that turn- off automatically when water is not in use. • Encourage water reuse/recycling during occupation phases. • Roof catchments of building blocks should be provided with rainwater harvesting systems (gutters, down pipes, and water storage facilities) to enhance collection and storage of the resulting run-off. Such water can be used in watering flower gardens, general cleaning etc. • Provide notices and information signs to sensitize on means and needs to conserve water resource i.e., Keep/Leave the Tap Closed etc.	SUA	8,000,000
IMPACTS FROM DECOMISSIONING PHASE				

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
NEGATIVE IMPACTS				
1	Air pollution due to dust and exhaust emission	• Employ dust control technologies such as water spraying systems to minimize the release of dust particles during demolition activities. This will help maintain better air quality. • Provide workers with personal protective equipment (PPE) such as masks and ear protection to mitigate health risks associated with dust inhalation and prolonged exposure to high noise levels. • Conduct awareness programs for local residents, informing them about the demolition schedule, potential impacts, and measures being taken to mitigate dust pollution. • Establish a monitoring system to regularly assess air quality. • Implement a reporting mechanism to promptly address any deviations from acceptable standards, allowing for quick corrective actions. • Explore and utilize demolition methods that generate less dust, such as mechanical methods that are more controlled and produce fewer airborne particles	Contractor	3,000,000
2	Noise pollution from demolishing works	• Personal protective Equipments (PPE) shall be properly selected, used and maintained to minimize noise. • Standard operating procedures will be developed and strictly observed. • Light machineries shall be used during demolition activities to reduce noise. while operators/ workers in various sections with significant noise levels shall be provided with PPE for noise protection		2,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
3	Water pollution from Stockpiling and hydrocarbons	• All excavated unwanted materials will be stockpiled away from drainage features. • Prior instructions to contractor on handling of hazardous waste such as oils, lubricants and gasoline during decommissioning process will be provided. • A site waste management plan shall be prepared by the contractor prior to commencement of the works. This will include designation of appropriate waste storage areas, collection and removal schedule, and a system for supervision and monitoring. • All refuelling for vehicles will be done on dedicated area that has been provided with concrete structure to retain any leaks. • Emergency response measures will be put on site in case of accidental oil spill that will include having absorbent materials and sand kits	Contractor	2,000,000
4	Traffic accidents	• Develop a comprehensive traffic management plan that includes designated routes for transporting demolition materials. Ensure coordination with local authorities to minimize disruption and avoid congested residential areas. • Schedule transportation of demolition materials during off-peak hours to minimize the impact on regular traffic flow. This can help reduce the likelihood of accidents and mitigate congestion. • Employ escort vehicles to accompany transportation trucks, providing advance notice to other road users. Clearly mark the vehicles carrying demolition materials with appropriate signage to alert drivers and pedestrians • Conduct public awareness campaigns to inform residents along the transport route about the decommissioning activities.	Contractor	2,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
		Provide information on alternative routes and the timing of material transportation to minimize inconvenience. • Ensure that workers involved in transportation activities are adequately trained on safety protocols. Emphasize the importance of adhering to traffic regulations and maintaining vigilance during transportation. • Develop a robust emergency response plan in case of accidents. This includes training personnel on immediate response measures, establishing communication protocols with local emergency services, and providing necessary equipment for rapid intervention. • Implement a system for regular monitoring of transportation activities, with mechanisms for reporting any incidents or near misses. This allows for proactive identification of potential issues and prompt corrective action		
5	Occupational Health and Safety Hazards to workers	• Comprehensive Decommissioning Plan shall be established to guide prior to undertake any activities. • Workers at the site should use appropriate protective gears such as boots, respiratory masks etc. • The contractor shall insist on their workers to use the gears properly. • Fatal accidents shall be reported to OSHA within 24hrs of occurrence so as to prevent further recurrences by doing investigation. • All respective government authorities should be involved prior to decommissioning activities		2,000,000

Item	Identified Impact	Mitigation & Enhancement Measure	Responsible Institution	Relative cost (TZS)
6	Loss of Aesthetics due to Abandoned Project Facilities	• The contractor shall ensure that demolished waste is removed from the site and properly disposed of in designated location. • The site will be rehabilitated to its original state, whereby will be handled over to project proponent who is the owner of the plot. Before handling over, the proponent will conduct internal environmental audit and thereport will be submitted to NEMC for approval		2,000,000
7	Loss of Employment due to Closure of the Project	• Transfer of permanent employees to other Government institutions • Provision of training that can make temporary workers competent for jobs elsewhere shall be provided. • Ensuring that Social Security contributions are remitted to the applicable fund at the right time. • Create a severance package in the event of abrupt closure of the facility. • Adapt a project – completion policy: identifying key issues to be considered. • Assist with re-employment and job seeking of the involved workforce. • Compensate and suitably recommend the workers to help in seeking opportunities elsewhere. • Offer advice and counselling on issues such as financial matters potential dust area within the project area		2,000,000
TOTAL				**198,000,000**

7.3 Disaster Risk Management plan

7.3.1 Disaster risks at SUA and level of management

Sokoine University of Agriculture is vulnerable to range of disaster risks, which pose risk to the students, teacher, and other staffs. SUA is vulnerable to the fire outbreak, diseases outbreak, traffic accident, robbery, ICT appliance damage and data loss, and chemical explosion. Other disaster risks include terrorist attack, ammunition accident, earthquake, and tsunami. The current level of disaster risk preparedness and management for Sokoine university of Agriculture is moderate because equipment (Measures) is in place but not enough to accommodate the whole university campus (Table 7.2).

Table 7.2: Disaster risk and management level

Disaster risk	Standard practice	Management level	Remarks
Fire Outbreak	Fire fighting	• Fire extinguisher • Fire hose reel • Fire alarms • Smoke detector	Average preparedness
	Assembly points	Present	Average preparedness
	Emergency exit	Present	Average preparedness
	Escape route	Absent	Poor preparedness
Disease Outbreak	Dispensary	Present	Good preparedness
	First aid kits	Present	Average preparedness
	Ambulance	Present	Good preparedness
Traffic Accidents	Traffic signs	-Zebra -speed limit	Average preparedness
	Car parking	present	Average preparedness
Robbery	Security guards	Present	Good preparedness
	Fence	Present	Average preparedness
	Identification card	present	Average preparedness
ICT appliance damage and data	Generators	Present	Average preparedness

7.3.2 Disaster Risk Management plan

The disaster risk management plan is intending to provide efficient and effective operational procedures that will allow the university to save lives, minimize injuries, protect property, environment and preserve functioning campus in times of natural and man-made/technological hazards. In addition, it can be used to control hazards so as reduce the vulnerability, to reduce the risk and the overall management of disaster risk to the SUA community. The plan provides the basic information on the action to be taken during the pre-disaster, the disaster phase (during the event) and post disaster phase. The plan describes the emergency and assigns the

responsibilities for various emergency tasks, specifically to WHO does, WHAT, WHEN AND HOW

7.3.3 Assumption made in the plan

The disaster risk management plan considers the following assumptions.

i. SUA will continue to be exposed to the impact of those Disaster risks identified and as well as others that may develop in the future because of climate variability, climate change and proposed future expansion in infrastructure.
ii. The possibility arises that an emergency or disaster may occur at any time.
iii. A major disaster or emergency can cause numerous losses of life and injuries, property damage, and disruption of normal life support.
iv. External services and resources may be necessary if an emergency exceeds the university capability.
v. Departments and agencies from the local government, state, and national levels may provide help to protect lives and property.
vi. SUA will follow all state and local regulations for safety plan and procedure review and inspection.

7.3.4 Health and Safety Management plan

Health Safety Management Plan (HSMP) helps in implementation, maintaining and continually improve Health and Safety management system in accordance with the requirements of Occupational Health and Safety Assessment Series (OHSAS) standards. It is therefore important that this is reflected in the university operations and responsibilities of every level of management within an organization. This plan shall help to implement the Safety and Health direction of construction of studios, classrooms, Laboratories, workshops, and lecture theatre buildings. It clearly states the requirements of donors, legislations, suppliers, management and employees in Safety and Health management.

a) Responsibilities

i. **SUA Management:** The management is committed to the principle of safe working and desires that on no account should any person ever be exposed to risk.
ii. **Supervisors:** It is the responsibility of the Supervisors to review and ensure awareness of emergency procedures among all the personnel.
iii. **Employees:** It is also the responsibility of all employees to continually familiarize themselves with the assembly procedures for their relevant areas of work.
iv. **General:** Any information being relayed about an emergency shall be clear and precise giving the exact location, the nature of the emergency and the seriousness of the emergency and contact numbers and names.

b) Training

Suitable training will be provided to all personnel during various stages of the project and when new work force is added.

c) Awareness

Necessary posters and boards announcing action in case of an emergency will be put up at prominent places, and at all assembly areas.

d) Emergency plan

All actions will be coordinated with the overall emergency plan operated by the Supervisor. The General Manager is overall responsible to coordinate all emergency procedures along with

the Health & Safety Manager. All emergency telephone numbers and contact names shall be posted at strategic points on site.
Subsequent actions as listed below will be taken as in instruction from the Supervisor.

i. Stop all work and report to the nearest evacuation area/ assembly area and await further instructions.
ii. Stop all equipment and vehicles.
iii. Contact the Health & Safety Manager and relay message to the Supervisor and General Manager.
iv. Ensure all personnel are aware of the emergency.

e) Assembly Point

In an emergency all personnel are to proceed in an orderly manner to the nearest safe assembly point.

f) Head Count

The Supervisor shall take a head count and check all employee's area at the assembly point. He /She shall also inform the General Manager of the result of the head count.

g) Rescue Team

For missing personnel, a rescue team will be formed in consultation with the Engineer and depending upon the type and status of emergency, all efforts will be made to rescue the missing personnel.

h) Fire Fighting

In case of a fire, after the alarm has been sounded, all efforts will be made to put off the fire by use of fire extinguishers, fire hydrants, hoses etc. until more professional help come.
Fire extinguishers will be available on site at strategic locations near stores, laydown area, and electrical distribution cabinets.

i) All Clear

Normal work will be resumed only after all clear signal is received from the Supervisor.

CHAPTER 8: ENVIRONMENTAL AND SOCIAL MONITORING PLAN

8.1 Introduction

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 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 implementation methods and techniques.
- **Compliance monitoring**: takes the form of periodic sampling and continuous measurement of relevant parameter levels for checking compliance with standards and thresholds – e.g., for waste discharge, air pollution.
- **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 7.1 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 developer are to be included in the project cost.

8.2 Health and Safety Monitoring

This shall involve careful observation of health and safety regulations and guidelines. Detailed HS plan has been included in appendix.

8.2.1 Construction phase:

- The safeguard personnel of the contractor shall monitor availability and use of safety gears including helmets, coats, shoes, gloves, and dust masks to protect them from exposure to various products, etc.
- The contractor shall hire a health specialist to monitor measures in place for prevention of the transmission of communicative diseases between the local community and construction workers. Monitoring may include conduction of voluntary HIV/AIDS testing and checking availability of free condoms at the construction site.
- Monitor availability of adequate First Aid facilities and a trained first Aider on site.

8.2.2 During the operation phase:

- SUA shall monitor availability and adequacy of safety equipment such as fire alarms and fire extinguishers provision in all buildings.
- Monitor functioning of constructed sanitation facilities, and waste management facilities; and Monitoring safety environment in the Laboratory (safe use of chemicals, use of protective gears while in the lab, storage of chemicals and so forth).

8.3 Cumulative impact monitoring

This development over time will result in a variety of changes. The most evident of these changes may be:

- This development will see a significant change in the land cover and landscape of the area; and
- The general culture of the area would change. A more likely result is a formal urban setting with the associated physical infrastructure and amenities.
- SUA shall monitor landscape and cultural changes with time, in order to device management mechanism.

8.4 Monitoring of key environmental and social parameters

Monitoring of all key environmental and social parameters that could potentially lead to an impact will be required to analyse the impacts of construction and operation on the environment. Therefore, self-monitoring and reporting techniques will be adopted to carry out monitoring. SUA Management shall be responsible for monitoring of residual impacts. The EIA has proposed monitoring techniques, monitoring frequency and methodology of selected parameters. Monitoring costs have also been provided.

An outline of the monitoring programs proposed for the construction and operation phases, is presented in Table 8.1. Monitoring process will enable SUA to understand how environmental performance will change over time and facilitate improvements to the Environmental and social management system.

8.5 Monitoring Responsibility

The Ministry of Education, Science and Technology has established a dedicated Project Implementing Unit (PIU) consisting of its own personnel for the implementation of all supported subprojects under HEET. The PIU shall hire an independent firm which have a Supervision Engineer, Environmental Specialist, Social Specialist, Occupational Health, and Safety Specialist to monitor and review on site implementation of the Environmental and Social measure. The overall activities of PIU will be supervision of implementation, monitoring and reporting, review of project implementation reports and reporting to MoEST.

The monitoring of environmental and social parameters during the construction phase shall be carried out by the Contractor's safeguard team. (i.e., Environmental, social and safety experts), under the supervision of the Consultant's safeguard team. They will conduct mitigation monitoring as part of the regular works inspections. The contractor shall appoint an Environmental, Social, Health and Safety Officer to oversee the E&S aspects. The EHS officer of the contractor will participate in the joint site inspections with the PIU and Environmental Supervision Engineer/consultant; A monthly Environmental and Social Compliance Report will be produced following each inspection and will incorporate any actions identified during inspections and site meetings. The inspection report will summarize the status of the site's compliance and include photographic records if appropriate.

The responsibility for mitigation and monitoring during the operation phase will lie with the SUA Estate Department. SUA shall be responsible to produce reports on environmental and social compliance during operation, as part of their annual progress reports and annual EHS monitoring/Audit reports. Depending on the implementation status and sensitivity of any emerging issues, OSHA and /or NEMC will perform annual EHS reviews in which environmental concerns raised will be reviewed alongside project implementation.

Table 8.1: Proposed Environmental and Social Monitoring Plan (ESMP) for mobilization/planning phase, construction phase, operation phase and decommissioning Phase

Significance Impacts	Parameter to be monitored	Monitoring Frequency	Sampling Area	Measurement unit	Measurement methods	Target level/standards	Responsible institution	Estimated cost (TZS) per annum
MOBILIZATION AND CONSTRUCTION PHASE								
Noise Pollution	Noise level	Quarterly	Project site	dBA	Noise Detectors/Sound Meters	75dbA daytime	Contractor Consultant	5,000,000
Vegetation Clearance	Presence of Natural/exotic vegetation.	Before and during construction phase	Project site	Land area cleared.	Physical observation	No widespread destruction of vegetation around the project areas	Contractor Proponent	2,000,000
Population Influx	Number of new job seekers	Monthly	Project site and project Area	Number of cases	Recording	Zero Impact	Contractor	2,000,000
Employment and Gender Based Violence (GBV)	Number of cases reported Number of workers trained on GBV and SEA	Daily	Project site	Number of cases	Reports/ Documents Review/Observations	Zero cases	Contractor Proponent	3,000,000
Child Labour and forced Labour	Number of incidences recorded	Daily	Project site/surrounding community	Number. of cases	Reports/ Documents Review/Observations	Zero cases	Contractor	3,000,000

Significance Impacts	Parameter to be monitored	Monitoring Frequency	Sampling Area	Measurement unit	Measurement methods	Target level/standards	Responsible institution	Estimated cost (TZS) per annum
Unplanned Pregnancies	Number of incidences recorded and reported	Daily	Project site/ surrounding community and SUA students	Number. of cases	Reports/ Documents Review/Observations	Zero cases	Contractor	2,000,000
Air pollution due to dust emission from transportation activities and earth works	Particulate matter (PM10, PM2.5)	Daily	Established monitoring stations	mg/m^3	Dust Track Aerosol Particulate Monitor	PM10 < 0.05 PM2.5 < 0.025	Contractor	5,000,000
Air pollution from exhaust emission during transportation and machinery operating on site	SO_2, CO_2, NOx, CH_4	Daily	Established monitoring stations	mg/Nm^3	Portable detector tubes	$SO_2 < 0.5$ $CO_2 < 500$, NOx < 0.2 $CH_4 < 20$	Contractor	3,000,000
Water pollution due to domestic activities	BOD, Total Coliform (TC)	Daily	Nearby water bodies	Mg/l, Counts	Laboratory Analysis	BOD<30, TC<100 counts	Contractor Proponent	2,000,000
Public health hazards due to poor management of Solid waste	Solid Waste/Litter	Weekly Inspection	Project area and surrounding environment	None	Recordings/ Site inspection & observations	Zero Impact	Contractor	2,000,000

Significance Impacts	Parameter to be monitored	Monitoring Frequency	Sampling Area	Measurement unit	Measurement methods	Target level/standards	Responsible institution	Estimated cost (TZS) per annum
Soil Erosion	Number of Trees Planted and Landscape	Quarterly	Project site	None	Site Inspection	Zero Impact	Contractor	1,000,000
Traffic Accidents	Number of Accidents reported	Daily	Project Site	Number of cases	Recording/ Inspection/ Observation/	No Accident	Contractor Proponent	2,000,000
Food Scarcity and price increase	Number of households with food insecurity	Monthly	Project site and surrounding community/ward	Number of cases	Reports and Survey	No significant cases related to food Scarcity	LGA and SUA	
Occupational Health and safety hazards	PPEs, Trainings, Safety Procedures	Daily	Project site	Number of cases	Recordings/ Inspections Observation and Interviews	No significant cases related to health and safety risks. ISO 45001	Contractor Proponent	2,000,000
HIV/AIDS Infections	Number of infected persons	Quarterly	Project site	Number of cases	Affected People	No new cases of HIV / AIDS and STI 's infections	Contractor	1,000,000
Employment Opportunities	Number of local employments	Monthly	Project Site	Number of local employments	Employed people	100% of unskilled Labourers from surrounding community	Contractor/LGAs	1,000,000

Significance Impacts	Parameter to be monitored	Monitoring Frequency	Sampling Area	Measurement unit	Measurement methods	Target level/standards	Responsible institution	Estimated cost (TZS) per annum
Risk of Construction Materials vandalism	Presence of Security Guards	Daily	Project Site	The number of security personnel onsite	Site Inspection	No significant cases related to vandalism	Contractor	N/A
Waste generation	Solid waste	Weekly	Project site	Kg of waste	Weight	Zero adverse impact and adequate volume of solid waste is reused or recycled/ TZS 1117:2009	Contractor	3,000,000
	Liquid waste			Liters of waste	Volume			
OPERATION PHASE								
Air Pollution	Ambient air quality (PM10 and PM 2.5)	Quarterly	Project site	mg/m³	Dust Track Aerosol Particulate Monitor	PM10 < 0.05 PM2.5 < 0.025	Contractor Contractor	5,000,000
	Concentrations of gaseous pollutants including SO_2, CO_2, NOx, CH_4			mg/Nm³	Portable detector tubes	SO_2 < 0.5 CO_2 < 500, NOx < 0.2 CH_4 < 20		

Significance Impacts	Parameter to be monitored	Monitoring Frequency	Sampling Area	Measurement unit	Measurement methods	Target level/standards	Responsible institution	Estimated cost (TZS) per annum
Waste Generation	Solid waste	Weekly	Project site	Kg of waste	Weight	Zero adverse impact and adequate volume of solid waste is reused or recycled/ TZS 1117:2009	Contractor	3,000,000
	Liquid waste			Litres of waste	Volume			
Land and Water contamination		Quarterly	Project site and vicinity	Number of Cases	Laboratory analysis	Zero Cases	SUA	2,000,000
Traffic Flow/ accidents.	Number of Accidents/ incidents	Monthly	Project area	Number of accident and incident	Review of accident & incident records /	Zero accidents/incidents	SUA	2,000,000
Population Influx	The proportion of the local population in the overall project	Monthly	Project site and project Area	Number of cases	Recording	Number of local employees and Number of admitted Students	SUA	2,000,000
Noise pollution	Noise levels	Annually	Project Site	dBA	Noise Detectors/Sound Meters	Daytime <75dBA	Proponent	1,000,000
Occupational Health and Safety Hazards	Number of incidences	Monthly	Project Site	N/A	Number of PPEs distributed. Documents review, visual, interview	No significant cases related to health and	Proponent	2,000,000

Significance Impacts	Parameter to be monitored	Monitoring Frequency	Sampling Area	Measurement unit	Measurement methods	Target level/standards	Responsible institution	Estimated cost (TZS) per annum
						safety risks ISO 45001		
Fire Hazards	Measures in place e.g. fire alarms, fire. detectors, firefighting equipments	Monthly	Project Site	N/A	Inspection/observation, document review	Zero accident	Proponent	2,000,000
DECOMMISSIONING PHASE								
Noise Pollution	Noise level	Quarterly	Project site	dBA	Noise Detectors/Sound Meters	Daytime noise levels < 60 dB • Night-time noise levels < 50 dB	Contractor	5,000,000
Air pollution due to dust emission	Particulate matter (PM10, PM2.5)	Daily	Established monitoring stations	mg/m³	Dust Track Aerosol Particulate Monitor	PM10 < 0.05 PM2.5 < 0.025	Contractor	5,000,000
Waste Generation	Solid waste	Weekly	Project site	Kg of waste	Weight	Zero adverse impact and adequate volume of solid waste is reused or recycled/ TZS 1117:2009	Contractor	3,000,000
	Liquid waste			Liters of waste	Volume			

Significance Impacts	Parameter to be monitored	Monitoring Frequency	Sampling Area	Measurement unit	Measurement methods	Target level/standards	Responsible institution	Estimated cost (TZS) per annum
Water Pollution	Physical and Chemical parameters	Monthly	Nearby water bodies	Mg/l	Laboratory analysis	Applicable standard limits	Contractor	2.000.000
Occupation Health and Safety risk	Number of incidences	Monthly	Project Site	N/A	Number of PPEs distributed. Documents review, visual, interview	No significant cases related to health and safety risks ISO 45001	Proponent	2,000,000
TOTAL COST								**75,000,000**

CHAPTER 9: COST BENEFIT ANALYSIS OF THE PROJECT

9.1. Introduction

This chapter presents the cost benefit analysis (CBA) of the proposed new building structures (academic building and Student hostel) to be built at Sokoine University of Agriculture, Solomon Mahlangu Campus together with warehouses to be remodelled. The estimation of cost benefit analysis reflects more than 100 years of the project design period. The details are not disclosed since they are still confidential in accordance with the Tanzania Procurement Act that prevents a detailed cost benefits analysis to be undertaken before tendering process. For that case, presented costs in this section are indicative and elementary qualitative description of the costs and benefits. The total operation cost has considered the indicative costs for implementation of mitigation measures as well as the cost of monitoring. However, total cost of the project will be stated later as project tendering are still in process.

9.2. Benefits related to the project

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

Direct benefits: The proposed project will create many job opportunities, good aesthetic view, good environments for students in their studies, entrepreneurial opportunities to the surrounding community as well as increase the number of skilled Labourers due to increase in the enrolment and presence of conducive environment for self-studies. Most of the non-quantifiable impacts are directly benefits to the project receptors.

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

9.2.1 Benefits to SUA

The proposed project has positive impacts to SUA since its benefit is a lifetime process throughout the project life span. The completion of these projects will be one of the pooling factors for increased number of students' enrolment thus in monetary cost its value has potential to increase annually. SUA financial capacity and sustainability are going to improve by far. Further, the improved financial standing is not only going to promote enrolment but also good governance and efficient running of the University. Teaching, Research and Public Service and its envisioned center of excellence in knowledge and dissemination to a wide spectrum of beneficiaries at national and regional levels are ones among the benefits. The project will also have several intangible benefits to SUA which include improving the university's image.

9.2. 2 Benefit to the Neighbourhood

The proposed construction of new buildings meant to increase the capacity of SUA in infrastructure. This improvement may lead to the increase in staff requirement that is technical, administrators and academicians. During and after construction phase the project is going to provide additional employment opportunities for people surrounding SUA campus related to operation and maintenance. However, non-skilled Labourers will benefit from the daily wages. University will also create business opportunities in vicinity of the campus. Business opportunities will be supporting government initiatives to create employment opportunities for Tanzanians as advocated by the current Government. Notwithstanding that now salaries are yet to be specified, it is envisaged that from employment, workers will get incomes, which will improve quality of their lives and perhaps improve their lifestyles. However, employment opportunities and income from salaries provided will extend beyond the workers and benefits many other people including dependents.

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

i. Utilization of locally available resources.
ii. Revenue to the Government will increase through payment of the various taxes (indirect and direct).
iii. Boosting the infrastructure and economy of the country and Morogoro Municipality in particular Mindu ward in which the project is located.

9.2.3 Benefit to the Government

The project will benefit the government in different aspects. These includes budget saving due to the relatively decrease in SUA financial dependence on the government. It is anticipated that during the operation phase the project will improve SUA financial capacity and sustainability resulting from project earnings. For that case, the government will have the opportunity to use the share of the budget which was supposed to go to SUA for other government development plans. Further the ability of SUA in contributing towards the realization of National Policies such as Education Reforms through expansion of enrolment of students into various degree programs is going to increase. The increase in the number of enrolments mean the increase in financial capacity of the institution.

However, the government will benefit from the increased number of experts in priority discipline with different disciplines that will be graduating from SUA. This will create the potential of the government to use internal resources (home country experts) in different future projects rather than contracting foreign experts.

9.3 Costs related to the project

The estimated costs for implementing enhancement measures, impact management as well as monitoring process as outlined in Chapters 7 and 9 is about TZS **183,000,000** and **75,000,000** per annum. The estimated costs for mitigation do not include the environmental costs, which could not be accurately calculated. Since some of the impacts will only to be realized during construction phase, the costs for these will also be short term, especially if mitigation measures are fully implemented. The construction costs for all the projects are detailed in Bills of Quantities.

9.4 Project cost benefit analysis

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

CHAPTER 10: DECOMMISSIONING PLAN

10.1 Introduction

Decommissioning forms the end part of the project life cycle. Environmental Impact Assessment regulation (URT, 2005 and its Amendments of 2018 direct developers to address the implications of the decommissioning process as part of the ESIA process.

The proposed project is not expected to end at near future due to its nature and inelasticity. However, if decommissioning become inevitable due to any causative factors, then the closure Plan must be abided. During decommissioning of the project, various disturbances that will have been caused in the area need to be addressed quickly and efficiently in order to minimize the possible impacts that could continue to happen even after closer of the project.

It is also important, that all remediation plans suggested are conducted by taking into consideration the needs for sustainable development of the project area. In order to achieve these consultations with various stakeholders during preparation of Closure Plan (CP) will be undertaken. It is the requirement of the Environmental Impact Assessment and Audit Regulations, 2005, as amended 2018 that the proponent prepares the closure plan in order to indicate how impacts will be dealt with, including cost of mitigation measures. The Closure Committee of these university facilities involving local and district levels will be established by the proprietor through consultations with relevant authorities.

It is the closure committee that will review from time to time the implementation of the Plan and set priorities of the future use of various infrastructures. The choice of whether the project site should be demolished or renovated or the project site should be replanned for other development projects or used by locals for other purpose and other closure priorities will be decided by the closure committee.

10.2 Preliminary Decommissioning and Closure Plan

The closure committee will be chaired by the council director in collaboration with local leaders including WEO and MEO. Members of the committee will be selected through consultations with the local authorities and relevant government institutions i.e., NEMC, TANESCO, OSHA, and Fire and Rescue offices. This is the set up and implementation procedure of the closure plan that will be followed as part of the ESMP. The Preliminary Decommissioning and Closure Plan (Table 12.1) objectives are set as follows:

i. The closure plan must limit the potential adverse effects of the closed projects site on the receiving environment and that the quality of life of the surrounding communities is not compromised after operation of the university buildings.
ii. The rehabilitation of the area in its natural appearance and closure plan complies with current regulatory requirements and must facilitate the attainment of site relinquishment after demolition of successful implementation of the closure measure stipulated in the plan.
iii. The decommissioning and rehabilitation are carried out in a planned sequential manner consistent with basic practice.
iv. That as far as is practicable the post project operation landform is safe stable non erodible, and it is integrated into the surrounding environment.
v. Prevent or minimize adverse long term social and environmental impacts of the post project site.
vi. Create a self-sustaining ecosystem or ultimate land use based on agreed set of the objectives.

vii. Enable all stakeholders to have their interests considered during project closure.
viii. Ensure the process of closure occurs in an orderly cost effective and timely manner.
ix. Ensure that the cost of closure is adequately represented in proponent's budgets.
x. Ensure clear accountability and sufficient resources for the implementation of the closure plan.
xi. Establish appropriate indicators for evaluating success of closure process. The achievement from this process will justify relinquishment of the project license.

The Proponent will participate in rehabilitation for disturbed and impacted areas depending on their location, the type of the impact and the proposed end land use. The closure plan identifies those actions that will be undertaken upon completion of the project activities and subsequent decommissioning of the site. This include the removal of structures; the disturbed landscape and vegetation will be restored to make it compatible with future use.

The Proprietor understands the importance for planning for decommissioning and closure early to ensure that the final landforms are properly designed and able to function as ecological systems in the long term and reach a point where the project proponent has met agreed completion criteria to the satisfaction of the Government and surrounding community.

Project decommissioning has five phases:

i) Pre-removal monitoring.
ii) Permitting.
iii) Interim protective measures.
iv) Project removal and associated protective actions.
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 three months). The fourth phase of the project removal and associated protective actions will take place six months after closing business. The fifth phase will begin after total removal and due to nature of the project (medium scale, with relatively moderate impacts) removal and continue for at least three months. The description that follows outlines the activities that will occur in each phase:

1. Pre-removal monitoring: Pre-removal monitoring includes environmental and socio-economic status of the project site and the surrounding. This monitoring is essential to identify if there is any environmental or social liability which need to be settled before the permit for closure is given. This period will also be used to inventories all assets and facilities that need to be disposed of and to prepare a final decommissioning plan for approval by NEMC.

2. Permitting: Proponent shall obtain all permits required to undertake removal of the Project. This basically will include NEMC, Morogoro Municipal Council etc.

3. Interim Protective Actions: This will take care of any interim protective measure that needs to be implemented to protect human health and environment, if any.

4. Project Removal: As noted above, the removal of the project will be completed within three months.

5. Post-Removal Activities: Post-Project removal monitoring will continue for three months

The Proponent shall remove the Laboratory equipment, rubbles from demolition and ancillary structures safely and in a manner that minimizes environmental impacts e.g., dust pollution, disposal of any hazardous material, providing protective gear to decommissioning personnel

etc; satisfies its obligations under the EMA Cap 191 and World Bank ESF; restores the site to a condition suitable for other use; and pays all dues (government, suppliers etc)

CHAPTER 11: SUMMARY AND CONCLUSION

11.1 Summary

Environmental and Social Impact Assessment (ESIA) for the proposed construction project at Solomon Mahlangu Campus was conducted to evaluate the potential environmental and social consequences of the proposed project. The assessment considered various aspects such as land use, air quality, noise, water resources, biodiversity, cultural heritage, and community well-being.

During the ESIA process, a comprehensive analysis of the project's potential impacts was undertaken. It was found that the construction and operation of the new buildings and renovated agro processing unit would have both positive and negative effects on the environment and local communities.

On the positive side, the project would provide additional facilities for students and faculty, enhancing the educational experience and academic programs at the university. The construction phase would generate employment opportunities and stimulate the local economy. The new buildings would also contribute to the development of infrastructure in the area.

However, the ESIA identified several potential negative impacts that need to be addressed and mitigated. These included land disturbance and habitat fragmentation during the construction phase, increased traffic congestion, noise pollution, and potential impacts on the local water resources. The assessment also considered the potential disruption to the surrounding community, including noise and dust from construction activities.

To mitigate these potential negative impacts, several measures and recommendations were proposed. These included proper waste management practices, dust and noise control measures during construction, and the implementation of water conservation strategies. The assessment also emphasized the importance of engaging with local communities and stakeholders throughout the project's lifecycle, ensuring their concerns are addressed and their input is considered.

11.2 Conclusion

It is evident that the proposed project is associated with both positive and negative impacts during construction, rehabilitation, and operation phases of the project. The following recommendations are made to enhance the viability of the project: The project shall be continued as planned as it is economically and socially viable, Morogoro Municipal Council and SUA, Solomon Mahlangu campus shall oversee activities of the Contractor in implementation the developed impact mitigation measures described in the ESIA report, The proposed mitigation and enhancement measures (the ESMP) should be implemented in order to minimize and/or avoid the identified adverse environmental and social impacts of the proposed project. The ESMP should be provided as part of the Contractor ‘s contract, The EMP should also be implemented to track the effectiveness of mitigation and enhancement measures and hence further improvement of the mitigation plan. Monitoring will be used as a means of ensuring compliance with national or international standards and this should go hand in hand with obtaining statutory approvals.

11.3 Recommendation

The Consultant suggests that the proposed project be approved as long as the Sokoine University complies with the ESMP and EMP suggested in this ESIA Report, as well as any additional requirements that NEMC/TCU may impose after consulting with lead agencies like World Bank group and other relevant parties.

REFERENCES

1. Ahmad Y. J. and Sammy G. K., 1987: Guidelines to Environmental Impact Assessment in Developing Countries, UNEP Regional Seas Reports and Studies No. 85, UNEP, 1987.
2. Consultancy Servicers for review and Update of documents for improvement of water and Sanitation services in Morogoro Municipality, (2018).
3. Community Development Policy, Dar es Salaam, Ministry of Community Development, Women Affairs and Children, (1996)
4. Conducting Environmental Impact Assessment for Developing Countries, United Nations University press, Modak P. & Biswas A. K., 1999
5. Environmental Impact Assessment and Audit (Amendment) Regulations, 2018.
6. Environmental Impact Assessment and Audit (Amendment) Regulations (G.N. No. 474) of 2018
7. International Finance Corporation, Performance Standards on Environmental and Social Sustainability, World Bank Group, 2012
8. Land Resources Inventory and Suitability, Msanya, B. K. (2001).
9. Methods of environmental impact assessment, UCL press, London, Morris P and Therivel R., (eds), 1995
10. Morogoro Municipal Council Strategic plan 2016/2017-2020/2021, (April 2017).
11. National Agriculture Policy, URT 2013
12. National Education and Training Policy; 2014
13. National Energy Policy (URT 2003)
14. National Environmental Standards Compendium. Tanzania Bureau of Standards, 2008.
15. National Gender Policy (URT 1999)
16. National Health Policy (URT 2007)
17. National Research and Development Policy 2010
18. National Science and Technology Policy (URT 1996)
19. Public participation in environmental assessment for banks supported projects in sub-Saharan Africa, in Environmental Assessment in Africa: A World Bank commitment, Environmental Department, World Bank Washington DC, Mutemba S., 1996:
20. Sustainable Industrial Development Policy URT 1996
21. The Construction Industry Policy (URT, 2003)
22. The Environment Impact Assessment & Audit Regulations, 2005 Gn No.349 of 2005
23. The National Environmental Policy (URT, 1997)
24. The National HIV/AIDS Policy (URT 2001)
25. The National Land Policy (URT, 1995).
26. The National Water Policy (URT, 2002.

27. UNDP (2002); United Nations Environment Programme UNEP Division of Technology, Industry and Economics and Trade Branch; Environmental Impact Assessment Training Resource Manual
28. URT 2003, Construction Industry Policy (URT 2003).
29. URT 2004, The National Environmental Management Act, No. 20 of 2004.
30. URT, 1982. Local Government Act (District and Urban Authorities) No. 7 and 8.
31. URT, 1984. The National Land Use Planning Commission Act No. 3 of 1984.
32. URT, 1999. Land Act.
33. URT, The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Tractebel Engineering S.A (2013):
34. Village Land Act No. 5, Ministry of Lands, Dar es Salaam, Housing and Human Settlement Development, (1999)
35. Word Bank Environmental and social Framework

APPENDICES

Appendix 1: Details of Stakeholders concerns (Source; Consultation with stakeholders in April 2023)

Level	Organization/Institution	Comment	Response section
National level	**Tanzania Commission of Universities (TCU)**	• Construction activities will create employment opportunity to the community around project area. • Construction will increase in noise, dust, and vibration in project site during implementation. • Construction and rehabilitation of buildings will increase pressure on available water supply by MORUWASA. • There will be an increase supply of quality and affordable student accommodation and increase in business opportunity. • Construction of buildings will increase in market supply of building materials. • SUA project will increase enrolment for students and academic performance	• The contractor should adhere to OSHA stipulated standards to make sure noise level and dust are controlled at workplace and neighbouring communities. • This report has included details of how proponent will enhance water availability for the project.
Regional level	**(TANESCO)**	• The project should consider the use of renewable sources of energy. • The project should consult TANESCO at the earliest stage possible in order to request for extension of services to new buildings and additional supply of electricity, if needed • It is recommended for utility University to use automation of power systems. The use of power system automation reduces numbers of activities, staffs and failure can be observed timely to effect action timely and this means that, makes quick fault detection, isolation, service restoration and therefore better services to consumers.	• The Contractor should adhere to details of the architect designs. • Stakeholder consultations were conducted as part of the project
	Occupation safety and health authority (OSHA)	• The proponent should make sure the project is registered under the Workplace Information Management System (WIMS) before pre- construction and construction phases.	• The report has stipulated all the recommendations which will assist to take care of all the Occupation Health

Level	Organization/Institution	Comment	Response section
		• There should be trained First Aiders at all project phases, as well as First Aid Kits with all necessary facilities and First Aider should renew the certificate after every 1 year as per OSHA requirement. • The proponent should conduct Risk Assessment before construction and prepare a Risk Assessment report. • There should be trained Health and Safety Officer representative at all project phases. • Safety awareness should be conducted including Safety training and safety signs. • Medical examination should be done to all workers before construction and operation phases as well as during operation phase. • The proponent should ensure there is sufficient water supply system, adequate sanitation facilities and changing (both male and female) at the workplace during construction as well as operation phase. • All workers should be provided with sufficient Personal Protective Equipment (PPEs) during all project phases. • Portable Toilets recommended to be available at project site during construction phase. • Changing rooms must be available at a project site	and Safety Concerns which may arise as a result of the project. • OHS aspects were addressed, and environmental management and monitoring were provided
	Wami/Ruvu Basin Water (WRBWB)	• They were positive about the SUA Construction project, but their concern was more effort to be on the conservation of water sources and their catchment areas. • There are people conducting agriculture activities inside the 500m and some settlements have been established inside the catchment area. • Proponent required to follow environmental compliance during implementation of the project.	• This report has included details of how proponent will enhance water availability for the project. • Liquid and sanitary waste will be managed responsibly to ensure no contamination or pollution of the natural environment and has been designed with the specific

Level	Organization/Institution	Comment	Response section
		• SUA have water use permits from Wami/Ruvu basin Water Board, so they required to renew water permits which are already expired and apply for water permit for the sources which do not have permit. • They are required to have good effluent treatment plant at Solomon Mahlangu Campus to prevent overflow which cause environmental pollution. • SUA conducting Irrigation Agriculture, so it is better to Check the Chemicals like pesticides and Fertilizer used if they pollute environments or not.	environmental context of the project site, particularly considering the hydrology and hydrogeological context
	Fire and Rescue Force	• The proponent should provide fire drilling to all workers and students at least twice per year. • The proponent can consult the Fire and Rescue Force office for the best choice of registered fire dealers. • Emergency exist must be available in new buildings. • There should be detection, alarming and lighting systems as well as portable fire extinguishers in all buildings. • All architectural drawings should be submitted at Fire and Rescue Force office to be reviewed, signed, and approved.	• The Contractor should adhere to details of the architect designs. • SUA should adhere this in order to ensure compliance and avoid unnecessary incident or accident. • The design group will need to incorporate and revise all the addressing concerns in the drawings in order to enhance their functionality.
Local level	**Morogoro Municipal Council** (DED	• Wider stakeholder consultations and community involvement with regard to land issues should be done before construction. • Employment priorities must be given to the local community around Sokoine University of Agriculture • Contractor should avoid Child Labour during the implementation of the Project.	• Preparation of the ESIA report itself is an indication of how committed the Client is to follow all the prescribed laws and regulations when implementing this project. • Stakeholder consultations ensured that the surrounding community are well briefed on the project and its potential impacts

Level	Organization/Institution	Comment	Response section
	Morogoro Municipal Council Environmental Management Officer	• All materials must be sourced from the designated areas and Municipal fees for transportation of materials from one place to another should be paid. • Management of solid waste is still a problem though the project design considered it. • Environmental education should be properly provided to local residents and staffs for management and sustainability. • During operation, the proponent should ensure adequate handling and disposal of all hazardous wastes such as chemicals from Laboratory • The solid waste contractor should be registered and authorized in the particular Municipal as per EMA 2004 and its amendment of 2018. • The proponent should know where the waste is disposed by the contractor	• Contractor should comply with all environmental and safety regulations. • SUA should provide training to their workers on management of wastewater from Laboratory before being discharge into the final treatment in order to enhance the efficiency of Wastewater stabilisation ponds(WSP)
	Morogoro Municipal Council Land Officer	• The department is well informed about this proposed project, and they are familiar with the title deed. • Good enough, land is 100% owned by Sokoine University of Agriculture and customary title deed has provided hence no social conflict is expected from local community. • They are required to pay Land Rent • They have to share their master plan with the Municipal Planning Authority • They required to prepare the site Layout before starting the project. • Town planners and Engineers should be part and parcel of the project. • SUA administration shall be responsible for supervising all construction activities to make sure no activity is conducted offsite.	• The certificate of INTERIM HANDING - OVER is appended (appendix 4) in this report and the process of occupying Certificate of Occupancy is on the way. • All recommendations have to be taken into consideration. • All development will adhere to planning standards and local guidelines and regulation

Level	Organization/Institution	Comment	Response section
		• Education on proper land use plan should be given to all communities and to instruct them not to offer lands illegally to investors without prior permission	
	Morogoro Municipal Council (Community Development Officer)	• Community development had to be involved from the initial stage of the project development. • Each department should know that community development is a crosscutting issue that should be shared to the department too. • DCDO has to be involved at early stages of the project to have better community participation. • Education must be provided about HIV/AIDS and Covid-19 • Contractor should consider Gender Balance during Employment.	• The importance of this project to community are identified in this report. • ESIA was conducted, including all stakeholders consulted
	Morogoro Municipal Council (Municipal Structural Engineers)	• Materials should be stored in a good, designed space to prevent blocking of the roads. • Cars must have permit to pass through the road during transportation of materials to the construction site. • The office of Regional Engineer must be involved at early stages of the project for further advice. • Induction should be given to the people at construction site before starting operation. • Environmental and Safety issues should be taken into consideration	• The report has made recommendations on how construction materials should be transported and stored at the project site. • Stakeholder consultations were conducted as part of the project
	Solomon Mahlangu Campus students	• Chairs and shelves in the rooms do not equal the number of students living in • There must be enough chairs in rooms as per number of students. • There is water problem in university Campus, so this new	The ESIA report has outlined the benefits of the project.

Level	Organization/Institution	Comment	Response section
		project must consider instalment of enough water facilities in order to increase water availability at university. • Projectors should be installed in rooms to allow smooth and on time learning. • Constructions of new playground and worshipping centers should be taken on board	
	Solomon Mahlangu Campus (Administrative and Academic staff)	• Internet sources and cables should be included in the designing of the buildings both in classes, and workshops/studios. • Microphones should be installed in classes. • Noise pollution should be controlled in order not to interfere with smooth learning process	• The ESIA report has outlined the benefits of the project. • Contractor will ensure that all working machines and trucks delivering construction materials are well inspected and serviced properly to reduce noise. • Site shall be fenced with well-approved material like iron sheets to reduce the speed of noise.
	Solomon Mahlangu Students, SUASO representatives and Services providers)	• Most of university infrastructures are not friendly to people living with disability. • Privacy should be considered in both rooms and toilets in the new buildings. • Sewage system should be observed and rehabilitated. • Rooms should be big enough and well ventilated	This has to be taken into consideration.
	Ward executive officer (WEO) and Mindu community	• Employment should be given to the local people surrounding the project site. • Construction activities will increase unplanned and early pregnancy cases, especially to School and local girls because their lusts they tend to date project workers. The contractor is	• This report recommended the local community to be given priority during project implementation. • Stakeholder consultations were conducted as part of the project.

Level	Organization/Institution	Comment	Response section
		advised to take precaution and strictly enforcement to his employees. • Construction of academic facilities at Solomon Mahlangu Campus will improve education status within the SUA and district at large. • Local suppliers to be given priority during construction stage. • The contractor should purchase, transport and store construction materials in an environmentally friendly way. • Public servants should demonstrate the value of the project by providing quality services to the community. • Local suppliers to be given priority during construction stage. • The contractor should extract construction materials in an environmentally friendly way. • They should consider the safety of their workers	• OHS aspects were addressed, and environmental management and monitoring were provided. • Impacts and appropriate mitigation measures are outlined in ESIA. • Stakeholder consultations ensured that the surrounding community are well briefed on the project and its potential impacts

Appendix 2: Ambient dust, gas, noise and ground vibration field measurements

Table 4.1: Average ambient dust level for proposed sites for. Construction.

Station code	Location	PM 2.5 (µg/m³)	PM 10 (µg/m³)
AQMS1	Student hostel	6.1	11.5
AQMS2	Academic building	5.7	10.5
TBS Limits		**75**	**150**
WB Group Guidelines		**25**	**50**

Table 4.2: Ambient pollutant gas level for proposed sites for. Construction at Solomon Mahlangu Campus

Station Code	Location	CO mg/m³	NO_2 mg/m³	SO_2 mg/m³	H_2S mg/m³	VOCs mg/m³
AQMS1	Hostel	<0.1	<0.01	0.01	<0.01	0.007
AQMS2	Academic building	<0.1	<0.01	<0.01	<0.01	0.008
TBS Limits		**15**	**0.12**	**0.5**	**-**	**6.0**
WB Group Guidelines		**30**	**0.2**	**0.5**	**20**	**-**

Table 4.3: Average noise level for proposed sites for construction

Station Code	Location	Average Noise Level in dBA
AQMS1	Students hostel	46.5
AQMS2	Academic building	41.3
TBS Limits		**52**
WB Group Guidelines		**55**

Table 4.4: Average vibrations measured in mm/s PPV

STATION CODE	Coordinate	Location	(mm/s PPV)
AQMS1	-6.84269 & 37.647291	Student hostel	0.02
AQMS2	-6.834937& 37.629422	Academic building	0.01
Human detection level			<0.15
British limit			<0.3
TBS Limit			**<5**

Sampling date: April 2023 **Source: Field Measurement**

Appendix 3: Certificate Of Interim Handing - Over

SOKOINE UNIVERSITY OF AGRICULTURE, MOROGORO

CERTIFICATE OF INTERIM HANDING – OVER

WE, the undersigned on this Wednesday 12th of APRIL year 2000, do hereby agree that, all the details contained in the accompanying documents, written after physical verification and mutual discussion thereafter, portrays the actual and true position of the Assets and Liabilities of the SOLOMON MAHLANGU CAMPUS as at 13th of January 2000.

Documents referred herein, drawn by representatives from the Ministry of Science, Technology and Higher Education – as the owning authority at the material time, in conjunction with those from Sokoine University of Agriculture – as the interested authority, are: -

1. RIPOTI YA KAMATI YA MAANDALIZI YA MAKABIDHIANO YA AWALI YA KITUO CHA MAZIMBU;

2. APPENDICES:

   1.0 REPORT ON THE PHYSICAL VERIFICATION OF FIXED ASSETS AT SOLOMON MAHLANGU CAMPUS AT MAZIMBU, MOROGORO;

   1.1 LAND AND BUILDINGS, INCLUDING SERVICE INFRASTRUCTURE AND SITE WORKS;

   1.2 PHYSICAL VERIFICATION OF FIXED ASSETS: MOVEABLE ASSETS.

Signing on behalf of:

(a) Ministry of Science, Technology and Higher Education

signature .....
NAME DR. FUNGO ALI FUNGO
TITLE SENIOR EDUCATION OFFICER

(b) (i) Sokoine University of Agriculture

signature .....
NAME H.B. Ahenga
TITLE REGISTRAR

12.04.2000
REGISTRAR
SOKOINE UNIVERSITY OF AGRICULTURE
P.O. Box 3000 MOROGORO

(ii) signature .....
NAME PROF. M.E.D.M.T.S.H.
TITLE DIRECTOR SOLOMON MAHLANGU CAMPUS, MAZIMBU

Witnessed by:

(a) NAME JAPHET J.K. MSHANA
TITLE CHIEF INTERNAL AUDITOR
REPRESENTING SUA
SIGNATURE .....

(b) NAME GEORGE C. KIFARO
TITLE FORMER ACTING DIRECTOR
REPRESENTING SUA
SIGNATURE .....

THE HANDING-OVER ABOVE WAS FULLY APPROVED AND IS ACCORDING TO THE INSTRUCTIONS GIVEN,

PROF. A.B. LWOGA
VICE - CHANCELLOR