ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED NEW BUILDINGS FOR THE SCHOOL OF AGRICULTURE, LABORATORY COMPLEX AND TWO HOSTEL BLOCKS AT SUZA TUNGUU CAMPUS, PLOT NO. 154, JUMBI SHEHIA, CENTRAL DISTRICT, SOUTHERN REGION IN UNGUJA – ZANZIBAR

PROPONENT

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EXECUTIVE SUMMARY

I. Introduction

The Revolutionary Government of Zanzibar through the State University of Zanzibar (SUZA) has set aside funds to undertake the Environmental and Social Impact Assessment (ESIA), Environmental and Social Management Plan (ESMP) and Environmental and Social Health and Safety Management Plan for the proposed SUZA project that comprises of the construction of the;

i. New building for School of Agriculture at Tunguu campus that host both teaching theatres and laboratory
ii. New building for laboratory complex at Tunguu Campus to host basic teaching labs for science subjects.
iii. 2 hostel blocks with the capacity of 1000 students (500 males and 500 female) at Tunguu campus

The project is implemented through Tanzania Higher Education for Economic Transformation (HEET) Project (P166415) funded by the World Bank. The ESIA study has been conducted in accordance with the World Bank Environmental and Social Framework as well as the relevant International Agreements, Conventions and Treaties. It is a requirement by the World Bank that all environmental and social risks and impacts of the project be addressed as part of the environmental and social impact assessment to be conducted in accordance with Environmental and Social Standards. The Environmental and Social Standard (ESS1) set out the obligations of the Borrower in identifying and addressing environmental and social risks and impacts that may require particular attention. This ESIA report has applied 5 relevant Environmental and Social Standards (ESSs) out of 10, namely:

- ESS1- Assessment and Management of Environmental and Social Risks and Impacts;
- ESS2 - Labour and Working Conditions;
- ESS3 - Resource Efficiency and Pollution Prevention and Management;
- ESS4 - Community Health and Safety; and
- ESS10 - Stakeholder Engagement and Information Disclosure.

Furthermore, the study has been conducted to comply with the Zanzibar Environmental Management Act No. 3 of 2015 which stipulates the requirements of ESIA for any development project or activity to be undertaken before commencement of such project/activity.

II. Project Descriptions

- **Project Location and accessibility**

The project is located within the SUZA in Central District, Southern Region in Tunguu campus. The project area is located about 15 km from Zanzibar Stone Town. It is also accessible via road linkages connected to Karume road which has already been constructed to bitumen standard. Its coordinates fall within 533923.30 m E. and 9314506.59 m S.

- **Project Components**

The proposed project will comprise of;

1. **The construction of lab complex building:** The proposed building will have 19 Science Basic Laboratories, five for Chemistry, five for Biology, five for Physics and four for ICT. The chemistry laboratories include of Organic Chemistry lab, Inorganic/Analytical lab and Physical chemistry lab, while biology laboratories are including Botany, Zoology and Microbiology labs. The five physics laboratories comprise of Optics Lab, Electricity and Electronics Lab, Applied Nuclear Physics and Physics general Lab. ICT labs are including GEO ICT, Multimedia and Remote Sensing. The building also will have twenty offices for staffs, ten rooms for lecture/seminar; the room will be big enough to accommodate at least 100 students each and 2 conferences room.
2. **Two block hostel facilities:** This comprises of one hostel for 500 males and another hostel for 500 female students. is an accommodation facility for the students to be created as part of the project and each room will have the capacity to house four people and would have the standard facilities as in case of any hostel in the campuses.
3. **School of Agriculture (SoA):** This will constitute the construction of two floor building premises which will involve 6 lecture rooms, one library for 100 students, 6 laboratory facilities and 50 staff office facilities. It will also constitute one multipurpose hall for 300 students.

III. Objectives of the ESIA

The objective of the ESIA study is to foresee the environmental and social impacts of the activities of the proposed project before their actual implementation. The study, therefore, should address the social, economic and environmental issues associated with the project's activities. This study will also provide relevant Environmental and Social Management Plan and Health and Safety Management Plan (HSMP) to prevent or minimize adverse impacts, identify organizational capacities and competence needed and recommend the means of monitoring the effectiveness of the prepared ESMP.

IV. Approach and Methodology

The ESIA study conforms to the requirement of the Zanzibar Environmental Management Act No. 3 of 2015 and World Bank ESF, 2018. The scoping exercise was undertaken based on checklists complimented by experience of the Consultants local government officials and neighbours near the project site. The study done as both a desktop study and fieldwork. It involved the collection and review of all publicly available and relevant environmental information, including previous work done by consultant, together with some consultation with key stakeholders and site visits. This information allowed the identification of potentially sensitive and valued environmental resources and receptors at an early stage in the design process. This information has been used to identify the potential effects from the development proposals and measures that could be adopted to avoid and minimize them.

V. Policies and Legal and Institution Framework

This ESIA study has considered relevant local laws, policies and legal documents have been reviewed to ensure that proposed projects meet policy and legislative criteria. Zanzibar is

committed to attaining development goals as stipulated in Zanzibar Development Vision 2050, Zanzibar Development Plan 2021/2026 many others. This is envisaged in the Zanzibar Environmental Policy and other sectoral policies as described in detailed in Chapter 5 of this report. Similarly, the ESIA has been also conducted in line with World Bank's Environmental and Social Framework, Safeguarding Policy for Investment Project Financing, Environmental and Social Standards (ESS1-10) as well as Environmental, Social Health and Safety Guidelines.

VI. Project Schedule and Life

Site preparation for the proposed projects in Tunguu SUZA main Campus is expected to start soon after approval of all related engineering designs and environmental clearance and construction tender award. The project life is expected to be 99 years to the completion of constructions.

VII. Stakeholders Engagement and Consultations

The stakeholders' engagement has conducted in accordance to World Bank ESS10. According to ESS 10, Stakeholder engagement is the continuous and iterative process by which the Borrower identifies, communicates, and facilitates a two-way dialogue with the people affected by its decisions and activities, as well as others with an interest in the implementation and outcomes of its decisions and the project. It takes into account the different access and communication needs of various groups and individuals, especially those more disadvantaged or vulnerable, including consideration of both communication and physical accessibility challenges.

a) Stakeholders Identification

Identification of Stakeholders who have an interest in the project under consideration, to be consulted in addition to the statutory consulates, was undertaken at the outset. The following categories of Stakeholders were established and the list identified: -

1. Environmental Authorities;
2. Sectorial government departments responsible for agriculture, energy, forestry, lands, etc. whose interests may be affected;
3. District and local authorities;
4. Groups representing users of the environmental resources;
5. Local community groups and resident groups;

The main stakeholders for proposed projects include; Central District, Government Entities:

- Zanzibar Investment Promotion Authority (ZIPA);
- Zanzibar Revenue Board (ZRB),
- Department of Environment (DoE),
- Zanzibar Water Authority (ZAWA),
- Zanzibar Environment Management Authority (ZEMA),
- Department of Town and Rural Planning Development,
- Department of Forest and Non-Renewable Natural Resources (DFNRNR),
- Land and Registration,
- Departments of Land Registration and Survey and Mapping,
- Ministry of Infrastructure, Communication and Transportation,

- The Ministry of Trade and Industry (MTI),
- Ministry of Lands, Housing, Water, Energy and Environment
- Fisheries Department (Water bodies),
- Department of Forestry and Non-Renewable Natural Resources,
- Department responsible for occupational Health and Safety,

Other are; Tunguu Community, Jumbi Community, SUZA student's local landowners, Community Based Organizations., Non-Governmental Organizations, disadvantaged groups, including women, youth and the disabled, that are however, may also be considered as affected parties of the project.

VIII. Findings and Baseline information

a. Sensitivity Screening

Most of the proposed project for the construction of the building premises for SUZA project sites does not likely to cause destruction to an endangered species of fall within sensitive ecosystem and the Zanzibar National Protected Areas, or areas of conservation planning.

b. Climatic and Microclimate Condition.

The construction and operation of the proposed project is expected to increase average intake of students which will automatically have a significant impact on the climate of Zanzibar. Climate change might result in heavy rainfall and extreme temperature increase can be managed by natural vegetation cover among others. The graduates in the field of agriculture will have a great impact towards climate change as they will increase the number of experts in the field of agriculture and forestry in Zanzibar. The design and construction in the project have taken into account a measure in climate change adaptation and resilience through incorporation of the vegetation cover around the building premises.

c. Air Quality

From the measured data to define the SUZA building premises in the proposed project sites' air quality baseline conditions, it can be concluded that the main sources of air pollution at the moment in the project area include fuel-powered vehicles passing along the South main road and fugitive emissions from households in the settlements burning wood for cooking and other purposes. Moreover, currently there is road construction in Tunguu, elucidating high incidence of dust within and along the South Road. There is need to keep into consideration by the project proponent and constructor during the Project Construction phase.

d. Noise and Vibration

It is anticipated that the Noise and vibration will be a negative impact during the construction phase of the site of the proposed project considering the site of the proposed project is located in the area where residents are nearby, hence noise and vibration impact will have negative and significant impacts.

e. Gender-Based Violence

Based on the experiences gained from the rise in incidences of Gender-Based Violence (GBV) from other construction projects, community members expressed their concerns that during

projects construction more people will come to work in the project area and hence may likely fuel gender-based violence in their communities as a result of interactions of people from different cultural backgrounds. They call upon the contractor to emphasize employees of the project to respect human dignity by abiding by traditional customs and norms instead of being the cause of fuelling of GBV related issues in the project area.

f. Access to Clean and Safe Water and Sanitation

Generally, water used by residents along the proposed project sites is safe from boreholes available within SUZA area. Also, ZAWA is distributing safe water to Tunguu community and throughout the Revolutionary Government of Zanzibar which currently busy in constructing water tanks and distribution systems.

Sanitation facilities indicate health status, as well as socio-economic development. Most of the households along the project area use toilets (with soak away pit/septic tank) with permanent structures including walls and roofs.

g. Health Services

The accessibility to health facilities in the proposed project areas is good. Moreover, in improving the health services in Zanzibar, the Government has built new District Hospitals including the Central where the project is existing.

h. Diseases and HIV/AIDS Prevalence

Zanzibar has a mechanism in controlling HIV infections in the population including treatments, prevention of new infections as well as care and support to those who are infected; and mitigate the impact of HIV and AIDS on the social and economic status of individuals, families, communities of all those living in Zanzibar. Risks of increased infections among workers and the spread of HIV/AIDS in the surrounding communities is significant. HIV/AIDS and other communicable disease such as COVID-19 are among the community health and occupational risk categories that need serious intervention in minimizing the rates of infections within a project area.

i. Waste Management and Disposal

In the project area solid waste management practices involve collection of solid wastes and disposal to landfill dumpsite located at Kibele. Liquid waste management is practiced through onsite disposal for most project's areas. Currently, SUZA use onsite waste water treatment facilities such as septic tanks and soak away pits.

IX. Project Cycle

a. Project Planning Phase

ESIA, preliminary engineering planning, final engineering planning and construction planning form the planning phase of the project.

b. Project Preparation & Construction Phases

The preparation/mobilization and construction phase will take place after the issuing of the Environmental Impact Assessment Certificate and once a construction contract with a

suitable contractor is signed. The construction phase is expected to be completed within 18 months for the proposed projects.

All efforts will be made to ensure that all construction works will be undertaken in compliance with local and national legislation, local and international best practices, as well as the ESMP.

During the construction phase, both skilled and unskilled temporary employment opportunities will be created.

c. Project Operation Phase

The project Phase will involve the use of building premises for lectures, practical works in the laboratories and any other academic activity intended courses and subject related to agriculture or any other subject that SUZA will decide.

Project Requirements

- ✓ **Water Supply**

  Water for construction and maintenance of the proposed projects during operation shall be drawn from ZAWA. Alternative suitable sources i.e. Boreholes will be determined based on demand and location/distance from the proposed project site under construction.

- ✓ **Power Supply for the Project**

  Power supply for the proposed project's construction activities will be provided by ZECO and generators for performing hot works, lighting, etc. During the operation phase, the project ancillaries might use solar when deemed necessary.

- ✓ **Construction Materials**

  Quarry and borrow pit for the project's construction materials will be generated from Zanzibar. Other construction materials such as Cement, still bars, gypsum powder, timber etc, shall be purchased from local authorized dealers for the project's site or imported, depending up on the availability of such materials in Zanzibar market.

- ✓ **Required Permits**

  Prior to the approval of the construction and eventual construction of the Project, it is necessary to obtain several authorizations and permits from local and central government authorities of Zanzibar.

Required Permits from Regulatory Authorities

Permit/Authorization	Issuing Authority	Description
ESIA Certificate	ZEMA	Approval of project implementation
Construction permit	The Central District Council	To waive away construction of the proposed SUZA

X. Assessment and Identifications of Impacts

Environmental risks and impacts assessment done included: (i) those defined by the World Bank Environmental Health and Safety Guidelines (EHSGs); (ii) those related to community safety; (iii) those related to climate change (iv) any material threat to the protection, conservation, maintenance and restoration of natural habitats and biodiversity; and (v) those related to ecosystem services and the use of living natural resources; and (vi) those related to the design of the physical facilities.

The Social risks and impacts assessment done included: (i) threats to human security through crime or violence; (ii) risks that project impacts fall disproportionately on individuals and groups who, because of their particular circumstances, may be disadvantaged or vulnerable; and (iii) negative economic and social impacts relating to the involuntary taking of land or restrictions on land use.

- **ESIA Process and Approach to the Assessment**

The assessment for the proposed Project has been undertaken in accordance with the guidelines and procedures noted above. It has followed a systematic process of predicting and evaluating the impacts. The Project is expected to have on the physical, natural, cultural, social and socio-economic environment. The proposed and identified measures ensure that the developer is able take to avoid, reduce, remedy, offset or compensate for adverse impacts, and to provide benefits.

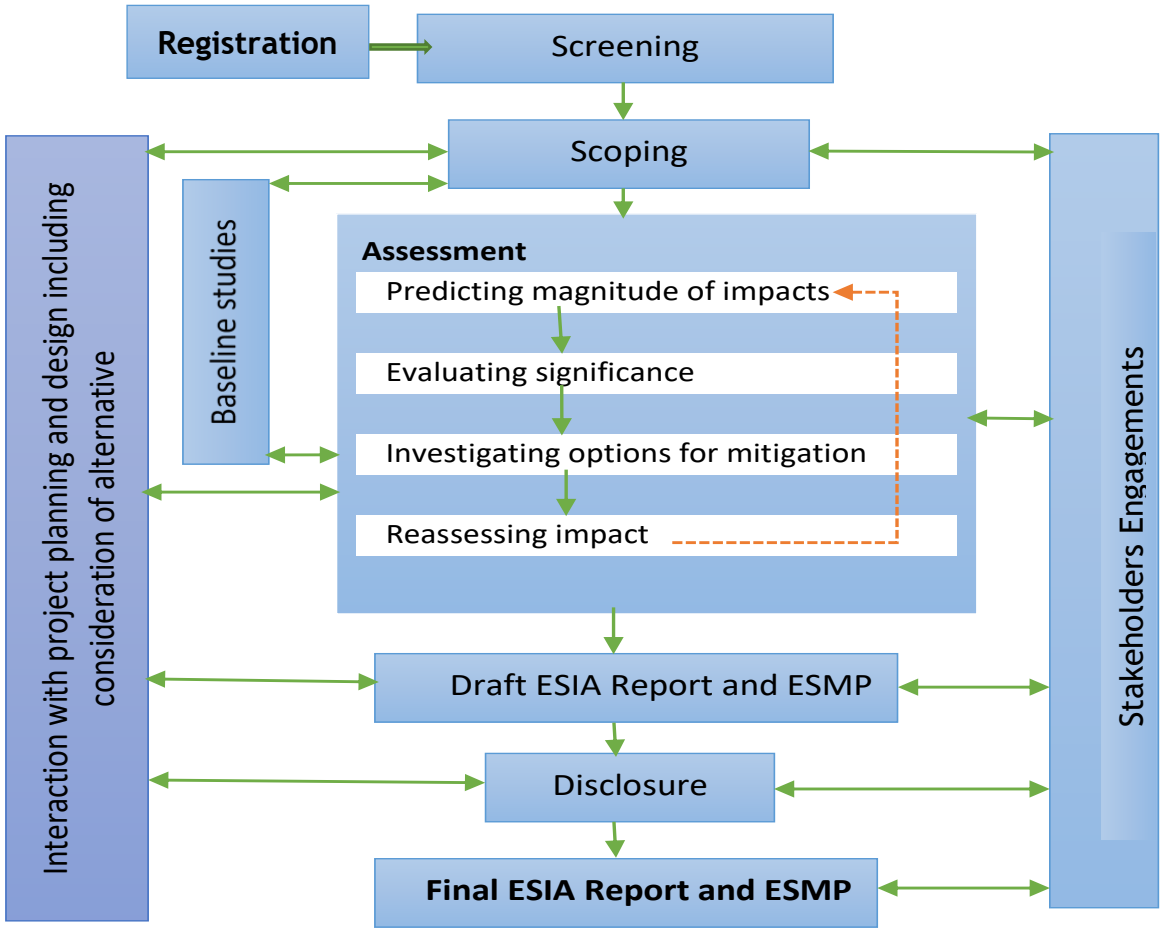

Figure 1: ESIA process and assessment approach

- **Identification Methods of the Impact Matrices**

Interactions between the project activities and the environment were identified for each stage of the project,

- **Focused Approach Impacts Mapping/Identification**

This is a collaborative process of reflecting the reality along with the proposed projects to find implementable solutions/mitigations to avoid or reduce the impacts.

Impacts associated with the project activities

- **A: Impacts on the physical Environment**
  i. Loss of biodiversity
  ii. Change of natural habitant
  iii. Loss of ecosystems services
  iv. Acceleration of soil erosion
  v. Generation of liquid waste
  vi. Generation of solid waste
  vii. Generation of Hazardous waste
  viii. Increased runoff/storm water
  ix. Land pollution
  x. Surface and ground Water Pollution
  xi. Air pollution
  xii. Contribution to Climate change
  xiii. Noise pollution
  xiv. Generation of vibrations
  xv. Visual impact
  xvi. Increase pressure on natural resources

- **B. Impacts on Socio-Economic Environment**

  Positive Impacts:

  i. Employment opportunities
  ii. Increase in income generation opportunities
  iii. Changes in lifestyle and quality of life
  iv. Increased skills and impart knowledge to local communities
  v. Increased Revenues to local authorities
  vi. Increased commercial and social activities around project locations
  vii. Increased Income to local suppliers and service providers

  Negative Impacts

  i. Loss of cultural assets and displacement ritual sites
  ii. Increased risks of road
  iii. Increase in level of crimes
  iv. Increased risks of communicable diseases like STDs, HIV/AIDS, COVID-19, etc.

v. Change in social values and ethics
vi. Increase in conflicts
vii. Food insecurity
viii. Price inflation of goods and services
ix. Occupation health, safety and security risks
x. Community health and safety risks
xi. Labour working condition/Child labour
xii. Increased incidence of GBV/SEA/SH
xiii. Loss of employment

Mitigation Measures

Many of the mitigation measures put forward are essentially good engineering practice that shall be adhered to during all the project phases.

i. Proposed mitigation measures during preparation/construction phase

Negative Social Impacts

i. The contractor shall comply with World Bank ESSs and the World Bank ESHS guidelines
ii. 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;
iii. Institute traffic management and safety programme including, training and testing of heavy vehicles operators and drivers, enforcement of speed limits, maximum loading restrictions and compliance with all Tanzania transportation law and standards;
iv. Provide more avenues for service providers e.g. cafeteria and restaurants
v. Constructions of police stations at University and the surrounding communities in order to strengthen security services
vi. Awareness campaigns /Education on HIV/AIDS, COVID-19 and STDs shall be provided to workers;
vii. The project will prepare a GBV Action Plan that ensures project awareness raising strategy (for workers and community members), a list of GBV service Providers to which GBV survivors will be referred, revisions to the GRM to ensure it can address GBV complaints, and information on GBV allegation procedures in the workplace.
viii. SUZA-UPIU will conduct regular monitoring of project workers in relation to health, working conditions, hours of work, minimum age, and the other requirement of national law.

Negative Bio-physical Environmental Impacts

i. The contractor shall comply with World Bank ESSs and the World Bank ESHS guidelines
ii. Equipment shall be maintained in good running condition and equipment, which generate excessive black smoke shall not be used;

iii. Enforce vehicle road restrictions to avoid excessive emissions from engine overloading, where practical switching off engines will be done when machines are not in use;
iv. Protect stockpiles of friable material subject to wind through wetting;
v. Cover loads with friable material during transportation;
vi. Green spaces shall be maximized in project areas
vii. Vehicles carrying construction materials shall be restricted to work during night time only;
viii. Impact pile driving shall be avoided where possible in vibration sensitive areas;
ix. Wastewater shall be properly treated using the system consists of the Septic –soak away system; UASB and wetland. Only effluents complying with TZS will be discharged on receiving water body.
x. The contractor shall have adequate facilities for handling the construction waste;
xi. Construction will be done as per engineering design and procedure of which a maximum requirement of compaction strength is achieved during the construction. That is maximum dry density (MDD) specified in the design manual by consultant;
xii. Locating parts of the development further away from the general public;
xiii. Clearance of patches of native forest remaining in the neighbourhood of the proposed project shall be avoided;

ii. Proposed mitigation measures during the operation phase

Negative Social Impacts

i. The proponent shall comply with the World Bank ESHS guidelines
ii. A safety, health and environment induction course shall be conducted to all students and workers, putting more emphasis on HIV/AIDS, which has become a national disaster as well as other emerging pandemics such as COVID 19 and dengue fever;
iii. Use of water conservatively by instituting technologies (e.g. self-lock water taps) and awareness raising notices to users, etc.;
iv. The project will prepare a GBV Action Plan that ensures project awareness raising strategy (for workers and community members), a list of GBV service Providers to which GBV survivors will be referred, revisions to the GRM to ensure it can address GBV complaints, and information on GBV allegation procedures in the workplace.
v. SUZA-PCT will conduct regular monitoring of project workers in relation to health, working conditions, hours of work, minimum age, and the other requirement of national law.
vi. Provide more avenues for service providers e.g. cafeteria and restaurants
vii. Constructions of outpost police stations at SUZA, in Tunguu Campus in order to strengthen security service;
viii. The cooperation of local people together will help to lessen theft incidents and maintain security of people and their properties.

Impacts on Bio-physical environment

i. The proponent shall comply with the World Bank ESHS guidelines
ii. Septic –soak away system, UASB and wetland shall be designed in such a way waste treatment is achieved by 100% before disposal to the receiving water body;
iii. The design of storm water drainage will be given a high priority;
iv. Adequate number of portable fire extinguishers shall be placed at strategic locations;
v. Good housekeeping shall be maintained at all the time;
vi. The design of buildings shall strictly adhere to the Fire Safety Standards;
vii. To change the consumption behaviour in terms of energy and water

XI. Environmental and Social Management Plan (ESMP)

The proposed mitigation measures provide the basis for the development of environmental management plan and monitoring plan for the Project, required to meet World Bank's E S S s and ZEMA's environmental approval and permitting requirements. The options to minimize or prevent the identified adverse social and environmental impacts as well as a monitoring plan have been suggested in this report and are contained in the ESMP. Many of them are based on good engineering and social practices. The ESMP defines roles and responsibility of different actors of the plan. However, the key actors during construction phase is contractor and University while during the operation phase, University will be the key actor in implementation of mitigation measures. The associated environmental management plan costs amount to TZS 332,000,000.

XII. Environmental and Social Monitoring Programme

There will be four types of monitoring activities; i) baseline monitoring, ii) impact monitoring, compliance monitoring, and mitigation monitoring. 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. The responsibility for mitigation and monitoring during the operation phase will lie with the SUZA. Depending on the implementation status and sensitivity of any emerging issues, OSHA and /or ZEMA will perform annual EHS reviews in which environmental concerns raised will be reviewed alongside project implementation. The estimated annual costs for carrying out the proposed environmental motoring programme amounts to TZS 26,500,000.

XIII. Decommissioning

As decommissioning will take place in the remote future, the specific conditions for mitigation are generally inherently uncertain. In view of this, specific mitigation measures pertaining to environmental impacts of decommissioning works cannot be proposed at the moment with a reasonable degree of certainty. A decommissioning plan that considers environmental issues shall be prepared by the developer prior to the decommissioning works. Should it be done, decommissioning may entail change of use (functional changes) or demolition triggered by change of land use.

XIV. Project Cost Benefit Analysis

The implementation of the proposed new building project at SUZA shall have costs to community, government and the environment. For instance, community shall have inherent costs associated with noise, impairment of air quality, and Safety and health risks. However, the introduction of mitigation measures will reduce the anticipated impacts. The government has secured the loan for this project; and there will be costs for mitigating environmental impacts. On the other hand, the proposed new building project has both direct and indirect benefits to university, neighbour and the government as well. The benefits of the project are experienced in all phases from mobilization, construction, operation to decommissioning phase. 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. However, building construction projects may generate negative benefits though; they are usually minimal compared to the positive benefits. Some of those benefits are non- quantifiable thus cannot be used in the cost- benefit analysis estimations.

XV. Summary and Conclusion

The proposed project has undergone ESIA study as legal requirement under the Zanzibar Environmental Management Authority Act No 3 of 2015 as well as World Bank's requirement as stipulated in Environmental and Social Framework, 2018. The proposed project is suitably located in an institutional area and is located at a site that is adequately accessible such that all heavy equipment and trucks may reach the site easily. The proposed project will contribute to socio-economic benefits to both SUZA and the nation at large. These socio-economic benefits include: Creation of employment opportunities; increase income to the SUZA and the Zanzibar as whole. On the other hand, the proposed project will entail some adverse environmental impacts of which adequate mitigation measures have been proposed and incorporated in the project design. The environmental impacts identified from this project include but not limited to: Increased noise levels; increased dust levels; waste management problems, storm water generation and safety and health risks.

It is, therefore, concluded that the proposed SUZA buildings project will entail no significant impacts provided that the recommended mitigation measures are adequately and timely implemented. The identified impacts will be managed through the proposed mitigation measures and implementation regime laid down in this ESIA. SUZA- UPIU will implement all the recommendations given in this ESIA and carry-out the environmental auditing and monitoring schedules.

SIGNED DECLARATION OF ESIA TEAM

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

S/NO.	Name	Professional	Signature
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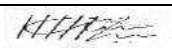
	Hamisi Shafii Msangi	HSE Specialist - Registered Env. Expert	
	Abbas Juma Mzee	Biodiversity Expert	
	Massoud Ali Mussa	Sociologist/Socio-economic Expert	
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ACKNOWLEDGEMENT

This Environmental and Social Impact Assessment for the proposed development of the new buildings for SUZA at Tunguu campus, located in the Shehia of Jumbi in Tunguu, Central District of Zanzibar, has been prepared for a multi-stakeholder review process for environmental clearance by the Zanzibar Environmental Management Authority (ZEMA). The work reflects the outcome of the Scoping Study and the resultant Terms of Reference prepared. We extend our sincere appreciation to everyone who helped in providing vital information, guidance, and feedback in the making of this ESIA Report. Specifically, we would like to acknowledge full support and assistance we received from all the government departments, institutions, and the community groups consulted during the exercise. Their perspectives on the environmental and social implications of this project component have been fully covered in various chapters of the ESIA Report.

LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
BOQ	Bill of Quantity
COVID-19	Corona Virus Disease-2019
DMD	Department of Disaster Management
DoE	Department of Environment
DoFNRNR	Department of Forestry and Non-Renewable Natural Resources
DoPSHE	Department of Preventive Services and Health Education
DOSH	Department of Occupational Safety and Health.
DoT	Department of Transportation
DoURP	Department of Urban and Rural Planning
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMA	Environmental Management Act
ESF	Environmental and Social Framework
ESHS	Environmental, Social Health and Safety Guidelines
ESIA	Environmental and Social Impact Assessment
ESMoP	Environmental and Social Monitoring Plan
ESMP	Environmental and Social Management Plan
GBV	Gender Based Violence
GDP	Gross Domestic Product
GPS	Global Positioning System
HEET	Tanzania Higher Education for Economic Transformation
HSE	Health, Safety and Environment
I&APs	Interested and Affected Parties
IUCN	International Union for Conservation of Nature
LGA	Local Government Authority
MKUZA-II	*Mpango wa Kupunguza Umasikini Zanzibar-awamu ya pili* (Zanzibar Poverty Reduction Strategy – Second Phase)
MoH	Ministry of Health
MoL	Ministry of Labour
NLUP	National Land Use Plan
OCGS	Office of the Chief Government's Statistician
OSHA	Occupational Safety and Health Authority
PIU	Project Implementation Unit
PCT	Project Coordinating Team
RGoZ	Revolutionary Government of Zanzibar
SoA	School of Agriculture
STDs	Sexual Transmitted Diseases
SUZA	State University of Zanzibar
SUZASO	SUZA Student Organization
ToR	Terms of Reference
WB ESF	World Bank's Environmental and Social Framework

WB ESSs	World Bank Environmental and Social Standard
ZAWA	Zanzibar Water Authority
ZECO	Zanzibar Electricity Corporation
ZEMA	Zanzibar Environmental Management Authority
ZHC	Zanzibar Housing Corporation
ZIPA	Zanzibar Investment Promotion Authority
ZSGRP	Zanzibar Strategy for Growth and Reduction and Poverty

CHAPTER ONE

1 INTRODUCTION

1.1 Background Information

The State University of Zanzibar (SUZA) was established by Act No. 8 of 1999 of the Zanzibar House of Representatives, amended by Act No. 11 of 2009, and further re-amended by Act No. 7 of 2016. The amendment has justified SUZA to merge with other Zanzibar higher learning institutions; these are Zanzibar Institute of Financial Administration (ZIFA), College of Health Sciences (CHS), Zanzibar Institute of Tourism Development (ZIToD), School of Agriculture (SoA) and The Zanzibar Journalism and Mass Media College (ZJMMC).

Currently, SUZA consists of seven campuses found at equally beautiful but different locations within the islands. Six campuses are in Unguja and one campus in Pemba Island. Tunguu is the main SUZA campus located about 15km away from Zanzibar town. The campus is huge and brand new, decorated with a green field that offers a cutting-edge infrastructure of the World standard. It gives students a local alternative to some of the world's attractive learning environments.

To strengthen the learning environment and labour market alignment of priority programmes at beneficiary higher education institutions and improving the management of the higher education system, The Project Development Objective (PDO) is required as one of the components of the project is Infrastructure development that includes civil works.
The United Republic of Tanzania has secured support from the World Bank to fund the Higher Education for Economic Transformation (HEET) project through Ministry of Education Science and Technology (MoEST), to benefit 19 higher learning institutions, SUZA being the amongst. The project intends to develop infrastructures for the SUZA, Tunguu Campus.
The proposed project includes the development of the following;

i. New building for School of Agriculture at Tunguu campus that host both teaching theatres and laboratory
ii. New building for laboratory complex at Tunguu Campus to host basic teaching labs for science subjects.
iii. 2 hostel blocks with the capacity of 1000 students (500 males and 500 female) at Tunguu campus in place

To sustain the long list of benefits of the HEET project and aligning with the Environmental and Social Management Framework of the project as per the Word Bank safeguards policies, the subproject involving huge civil works acquires ESIA. Thus, the State University of Zanzibar has set aside funds to undertake the ESIA, develop ESMP, and Health and Safety Management Plan (HSMP) for the proposed activities for the Proposed activities for the development of new building for School of Agriculture of SUZA at Tunguu campus Zanzibar that host both teaching theatres and laboratory.

1.2 ESIA Requirements

To sustain the long list of benefits of the HEET project and aligning with the Environmental and Social Management Framework of the project as per the Word Bank safeguards policies, and Zanzibar Environmental Management Act, the proposed project HEET project at SUZA, Tunguu campus will involve huge civil works that require ESIA study. According to the TOR, the project falls under Category A projects. Similarly, this ESIA study has been conducted in accordance with the World Bank Environmental and Social Framework as well as the relevant International Agreements, Conventions and Treaties. Moreover, the World Bank Environmental and Social Standard One (ESS1) emphases on the Assessment and Management of Environmental and Social Risks and Impacts requires the borrower to carry out an environmental and social assessment of the project to assess the environmental and social risks and impacts of the project throughout its life cycle. Other standards applicable to this proposed project prescribed in ESS2, ESS3, ESS4 and ESS10). Moreover, the Environmental Management Act of 2015 of Zanzibar requires all projects specified under the section 40 to be preceded with an ESIA, which is guided by the Environmental Impact Assessment Regulations of 2019. The regulations give the mandate to the Zanzibar Environment Management Agency (ZEMA) to oversee the ESIA and Environmental Audit (EA) processes toward the award of an Environmental Certificate/Permit (EP). The regulations require that the Environmental and Social Impact Assessment studies should be conducted by a Consulting Firm.

1.3 Rationale of ESIA Study

The ESIA study provides an analysis of the implications of building development to the social and biophysical environment in the project area. The study also provides a mitigation plan to prevent or minimize adverse impacts to be caused by the construction activities of SUZA buildings. The study addresses key Environmental and Social Aspects of the proposed project concerning other land uses and community life in Tunguu and South Region as a whole.

1.4 Rationale of Project

The enrolment trend of the students in Zanzibar has been increased year to year. The expansion in basic education is an overall outcome of the successful performance in basic education that demands for subsequent levels of education and especially higher education. In this regard, the main challenge is inability of the system to absorb the expanding number of graduates in basic education inspiring and capable of joining the higher education subsector. To overcome the challenge, the HEET project has been a solution that will finance the development of infrastructures, faculties, and quality assurance systems in higher education to facilitate rapid economic transformation in the country. Through HEET project, the Revolutionary Government of Zanzibar seeks to build requisite operational capacities of public university in order to empower it to be dependable driver for economic transformation by building its respective institutional visions, missions, objectives and core values.

1.5 SUZA HEET Project objectives

According to the HEET's Project Appraisal Document (PAD) of 2021, The development objective of the project is to strengthen the learning environment and labour market alignment of priority programs at the SUZA, Tunguu campus and improve the management of the higher education system. Prior to the construction of the proposed project, Environmental and Social Impact Assessment is required by World Bank and Tanzanian laws and governing in order to protect the environment and lives of people. The ESIA study shall be conducted in accordance with World Bank Environmental and Social Framework as well as Zanzibar's National Environmental Management Act of 2015 and its subsequent Environmental Management (Environmental Impact Assessment and Audit) Regulation.

In complying with World Bank's ESF (ESMF, ESCF, RPF, etc) and Standards as well as the provisions of the Environment Impact Assessment Regulations, (GN) No.474 of 2018, the project beneficiary (SUZA) has conducted this ESIA study to address: the nature of the project; its location; main processes; materials use, by products and their disposal; environmental impacts; and their mitigation measures. It also analyses the economical and socio-cultural impact of the project to the local community and the nation at large.

1.5.1 Specific Objective for SUZA HEET Project

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

i. To construct and equip (a) New Building for School of Agriculture that host Teaching spaces, offices and laboratory, (b) New Building for Laboratory complex to host science research laboratories, ICT labs, offices and teaching spaces and (c) two hostel blocks with capacity of 1000 (500 female and 500 Male students);
ii. To update curriculum and introduce innovative pedagogical methodologies;
iii. To promote applied research and innovation capacity;
iv. To build functional linkages with private sector/industry;
v. To strengthen use of digital technologies
vi. To promote self-generated income; and
vii. To build capacity of academic staff and university leadership.

1.6 Objectives of the ESIA

1.6.1 General Objective

The objective of the ESIA study is to foresee the environmental and social impacts of the activities of the proposed project before their actual implementation. The study, therefore, should address the social, economic and environmental issues associated with the project's activities. This study will also provide relevant Environmental and Social Management Plan to prevent or minimize adverse impacts, identify organizational capacities and competence needed and recommend the means of monitoring the effectiveness of the prepared ESMP.

1.6.2 Specific Objectives

The specific objectives of the ESIA study are as follows:

i. To identify, analyse and assess environmental and social impacts of the proposed construction project;
ii. Develop mitigation measures that aim at eliminating or minimizing the potential negative impacts and promote positive ones.
iii. To develop ESMP, and HSMP for construction, operation and maintenance phases of the Project and monitoring plan for ease of reference during project implementation.
iv. 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;
v. To recommend cost-effective measures for minimizing or eliminating adverse impacts of the proposed construction, operation and maintenance of the project;
vi. To establish baseline information on both the natural and built environment including socioeconomic/cultural conditions of the proposed project area.
vii. Consult with various key stakeholders impacted by the proposed project (including persons with disabilities, the elderly, and members of other marginalized/vulnerable groups), but not limited to the ones identified during scoping, to capture and consider their views and concerns regarding the proposed development.

1.7 Scope of the Work

The ESIA study is conducted in accordance with the ToRs including the applicable National Legislations as well as World Bank Environmental and Social Framework requirements. The study is required to carry out a comprehensive and detailed Environmental and Social Impact Assessment Report and submitted to the ZEMA in a format outlined in the ToR of this study. With respective to this aspect, the scope of this work will cover the following aspects:

i. Provide a brief description of the relevant parts of the project using maps of appropriate scale where necessary.
ii. Assembling, evaluating, and presenting baseline data on the relevant physical, environmental, and social characteristics of the study area.
iii. Making consultation with Government agencies, local communities and the private sector operating in the area affected by the project.
iv. Reviewing and describing the relevant policies, legislation, standards and regulations governing environment at international, regional and local levels with respect to the type and nature of the activity/project.
v. Identification and evaluation of key and potential environment and social impacts and risks resulting from the project development.
vi. Describing alternatives that were examined while developing the proposed project and identify other alternatives, which would achieve the same objectives
vii. Developing ESMP detailing actions and responsibilities for impacts mitigation and monitoring.

viii. Description of public participation and stakeholder engagement activities carried out to date.

1.8 Approach and Methodology of ESIA Study

1.8.1 Team of Experts for the ESIA

A multi-disciplinary team of experienced scientists and environmental professionals was assembled to carry out the required resource assessment, generation of baseline data, determination of potential impacts and recommendation of mitigation measures. An interactive approach among the environmental team members and other project professionals adopted. The ESIA study team utilized the checklist for data gathering, analysis, and presentation whereby team members conducted the reconnaissance investigations to determine the critical elements for analysis and the issues highlighted for the design and planning process. Team meetings were held to discuss the progress of investigations and analyses and facilitate integration of data toward an understanding of the systems at work in both the natural and built environment. Baseline data for the study area were collected using a combination of:

d. Site Reconnaissance
e. Analysis of the Maps and Plans
f. Review of Reports and background documents
g. Checklists
h. Field Studies
i. Public Consultations

1.8.2 Literature Review

Broader literatures were reviewed to understand the environmental and socio-cultural characteristics of Zanzibar and the project area. The study was also conducted through reviewing of different supplementary reports including but not limited to WB-ESF of 2018, Environmental and social legal frameworks, policies, ZEMA general ToR for conducting EIA/ESIA of October 2021, SUZA ToR for undertaking ESIA of 2022, Ministries' reports, city council and Central Districts' profile, education and health reports and many other published/non-published official and non-official documents. Others were collected from relevant stakeholders including government offices and others accessed via the internet (websites).

1.8.3 Field visit and direct observation

The field visits were essential to fully realize the scope of the project, the biophysical environment specific to the location and the socio-economic conditions in the project area. Both primary and secondary data were collected. Primary data were collected by direct measurement, observations and using semi-structured interviews with respective and targeted parties. Secondary data were obtained from various relevant sources of information such as Ministries' reports, city council and Central Districts' profile, education and health reports and many other published/non-published official and non-official documents.

1.8.3.1 Direct Physical Observation

Some facts were observed directly by the team members during the site visit. The information obtained from this technique assisted by the study team to have the starting

point during subsequent one-to-one interviews, focus group discussion and with other stakeholders. But also, the information obtained through observations was used for verification other facts and identification of the socio-economic and environmental condition in the study area.

Measurement of Baseline Air Quality Data

The ESIA team collected and analysed baseline air quality and noise level at the site, and adjacent areas within the SUZA compound. Five (5) sampling locations were selected based on relative distance to the proposed project sites, and existing multiple sources of air pollution in the campus. The methodology outlines the procedures and methods used to collect and analyse data for establishing air quality, baseline. A Baseline survey was conducted in the project area zone to collect levels of Particulate Matter (PM10 and PM2.5) Sulphur dioxide (SO_2) and Oxides of Nitrogen (NOx), baseline data on the locations. The sampling station were established along the potential areas within the selected sample locations.

Measurement of ambient dust levels ($PM_{2.5}$ and PM_{10})

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

Measurement of Ambient gaseous pollutants

Baseline levels of ambient gaseous pollutants were measured using a FD-4S Portable Multi-Gas Detector. The instrument operates using a heated metal oxide semiconductor. The gas molecules adsorb onto the heated surface where an oxidation-reduction reaction occurs causing a change in the electrical conductivity of the metal oxide. This change is proportional to the concentration of the gas of interest. Parameters measured included: carbon monoxide (CO) in parts per million (ppm), Oxygen (O_2) in %, and hydrogen sulphide (H_2S) in ppm. At the sites, the equipment was mounted at 1.5m above the ground. Three reading were collected at each sampling point, and the mean value was used as a representative value of that particular point. Results were compared with local and international standards.

Noise level Measurements

The measurements and assessment of environmental noise levels were determined in accordance to ISO standards using SLM-25 sound level meter. On taking measurements, the device-meter scale was set to the "A" weighed measurement scale which enables the devices to respond in the same manner as the human ear. Data were recorded at the interval of 1 minute at representative1 hour period and Equivalent noise levels were computed. where the sound level meter was at a distance of 3.5m from reflecting walls and set. Measurement made according to ISO 1996-1 and BS 7445-1 and ZNS 15: 2021. The device was stationed approximately 1.5m above the surface and at least 3.5m away from hard-reflecting surfaces. The Instrument was checked and calibrated prior to use.

Vibration measurements

As part of the project's environmental impact assessment, vibration measurements were conducted to assess the potential effects after construction activities on nearby structures and human health. This section provides an in-depth overview of the methodology employed to collect vibration data in accordance with ISO 4866, British BS 7385-2, and WHO standards, as well as the permissible standards for vibrations. The vibration measurements were conducted using the TASI TA8663 Digital Vibration Meter, a specialized instrument designed to accurately measure vibrations in accordance with international standards. The methodology followed the guidelines outlined in ISO 4866, British BS 7385-2, and WHO recommendations for vibration monitoring.

Meteorological conditions

Temperature and relative humidity were measured at the same sampling points used for ambient air quality, using the same device used to measure vibration. Six readings were recorded for each parameter and the average value was used.

Collection of biological information

The survey was based on qualitative method where by field observation using car for travelling within the entire proposed project site aided with ocular survey in places where a car couldn't go through was conducted. The vegetation types were classified basing on their physiognomic characterization. Identification of plant species was conducted directly in the field by botanist aided by various plant identification books includes Flora of Tropical East Africa series and various reports for the coastal forest vegetation especially Frontier Tanzania expeditions.

Existing two documents of CITES list (Convention on International Trade an Endangered Species of Wild Fauna and Flora) and the IUCN (International Union for Conservation of Nature) Red List of Threatened plant species, have been used to identify those plant species which falls in any of its categories and appendices respectively. Digital Camera was used to take photographs for further illustrations as well as GPS used for marking various important points.

Collection of socio-economic data

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

1.8.4 Stakeholder Engagement and Consultations

1.8.4.1 Identification of stakeholders

Identification of Stakeholders who have an interest in the project under consideration, to be consulted in addition to the statutory consulates, was undertaken at the outset. The following categories of Stakeholders were established and the list identified: -

i. Environmental Authorities;
ii. Sectorial government departments responsible for agriculture, energy, forestry, lands, etc. whose interests may be affected;

iii. District and local authorities;
iv. Groups representing users of the environmental resources;
v. Local community groups and resident groups.

1.8.4.2 Method of stakeholder involvement

The main methodologies used for stakeholders' consultation were Focus Group Discussions, particularly with government institutions, as well as Open discussions with local communities and Non-Governmental Organizations. Consultations were conducted in Stakeholders' offices, as well as proposed project area and Sheha's office for local communities of Tunguu, Jumbi and Ubago. Stakeholders' comments were documented and consultation sheets signed by the stakeholders.

1.9 Project Impact Assessment

1.9.1 ESIA Process and Approach to the Assessment

The assessment for the proposed Project has been undertaken in accordance with the guidelines and procedures noted above. It has followed a systematic process of predicting and evaluating the impacts. The Project is expected to have on the physical, natural, cultural, social and socio-economic environment. The proposed and identified measures ensure that the developer is able take to avoid, reduce, remedy, offset or compensate for adverse impacts, and to provide benefits.

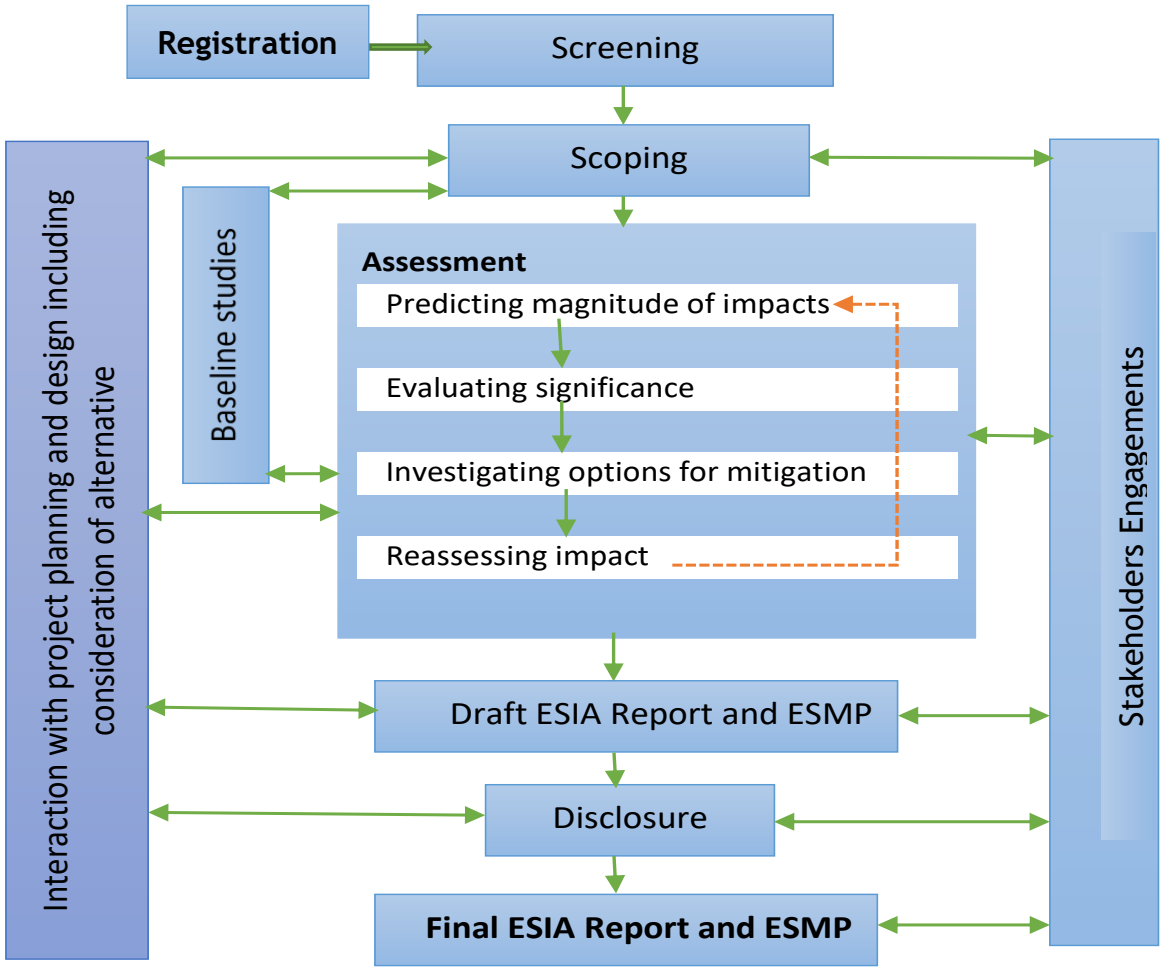

Figure 1. 1: ESIA process and assessment approach

1.9.2 Impact Identification

The checklist method has been used to identify the impacts and to recommend mitigation measures. Further, the environmental impact matrix method has been adopted to identify impacts of major concern. A key guiding assumption in this study is that the project will be designed, constructed, operated and maintained with due care for safety and environmental matters using current and practical engineering practice and/or Best Available Technology Not Entailing Excess Cost (BATNEEC). The implementation schedule of the mitigation measures is summarized in the ESMP.

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

1.9.3 Impact significance and evaluation

Potential project impacts were evaluated during mobilization, construction, operation and decommission phases. Impact significance were dtermined using both project and environment factors.

Table 1. 1: Factors considered in ascertaining significance of impacts

General	Ecological	Social
- Magnitude - Extent - Non-conformity with environmental standards - Level of public concern - Social impacts resulting from environmental change - Scientific and professional evidence concerning: - resource loss/ecological damage - negative social impacts - foreclosure of land and resource use options - Environmental loss and deterioration - Probability and acceptability of risk - Environmental sensitivity	- Reduction in species diversity - Habitat loss, degradation or fragmentation - Affecting threatened, rare and endangered species - Impairment of ecological functions	- Displacement of people - Human health and safety - Decline in important local resource - Loss/gain of valued area - Disruption of community livelihoods - Demands on services and infrastructure - Public concern - Political concern

1.9.4 Identifying Mitigation and Management Options

The options for dealing with identified and predicted impacts were considered. This enabled the study team to analyse proposed mitigation measures. A wide range of measures have been proposed to prevent, reduce, remedy or compensate for each of the adverse impacts

evaluated as being significant. Analysis of the implications of adopting different alternatives was done to assist in clear decision-making.

1.10 The ESIA Report Outline

The structure of the report should include:

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

References
Appendices

CHAPTER TWO

2 PROJECT DESCRIPTIONS

2.1 Project Location and accessibility

The proposed buildings for hostels, School of Agriculture (SoA) and Lab complex are located within the SUZA in Central District, Southern Region in Tunguu campus. It is accessible via road linkages connected to Karume road which has already been constructed to bitumen standard. The road connection will support the transport of building materials to the project site. The proposed project area is located about 10 km from Zanzibar International Airport and 15 km from Zanzibar stone town. The project sites fall within the coordinates 533923.30 m E. and 9314506.59 m S (Figure 2.1).

Figure 2. 1: Location Map of SUZA Project area, (Source: Google Earth, October, 2023)

2.2 Existing Situation of the SUZA Project Sites

The area is suitable for the proposed project due to the fact that there is no any matter such as preserved land, endangered fauna and flora etc. which hinder the establishment of the proposed SUZA School of Agriculture. Currently, the area is clear with no any structure development. The area is still in its natural status, covered with tropical shrubs. The site is near the Institute of Public administration (IPA) and the Zanzibar High court building premises.

2.2.1 Proposed Lab Complex building

The proposed area for construction of Lab complex building is located between administration building and SUZA library building. Within the proposed area, there is building (it was used as canteen) and open rectangular ground tank (it was used as water

storage tank) which are currently not used. During construction of proposed lab complex building, this an unused canteen will be demolished to pave the way for new lab complex building while open rectangular ground tank will be used as water storage tank during construction of the proposed project. Other area within the proposed area is occupied by grasses. On the west side of the proposed site is bounded with the gravel road which will be used during transportation of the construction material during construction of the proposed project. SUZA had planned to open other gate purposely for construction machine and vehicles to minimise/prevent interaction of construction machine/vehicles with students/SUZA Staffs during implementation of the proposed project. The figure below shows the proposed area for lab complex building together with existing building and open underground tank.

Figure 2. 2: Proposed area for construction of lab complex building (Source: Google Earth accessed on 24th Nov. 2023)

2.2.2 The Proposed Hostel facilities.

The proposed area for construction of two hostel facilities with three storey each (one block for Men and one for woman) is located at south part of the SUZA Tunguu campus area. The site can be accessed through gravel road located Westside of SUZA Tunguu campus area. Currently the proposed site is occupied with small shrubs. The site is almost coved by grasses. No any endangered flora or fauna observed at site. No any structure existing at the proposed site but the site is within block fence of SUZA Tunguu campus. The proposed site for hostel facilities is located away from existing student classes or administration block. The gravel road located along with SUZA Tunguu campus at west side will be used to transport material and machine to the proposed hostel site. These will help to prevent any interaction of construction activities with dairy SUZA Tunguu activities.

2.2.3 Proposed School of Agriculture (SoA)

The proposed area for construction of School of Agriculture building is located at south part of the SUZA Tunguu campus area. The site can be accessed through gravel road located Westside of SUZA Tunguu campus area. Currently the proposed site is occupied with small shrubs. No any endangered flora or fauna observed at site. No any structure existing at the proposed site but the site is within block fence of SUZA Tunguu campus. The proposed site for hostel facilities is located away from existing student classes or administration block but it is located nearby power station building. The gravel road located along with SUZA Tunguu campus on west side will be used to transport material and machine to the proposed SoA site. This will help to prevent any interaction caused by construction activities against dairy SUZA Tunguu activities.

2.3 Project Proponent and Land Ownership

The project proponent is the State University of Zanzibar. SUZA has been given a certificate of Right of Occupancy issued by Ministry of Lands, Housing, Water and Energy, Zanzibar, for the land parcel situated at Tunguu area in the Jumbi Shehia under Central District measuring 682,000.00 square meters, identified as Plot No. 154, depicted with boundary demarcations as per the registered survey plan numbered S.213/2009, on which the University is established and also possesses the site plan showing all boundaries. SUZA has a certificate of Right of Occupancy for the land parcel of 68.2ha issued on 20th June, 2014 (Appendix I).

2.4 Project Infrastructures and the Key components

The proposed project will comprise construction of lab complex building, two block hostel facilities, and School of Agriculture (SoA). The proposed key components of each project are described as follows:

2.4.1 Proposed project Student Hostel

The hostel facility is primarily established to provide accommodation to the students pursuing their academics in the SUZA. Along with the accommodation facilities to the students, certain other additional complimentary facilities are also provided. The accommodation facility for the students will be created as part of the project and each room will have the capacity to house 4 people and would have the standard facilities as in case of any hostel in the campuses. The key spatial provisions that are proposed for the Student Hostel Project are as follows:

i) **Hostel blocks separately for** Boys Hostel and Girls Hostel
ii) **Mess/ Canteen separately for** Boys Hostel and Girls Hostel
iii) **Commercial Spaces**

- Convenient / Tuck Shops (separate for boys and girls)
- Shopping Center (Common for boys' and girls' hostel)

iv) **Other facilities for each respective hostel (separately for boys and girls)**

- Central common recreational room
- Mini common/study rooms
- Washing and Drying Area
- Hostel Parking- The parking facility to be created for the students as well as other visitors intending to use the facility including commercial area.

- Playing grounds for football and netball/basketball

The buildings will accommodate bedrooms, Dining halls, Common halls, Hall manager office, toilets facilities, laundry, ablution areas, and staircase and circulation area. Additional supporting facilities to be included are cafeteria, gymnastics rooms, parking, sports ground and shopping centre.

2.4.2 Proposed School of Agriculture (SoA)

The proposed project will constitute the construction of two floor building premises which will involve 6 lecture rooms, one library for 100 students, 6 laboratory facilities and 50 staff office facilities. It will also constitute one multipurpose hall for 300 students. The project will occupy the area 200 m^2. These new building for School of Agriculture will be carried out through Higher Education for Economic Transformation (HEET) projects funded by World Bank. The project is intended to improve staffs and students to have a good and conducive teaching and learning environment as well as providing an opportunity for conducting agricultural related researches with modern technologies.

Table 2. 1: Main components of the proposed School of Agriculture Building

FLOOR LOCATION	COMPONENT	FUNCTION AND CAPACITY	AREA
Ground floor	Lecture Hall	The hall will accommodate about 300 students at once. The hall will be used for teaching student various courses.	1,300 Sqm
	Washrooms	About 12 washrooms are available at the ground floor for male and female. The washroom will accommodate also people with special needs.	
	Animal science laboratory	Three labs are available at the ground floor know as animal breading and nutrition, anatomy and pathology, and food science and human nutrition. The lab will be used to conduct different research.	
	Store	For storing different items.	
First floor	Office and meeting room	Five offices and one meeting room are located at first floor. The office will have capacity of accommodating about 16 SUZA staff and the meeting room will have capacity of accommodating 12 people at once.	1,105 Sqm
	Store	Storing different items	
	Player room	Will be used for those who are in need of praying	
	Washrooms	About 12 washrooms are available at the first floor for male and female. The washroom will accommodate also people with special needs.	
	Animal science laboratory	Three labs are available at the ground floor known as Microbiology and Parasitology, Entomology and pathology,	

		and soil science. The lab will be used to conduct different research.	
Second floor	Library	The library will have capacity of accommodating about 100 students at once.	1,105 Sqm
	Washroom	About 12 washrooms are available at the second floor for male and female. The washroom will accommodate also people with special needs.	
	Store	For storing different items	
	Player room	Will be used for those who are in need of praying	
	Conference hall	The conference hall will have capacity of accommodating about 70 people at once. Different conference will be conducted at this hall.	
	Laboratory computer room	Two identical computer rooms are available at this floor of each have the capacity of accommodating 32 users at once.	

The project is intended to improve staffs and students' access to conducive teaching and learning environment as well as providing an opportunity for conducting agricultural related researches with modern technologies.

2.4.3 New building for laboratory complex at Tunguu Campus

The proposed project will include the construction of a Laboratory Complex block with built up area of 2,673.75 m^2. The proposed building will have nineteen ICT and Science Basic Laboratories rooms, five for Chemistry, five for Biology, five for Physics and four for ICT. The chemistry laboratories include of Organic Chemistry lab, Inorganic/Analytical lab and Physical chemistry lab, while biology laboratories are including Botany, Zoology and Microbiology labs. The five physics laboratories comprise of Optics Lab, Electricity and Electronics Lab and Physics general Lab. The four ICT labs are including GEO ICT, Multimedia and Remote Sensing labs.

Table 2. 2: Main components of the proposed Lab. Complex building

FLOOR LOCATION	COMPONENT	FUNCTION AND CAPACITY	AREA
	Lecture Hall	The hall will accommodate about 208 students at once. The hall will be used for teaching student various courses.	
	Washrooms	About 18 washrooms are available at the ground floor for male and female. The washroom will accommodate also people with special needs.	
	Chemistry laboratory	Four labs are available at the ground floor known as Inorganic, Organic, analytic and Organic. The lab will be used to conduct different research.	
	Store	For storing different items.	

Ground floor	Nursing room	In case of emergency, students will be getting medical assistant before transported to hospital for further treatment.	3,195 Sqm
	Breast feed room	For those females students who had child, the will use this place to feed their child when they are in university.	
	Meeting room	The room will be used to conduct meeting between staffs and it will have capacity of accommodating 10 people at once.	
	Pool office	Pool office will be 8 in number and will have capacity of accommodating about 35 SUZA staffs.	
First floor	Pool office	Pool office will be 6 in number and will have capacity of accommodating about 28 SUZA staffs.	2,737 Sqm
	Store	Storing different items	
	Office	Three offices will be located at first floor and will accommodate about 7 SUZA staffs.	
	Player room and ablution area	Will be used for those who are in need of praying	
	Washrooms	About 18 washrooms are available at the ground floor for male and female. The washroom will accommodate also people with special needs.	
	Biology laboratory	Four labs are available at the first floor known as Botany, biology, Zoology and Microbiology. The lab will be used to conduct different research.	
Second floor	Lecture room	Four lecture rooms will have capacity of accommodating about 99 students at once for each one.	2,737 Sqm.
	Washroom	About 18 washrooms are available at the ground floor for male and female. The washroom will accommodate also people with special needs.	
	Store	For storing different items	
	Player room and ablution	Will be used for those who are in need of praying	
	Lecture hall	The hall will have capacity of accommodating about 208 people at once. Different conference will be conducted at this hall.	
	Office	Four office will available at this floor, the office will accommodate about 8 staffs	
	Physics Laboratory	Four labs are available at the second floor known as Optic, Electrical, general and electronics. The lab will be used to conduct different research.	
Third floor	Board room	Two board rooms allocated in this floor, different board meeting will be conducted.	
	Geo ICT Lab	The room will have adequate computer which will be used for ICT purpose.	
	Lecture	The room will have capacity of accommodating 208 students at once	

	Seminal	6 seminal rooms will be available at this floor.	2,737 Sqm.
	Washroom	About 18 washrooms are available at the ground floor for male and female. The washroom will accommodate also people with special needs.	
	Multimedia and Communication lab		
	Office	Three offices will be located at this floor and will have capacity of accommodating about 7 staffs.	

The building also will have twenty offices for staffs, ten rooms for lecture/seminar; the room will be big enough to accommodate at least 100 students each and 2 conferences room. The building will also have big GEO ICT lab, a GIS/Remote Sensing Lab, one room for data Centre, one Communication and Networking Lab as well as one Multimedia Lab.

In addition to that, the building will have Student lounge of 100 m^2, research laboratories for postgraduate and researchers these will include a lab for Analytic Chemistry and Organic Chemistry, Biology Labs and Physics labs which include the Material Science Lab and Applied Nuclear Physics Lab.

Other additional complimentary facilities are also provided including;

- Emergency eye wash and safety shower equipment.
- Compressed gas cylinders.
- Flammable liquid storage cabinet.
- Hazardous materials storage and management.

2.5 Project Design

The proposed Buildings for Hostel, lab complex and School of Agriculture (SoA) are constantly subject to several climatic and environmental elements (wind, sunlight, temperature, rain, earthquakes, and other factors). During the preparatory phase of the project, SUZA engaged experts in assessing and understanding risk and integrating risk management in development planning of the SUZA. Several studies were conducted during the preparatory phase of the project, as part of Risk Hazard Assessment (RHA). The studies include; geotechnical investigation, topographical surveys and environmental and social impacts assessment. Furthermore, with inputs from these studies, the project design took into consideration aspects of climate change risks, disaster risk management, gender, and occupation health and safety.

2.5.1 Climate Change risks mitigation and adaptation in the Project Design

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

- ***Park and open space:*** A park and public open spaces are planned to maximize the tree canopy cover and shade provided by trees in the area and more provision of

ecosystem services. In the open spaces, native plants have been recommended to add the benefit of being useful for storm water treatment and infiltration in the valley, which is located in the central part of the site.

- ***Greenery walkways:*** The design maximizes pedestrian movement and minimizes motorized transport within the site in order to reduce air emissions (greenhouse gasses (GHGs)) and maximizing Carbon sequestration. Walkways are provided to restrict free movement that causes vegetation destruction in the site, and reducing land cover important for carbon sequestration. Trees are proposed to be planted along the vehicular access road and footpaths to improve landscape and reduce effects of sun radiation during the day. Furthermore, trees proposed to be planted around playing area such as football ground and netball ground.

- ***Botanical garden:*** The zoning of different land uses at the proposed project sites was guided by inner roads, which act as veins dispersing from the artery and provide the botanical garden, which acts as the heart of the whole site. The botanical gardens which include the green belt and conservation area, the constraints areas, and the University Park is the breathing space for the whole site and an urban filter in terms of urban climate. Further, the botanic garden will allow cross ventilation and other sanitary waste treatment. The proposed project will have botanic garden between each project site of which will also act as the resting place to students.

- ***Green areas:*** Green areas are distributed in every block to allow cross fresh air into the buildings. Due to the topographical nature and natural vegetation cover, green belt and conservation zone intend to preserve the ecosystem and control land degradation. Vegetation will reduce soil erosion in sloping area and all areas prone to soil erosion.

- **The building with low energy use**; Provisions for adequate openings for cross ventilation, that will ensure easy flow of clean air and reduce energy use (thus reducing emissions); provisions for motion sensors in public areas, to enable auto switch ON/OFF of lights; installation of *presence sensors* in offices; proper orientation to reduce indoor discomfort and capture natural air as much as possible and minimization of the sun effects (installation of fins; and provisions for solar lights along the pathways for sun shading); maximizing the potential of utilization of renewable energy options such as solar and wind; Utilization of biogas from the wastewater treatment plant for cooking; buildings to be oriented and constructed to take advantage of natural lighting and cross ventilation as a means of minimizing energy consumption during operation.

- **The buildings with low footprint.** This increases green spaces; and accommodation of rainwater harvesting, storm water and waste management systems and embracing water-efficient processes.

2.5.2 Disaster risk management

The proposed project shall have provisions for fire prevention and firefighting facilities. Also, the building shall have provisions for solid waste and liquid waste management for diseases prevention. In addition, two possible access roads shall be used to ensure easy walkability and vehicular access to and from the building to avoid car accidents. Currently, SUZA Tunguu campus has two gate entrances which used to enter into the SUZA premises. Administration has the plan to add one gate entrance for accessing student hostels and School of Agriculture building. The roads shall be safely connected to the parking area huge enough to accommodate cars. SUZA shall have an emergency management plan that assigns the responsibilities for various emergency tasks, specifically to WHO does, WHAT, WHEN AND HOW.

2.5.3 Gender inclusivity

The SUZA proposed buildings shall be developed to be smart and friendly to gender, including considerations of persons with special needs (e.g. physical, learning impairment, emotional and behavioural). These include provisions of lamps, toilets, etc.

2.5.4 Safety and Health Issues Requirements

Occupational health and safety issues are mainly related to the risks associated with fire outbreaks in the temporary site facilities or in an operational phase or physical accidents caused by vehicle or tanker trucks. The project will comply with the ILO codes of conducts as well as the national OSHA regulations. Procedures from the Occupational Safety and Health Act of Zanzibar will be complied with. The World Bank Environment, Health and Safety Guidelines (WB-EHS) will also be followed as a safety provisions benchmark.

2.5.5 Occupational health and safety (OHS)

2.5.5.1 OHS During pre-construction phase

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

2.5.5.2 OHS During construction phase

SUZA 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 worker's 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 hazards and hazard management will be provided to workers and particularly as stipulated in the general World Bank ESHS guidelines during construction the contractor will be required to put emphasize on training related to specific hazards such as working at height, ergonomic, slips and falls, dust and moving machinery and any other relevant hazard that will be identified during construction.

2.5.5.3 OHS During operation phase

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

2.5.5.4 OHS during decommissioning phase

If decommissioning has to happen, it is anticipated that the project will have hazards resulting from noise and vibration that may be caused by the operation of pile drivers, earth moving and excavation equipment, concrete mixers, cranes and the transportation of equipment, materials and people. According to IFC/WB Guidelines specifically the general Environmental Health and Safety guidelines, slips and falls on higher elevation associated with poor housekeeping, such as excessive waste debris, loose decommissioning materials, liquid spills, and uncontrolled use of electrical cords and ropes on the ground, are also among the most frequent cause of lost time accidents at decommissioning site. To control these challenges during decommissioning phase, the contractor shall be required to have a clear understanding on the historical use of the land with regard to the potential presence of hazardous materials or oil prior to initiation of decommissioning activities, preparing plans and procedures to respond to the discovery of contaminated media to minimize or reduce the risk to health, safety, and the environment but equally important to provide adequate and the right PPEs for the anticipated hazards during decommissioning.

2.6 Project Design Criteria

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

i) Easy vehicular access to and from the building,

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

2.7 Development Conditions

The proposed project is in line with the priority of the fifth phase government on industrialization and Vision 2025 in general, requires higher learning institutions to produce high quality, ready to use skilled labour. SUZA ought to expand its physical infrastructure to accommodate this need. Establishment of the hostel blocks, School of Agriculture and Laboratory complex building is, therefore, characterized by the fulfilment of the objectives and requirements of the HEET project. The HEET project required the SUZA project to be established and operated within the project time frame.

2.8 Project Activities

2.8.1 Project Planning Phase

This in accordance with the Zanzibar Development vision 2050 and SUZA Strategic Plan to enhance its contribution in building the economy of Zanzibar and Tanzania in general. SUZA has embarked on this project with the realization of the responsibility to enhance the principles of sustainable development. The Plan has demonstrated the main project components of SUZA including the establishment of School of Agriculture, Hostel blocks and Laboratory complex building at Tunguu campus. It has outlined the required funds, source of funds, quality assurance; results frame works, Budget plan, Procurement plan and five-year project cycle among others.

Preliminary engineering planning determines the approximate location of the building premises with consideration of the principles underlying the prevention of negative impacts to the environment. Planning is performed at a level of detail which ensures that the plan is technically, financially and environmentally feasible. Since Zanzibar legislation requires an ESIA, the proposed project environmental impacts are assessed according to the Zanzibar Environmental Management Authority Act, No. 3 of 2015 and its corresponding regulations during the preliminary engineering planning phase.
During project planning phase only, paper works are involved as summarized below:

- Evaluation of project concepts and alternatives selection,
- Design of all project components
- Topographic survey
- Geo-technical Investigations
- Soils and Materials Investigations
- Carrying out ESIA of the project
- Tendering for construction works
- Approval of Engineering designs and Environmental Certification

Duration:
This stage will be executed for the period of maximum six months.

2.8.2 Mobilization/Pre-Construction Phase

This initial phase of project implementation will commence when all necessary permits and preparatory processes (including works tender) have been successfully completed. Furthermore, activities that will be included in this phase are as follows:

- mobilization of the labour force, equipment
- Preparation of temporary campsite/offices;
- Transportation of materials, equipment and machinery to the site;
- Stockpiling of materials;
- Recruitment and deployment of construction work force;
- Securing the way leave;
- Identification of source of local materials i.e. gravel, stone and sand for concrete (Borrow pit) and water;
- Preparation of site construction materials; and,
- Security and safety.

Duration:

The timeframe for completion of the mobilization activities will last for five months before actual project work implementation.

2.8.3 Construction Phase

The construction phase will take place subsequent to the issuing of Environmental Impact Assessment Certificate and once a construction contract with a suitable contractor is signed. The following are the main activities to be executed on the site during construction phase of the project

- **Earthworks (site clearance)** - This shall be done by means of motor grader. The proponent shall ensure removal of only necessary trees as possible and other are left as it is. This will also ensure that the drainage pattern of the site is not interfered with.
- **Foundations excavation**- Most part of the site is covered with vegetation (grasses, trees and shrubs). The same will be removed and disposed of by a licenced waste handler to pave way for the construction.
- **Material transportation**- Materials (fine and coarse aggregates) from quarries will be transported by trucks to the construction site. Water will be brought to the site by tanker trucks from within SUZA proposed project areas. Other materials like cement, timber and reinforcement bars will be transported by trucks from Zanzibar vendors/ Dar es Salaam to the construction site. material for construction will be entered at SUZA campus through special entrance which will not interfered with any other users except for construction purposes.
- **Material Storage-** Materials like aggregates and sand will be stored at the site ready for use. Cement and reinforcement bars will be stored in special storage rooms. Timber will directly be used at the required areas and consequently there will be no stockpiling of timber at the camp sites. Fuel will be stored in drums in quarantined areas.

- **Masonry, Concrete works and related activities**- The construction of the building walls, foundations, floors, pavements, drainage systems, perimeter fence and parking area among other components of the project will involve a lot of masonry work and related activities. General masonry and related activities will include stone shaping, concrete mixing, plastering, slab construction, construction of foundations, and erection of building walls and curing of fresh concrete surfaces. These activities are known to be labour intensive and will be supplemented by machinery such as concrete mixers.
- **Steel Structure works**- The buildings will be reinforced with structural steel for stability. Structural steel works will involve steel cutting, welding and erection.
- **Roofing and Sheet metal works**- Roofing activities will include sheet metal cutting, raising the roofing sheets and structural timber to the roof and fastening the roofing materials to the roof.
- **Electrical Work**- Electrical work during construction of the premises will include installation of electrical gadgets and appliances including electrical cables, lighting apparatus, sockets etc. In addition, there will be other activities involving the use of electricity such as welding and metal cutting.
- **Plumbing-** Installation of pipe-work for water supply and distribution will be carried out within all units and associated facilities. In addition, pipe-work will be done to connect sewage from the premises to the effluent treatment plant.
- **Landscaping-** To improve the aesthetic value or visual quality of the site once construction ceases, the proponent will carry out landscaping. This will include establishment of flower gardens and lush grass lawns where applicable and will involve replenishment of the topsoil. It is noteworthy that the proponent will use plant species that are available locally preferably indigenous ones for landscaping.

Duration:

This stage will be executed for the period of maximum two years

Types, Amount and Source of Project requirements

The main construction materials for the Hostels, School of Agriculture and lab complex building and its associated premises include sand, gravel, hard stones (aggregates), reinforcement iron bars and water. Most of the materials shall be obtained locally (within Zanzibar or Tanzania mainland), materials that are obtained locally shall be imported.

Table 2. 3: Types, amounts and sources of project requirements during the construction phase

Requirements	Type	Source	Quantity (Estimates)	Mode of Transport
	Aggregates	Unguja/Zanzibar	2,000-3,000m^3	Trucks traveling on roads
	Sand	Unguja/Zanzibar	6,000-10,000m^3	Trucks traveling on roads
	Cement	Unguja/Zanzibar / local vendors	3,000-4,000 tons	Trucks traveling on roads

Requirements	Type	Source	Quantity (Estimates)	Mode of Transport
Raw Materials	Water	Borehole (ZAWA)	✓ 200 m^3 for construction activity and ✓ 12 m^3/day for domestic use (assuming that 200 people will demand 60 l/day)	✓ Trucks will serve the campus in seasons of intermittent supply ✓ The water supply infrastructure plan will comprise two water storage tanks and a distribution network that will serve the campus during operation phase
	Reinforcement bars	Unguja/Zanzibar/ local vendors	1,500Tons	Trucks traveling on roads
	Timber	Unguja/Zanzibar/ local vendors	30 Tons	Trucks traveling on roads
Manpower	Skilled	Contractor	40	Communal buses
	Unskilled	Local	210	Communal buses
Equipment	Excavator	Contractor	1	Trucks traveling on roads
	Bulldozer	Contractor	1	
	Motor grader	Contractor	1	
	Plate compactor	Contractor	1	
	Trucks	Contractor	5	
	Construction Crane	Contractor	2	

Source: *Consultant Analysis, 2023*

Transportation

Materials (fine and coarse aggregates) from quarries will be transported by trucks to the construction site. Water will be taped from SUZA Boreholes or moved by water trucks when a need arise. Other materials like cement, timber, and reinforcement bars will be transported by trucks to the construction site. This is another source of environmental pollution and one of the social and health risks due to dust splits and accident risk during the truck movement.

Types, Amounts and treatment/disposal of Wastes

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

Table 2. 4: Types, amounts and treatment/disposal of wastes during the construction phase

Waste	Types	Amount	Treatment/ Disposal
Solid Waste (Degradable)	Vegetation	Approximately 5000m^3 of biomass	✓ The logs shall be given to people to be used as fire wood ✓ Other vegetation will be left at site for soil conditioning
	Remnants of timber.	Estimated to be 500m^3. The estimate is based on activities expected to generate remnants of timber such as formworks	They shall be given to people to be used as fire wood
	Scrap metals, drums, plastic, tins and glasses.	10 – 15 kg/day	Sold to recyclers
	Food remains, cardboards and papers	72/day (based on generation rate of 0.3kg/day/ person and 240 people)	To be collected in the large skip bucket at site ready to be disposed at the designated dumpsite at Kibele area
Solid Waste (Non-Degradable)	Demolition waste and Spoil Soil	100 m$^{3.}$ The estimate is based on the area to be excavated	This soil shall be stock piled along the foundation trenches. The soils shall be used to reinstate site at the end of construction activities
Liquid waste	Sewage	7.36m3/day (based on generation rate of 32l/day/person and 240 people)	Septic tank

Source: *Consultant Analysis, 2023*

2.8.4 Demobilization Phase

Demobilization of temporary structures will be done for proper restoration of the construction sites, restoration of borrow pits to required grades, and removing all temporary structures. Other activities include;

- Reinstatement of the excavated area(s) including borrow pits;
- Removal of any remaining construction materials;
- Use of spoils to reinstate the excavated area;
- Remove spoiled material from the sloppy areas to avoid the movement of soil and sediment
- Clearing of stock yard;
- Transportation of equipment and machinery;
- Rehabilitation or restoration of the part of campsite which will not be used; and,
- Security and safety.

Types, Amounts and Sources of Project requirements

Types, amounts and sources of project requirements during the demobilization phase are shown in Table 2.5:

Table 2. 5: Types, amounts and sources of project requirements during the demobilization phase.

Requirement	Type	Source	Amount
Manpower	Skilled	Contractor	5
	Unskilled	Local area	30
Water	Domestic water use (drinking and sanitation hygiene)	Borehole/ZAWA	2.1 m^3/day. Assuming the phase will have 35 workers each demanding 60 l/day
Equipment	Bull dozer	Contractor	2
	Motor grader	Contractor	1
	Plate compactor	Contractor	1
	Tippers	Contractor	1

Source: Consultant Analysis, 2023

Types, Amounts and treatment/disposal of Wastes

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

Duration:

This stage will be executed for the period of maximum two months

2.8.5 Operation Phase

The operation phase will involve:

- Operation of the Hostel blocks, School of Agriculture building and lab complex building;
- Periodic servicing of the facilities.
- Tenancy/Occupancy;
- Imparting Knowledge;
- Occupational health and safety management;
- Good housekeeping of the area;
- Project Maintenance.

Duration:

This stage will be executed for the period of more than fifty years

Types, Amounts and Sources of Project requirements

Types, amounts and sources of project requirements during the operational phase are shown in Table 2.6.

Table 2. 6: Types, amounts and sources of project requirements during the operational phase

Requirements	Type	Source	Quantity
Water	Borehole	ZAWA	Estimated; 15,000 – 25,000 litres per day
Energy	Electricity	• ZECO (National Grid) • Standby generator at the Site	• 300kwhr per day • 30000kVA

Source: Consultant Analysis, 2023

Types, Amounts and treatment/disposal of Wastes

Types, amounts and treatment/disposal of wastes during the operation phase are shown in Table 2.7.

Table 2. 7: Types, amounts and treatment/disposal of wastes during the operation phase.

Waste	Types	Amount	Treatment/ Disposal
Solid Waste (Degradable)	Food remains, cardboards and papers	0.525tons/day (based on generation rate of 0.35kg/day/ person, proposed projects intended to accommodate (1200 Students) people, worst case scenario)	•Sorting will be done onsite and a large refuse collection point shall be provided to facilitate collection of Solid wastes from Building. •The solid waste from the refuse collection point shall be collected by Municipal/Private trucks for disposal at the designated dumpsite found in Kibele area
Solid Waste (Non-Degradable and recyclable)	Scrap metals, drums, Tins, glass and plastics.	5-10 kg/day	Sorting will be done at site to reduce waste fractions Scrap metals and drums will be sold to Recyclers disposal at the designated dumpsite, currently at Kibele area
Liquid waste	Sewage	60.0m^3/day (The proposed projects intended to accommodate 1250 people, water consumption rate of 60L/capita/day and wastewater discharge factor of 80%) and 70% will use facilities	All the liquid wastes from toilets, kitchen, bathrooms etc. will be collected and directed to the Treatment plants –Septic tanks and soak away pit and recommended Up flow Anaerobic Sludge Blanket (UASB)

Waste	Types	Amount	Treatment/ Disposal
		Q= 0.8*(60*((1200 Students +50 (staff)) people, worst case scenario) *0.7 =52,500 l/day	
Electronic wastes	Worn out computers, telephones and other non-functioning electronics	-Assumption is that 1 person may generate 5kg of E-waste annually and 70% of the occupants will produce the E waste, therefore E-wastes generated will be: ((1250)) people, worst case scenario) *5= 4,375 kg/year	Service and maintenance of vehicles will be done at designated garages -Sorting of wastes will be done onsite to allow recycling of electronic wastes since these wastes contain important materials such as cupper etc. sorted recyclable e-wastes will be sold to recyclers
Hazardous waste	-Oils and greases -Chemicals -Scrap metal -Tins, -glass -Medical waste		- Special hazardous treatment - Authorized dealers for disposal of hazardous waste will be deployed/contracted by SUZA.

Source: Consultant Analysis, 2023

2.8.6 Decommissioning Phase

Decommissioning is not anticipated in the foreseeable future. However, if this will happen, it may entail change of use (functional changes) or demolition triggered by change of land use or malfunctioning of infrastructure.

The following are the main activities to be executed on the site during demolition phase of the project

- Demolition Works- The existing buildings on site shall be manually demolition by using labourers. Equipment such as hammer, shovel, trolleys shall be used. The demolition wastes shall be used for levelling considering that some sites have a gentle slope.

Duration

The duration of this phase will be Three (3) months.

2.9 Project Resources and equipment Used

2.9.1 Construction Materials

The main construction materials for the proposed project include sand, gravel, hard stones (aggregates), reinforcement iron bars and water. Gravel for concrete and natural stones for

construction can likely be sourced at the project area. Almost all of the materials shall be obtained locally within Zanzibar and may be sources from Tanzania Mainland. Quality of the material appears to be good, and required quantities make it more efficient to establish a small quarry and to bring in a rock crusher, rather than transporting this material in from the next town or quarry. However, laboratory testing of the material prior to use as aggregate is strongly recommended, particularly in view to potential alkali-aggregate reactions. Sand in sufficient quality and quantity will be brought to the site from supplier. However, further investigations by the contractor might also reveal closer sources.

2.9.2 Human Resources and labour

Based on preliminary estimations, at the peak of the construction phase, the approximate contractor crew at the site shall be 30-210 people. However, only a few of these shall be accommodated at site. It is expected that most of them will be villagers residing in the Tunguu area/Jumbi Shehia. The qualified and interested people from project surrounding area shall register their name and skilled at Shehia office. SUZA PIU with collaboration with Project Contractor and project consultant shall be source from Shehia office for further employment procedure.

2.9.3 Power Supply.

The proposed site for the SUZA Tunguu Campus is connected to the Zanzibar National grid of ZECO. The transmission line of ZECO has passed across the proposed project site, thus making easy for connection. Currently SUZA Tunguu campus uses an average of electricity demand of 2800 KVA in a month. It is expected that the power consumption of the SUZA Tunguu Campus will increase when the proposed project buildings will be in entire operation. To meet the SUZA Tunguu Campus demand of electricity, the project design has provision for installation of backup power (generators) to operate in zones with a capacity of 450KVA to serve administrative and academic purposes only.

2.9.4 Source of water for the project

The main source of water in Tunguu area is from Zanzibar Water Authority (ZAWA). However, SUZA has its own boreholes (three boreholes available at SUZA Tunguu campus but only two are working currently, water for construction activities will sourced from the borehole which are not used currently) that supports for the water supply. During construction phase, water will be sourced from SUZA boreboles though evaluation of the water quality shall be done to determine whether its quality fits usage in construction works.

2.9.5 Telecommunication

Zanzibar is now well connected to internal and external areas from the available operating communication networks of T.T.C.L, Tigo/Zantel, Vodacom, Halotel and Airtel. Many remote areas of the islands are well accessible to these networks, where in some area's internet Services are equally available. The project will use some of them for effective communication. The aim is to enable SUZA premises to have reliable communication network.

2.9.6 Required Permits

The proposed project implementation shall be carried out in accordance with international and Tanzania and Zanzibar environment, health, safety and security requirements, standards and best practices including all conventions ratified by Tanzania. The equipment and materials used will have all necessary certification/registration and fully compliant with specific requirements for subproject size and purpose. SUZA will seek and obtain the necessary permits and/or MOUs from relevant authorities and undertake notifications as per environmental management regulations. SUZA PIU will ensure that all relevant project approvals including ESIA Certificate, building permits, OSHA etc. are in place. Before the approval of the construction and eventual construction of the proposed project, it is necessary to obtain several authorizations and permits from local and central government authorities of Zanzibar, related to environmental issues. Among other permits is ESIA certificate from ZEMA.

2.10 Emission and Waste Generation

2.10.1 Gaseous and dust emission

The proposed projects will lead to various types of emissions and wastes mainly depending on the type of activities and phase of the project. The main emissions will be vehicle exhaust and plant machinery emissions containing greenhouse gases like CO_2, CH_4 and SO_x, NO_x, and other gases. Emissions will come from construction vehicles and plants that use fossil fuels during excavations, constructions and materials trasnportations. In addition,there will be apprent production of dust during construction earth works and stone aggregates production.

2.10.2 Wastes generation

The projects are likely to cause sufficient amount of solid and liquid waste due to its construction and operational activities These will include metal cuttings, rejected materials, surplus materials, surplus oil, excavated materials, paper bags, empty cartons, empty paint and solvent containers, broken glass among others bio degradable, non-biodegradable waste and other debris.

2.10.3 Construction Phase

During the Construction phase, waste characterization has been defined based on the following:

i. Construction debris wastes.
ii. Waste from the temporary site facilities services such as spent food, paper, and office wastes.
iii. Hazardous wastes such as spent oil, paints and other chemicals.

The proponent will contact the waste management Authority of Central District for disposing the solid waste generates during the construction phases. For this, the whole solid wastes will be collected and disposed safely since the responsible Authority disposes waste to the appropriate disposal site kept by the Government.

2.10.3.1 Operational Phase

- **Solid waste**

Main solid waste generated from the Hostel blocks and its facilities, Lab complex and School of Agriculture (SoA) buildings is huge organic waste, which is packaging materials (from the student homes, boxes), food leftover (from restaurants and food vender), sweepings, plastic bottle, tins, glass. The project management set aside a special garbage collection store with the project area.

- **Wastewater**

Sewage generated from toilets, offices, showers and kitchens will directly be discharged into concrete septic and soak away tanks.

- **Wastes management and disposal**

The proponent will take steps to minimize the generation of such waste and to ensure proper disposal procedures. Domestic waste such as waste from packaging, empty plastic containers, cartons, plastics organic waste from food remains, vegetables and wastewater from toilets, land other waste generated by washing activities etc., will be generated during the operational phase of the project.

In the project area solid waste management practices involve collection of solid wastes and disposal to landfill dumpsite located at Kibele. The liquid waste management is practiced through onsite disposal for most projects' areas.

2.11 Cost of the Project

The budget of the proposed project will be presented after the completion of the design. This covers the cost for construction, purchasing materials, labour cost and all miscellaneous expenses subjected in the implementation of the all project. The project is wholly funded by the Tanzanian government through loan from World Bank.

2.12 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.

2.12.1 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 Hostel Blocks in Tunguu campus, Central District council, Unguja-Zanzibar. Many institutions and administrative units in Zanzibar are of interest;

- Ministry of Education Science and Technology
- Central District Council

- Tanzania Commission of Universities (TCU)
- Fire and Rescue Force
- Occupational Safety and Health Authority (OSHA)
- ZAWA
- ZECO
- Tunguu Shehia

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

2.12.2 Temporal boundaries

Temporal boundaries refer to the lifespan and reversibility of impacts. For example, the impact of construction work for the lab complex, School of Agriculture and student hostels 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, 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, e.g., noise caused by bulldozers will disappear as soon as the construction phase will be completed. The construction period will last for not more than sixty months while the operational phase is designed for more than 99 years unless unforeseen event occurs.

2.12.3 Spatial boundary

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

1. The core Impact zone- The core impact zone includes the area immediately bordering the project (0-500m radial distance). In the case of this project, local impacts will include the site of the construction and the immediate surrounding areas.
2. The influence impact zone- includes the area beyond 500m from the proposed site. Most of impacts are expected to be within this boundary.

CHAPTER THREE
3 BASELINE CONDITIONS DESCRIPTIONS

3.1 Overviews

The baseline data and conditions were conducted to establish the benchmark for environmental and socio-economic condition of the project are before project's implementation so as to determine change at the intervention during the project execution and being able to establish and identify social economic and environmental impacts that will result from the change of the project development during and after construction phase.

The proposed project's environmental baseline study was conducted from August to September 2023. The baseline study was done in areas of direct and indirect zone of influence of the proposed project. Gathering of baseline data was done to meet the following objectives:

- To understand key biological, physical, ecological, social, cultural, economic, and political conditions in areas potentially affected by the proposed project;
- To understand the expectations and concerns of a range of stakeholders on the proposed development;
- To inform the development of mitigation measures;
- To benchmark future socio-economic changes/ impacts and assess the effectiveness of mitigation measures.

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

3.2 SUZA Baseline Information

The University State of Zanzibar and other participating organizations will conduct the construction works of various building within Tunguu Campus and land. There are existing facilities in vicinity to proposed site areas. University land uses are dominated by office buildings, hostels laboratories, restaurants and other essential facilities. Most of the university campus is surrounded by trees and shrubs and is bordering settlements, institutions and farmlands.

The existing plan is to revise the master plan aiming at reallocating the respective use of land following the merging of 2016/2017. The land is now planned to be used for investments on building administrative offices for new schools, lecture halls, laboratory complex, student centre and sports facilities and hostels. Total number of students, male, female, and staff: Total number of registered students are 7,060, of which 2,751 are males and 4,309 are females; Staff are 752, out of which 295 are females and 457 are males.

Students staying on campus or outside: A large number of students are staying outside the campuses. The university does not have enough facilities to accommodate student stay in the campuses. The university does have few staff houses, the majority of staff are staying off campus.

Means of transport: The University uses public transport available in the main routes at the respective campus.

Vegetation within and surrounding the university: The State University of Zanzibar is surrounded with several with a variety of natural tree species and planted species. The trees provide shade for comfortability of students when they are in the university premises.

Neighbouring areas: Planned neighbourhood with few institutions such as IPA, High Court, and Office of President of Tanzania, office of parliament, South region office, and district migration office and district police. There are good interactions with university.

Waste management: Generally, the university does not have waste management facilities. However, we collect the waste depending on the location of the respective campus. All solid waste within the campus are collected in special bins and taken to nearby modern facility that handles all waste of the Zanzibar municipality. Liquid wastes are managed firstly by temporarily using by sceptic tanks and soak away pits, which after they are full, the waste is also collected and taken to special modern facility that handle all waste of the Zanzibar municipality.

3.3 Physical Environment Condition

3.3.1 Geology and physical characteristics

The core of these islands consists of rocks ranging in age from Miocene to recent calcareous sediment with limestone of marine origin that was subsequently more or less covered by sands, silt and clays. According to earlier local classification based on physical characteristics, soils of Zanzibar can be categorized into upland soil types differentiated by geomorphology and lowland soils whose parent material forms the basis for classification. Its geomorphology periods of higher sea level, marine erosion with wave cut – cliffs and platforms, reworked marine and fluviatile sea cliffs and beaches and raised and submerged coastal cliffs. The soils throughout the area of Municipality comprise Quartzite silty sand with top soil limited to 120 - 300 mm. The natural Vegetative cover is a coarse grass and shrub. The soil type of the project site is grouped locally as Maweni (Rendzic Leptosols, Lithic Leptosols) and Uwanda (Mollic Leptosols). Geological, these types of soils are free-draining development on weathered limestone materials with a pH of 8.0.

3.3.2 Topography

The town rises gradually from low ground in the west to higher ground in the east from stone town with mean coast elevation of 6.6 m above mean sea level to the highest point of Masingini ridge climb with elevation of 120 m. It is dissected by hills and ridges and has a marked indented western coastline with low-lying shore and numerous marine inlets. The Islands of Zanzibar are surrounded by coasts of rocky inlets or sandy beaches, with lagoons and mangrove swamps, and coral reefs beyond the shoreline. The project site is located in the Central District, South Region of Unguja Island.

3.3.3 Soils

Tunguu has a soil classified as sandy, loam and clay acidic soils with pH ranging from 5-5.5. The soil of the estate mainly originates from the weathered deposits of limestone. The sandy soil covers 18% on the west part of the area. Clay soil covers about 6% of the area Loam soil covers 12% of the area and consisting of 2.2% humus, 0.1% Nitrogen, 0.2 ppm Potassium. Sandy loam covers 64% in the Northern, middle and eastern parts of the estate. This soil contains 1.1-14% humus, 0.05-0.09% Nitrogen and 0.06 ppm potassium

3.3.3.1 Soil Erosion Potential

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

3.3.4 Climate and meteorology

The study area is Located at an elevation of none meters (0 feet) above sea level, in Unguja which has a Tropical monsoon climate. The district's yearly temperature is 28.23ºC (82.81ºF) and it is 4.01% higher than Tanzania's averages. The area typically receives about 223.12 millimetres (8.78 inches) of precipitation and has 235.49 rainy days (64.52% of the time) annually. Temperatures during the day are in the range from 29 °C (83 °F) in July to 33 °C (91 °F) in February. The highest night temperatures could be experienced in January with 24 °C (75 °F), the lowest in August with 20 °C (69 °F). The highest sea temperatures are in March with 29 °C (84 °F) and the lowest in August with 25 °C (78 °F). The least rainy month is February with its 4 days of rain, the rainiest month is April, when it rains 17 days. Rainfall is reliable and well-distributed in comparison with most of eastern Africa. Northeast trade winds blow from December to March and southeast trade winds from May to October. The "long rains" occur between March and May and the "short rains" between October and December.

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

3.3.5 Rainfall

The long rains begin in March and end in May, while the short rains begin in October and continue to early January. The Project area precipitation is characteristics monthly variations, whereby the minimum precipitation is observed from June to February which ranges from 17 mm to 126.6 mm, and the maximum is observed from March to April which ranges from 342.9 mm to 159.4 mm, the region experiences the maximum precipitation on

April 342.9 mm as shown in Figure 3.1. During rainfall season the project construction activities may likely to cause more accident, if safety precautions are not followed, like wise during low or no rainfall months, most of the particulate matters generated by the project construction activities will tend to be present more on the ambient environment where the close monitoring is needed to control the particulate matter emissions and effects to the nearby receptors.

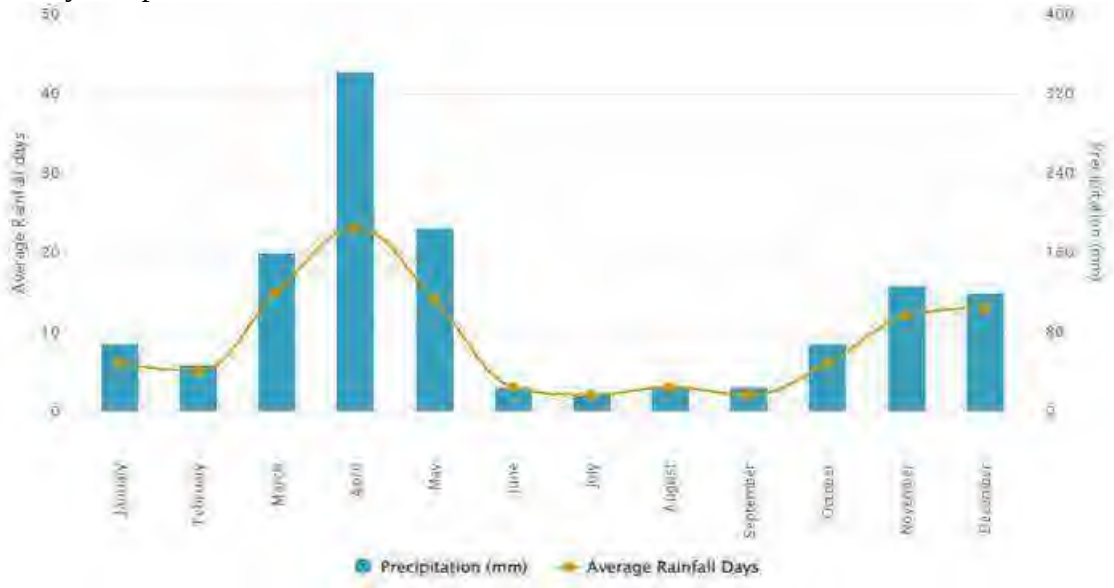

Figure 3. 1: Monthly average rainfalls

Source:Worldweatheronline.com (https://www.worldweatheronline.com/unguja-weather-averages/zanzibar-urban/tz.aspx)

In general, Zanzibar climatic condition is mainly influence by monsoons with two peak rainfall seasons. The long rains occur from March to May while the short rains are from September to November. The average annual rainfall is 1600 mm and 1900 for Zanzibar and Pemba respectively. The Urban Municipal Council in the tropical belt and rainfall depend heavily on the season and elated to the change of Monsoon wind. The season of heavy rains start from March to May. The relative cool and dry season (Kusi) covers the period from June to September, a lesser rainy season occurs during October to December. The North –East Monsoon(Kaskazi) from January to March and Urban Municipality receives an annual rainfall of about 1,500 mm to 2,000 mm. Urban Municipality enjoys climate weather throughout the year with only mild variation.

3.3.6 Relative Humidity

Humidity refers to the water vapour content in air at that particular place and time. Relative humidity is the ratio of the air's water vapour content to its water vapor capacity and directly related to the rate of evaporation. The average annual relative humidity is 64.3% and average monthly relative humidity ranges from 56% in September to 73% in April.

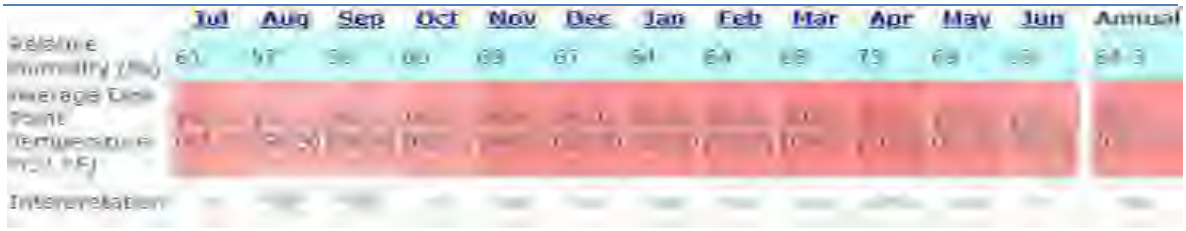

Figure 3. 2:Humidity

Source:(https://www.zanzibar.climatemps.com/humidity.php)

Generally, the period from November to March is relatively hot and humid with maximum temperatures exceeding 30° centigrade (the northeast monsoon) and the coldest is July at 24°C (75.2°F). Cooling sea breezes and trade winds relieve the humidity in coastal areas throughout the year. The relative humidity is high, with a monthly average ranging from 87% in April (Masika) to 76% in November (Vuli), and a minimum at 60% during the dry season.

The limited and characteristic fauna and flora of the coral rag bush land has occurred as a direct result of extended periods of evaporation deficit. The minimum evaporation is in September (110 mm/month) while the maximum evaporation is in November (190 mm/month). From May to September, the evaporation lies between 100 and 130 mm/month. The overall is 137 mm/month. Rainfall exceeds evaporation during the months of April, May and November.

During the operation of the proposed projects, clouds are expected to affect road users as they will reduce road visibility and are likely to influence accidents. Precautions should be made to road users.

3.3.7 Temperature

Along the project area temperatures are higher between December and March, and coolest between June and August. The average maximum temperature and minimum average temperature for the region ranges from 20^{o}C - 32^{o}C respectively as shown in Figure 3-7. During the coldest months most of the pollutant vertical mixing is inhibited by and will be available close to the earth surface, where close monitoring should take place to minimize the impact of the pollution to the nearby receptors such as workers and students. This is caused by the formation of the temperature inversion layer which will inhibit pollutant mixing and facilitate the horizontal dispersion of the pollutants, especially particulate matters (PM10 and PM2.5) generated from the construction activities.

Figure 3. 3: Average high and low temperature

Source: Worldweatheronline.com (https://www.worldweatheronline.com/unguja-weather-averages/zanzibar-urban/tz.aspx).

3.3.8 Wind regime

The wind regime of the Western Indian Ocean is generally characterized by a complete clockwise wind system over the northern Indian Ocean that sets out during the northern summer. The average wind speed from January to April ranges from 10.2 kmph to 12.6 kmph; while from May to July, it ranges from 15.7 kmph to 17.6 kmph. Similarly, during the months of August and December, the wind velocity is between 9.1 kmph to 14.1 kmph. This shows that the area has highest the average wind velocity from May to July. The wind velocity of the area for the year 2022. During the highest wind speed the projects pollutants will be blows farther from the project site than during the low wind speed months, which will affect the downwind far neighbourhood, where a close monitoring is needed to minimize the impacts.

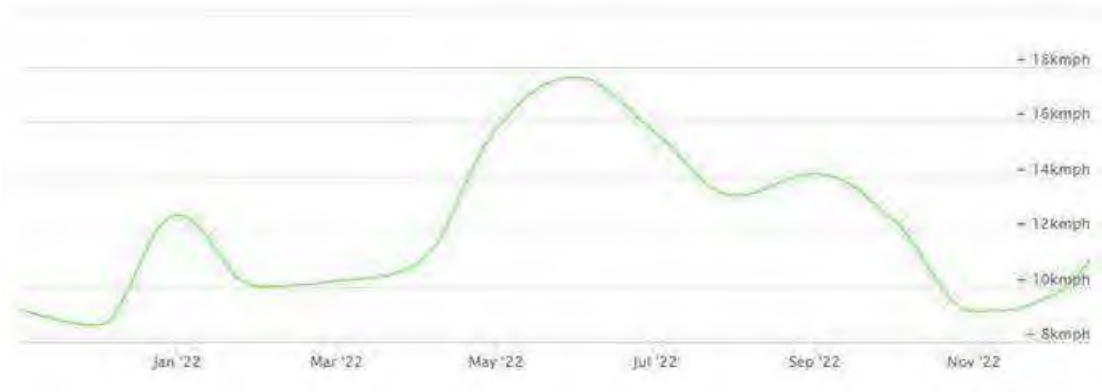

Figure 3. 4: Average wind velocity of the project area

Source: Worldweatheronline.com (https://www.worldweatheronline.com/unguja-weather-averages/zanzibar-urban/tz.aspx)

i. Wind rose

Most of the wind blow from Southeast location direction of the project area, during the sampling period, with wind speed >19 km/h. Least of the wind blows from the Northeast direction as shown in Figure 3. 5: which indicate that the pollutants will blow toward the North West direction during the project construction phase, which make the receptors along the direction prominent to pollution.

Figure 3. 5: Project area wind rose

Source:Meteoblue(https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/unguja-ukuu-pwani_tanzania_149191)

3.3.9 Ambient air quality;

The methodology outlines the procedures and methods used to collect and analyze data for establishing air quality, baseline. A Base line survey was conducted in the project area zone to collect levels of Particulate Matter (PM10 and PM2.5) Sulphur dioxide (SO_2) and Oxides of Nitrogen (NO_x), baseline data on the locations. The sampling station were established along the potential areas within the selected sample locations and measurement were taken according to ZNS 16:2014 and WHO guidelines.

The sampling and monitoring activities were conducted at sensitive receptors, which refers to specific locations where the potential for environmental impact is higher or where vulnerable populations reside. In order to capture the overall air quality in the area, one sampling point was taken per village along the proposed project location. The locations of the ambient air quality monitoring stations in the project area are given Table 3.1.

Table 3. 1: Selected Air quality sampling location in Tunguu campus (SUZA)

Sampling location and coordinate	Location ID	Description of sampled location	Source of pollution/contributor	Receptors
Concert hall 10 m nearby proposed Buildings -6.20133, 39.30512	AM-1	The selected sampling location is 25 m from the concert hall and 10 m from the proposed building's locations	• Activities within the concert hall • Low vehicles movement on a road located 50 meters from the location • Wind, Bird, Human activities	• Students and Workers within the campus

Sampling location and coordinate	Location ID	Description of sampled location	Source of pollution/contributor	Receptors
Label complex 15 meters nearby administration block -6.20025, 39.30593	AM-2	The sampling location is nearby the administration block.	• Wind, Bird, Human activities	• Students and Workers within the campus
Proposed blocks area -6.20107, 39.30703	AM-3	The sampled location is located about 80 meters from the administration block within the proposed Teaching Theatres and Laboratory	• Wind, Bird, Human activities	• Students and Workers within the campus
3meter from both SUZA and Tunguu road -6.19812, 39.30765	AM-4	The sampling location is located 3 m from SUZA	• Road vehicles and motorcycle movements	• Students and Workers within the campus
Tunguu mosque -6.19741, 39.30637	AM-5	The sample was taken 3meters from Tunguu mosque, which is located 18 meters from Tunguu main campus	• Main source of pollution observed are movement of trucks, lorry, bus and motorcycle	• Mosque and Regional commissioner's office

3.3.10 Ambient Air Quality Monitoring Methodology

Monitoring was conducted in respect of the following parameters:

- Particulate Matter (PM 10)
- Particulate Matter (PM 2.5)
- Sulphur Dioxide (SO_2)
- Oxides of Nitrogen (NO_x)
- Carbon Monoxide (CO)

In the assessment of air quality, particular attention was given to the levels of Particulate Matter (PM10 and PM2.5) Sulphur dioxide (SO_2) and Oxides of Nitrogen (NO_x), as these pollutants have significant impacts on human health and the environment. To measure Sulphur dioxide (SO_2) and Oxides of Nitrogen (NO_x) pollutant levels, an advanced and highly responsive environmental kit instrument, the 3M™ EVM 7 Environmental Monitor Kit was used and to measure particulate matter, Micro dust pro, was utilized. These portable air samplers are equipped with cutting-edge technology and adhere to various international and industry-specific standards, ensuring reliable and accurate results. The 3M™ EVM 7 Environmental Monitor Kit and Micro dust pro meets stringent Electromagnetic Compatibility (EMC) standards, which ensure that the instruments operate effectively without interference from other electronic devices. Additionally, it complies with Generic Emissions Standard for Residential, Commercial, and Light Industry (EN50081-1:1992 and EN 50081-2:1993), ensuring its suitability for a wide range of monitoring scenarios. To determine the mass concentration of particulate matter, the manual method outlined in ISO 9096:2003 was followed. Moreover, the equipment used adhered to the requirements of Air Quality General Considerations ZNS 18:2014, TZS 837(Part 2):2011 and Manual

Determinations of Mass Concentration of Particulate Matter ZNS 19:2014, TZS 836 (Part 2):2011 further ensuring the accuracy and reliability of the data collected.

During the sampling process, great care was taken to ensure that the monitoring stations were fixed at a breathing height of approximately 1.5 meters above the ground for both PM10 and PM2.5 measurements. This height is critical as it represents the level at which human exposure to these particles is most relevant. Each monitoring station was meticulously prepared and calibrated before use, in strict accordance with the equipment's manual, to guarantee precise and consistent measurements. This comprehensive gas sampling approach allowed for a comprehensive understanding of the air quality in the project area. All monitoring and sampling equipment underwent stringent checks and calibrations before usage to ensure accurate readings and reliable data collection. Furthermore, the equipment was regularly maintained in accordance with the manufacturer's specifications to sustain its optimal performance throughout the monitoring period.

The results obtained from these efforts serve as a crucial foundation for environmental management, ensuring that appropriate measures are implemented to safeguard public health and the environment in the proposed project area.

Table 3. 2: Methodology for Ambient Air Quality Monitoring

Parameter	Tool	Measurement Methods	As Per
PM_{10}	Micro dust pro	Gravimetric	ZNS 17:2014, TZS 837, Part 7:
PM 2.5	Micro dust pro	Gravimetric	ZNS 17:2014, TZS 837, Part 7:
SO_2	The 3M™ EVM 7 Environmental Monitor Kit	Colorimetric (EPA modified West & Gaeke Method)	ZNS 17:2014, TZS 837 Parts (1, 2, and 4).
NO_x	The 3M™ EVM 7 Environmental Monitor Kit	Colorimetric (Arsenite modified Jacobs & Hochheiser Method)	ZNS 17:2014, TZS 837 Part 1, 2, and 5
CO	The 3M™ EVM 7 Environmental Monitor Kit	Non-Dispersive Infra-Red (NDIR) Spectroscopy Technique	- ZNS 17:2014, TZS 837 Parts 1,2, and 6

Table 3. 3: Detailed Ambient Air Quality Monitoring Results

S/N	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	NOx ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	CO (mg/m^3)	CO_2 (PPM)
AM-1	29.26	12.32	BDL	BDL	BDL	438.2
AM-2	25.86	9.06	BDL	BDL	BDL	479
AM-3	20.1	7.23	BDL	BDL	BDL	459.2
AM-4	29.32	16.26	BDL	0.06	0.01	464.8
AM-5	22.82	12.22	BDL	0.02	0.01	421.6
WHO standards	50	25	200	20	4	-
ZBS standards (ZNS 20:2014)	50-90	25	200	20	4	-

*BDL-Below instrument detection limit of 0.001µg/m^3

3.3.10.1 Air quality result and discussion

Tunguu campus expansion project, the five-sampling location where selected and the result of measurement for air quality, noise and vibration are describing as follow;

- **PM_{10} (Particulate Matter 10):** The 24 hours' average values of PM_{10} in AM-2, AM-3, and AM-5 all have PM_{10} levels below the WHO guideline and ZBS standard of 50 $\mu g/m^3$. This suggests that these areas maintain good air quality concerning PM_{10} concentrations, meeting the WHO standards.
- **$PM_{2.5}$ (Particulate Matter 2.5):** Similar to PM_{10}, $PM_{2.5}$ levels show a comparable trend across the different AM stations.AM-1, AM-2, AM-3, and AM-5 all have PM2.5 levels below the WHO guideline of 25 $\mu g/m^3$. This suggests that these areas maintain good air quality concerning $PM_{2.5}$ concentrations, meeting the WHO standards.
- **NOx (Nitrogen Oxides):** Most of AM stations have recorded NOx levels below instrument detection limit, indicating no detectable presence of nitrogen oxides. This indicates that the levels of NOx pollution in these areas are within the WHO and ZBS standard of 200 $\mu g/m^3$ for nitrogen dioxide (NO_2).
- **SO2 (Sulfur Dioxide):** Similarly, AM4 to AM 5 stations show SO2 levels of 0.02-0.06 µg/m3, while AM-1 to AM-3 shows levels are below instrument detection limit, all these results suggesting very low measurable amount of sulfur dioxide. This meets the WHO and ZBS standard of 20 $\mu g/m^3$ for SO_2.
- **CO (Carbon monoxide):** AM4 to AM 5 stations show SO_2 levels of 0.01mg/m^3, while AM-1 to AM-3 shows levels are below instrument detection limit, all these results suggesting very low measurable amount of carbon dioxide. This meets the WHO and ZBS standard of 4 mg/m^3 for SO_2
- **CO_2 (Carbon Dioxide):**
    - No specific WHO or ZBS standards for ambient air quality.

The data represents the baseline data which were taken before the project construction or operation. The area is located in a low emission zone from sources such as traffics and other human activities which make the measurements fall within the permissible limits by the given standards as shown in the table 3-5. The emission levels will be influenced by the project during construction and operation which need to be monitored.

3.3.11 Noise and Vibration

It is anticipated that the Noise and vibration will be a negative impact during the construction phase of the site of the proposed project considering the site of the proposed project is located in the area where residents are nearby, hence noise and vibration impact will have negative and significant impacts.

A Base line survey was conducted in the project area zone to collect levels of noise and vibrations baseline data on the locations. The sampling stations were established along the potential areas within the selected locations and measurements were taken according to ZNS 16:2014 noise guideline, ZNS 32:2014 vibration guidelines and IFC guidelines.

Considering the factors governing the selection of sampling location in table 3-6 were selected and measurements were performed and used to calculate the average levels of Noise in the respective sampling station. The recorded average values were compared with

prescribed available limit to check their compliance with ZBS standards and WHO/IFC guidelines listed in Table 3.4.

Table 3. 4: Selected noise sampling location in Tunguu campus (SUZA)

Sampling location and coordinate	Location ID	Description of sampled location	Source of pollution/contributor	Receptors
Concert hall 10 m nearby proposed Buildings -6.20133, 39.30512	NM-1	The selected sampling location is 25 m from the concert hall and 10 m from the proposed building's locations	• Activities within the concert hall • Low vehicles movement on a road located 50 meters from the location • Wind, Bird, Human activities	• Students and Workers within the campus
Label complex 15 meters nearby administration block -6.20025, 39.30593	NM-2	The sampling location is nearby the administration block.	• Wind, Bird, Human activities	• Students and Workers within the campus
Proposed blocks area -6.20107, 39.30703	NM-3	The sampled location is located about 80 meters from the administration block within the proposed project area	• Wind, Bird, Human activities	• Students and Workers within the campus
3meter from both SUZA and Tunguu road -6.19812, 39.30765	NM-4	The sampling location is located 3 m from SUZA	• Road vehicles and motorcycle movements	• Students and Workers within the campus
Tunguu mosque -6.19741, 39.30637	NM-5	The sample was taken 3meters from Tunguu mosque, which is located 18 meters from Tunguu main campus	• Main source of pollution observed are movement of trucks, lorry, bus and motorcycle	• Mosque and Regional commissioner's office

The measurements and assessment of environmental noise levels were determined in accordance to ISO standards using SLM-25 sound level meter. On taking measurements, the device-meter scale was set to the "A" weighed measurement scale which enables the devices to respond in the same manner as the human ear. Data were recorded at the interval of 1 minute at representative1 hour period and Equivalent noise levels were computed. where the sound level meter was at a distance of 3.5 m from reflecting walls and set. Measurement made according to ISO 1996-1 and BS 7445-1 and ZNS 15: 2021. The device was stationed approximately 1.5 m above the surface and at least 3.5 m away from hard-reflecting surfaces.

The noise survey was performed in accordance with the recommended method for evaluating the environmental noise impact on surrounding communities, with respect to

annoyance: "The measurement and rating of environmental noise with respect to land use, health, annoyance and speech communication".
The general principles employed for measuring sound pressure levels at the site are briefly described below:

- All microphone measuring points were at least 1.5 m above ground level and 3.5m away from reflecting surfaces;
- A suitable windshield will use on the microphone for all measurements in order to minimize wind interference;
- The sound level meter will set to A-weighting for all measurements.

3.3.11.1 Noise Level Measurements Results and discussion

The noise monitoring conducted along the Tunguu campus project area provides valuable insights into the current noise levels in different areas. These measurements taken, allow for a comprehensive analysis of the noise pollution scenario.
The noise levels in all noise monitoring location NM-1, NM-2, NM-3 and NM-5 falls within ZBS (ZNS 15: 2021) standards and IFC/WH standards except for the noise level NM-4 which is slightly higher due to traffic noise sources, where the point also doesn't reach the threat levels of 85 dBA.

Table 3. 5: Noise measurement along the project zone

Noise monitoring location	Measured LAeq,1hr dB(A) Day	Zanzibar Bureau Standards (ZNS 15: 2021) LAeq, dB(A)	IFC/WHO standards LAeq, dB(A)
NM-1	37.6	55	55
NM-2	44.2		
NM-3	45.6		
NM-4	59.2		
NM-5	52.9		

3.3.11.2 Vibration Measurements Results and Discussion

The project aims to improve Tunguu campus infrastructure while minimizing potential environmental and social impacts. As part of the project's environmental impact assessment, vibration measurements were conducted to assess the potential effects after construction activities on nearby structures and human health. This section provides an in-depth overview of the methodology employed to collect vibration data in accordance with ISO 4866, British BS 7385-2, and WHO standards, as well as the permissible standards for vibrations
Measurement locations were selected based on the proximity to the present SUZA university buildings and infrastructures and potential receptors such as Tunguu mosque. A comprehensive site survey was conducted to identify suitable locations that represented the range of potential impacts as shown in table 3-8.

This Section presents the results and discussion of the vibration measurements conducted for the proposed Tunguu campus expansion project. The chapter focuses on comparing the obtained vibration data with relevant standards, including ISO 4866 and Zanzibar's environmental management noise and vibration standards. The discussion highlights the potential impacts of vibrations on structures and human health and proposes mitigation measures to ensure compliance with ZBS's standards. The findings provide valuable insights

for the upcoming project and emphasize the importance of minimizing the adverse effects of vibrations on the surrounding environment and communities

Table 3. 6: Vibration measurement results

Vibration monitoring location	NM-1	NM-2	NM-3	NM-4	NM-5
Min(mm/s)	0.1	0.1	0.3	0.1	0.4
Max(mm/s)	2.1	2.6	3.8	2.3	3.5

ZBS Standards: Zanzibar Bureau standard guidelines (ZNS 32:2014) set a permissible maximum limit of 5 mm/s for vibration measurements. Comparing the provided data with this standard:

Vibration monitoring location	NM-1	NM-2	NM-3	NM-4	NM-5
Max (mm/s)	2.1	2.6	3.8	2.3	3.5

From the results, we can see that the maximum measured vibrations at all monitoring locations are below the permissible limit of 5 mm/s set by ZBS standards.

Based on the vibration measurement results obtained from the monitoring locations (NM-1 to NM-5) for the proposed project, it can be concluded that the recorded vibrations are within acceptable limits according Zanzibar Bureau standard guidelines (ZNS 32:2014). Furthermore, the area has no impact on vibrations to nearby local communities around the proposed project site. Therefore, some efforts should be directed to maintain these lowest values during constructions and operations activities of the proposed project.

3.3.12 Surface and groundwater hydrology;

Zanzibar is dependent upon groundwater for freshwater needs. Annual water abstracted is approximately 30.6 million cubic meters and serves 80% of the urban and 60% of the rural demand. Fifty per cent of the water abstracted is used for domestic purposes, whereas the other half is divided among commercial, institutional and industrial activities. Zanzibar's natural groundwater quality is quite good SUZA source being among of them. However, over abstraction has led to increased salinity in some areas. Furthermore, surface and groundwater sources face contamination due to encroachment into water catchment areas, deforestation and wastewater. Water production for Zanzibar Town's urban water supply system is based on fifty-two boreholes, two springs and one cave. Twenty-three boreholes have been abandoned and one has been transformed into a monitoring well. Many boreholes are left uncovered or have inadequate sealing, presenting a significant risk of bacteriological contamination of groundwater.

ZAWA produces 80,000,000 L/day, or 117 L/day per 725,000 inhabitants of Zanzibar City. This is an acceptable rate, however, there are significant losses due to leaks in the distribution system and the absence of meters.

3.3.13 Water quality

Water supplied to the community and to the SUZA is done by ZAWA boreholes. On October, 2023, water samples (17 samples) were collected from the boreholes that are located around SUZA compound and Tunguu area. The physical, biological and chemical parameters were analysed to check the level of contamination. The samples were collected into 1litter bottles and were analysed at Ardhi University Environmental Laboratory-Dar es Salaam. The analysis of the results was as elaborated in Table 3.7 and Table 3.8.

3.3.13.1 Physico-Chemical Parameters Analysis

The boreholes water analysis showed a concentration of organic and chemical pollution lower than the guidance standard of both WHO and Zanzibar Bureau of standards (ZBS) while nitrate which is also indicating organic pollution is usually up to 2.0 mg/l for portable water.

The boreholes water analysis showed a concentration of organic and chemical pollution is lower than the guidance standard of both WHO and Tanzania Bureau of standards (TBS) while nitrate which is also indicating organic pollution is usually up to 2.0 mg/l for portable water. Analysis shows that borehole water collected at borehole G9 (-6.201914, 39.315015) is slightly contaminated with Nitrite-Nitrogen concentration of; 0.173mg/l. However, from the laboratory analysis report, it is shown that, the groundwater source from the study area is physically and chemically good.

3.3.13.2 Heavy metals concentration analysis

On October 2023, the samples collected from 17 boreholes surrounding the Tunguu site area, collected in volume of 1litter bottles and were analysed at Ardhi University Environmental Laboratory-Dar es Salaam. The collected samples from boreholes were analysed at Ardhi University – Environmental Laboratory. The water quality results are shown in table 3.7. The heavy metal parameters were analysed to check the level of groundwater contamination. The analysis results were as in Table 3.8. The groundwater analyses showed a concentration of heavy metal pollutions were lower than the guidance standard of both WHO and Zanzibar standards (ZBS).

Table 3. 7: Location of the sampling points

Sample Code	**LATITUDE** (ºS)	**LONGITUDE** (ºE)
G1	6.200732	39.308759
G2	6.200992	39.30883
G3	6.20127	39.304348
G4	6.203544	39.300806
G5	6.209041	39.30367
G6	6.209432	39.301037
G7	6.207593	39.303682
G8	6.203813	39.302441
G9	6.201914	39.315015
G10	6.198492	39.314724
G11	6.196138	39.30998
G12	6.193289	39.310671
G13	6.210166	39.318717
G14	6.211722	39.320172
G15	6.206993	39.31673
G16	6.195326	39.303166
G17	6.195048	39.298848

Table 3. 8**:** Physico-chemical concentration of groundwater well around SUZA Tunguu main Campus, Zanzibar

Sample Code	Parameter	pH	Temp.	Turbidity	Colour	Salinity	EC	TDS	Phosphate	Nitrate-Nitrogen	Nitrite – Nitrogen	NH_4-N	Sulphate
	WHO	**6.5-8.5**	**30**	**5**	**15**	**100**	**1000**	**500**	**6.5**	**50**	**0.001**	**0.1**	**100**
	TBS	**6.5-9.2**	**-**	**25**	**50**	**-**	**1500**	**1000**	**-**	**75**	**0.003**	**0.5**	**400**
	Units		^{0}C	NTU	TCU	‰(ppt)	µS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
	Well depth												
	(m)												
G1	15	7.45	23.1	6	10	0.16	313	156.5	1.35	0.4	0.0144	0.15	5
G2	18	7.09	23.5	0	0	0.2	389	199.5	0.64	0.9	0.0172	0.14	<1.0
G3	14	6.9	22.72	0	0	0.32	642	321	0.45	1.7	0.0141	0.15	19.8
G4	13.5	7.13	23.02	9	0	0.23	643	231.5	0.36	2.1	0.0121	0.156	14.1
G5	14	7.31	22.6	5	1	0.1	201	100.5	0.33	2	0.0134	0.148	5.3
G6	15	7.28	22.6	9	0	0.12	235	117.5	0.86	1.2	0.0145	0.156	9.5
G7	14	7.09	22.6	0	0	0.15	393	146.5	1.09	1	0.0152	0.141	0.5
G8	17	7.05	22.7	4	0	0.2	413	201.5	0.89	1.5	0.0215	0.196	12.2
G9	50	7.4	22.7	0	0	0.18	352	176	0.98	1.4	0.173	0.122	<1.0
G10	17	7.01	22.3	0	2	0.22	441	220.5	0.61	1.8	0.0177	0.141	3
G11	16	6.98	22.5	0	0	0.21	427	213.5	0.96	2.3	0.0184	0.131	6.2
G12	15	6.94	22.6	0	0	0.27	538	269	1.41	0.3	0.0168	0.299	20.7
G13	7	7.04	22.6	0	0	0.21	924	214	0.8	0.8	0.0157	0.174	<1.0
G14	8	7.17	22.6	9	1	0.21	423	211.5	1.53	0.8	0.0164	0.169	<1.0
G15	12	7.2	22.4	1	0	0.19	384	192	0.66	1.4	0.0176	0.168	1.3
G16	12	7.25	22.4	0	0	0.21	419	209.5	0.73	2.7	0.0188	0.142	7.7
G17	18	7.15	22.5	0	0	0.31	623	313	1.38	1.9	0.0184	0.202	2.3

Sample Code	Parameter			Lead	Copper	Zinc	Nickel	Chromium	Cadmium	Oil & grease
	TBS			**0.01**	**1**	**15**	**0.02**	**0.05**	**0.003**	
	WHO			**0.01**	**0.1**	**5**	**0.02**	**0.05**	**0.003**	
	Units			**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**
	LATITUDE	**LONGITUDE**	**Well Depth**							
	(ºS)	**(ºE)**	**(m)**							
G1	6.200732	39.308759	15	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<1.0
G2	6.200992	39.30883	18	<0.01	<0.01	<0.01	0.012	<0.01	<0.01	<1.0
G3	6.20127	39.304348	14	<0.01	<0.01	<0.01	0.018	0.014	<0.01	<1.0
G4	6.203544	39.300806	13.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<1.0
G5	6.209041	39.30367	14	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<1.0
G6	6.209432	39.301037	15	<0.01	<0.01	0.015	<0.01	<0.01	<0.01	<1.0
G7	6.207593	39.303682	14	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<1.0
G8	6.203813	39.302441	17	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<1.0
G9	6.201914	39.315015	50	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<1.0
G10	6.198492	39.314724	17	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<1.0
G11	6.196138	39.30998	16	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<1.0
G12	6.193289	39.310671	15	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<1.0
G13	6.210166	39.318717	7	<0.01	<0.01	<0.01	0.013	<0.01	<0.01	<1.0
G14	6.211722	39.320172	8	<0.01	0.012	<0.01	<0.01	<0.01	<0.01	<1.0
G15	6.206993	39.31673	12	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<1.0
G16	6.195326	39.303166	12	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<1.0
G17	6.195048	39.298848	18	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<1.0

Table 3. 9**:** Heavy metals concentration of groundwater well around SUZA Tunguu main Campus, Zanzibar

3.3.14 Solid Waste Generation and Management

The solid waste management in the project zone is implemented by Central District Local Council. Facilities for solid waste and septic sludge remain inadequate, and there is no formal site for waste disposal in the project zone. Wastes have to be transported by the Local Council towards a transfer station and then sent to Kibele. Given the expected influx of population in the new hotel buildings, it is estimated that 750 kilograms of garbage will be generated daily from the proposed hotel. This might induce environmental risk in the project zone and unless there are increased waste management services the project zone could potentially be exposed to pollution. In the project area solid waste management practices involve collection of solid wastes and disposal to landfill dumpsite located at Kibele.

3.3.15 Wastewater generation and management

The existing condition in according to environmental and social, most residents have onsite disposal of the domestic wastewater through a leaching pit. The generated wastewater commonly exceeds the capacity of the onsite disposal facilities. As a result, many people flooded with sewage effluent, contaminating drainage water as well as ground water. This habit is highly discouraged. It is estimated that, more than 50% of the diseases that affects people of Zanzibar are water- and sanitation related. There is no centralized sewerage system in the Zanzibar, only Stone Town and some areas in Ng'ambo of the Zanzibar Municipality. Domestic wastewater is discharged into septic tanks, after which the overflow combines with storm water and gets finally disposed into the sea. It was reported on 2012, large quantities of sewage estimated to be more than 2,200m3/day were discharged into the marine environment without effective treatment. It has been reported that, about 73.4% of the households use pit latrines as the means of individual sewage disposal facilities, and 22.4 % use flush toilet incorporated with septic tank and soakage pit. Zanzibar Municipal Council (sewerage, drainage and solid wastes) By-laws established on, 2006 for new tariff set-up and enforcement of revenues collection from solid wastes and sewerage services. The revenues collected from the customers' services charge aiming at operating and maintaining of the waste facilities. Liquid waste management is practiced through onsite disposal for most project's areas. It has been recommended that, the project shall consider the separate systems for wastewater from laboratory and the latrines ones and should be treated separately.

3.3.16 Access to Clean and Safe Water and Sanitation

Generally, water used by residents along the proposed project sites is safe, the fact that ZAWA is distributing safe water to Tunguu, thanks to Revolutionary Government of Zanzibar which currently busy in constructing water tanks and distribution systems.
Sanitation facilities indicate health status, as well as socio-economic development. Most of the households along the project area use toilets (with soak away pit/septic tank) with permanent structures including walls and roofs.

3.4 Biological Environment Condition,

3.4.1 Terrestrial Flora;

The baseline survey revealed that the project area has a total of 5,163 individual plants in almost 6.7 hectors where 130 plant species belonging to 112 genera and 53 families. The detailed botanical information for the project site will be illustrated in the Fauna and Flora Report (appendix VIII) of this project work. The area is covered by coral rag forest spots which contain different wildlife species.

Biogeographically, the flora of Zanzibar State University The area is one of the coral rag spots of Zanzibar and is the remnant of coastal forest of east Africa with diverse flora and discrete vegetation type dominated by evergreen scrub forest, Dry bush land thickest and Shrub land. This survey attempts to identify and document available plant species, their abundance, dominance, conservation status, growth category and adaptation characteristics for future use.

3.4.1.1 Floristic Composition

The survey counted a total of 5,163 individual plants in two working plots. In the plot "A" of 5.6 hectors 4,498 individual plants was found, while in the plot "B" of 1.1 hectors 665 individual plants. The studies come up with the results of 130 plant species that belong to belonging to 112 genera and 53 families. This result includes both sites of plot "A" and plot "B". The study indicating that Fabaceae, Euphorbiaceae, Rubiaceae, Verbenaceae and Asteraceae (Compositae) are dominant families to all worked plots, representing by 15, 9, 9 and 6 plant species respectively.

In growth categories, the results indicated that herbs were dominant by scoring 38.2% (1086 stems) followed by shrubs 35.4% (1830 stems), followed by tree 21% (1086 stems), followed by climbers 3.4% (174 entities) and lastly were sages that get 2% (104 stems).

From the survey the dominants plant species were Psiadia punctulata (1,114) followed by Stachytarpherta jamaicensis (herb) (576) and Flueggea virosa (369).

- **The most common floral species are as follows:**

Table 3.9: Endemic and near endemic plant species of State university of Zanzibar

Family	**Species name**
Annonacea	*Monanthotaxis fornicata*
Apocynaceae	*Rauvolfia mombasiana*
Thymelaceae	*Synaptolepis kirkii*
Rubiacea	*Trianolepis africana*

The study findings explaining that among 130 plant species found are indigenous (native) coverage are high by 76.2% (99 plants) compare to exotics that scoring 23.8% (31 plants). These results represent all 2 surveyed areas, which were purely coral rag patch of vegetation. These are because all forms of growth categories were observed ranging from trees, shrubs, herbs, climbers and sage.

Meanwhile the indigenous plants existing in high number 76.2% compared to exotics that its being is 23.8%. This indicating that the patch is under facing heavy disturbance or encroachment, although regeneration is taking place immediately. The history of the area elucidated that previously the area of State University was among the ranch areas of Department of Livestock, Zanzibar. The diversity is encouraging and worth of according to conservation consideration especially for those species with attentive conservation status.

3.4.1.2 Fauna in Project Area

The assessment of fauna species in the project area indicated that, the most dominant animal species include Black egret (Egretta ardesiaca), Curlew sandpiper (calidris ferruginea), Zanzibar sombre greenbul (Andropadus importunes), Yellow- vented bulbul (Pyconotus barabatus), Common sandpiper (Actitis hypoleucos), Little egret (Egratta garzetta). Others are Mongoose sp, House rat (Rattus rattus), Giant rodent, Zanzibar Gallegos/bush baby and lizards as the most dominant reptile. Moreover, a variety of butterfly species are also observed which increase the beauty of the area for the visitors of the area.

3.4.2 Ecologically important or sensitive habitats,

Generally, the area was observed ranging from small trees, shrubs, herbs, and climbers. Some animals, birds, butterflies and other small organisms were found relating from one another. This is an indicator that the patches will be under disturbance with during the project. Even the history of the area explained that previously the vast area of SUZA was used for ranching of cattle. However, the project does not fall within any threatened ecosystem, Zanzibar National Protected Areas, Focus Areas or areas of conservation planning.

3.5 Conclusion and Recommendation

Zanzibar State University area was found to be home of diverse groups of plant species, but are continuously under pressure from anthropogenic activities. A remnant of coral rag forest that once provided benefits to local people surrounding the area which is still being severely exploited as observed during the survey. The observed major threats to plants in the survey area were overharvesting of products including for fire wood. This calls for the need of serious attention for conservation and management of the plot. Hence the following recommendations are made to meet these objectives:

- Give conservation priority for identified threatened, vulnerable and rare plant species,
- Promote in-situ conservation and establish nurseries for ex-situ conservation of threatened plant species.
- Encourage surrounding communities to support conservation initiative; and
- Carry out ethno-botanical survey to identify and document all plant species used by local herbalist.

3.6 Social-cultural environment

3.6.1 State University of Zanzibar (SUZA)

The State University of Zanzibar consists of seven campuses found at equally beautiful but different locations within the islands. Six campuses are in Unguja and one campus in Pemba Island. Tunguu is the main SUZA campus. The campus is huge and brand new, decorated with a green field that offers a cutting-edge infrastructure of the World standard. It gives students a local alternative to some of the world's attractive learning environments.

As a public, academic institution, SUZA commits to delivering quality education to transform society to be well educated, acquire responsible leadership and practical entrepreneurial skills, and adopt a democratic citizenry. Most importantly, SUZA fully contributes to preparing and shaping future leaders of the country, both in the private and public sectors. SUZA aims to elevate its reputation even higher. In addition to its reputation in offering quality education, SUZA strengthens its research to contribute globally in generating new knowledge and thus, answering difficult questions that puzzle the world today.

3.6.2 Population

The District and Shehia populations reported in the National Census Report of 2022 have not been conveyed yet. However, the report has revealed a total 195,873 peoples[1] in South region.

3.6.3 Basic needs Poverty

According to Household Budget Survey – HBS (2015), the district had an increase in the basic needs poverty Headcount rate of 26.3% by 2014/15.

3.6.4 Distribution of the main sources of water

Water sources are classified as either 'improved' or 'unimproved'. Improved water sources include piped water into homes, public stand pipe, borehole, protected well, and rain water collection while unimproved water sources include unprotected wells, vendors and tanker trucks. Percentage of Households and Main Source of Drinking Water in South District[2], 2014/25 HBS for the South district are as tabulated below:

Table 3. 10: The proportions of water sources in Central District

Main source of drinking water	Percentage (%)
Piped water into dwelling	4.6
Piped water to yard/plot	8.4
Public tap / stand pipe	28.8
Neighbourhood tap	3.0
Tube well / borehole	37.5
Protected dug well	6.3

[1] Tanzania National Census Preliminary report 2022.

[2] Household Budget Survey – HBS (2015), Zanzibar.

Unprotected dug well	6.9
Cart with small tank/drum	4.4
Other	0.0
Not stated	0.3

3.6.5 Education

Currently the Government of Zanzibar provides free education for all citizens from Standard 1 to Form 2. In accordance with the 2006 Education Policy, the Government is transitioning to the system of compulsory education from pre-primary until Form 4. Zanzibar has made significant progress in increasing the number of students attending basic education. There has been a 12 % increase in Primary education in the past 5 years, from 220,819 in 2009 to 247,352 in 2013. At Ordinary Secondary level (Form 1 -Form 4) enrolment has been roughly stagnant, falling by 1.6 % from 77,958 in 2009 to 76,706 in 2013. Moving beyond basic education progress has been less positive with a 54 % decrease in enrolment between 2009 and 2013.

3.6.6 Health Services

The project area has a number of primary health care units but many patients visit secondary and referral hospitals for a guaranteed treatment. Major hospitals within 15- kilometre radius include Al Rahma Hospital, Global Hospital and the Mnazi Mmoja Referral Hospital. The numbers of recorded out-patients in public hospitals were approximately 237,293 in 2013, out of which 16,132 were from Mnazi Mmoja hospital. In South Region the total number of health facilities is 57[3] constituting one Hospital, 48 Zahanati and 8 health centres. The numbers of in-patients recorded were 60,933, where 27,654 patients were admitted at Mnazi Mmoja Referral Hospital. The accessibility to health facilities in the proposed project areas is good. Moreover, in improving the health services in Zanzibar, the Government is building new District Hospitals including the Central where the project is prevailing.

3.6.6.1 Water Supply

According to ZAWA Report, the amount of water Supplied in 2021 was 131,812,147 cubic meters whereas the estimated demand was 240,465,120 cubic meters, this indicates a total deficit of 45.2 percent in demand. The highest water supply by region was recorded in Mjini Magharibi Region where 47,796,000 cubic meters was supplied followed by Kusini Pemba Region with 25,814,880 cubic meters. The region with the lowest water supply was Kusini Unguja whereby there were only 14,275,200 cubic meters supplied Table 11. The Table shows the total revenue collected for water supply in 2021 was TZS 2,613 million with the highest revenue collected from Mjini Magharibi Region amounting TZS 932.0 million (32.1 percent), followed by Kusini Pemba with total revenue of TZS 600.6 million (24.9 percent). The Region with the lowest revenue collected was Kaskazini Pemba with the total amount of TZS 174.3 million (7.2 percent).

[3] The National Population Census 2022

Table 3. 11: Water Supply and Revenue Collection (TZS Million) by Region, 2021

Region	Total Water Production (M^3)	Estimated Water Demand (M^3)	Deficit in Demand (%)	Revenue Collection
Kaskazini Unguja	21,708,000	33,250,760	34.7	475.4
Kusini Unguja	14,275,200	19,714,940	27.6	518.1
Mjini Magharibi	47,796,000	105,004,620	54.5	932.0
Kaskazini Pemba	22,218,067	42,864,220	48.2	320.1
Kusini Pemba	25,814,880	39,630,640	34.9	368.2

Source: Zanzibar Water Authority

3.6.6.2 Public health risk

Inadequate environmental management can lead to significant impact to human health and ultimately on the socio-economic development in the project area and Zanzibar at large. Health issues recorded among the communities are due, in large part, suffer from illnesses such as Cholera, infections and diarrhoea, and respondents report to be ill an average of 9.4 days per year. Many people indicated that the current poor health situation can be improved if people have access to safe water, improved drainage system, installation of sewerage systems, and a clean environment with specified and well-designed solid waste collection and disposal site.

3.6.6.3 HIV/AIDS situation

The first AIDS case in Zanzibar was diagnosed in 1986. Since then, the HIV epidemic has remained low (below 1%) in the general population. However, Zanzibar is typically characterized by concentrated HIV epidemic with high HIV prevalence among female sex workers (FSWs), people who inject drugs (PWIDs) and men who have sex with men (MSM). According to the Integrated Bio-Behavioural Surveillance Survey (IBBSS) conducted in 2018/19, HIV prevalence in these sub-population was estimated to be 12.1%, 5.1% and 5.0% among FSWs, PWID and MSM, respectively. As of December 2022, spectrum projection estimated a total of 10,477 people including adults and children were living with HIV in Zanzibar. Among them, 93.3% (9,782) were people aged 15 years and above. The population of people living with HIV (PLHIV) has been increasing steadily from 2011 to 2022. A total of 519 new HIV cases were estimated in 2022. Of them, 440 (84.7.3%) were adults above 15 years. The number of new HIV infections from 2015 to 2022 shows a downward pattern across all age groups. In the last 12 years, the estimated annual AIDS deaths among PLHIV have been decreasing. The decrease is of statistical significance.

3.6.7 Access roads

South highway connects the project site with the rest of the island of Unguja. There is a strong network of basic access roads at the project site and although the current road network in Zanzibar Town may seem sufficient to support current traffic volumes, the increasing population and motorization growth rates, in the near future will be problematic for the

residents of the proposed project. Revamping of public transport and green solutions in transportation is needed for safe and efficient traffic management.

All traffic flows to and from the construction site shall be executed in such a manner that will ensure minimal interference with use of public access roads. In case of heavy traffic, the project proponent shall communicate and coordinate with the local authorities to ensure the provision of temporary traffic control and diversion arrangements have been provided. Contractors shall develop road clearing strategies to ensure that public ways are kept clear, safe and passable.

3.6.8 Economic Activities

The district economy manly depends on agricultural and tourism activities. In-formal employment in the district is dominated.

3.6.9 Agriculture

The economic activity that the people of Central District are mostly engaged in agriculture and tourism. This activity is being practiced by either growing crops only or keeping animals only and sometimes both are being conducted at a time. However, crops production seems to be the leading agricultural activity to be performed in the district followed by practicing both food crops growing and animal keeping while the practice of keeping animals only seems to be not common among the residents. Tourism sector has experienced a rapid growth in recent years. Four Seasons Resort in Pongwe pwani is a good opportunity to improve the growth of tourism sector in Central district and the South region at large.

3.6.10 Livestock

The Central District has a total of 10,062 owners of acres used for livestock. Cattle grazing have emerged as the fastest growing economic sector in the project zone. Herds of cattle can be seen on the roads, around the villages, and on the beaches, which are supposed to be reserved for tourism activities. Most of the herders are predominantly beach resorts' workers (mainly security staff) and can be seen during their alternate days taking cate of the livestock. This is growing into a nuisance especially on the roads and beaches.

3.6.11 Gender Based Violence (GBV) and Social Issues

Gender refers to the social, behavioural, cultural attribute expectations and norms associated with being a woman or a man. Gender based violence results from unequal power relationships between women and men and it cuts across all divisions of classes, race, religion, age group and ethnicity. Gender Based Violence (GBV) and HIV/AIDS are major social and problems health affecting women and men in African countries Tanzania included.

In Zanzibar, Gender based violence takes place in different forms including physical and psychological violence, child marriage, sexual violence, economic violence such as lack of women to own resources and deprived acquisition of basic needs. There is also cultural violence such as female genital mutilation and psychological violence, such as depression and trafficking of women and girls. The HEET project will conduct SEA/SH risks assessments to obtain data and information on the role of GBV/SEA/SH in higher education

and its impact on access to education and equity as well as prepare GBV Action Plan after project effectiveness.

Violence against women and children is a grave violation of human rights. Its impact ranges from immediate to long-term multiple physical, sexual and mental consequences for women and children, including death. A total of 1,222 cruelty and gender based violence incidents were reported in 2021 that involved 154 women victims (12.6 percent) and 1,068 children victims (87.4 percent), among the children victims, 846 (79.2 percent) were girls and 222 (20.8 percent) were boys (Table 3-16) Compared with the previous year, the number of incidences decreased from 1,363 incidences reported in 2020 to 1,222 reported in 2021, which indicates decreased by 10.3 percent. The highest number of incidences reported in 2021 was in Magharibi "A" district with 290 incidences (23.7 percent), followed by Magharibi 'B' district with 182 incidences (14.9 percent). Among all violence reported in Zanzibar, rape offences seemed to be the biggest problem 621 offences (50.8 percent) compared to other offences. Magharibi "A" district have a large number of rape offences counted for 112 (18.0 percent) followed by Magharibi 'B' district was 79 (12.7 percent) and the least number of rape offence was found in Kusini district was 23 incidences (3.7 percent). Children aged 15-17 reported to have the highest number of incidences with 558 victims (52.2 percent) compared with other age groups. Many incidences of cruelty and gender-based violence occurred at other places, 641 (52.5 percent) compared with home. More than one quarter 527 (43.1 percent) of the total incidences was under investigation, 333 incidences (27.3 percent) was in Court, 261 incidences (21.4 percent) was closed to the police by difference reasons and remaining incidences with other action to be taken.

Table 3. 12. Number of Reported Gender Based Violence against Women and

Type of Violence	**2019**	**2020**	**2021**
Rape	651	571	621
Sodomize	157	102	177
Interference Against Nature	8	46	83
Abduction	180	150	95
Incidence Assault	104	74	114
Assault	269	420	132
Number of Offences	**1,369**	**1,363**	**1,222**

Source: Zanzibar Police Head quarter

Table 3. 13: Number Reported Gender Based Violence against Women and Children

District	Types of Violence						Number of Offenses
	Rape	Sodomize	Interference Against Nature	Abduction	Incidence Assault	Assault	
Kaskazini 'A'	38	6	4	4	8	0	60
Kaskazini 'B'	59	3	6	4	4	4	80
Kati	68	8	13	9	3	0	101
Kusini	23	4	0	6	2	0	35
Mjini	71	37	13	8	12	28	169
Magharibi 'A'	112	56	28	10	15	69	290
Magharibi 'B'	79	35	16	12	9	31	182
Wete	47	14	1	18	31	0	111
Micheweni	41	4	1	4	3	0	53
Chake Chake	43	7	1	14	23	0	88
Mkoani	40	3	0	6	4	0	53
Total	621	177	83	95	114	132	1222

Source: Zanzibar Police Headquarters

CHAPTER FOUR
4 STAKEHOLDER'S ENGAGEMENT

4.1 Overview of Stakeholder Engagement

The stakeholders' engagement has conducted in accordance to World Bank ESS10. According to ESS 10, Stakeholder engagement is the continuous and iterative process by which the Borrower identifies, communicates, and facilitates a two-way dialogue with the people affected by its decisions and activities, as well as others with an interest in the implementation and outcomes of its decisions and the project. It takes into account the different access and communication needs of various groups and individuals, especially those more disadvantaged or vulnerable, including consideration of both communication and physical accessibility challenges. Engagement begins as early as possible in project preparation, because early identification of and consultation with affected and interested parties allows stakeholders' views and concerns to be considered in the project design, implementation, and operation.

4.2 Objectives of Stakeholder Engagement

The objectives of stakeholder engagement and information disclosure as outlined in WB-ESS10 include:

i) To establish a systematic approach to stakeholder engagements that will help Borrowers identify stakeholders and build and maintain a constructive relationship with them, in particular project-affected parties.
ii) To assess the level of stakeholder interest and support for the project and to enable stakeholders' views to be taken into account in project design and environmental and social performance.
iii) 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.
iv) To ensure that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format.
v) 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.

4.3 WB Environmental and Social Standard on Stakeholder Engagement

The World Bank ESS10, "Stakeholder Engagement and Information Disclosure" recognizes "the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice". According to ESS10, the Borrower should also propose and implement a grievance mechanism to receive and facilitate the resolution of concerns and grievances of program- affected parties related to the E&S performance of the program in a timely manner (World Bank, 2018; https://www.worldbank.org/en/projects- operations/environmental and social framework/brief/environmental and social standards).

4.4 Stakeholder Identification

In line with World bank ESS10 and the SEP, stakeholder engagement focus on broad inclusion and ensuring meaningful engagement with and participation of members of vulnerable individuals, including persons with disabilities, people living with HIV/AIDS, persons with albinism, women, the elderly, female and children headed households and the poorest of the poor, youth, the unemployed.

The first step in the stakeholder engagement process is to identify the stakeholders to be consulted and involved throughout the project life cycle. Stakeholders are individuals or groups who are affected or likely to be affected by the project affected parties (PAP) and who may have an interest in the project as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively (other interested parties OIPs).

Stakeholders' analysis involves identifying the individuals or groups stakeholders who are likely to affect or be affected by proposed project because of different circumstances. The project will further plan the effective methods of engaging stakeholders based on their needs about project design, impact and mitigation measures. For the proposed SUZA-HEET project, the stakeholder groups include:

- **Implementation Agencies:** This includes agencies which shall have a role in implementing HEET project. This mainly includes government institution and regulatory authority such as SUZA, Zanzibar Environmental Management Authority (ZEMA), MoEST and the like.
- **Project Affected Communities:** Project affected parties under SUZA project are likely to include the following sub- categories;
  Direct beneficiaries: These are institutions and agencies where HEET project will be implemented, staff, students including vulnerable students and general population who will be benefiting from the improvement resulting from HEET project.
  Impacted communities: These are groups of people who can be directly or indirectly negatively affected by the project. The impacted community may be affected through components of the natural or social environment as a consequence of various aspects of a project in varying degrees over its life cycle.
- **Vulnerable Groups/Disadvantaged:** include vulnerable households such as elderly, youth, women especially female headed households, persons and students with disabilities, people living with HIV/AIDS or other chronic diseases.
- **Non-Governmental Organizations:** groups who are focused on enhancing education, protection of the Human Rights, support of disadvantaged / vulnerable peoples such as the disabled, the elderly, People Living with Albinism, etc and environment.
- **Private Sector:** These are usually direct or indirect hired suppliers who will be involved in supporting the project at various aspects. These may include but not limited to Consultant firms and construction companies.

- **Other Interested Parties:** An interested party is any person, group of persons or organizations interested in an activity and may include project proponents, local or national government authorities, local or national politicians, traditional authorities, religious leaders, civil society organizations including NGOs, community-based organizations, and other businesses and/or private sector.

4.5 Engagement Approach during Preparation

The approach for the stakeholder's engagement included the preparation of safeguards documents, the disclosure of the environmental and social risks management documents for the Project. As part of the engagement, the consultations meetings with identified stakeholders were conducted. This was done to provide stakeholders with timely, relevant, understandable and accessible information in a culturally appropriately manner which is free of manipulation, interference, coercion, discrimination and intimidation. Also, the engagement considered the stakeholders' views, concerns and opinions on project design, risk, impact and mitigation measure associated with the Project. All their comments and recommendation were well recorded and whenever the response was required, the consultant provided the responses all the meeting minutes were recorded.

4.6 Stakeholders Engagement during Implementation: Proposed Strategy for Information Engagement

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

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

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

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

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

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

4.7 Stakeholders Analysis

After identifying and grouping stakeholders, stakeholder analysis was used to characterize stakeholder groups' interests, how they will be affected by the proposed subprojects and to what degree, and how those groups may influence the subprojects. The stakeholder analysis process revealed important differences among groups, including their concerns and priorities. Communities and other stakeholders that will be affected by the subprojects were engaged as early as possible during subprojects design. By engaging with the stakeholders early, it may be possible to avoid, mitigate, or decrease the subproject's impact. It is generally not practical or feasible to engage with every single stakeholder group at every level.

Table 4. 1**:** Stakeholder analysis for the proposed project at SUZA

Stakeholder	Interests	Opportunities	Threats	Linkages with the proposed project
Central Government entities	-Sectoral guidance and policies -Input to environment management plans -Monitoring of environmental and social issues	-Institutional support and coordination	-Limited resources for monitoring -Bureaucracy that may delay progress of operations thus costing the project more time and money	-Give guiding policies and government regulations -Monitoring of works -Technical support to District staff for restoration activities -Issue approvals/ permits/ certificates to the project
Other Government Institutions: Ministry of Infrastructure and Communication and ZAWA	-Responsible for the planning and development of infrastructure (roads, water supply) -Representing project affected persons -Technical guidance during data collection	-Can provide information about population trends and their dynamics in the project area -Political support and mobilization -Can be utilized as the contact	-Political interference -Lack of resources to participate fully in the environmental and social assessment	-Share information on compensation modalities -Witness the land acquisition and compensation process -For purposes of facilitating the process of information among the stakeholders, district officials can participate in project progress and site meetings -Can take up the role of liaising with the local communities since they are on

	-Accountability for development in their areas of jurisdiction	persons in the project area -Can help in spreading information from sensitization meetings		the ground through the Environmental Officer, the district can take on the role of environmental monitoring in collaboration with consultants
Local Communities	-How will they be affected by the project? -Good source of information on the trends and dynamics within the project area -In some cases particularly the land owners, their livelihood might be affected by the proposed project -Can provide casual labour for the project	-Assistance in information transfer -Labour supply (Unskilled)	-Misinterprets project -Intentions and therefore, sabotage which eventually results in project delays -If not sensitized, they might disrupt project activities	-Good channel for information transfer and sharing -Need for compensation -Supply chain linkages

4.7.1 Public Meetings

Dissemination of project information among communities along/surrounding the project through meetings was an important aspect of the public participation process; they needed to be appropriately informed about what is planned in their area.

The community consultations were conducted with the intention to;

- Provide clear and accurate information about the project to the communities
- Inform communities along/surrounding the project area about the Project schedule
- Gathering from population and their representatives about main environmental and social concerns and perceptions regarding the project
- Gather opinions and suggestions directly from the communities on their preferred mitigation measures
- Gather opinions and concerns of the various minority groups of women, children, disabled and youth on the proposed project were noted.

Each meeting was hosted by local authorities and was conducted for more than one hour; the IRCS as a consultant had at least a team of three experts; social scientist, environmental scientist and the Team leader. The Team leader was a moderator, and other were taking

notes for the meeting.

Public meetings were conducted in each Shehia located along/surrounding the subprojects area as detailed in the table below shows the number of village participants of the meetings:

The discussions focused on environmental, social economic and project safety issues in the areas raised by community groups that are likely to be impacted during the construction and operation phases.

4.7.1.1 Consultative Meetings with Institutions

The institutions involved in the consultative meetings were those in public sectors but one way or another are concerned with the project objectives. They include: Regional and District administrative offices, ZIPA, Ministry of Education and Vocational Training, SUZA, ZEMA, DoE, Ministry of Land and Housing Development, DOSH, ZECO and Department of Fire Fighting and Rescue. Stakeholders' meetings / interviews from other sectors included both managerial and technical staff.

- **Consultative meetings with districts' & regional authorities and other stakeholders**

Consultative meetings at district and regional levels included discussions with districts' Council Management Team (CMT) which comprised of technical staff from all departments and regional officers. Stakeholders' meetings/interviews from other sectors included both managerial and technical staff.

4.7.1.2 Issues and Concerns raised by Stakeholders.

During the engagement activities undertaken for the preparation of this study, the following key themes were raised by stakeholders. These issues have been addressed either in the Project design or through the development of mitigation measures in the project instruments as presented in the table below.

Table 4. 2: Summary of the key raised issues and concerns

S/N	Institution consulted	Concerns	Response
1	**Zanzibar Environmental Management Authority (ZEMA)**	▪ The project management (SUZA) should ensure that they are using appropriate raw materials that will be considering environment of the project area. ▪ The proposed project construction should consider disability ▪ They should prepare rescue plan for their proposed project construction ▪ The construction of proposed should have EIA certificated prior implementation.	Implementation of the proposed project will ensure protection and good management of the environment by source all material from authorised dealers. The designs of the proposed project are equal friendly to all users including people with special needs. The project will ensure possessing of EIA certificated prior implementation.

2	**Zanzibar Water Authority (ZAWA)**	▪ ZAWA has no objection on the proposed construction of the Teaching Theatres and Laboratory under SUZA management ▪ Project proponent should ensure that all rules and regulation concerning with the proposed construction are fully considered during the construction and operation phases ▪ ZAWA infrastructures should be regarded during the construction phase. ▪ Safe uses of water services should be considered when needed	SUZA PIU with collaboration of project contractor and project consultant will work together with ZAWA so as to ensure the smooth implementation of the proposed project. During implementation of the project, when contractor encounter ZAWA infrastructure, it will be handled with maximum care and ZAWA will be notified and ask for help when needed.
3	**Department of Environment (DoE)**	▪ SUZA management should ensure that the proposed project has good waste management system. ▪ The sustainability of the Environment should be full regarded by SUZA management. ▪ The contractor should ensure that health and safety to their staffs are considered as well ▪ The contractor should ensure that Environmental regulations during the construction and operation of the project are observed ▪ All procedures concerning with the project's construction should be followed the contractor and SUZA	All construction waste will be handled aseptically, and will be disposed at authorized dumping area. SUZA PIU will be responsible for overlooking all project implementation activities, hence will ensure good management of all waste generated during project implementation.
4	**Fire and Rescue Force**	▪ SUZA management as well as their contractor should have good cooperation with the fire brigade. ▪ The project management (SUZA) should ensure that all conditions relating to the proposed project construction and operation are effectively followed ▪ The Installation of Firefighting equipment should be in place at the proposed Teaching Theatres and Laboratory project at SUZA compound ▪ The directive/safety signs should be available at the all project area. ▪ They should have an emergency plan at their project area ▪ A consideration on all occupational safety guidelines must be taken. ▪ They should conduct training to all staffs on using various machines and equipment at the project site when needed	SUZA PIU together with Project contractor and project consultant will have good collaboration with Fire brigade during project implementation. Adequate fire extinguisher will be installed at strategic location and training will be given out to SUZA communities frequently. Fire and safety signs will be installed at strategic area and emergency plan will be in place.

5	**Zanzibar Electricity Cooperation (ZECO)**	▪ The cooperation has no objection with the proposed construction of Teaching Theatres and Laboratory if all rules and regulations are considered ▪ SUZA should ensure that their proposed construction is complied with all ZECO rules and regulations in term of using power ▪ SUZA management should go to ZECO office to seek an advice from them concerning to the technical issues of electricity connection when need ▪ Contractor and SUZA management should ensure that all procedures related to connection, maintenance and connection of the power are followed	SUZA UPIU together with Project contractor and project consultant will have good collaboration with ZECO office during project implementation.
6	**Department of Occupational Safety and Health (DOSH)**	▪ No objection on the proposed construction of Teaching Theatres and Laboratory at SUZA compound. ▪ They should ensure that they have enough Fire extinguishers at the project site. ▪ The project has been registered with relevant authorities and permits secured. ▪ SUZA management should ensure that the proposed project site is appropriate for the proposed project construction ▪ Availability of safe and clean drinking water for workers. ▪ Safety of workers should be considered as priority in all project stages.	The project will not only be registered with OSHA but will abide will all issues required to maintain the safety of the workers and users as well. Adequate fire extinguisher will be installed at strategic location and training will be given out to SUZA communities frequently. The project will be registered with relevant authorities including ERB, CRB, AQRB, OSHA, Fire and Rescue Brigade, City Council. The contractors will ensure that safer and clean water is available all the time for workers during the implementation of the project.
7	**Zanzibar Investment Promotions Authority (ZIPA)**	▪ They have no objection with this proposed project construction at SUZA compound ▪ The contractor of the proposed project construction should recruit the surrounding community on various employment posts during the construction phase	Skilled and unskilled labour from Jumbi Shehia and surrounding project area will be highly emphasized to apply for work during implementation of the proposed project SUZA PCT will ensure environmental preservation

		▪ The project activities should consider the environmental preservation at the project site	during implementation of the proposed project by ensuring project ESMP and ESMoP are followed.
8	**Zanzibar Land Commission**	▪ No objection on this proposed construction because the proposed project site is within the SUZA compound ▪ During the construction the contractor should ensure that there are no conflicts for such project site ▪ All procedures relating to these projects should be considered by the project's proponents. ▪ The project proponent should ensure that they have all permits relating to the project construction.	All permits such as EIA, Construction permit etc. will be obtained prior project implementation.
9	**Central District Commissioner's office**	▪ They have no objection with the proposed project construction ▪ The proposed project construction will be developed within SUZA compass ▪ SUZA management should ensure that their contractor has required professional in order to have capacity of developing strong and quality building ▪ The proposed project construction is among required faculty in Zanzibar	SUZA PCT consists of various professionals who are capable of ensuring smooth implementation of the proposed project. Furthermore, the qualified contractor and consultant will be procured to ensure quality of the proposed project buildings.
10	**Central District Council**	▪ The proposed project will help students at SUZA to get knowledge at advantageous environment. ▪ District Council office has no objection with the proposed project construction ▪ The proposed project construction should consider disabled ▪ Safety and health of the students and staffs should be observed from the construction activities of the proposed project construction	The design of the proposed project considers all users including people of special needs. Health and Safety measures will be ensured during implementation of the proposed project.
11	**Chief Government Chemist and Lab Agency**	▪ The proposed lab complex should have emergency exist plan and adequate fire extinguishers ▪ The lab furniture should not allow chemical spill penetration and the sink which is not destroyed by chemical.	The proposed project will have emergency plan and adequate fire extinguishers will be installed at strategic area. SUZA will procure best quality furniture and apparatus for laboratory purpose which are durable and ergonomic friendly.

		▪ The lab complex should have chemical storage area and no easy to be reached by student and other unauthorised personnel ▪ Proper management of chemical waste should be well managed during project operation.	In design, each laboratory room will have separate chemical storage room with door. Lab technician will be in charge of the lab and all time the door will be locked and unauthorised personnel will not have access to chemical storage room. All chemical waste will be temporary stored at lab chemical storage room and authorised chemical disposal dealer will be deployed for final disposal
12	**SUZA STUDENTS**	▪ Internet services should be improved for students, these services should be available in their study areas such as classrooms, hostels and other areas around students. ▪ Power supply facilities should be added in classroom to enable good studying environment ▪ Projectors and their screens should be fixed in class rooms at locations that enable every learner/student to see. ▪ The numbers of toilets in the proposed building should be adequately and user friendly to all student including student with special needs. ▪ The campus is expanding services that offer meals and other services should be considered in the new buildings	The design should consider internet connectivity exist when students and staff are within the building and the surrounding area. The designs and the developer should consider installing power outlets in classrooms to facilitate student to use computer and other power requiring gadgets The designs and the developer should install projectors and screen in every learning area (classrooms, theatres, laboratories etc.) The Developer should ensure that adequate water closet facilities for female, male and people with special needs are provided in the new buildings. The Developer should ensure that these services are provided at a working distance within the campus.

4.7.1.3 Key Findings from Stakeholders Consultation & Public Engagement

From the engagement activities performed, stakeholders identified a number of issues that they anticipate from the proposed projects; these include ESMP and ESHS Management Plan:

The stakeholders in the project area raised the following issues;

1. It was pointed out repeatedly by different stakeholders that the construction of hostel should consider people with special needs. Some stakeholders specifically mentioned toilet facilities and pram should be designed to meet their needs.
2. Hostel construction should consider norms and traditions of Zanzibar.
3. **Economic benefits to be realized after completion of subprojects:** implementation of the Subprojects will bring various economic benefits to communities living along or near the subprojects.
4. **Avoid disruption of essential services by damaging the public facilities:** Some of the services that are being provided to the communities i.e. water supply, electricity and telecommunication will be affected/ or disrupted by the project construction.
5. **Spread of HIV/AIDS and other sexually transmitted infections**: Impaired community safety and risk of disease intensifications, especially HIV/AIDS. Central District Council to officially make a formal contract with institution that will be carrying out the HIV/AIDS preventive campaign through dissemination of relevant and appropriate HIV/AIDS preventive awareness creation seminars, campaigns should be to both workers in particular and the communities, effective collaboration with CMACs and other stakeholders is paramount for result based HIV/AIDS awareness creation campaigns during construction of the Labs.
6. **Gender based violence**: Based on the experiences gained from the rise on incidences of GBV from other construction project, community members expressed their concerns that during project construction more people will come to work in the project area and hence may likely fuel gender-based violence in their communities as a result of interactions of people from different cultural backgrounds. They call upon the contractor(s) to emphasize employees of the project to respect to human dignity by abiding to traditional customs and norms instead of being the cause of fuelling of GBV related issues in the project area.
7. **Recruitment of local labour during construction phase:** Each *Shehia* being transverse should be given first priority in the provision of unskilled and semi-skilled labours in the project. The contractor(s) should therefore adhere to local content policy in executing the project during recruitment of labours and commodities and services supply chain.
8. **Dust production, noisy and blasting of rocks during construction:** Dust production, noise from moving construction equipment / machines and blasting of rocks are inherent to all project' construction works. The contractor(s) must have means to suppress the dust, reduce the level of noise and provide early notification to the communities about the proper time of blasting rocks to obtain gravels.
9. **Environmental safeguard and sustainability**: storm water channels should not be directed to farms or residents since such practice has damaged crops, farming land and residents due to accelerated erosion.
10. Street lights, CCTV, and emergency exit should be put in place for security purpose.
11. Shopping centres and sports venues should be among the priorities.
12. Rooms should be configured at different size, but should not be the ones which exceed four people.
13. Availability of reliable water and electricity should be ensured.
14. Rent of the rooms should be of reasonable amount.

4.8 Stakeholders' Engagement Plan (SEP)

The engagement plan will be reviewed and updated throughout the project implementation. During this process, the focus and scope of the SEP may change to reflect the varying stages of project implementation and to encompass any changes in project design and lessons learnt from previous phases of the Project. However, it is important to develop a guiding framework that may act as roadmap for stakeholders' engagement as shown in Table 4-4

Table 4. 3*: Stakeholders' Engagement Plan*

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

Target Stakeholders	*Objective*	*Messages/ Agenda*	*Means of Communication*	*Schedule/frequency*	*Responsible person/ group*
		timelines for compliance with ESS documents 8. The LMP identifies the main labour requirements and risks associated with the project.			
Representatives of implementing institutions and agencies (ZECO, ZAWA, OSHA); Community groups representatives from Jumbi Shehia, SUZA Students and Student organization, SUZA staff, service providers and private sector surrounding project site	To disclose finalized ESMF, SEP, LMP and ESCP and ESIA	1. Email message to advise Stakeholders of disclosure and where to access the disclosed documents. 2. Disclosure of Project documentation in an accessible manner	Organized public Meetings/ Consultations Disclosure of Project documentation Email copies to key individuals and organizations.	At least once per each stage of the project or once when there is changes or revision	ESIA team, SUZA Monitoring and evaluation team
CONSTRUCTION PHASE					
Representatives of implementing institutions and agencies (ZECO, ZAWA, OSHA); Community groups representatives from Jumbi Shehia, SUZA Students and Student organization , SUZA	Meeting to inform stakeholders to the start of construction	1. Inform stakeholders that construction will commence. 2. Information and education on the risks and impacts, GRM,	Public Meetings Focus Groups Discussions. Face to Face Meetings	At least once per each stage of the project or once when there is changes or revision	ESIA team, SUZA Monitoring and evaluation team

Target Stakeholders	*Objective*	*Messages/ Agenda*	*Means of Communication*	*Schedule/frequency*	*Responsible person/ group*
staff, service providers and private sector surrounding project site		workers code of conduct etc. 3. Inform the stakeholders of the construction plans, builders, route for transportation of materials, water sources			
Representatives of implementing institutions and agencies (ZECO, ZAWA, OSHA); Community groups representatives from Jumbi Shehia, SUZA Students and Student organization, SUZA staff, service providers and private sector surrounding project site	1. To inform stakeholders of any new activities, unexpected impacts etc. during construction. 2. To Provide updates on project progress	3. Inform on the new changes and progress	Public Meetings Focus Groups Discussions. Face to Face Meetings	At least once per each stage of the project or once when there is changes or revision	ESIA team, SUZA Monitoring and evaluation team
Representatives of implementing institutions and agencies (ZECO, ZAWA, OSHA); Community groups representatives from Jumbi Shehia, SUZA Students and Student organization , SUZA	1. Inform stakeholders of any new activities, unexpected impacts etc. during construction.	Inform public about any emerging issues Information and education on the risks and impacts, GRM, workers code of conduct etc.	Public Meetings Focus Groups Discussions. Face to Face Meetings	At least once per each stage of the project or once when there is changes or revision	ESIA team, SUZA Monitoring and evaluation team

Target Stakeholders	*Objective*	*Messages/ Agenda*	*Means of Communication*	*Schedule/frequency*	*Responsible person/ group*
staff, service providers and private sector surrounding project site	2. Provide updates on project progress	Updates on project progress etc.			
Local NSAs; Community groups representatives from Jumbi Shehia, Students and Student organization, SUZA staff, service providers and private sector surrounding project site	Resolve grievances received	1. To address grievances related to construction activities 2. Refer persons affected by project related GBV/SEA to services 3. To promote accountability for violations of GBV by project staff.	Face-to-face meetings Confidential and safe face to face referral for GBV survivors Meetings and aggrieved persons	Every time a grievance is received	ESIA team, SUZA Monitoring and evaluation team, SUZA Gender Unit and Gender Desk at Central DC and police station
Representatives of implementing institutions and agencies (ZECO, ZAWA, OSHA); Community groups representatives from Jumbi Shehia, SUZA Students and Student organization, SUZA staff, service providers and private sector surrounding project site	Contact with the Environmental and Social Project Experts	Sharing of phone number and WhatsApp number to submit questions and other comments.	Phone number WhatsApp number	At least once per each stage of the project or once when there is changes or revision	ESIA team
THROUGHOUT THE PROJECT (ALL COMPONENTS)					

Target Stakeholders	***Objective***	***Messages/ Agenda***	***Means of Communication***	***Schedule/frequency***	***Responsible person/ group***
Representatives of implementing institutions and agencies (ZECO, ZAWA, OSHA); Community groups representatives from Jumbi Shehia, SUZA Students and Student organization, SUZA staff, service providers and private sector surrounding project site	Information dissemination	To share general information on project, activities	Posting on bulletin boards; Information leaflets Community meetings Outreach activities – Focus groups. One to one meeting Sharing on SUZA social media and website	At least once per each stage of the project or once when there is changes or revision	ESIA team and SUZA-PRO office
Representatives of implementing institutions and agencies (ZECO, ZAWA, OSHA); Community groups representatives from Jumbi Shehia, SUZA Students and Student organization, SUZA staff, service providers and private sector surrounding project site	Contact with the Environmental and Social Project Experts	Sharing of phone number and WhatsApp number to submit questions and other comments.	Phone number WhatsApp number	At least once per each stage of the project or once when there is changes or revision	ESIA team

4.9 Grievance Redress Mechanism (GRM)

4.9.1 Introduction

The SUZA has developed GRM that shall be adhered throughout the project life to deal with grievances and complains. The SUZA PCT will apply transparent procedures to deal with inquiries and complaints received from stakeholders.

The main objective of a GRM is to resolve project related complaints and grievances in a timely, effective, and efficient manner that satisfies all parties involved. Specifically, it provides a transparent and credible process for fair, effective, and lasting outcomes. It also builds trust and cooperation as an integral component of broader community consultation that facilitates stakeholder's engagement.

For the case of SEA/SH SUZA has established Gender desk as a Platform to create awareness about gender-based violence, sexual harassment and all related gender issues. SUZA gender Desk shall provide confidential support to complainants and shall collaborate with the GBV/SEA support facilities provided by the Revolutionary Government of Zanzibar.

Table 4. 4*: Step and procedures for presenting grievance.*

STEP	PROCEDURE	TIME FRAME
1	Receive and register grievance	Within 24hours
2	Acknowledge	Within 24hours
3	Assess grievance	Within 2Days
4	Assign responsibility	Within 2Days
5	Development of response	Within 21Days
6	Implementation of response if agreement is reached	Within 21Days
7	Close grievance	Within 30Days
8	Initiate grievance review process if no agreement is reached at the first instance	Within 30Days
9	Implement review recommendation and close grievance	Within 30Days
10	Grievance taken to court by complainant	As applicable

A complaint can be submitted to the SUZA GRM through the following channels:

By email: grievances@suza.ac.tz
By Phone: +255 773 333167
P.O. Box 146. Zanzibar.
Complaint Boxes

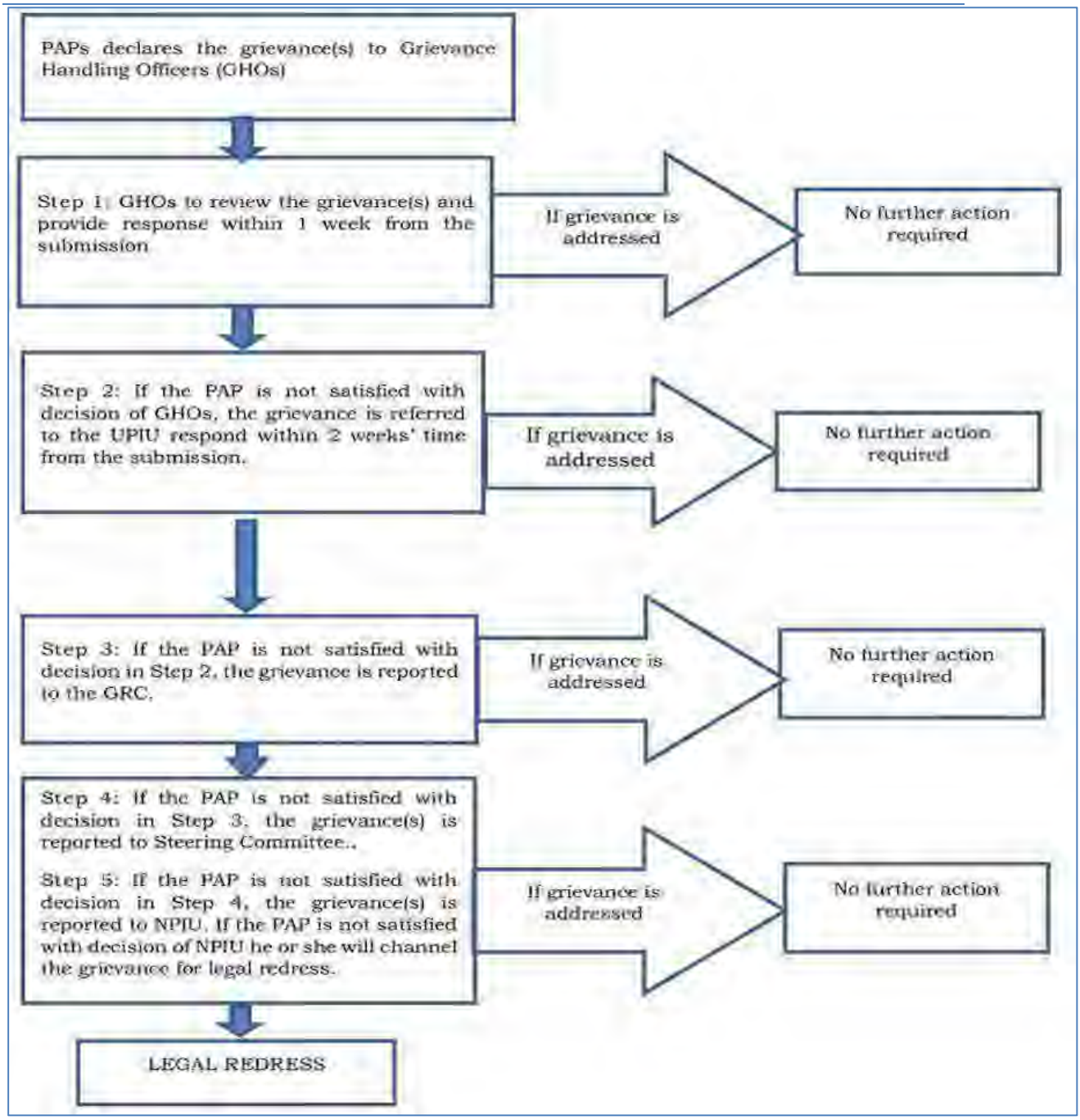

Figure 4. 1: The flow chart for steps in GRM (Source: SUZA GRM, 2023)

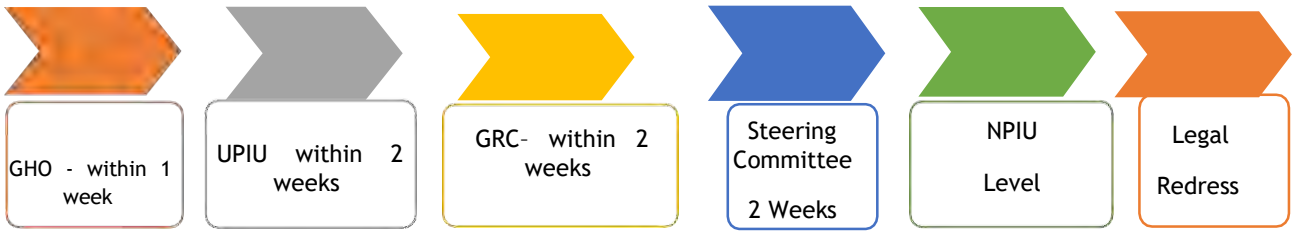

Figure 4. 2: Timeframe in resolving complaints (Source: SUZA GRM, 2023)

4.9.2 World Bank Grievance Redress System

Communities and individuals who believe that they are adversely affected by a Program supported by the World Bank may also complain directly to the Bank through the Bank's Grievance Redress Service (GRS) (https://www.worldbank.org/en/projects-operations/products-and services/grievance-redress-service). A complaint may be submitted in English, or in local languages, although additional processing time will be needed for complaints that are not in English. A complaint can be submitted to the Bank GRS through the following channels:

By email: grievances@worldbank.org
By fax: +1.202.614.7313
By mail: The World Bank, Grievance Redress Service, MSN MC10-1018, 1818 H Street Northwest, Washington, DC 20433, USA on Panel may be found at www.inspectionpanel.org

4.9.2.1.1 Gender Based Violence (GBV)

The Project may result in incidences of GBV and SEA affecting workers and the community. GBV cases are different from other complaints that are typically handled through the grievance redress mechanisms.

As outlined in the ESMF, a GBV action plan developed for the Project to be used for the PIUs once service providers have been identified. A GBV referral pathway has been identified in Central district mapping services with the appropriate capacity and quality of service delivery.

The CGC will be trained on how to manage GBV related grievances including matters of confidentiality, treating survivors with empathy and what non-identifiable data should be collected and how to close the case. In addition, members of the Shehia council will also be trained on how to receive and manage this information. However, the Shehia Council will not be involved in resolving GBV related cases as this will be determined by the survivor with support from the appropriate service providers based on their needs and wishes.

In cases involving a Project Worker, the contractor and PIUs are advised about the case who will in turn inform the GBV Specialist at the national level who will instigate any investigation required involving the contractor, PIUs, services providers etc. They will then recommend action to be taken by the contractor/CGC in ensuring that administrative sanctions are taken against an alleged perpetrator of sexual assault.

4.10 Monitoring

Monitoring of the implementation of stakeholder engagements is paramount for the success of the project. HEET project will maintain a Stakeholder Engagement Log that documents all stakeholder engagements planned and undertaken. The Engagement Log includes location and dates of meetings, workshops, and discussions, and a description of the project-affected parties and other stakeholders consulted. Monitoring reports which will be presented to the UPIU include details from stakeholder engagement logs as well as feedback from the GRM regarding the status of cases logged over the reporting period.

There will be period reporting of the SEP as part of the project monitoring report. The project will also develop an evaluation form to assess the effectiveness of the formal engagement process. The questions will be designed as appropriate for the relevant audience. In addition, SEP will be periodically revised and updated as necessary during project implementation. Major changes to project activities and to schedule will be duly reflected in the SEP.

4.10.1 Monitoring Framework

It is important to monitor stakeholder engagement so as to ensure that consultations and disclosure efforts are effective, and that stakeholders have been meaningfully consulted throughout the process. A set of specific Key Performance Indicators (KPIs) will be monitored by the project on a regular basis in relation to the engagement measures proposed in this SEP. Monitoring will include: -

- Auditing implementation of the Stakeholder Engagement Plan (SEP);
- Monitoring formal and informal consultation activities conducted with communities and government authorities; and
- Monitoring the effectiveness of the engagement processes in managing impacts and expectations by tracking feedback received from engagement activities and recording and tracking commitments made to stakeholders.

Table 4. 5*: Potential List of SEP Monitoring Indicators*

Goal	**Indicators**
Stakeholder Engagements (prior to and after its establishment of the Construction)	• Number of stakeholders consulted, disaggregated by the type of stakeholder. • Number of Stakeholder workshops or meetings organised. • Number of press materials published/broadcasted in the local, regional, and national media relating to stakeholder engagements. • Number of participants attending stakeholder consultations, disaggregated by sex and stakeholder group. • Proportion of stakeholder groups identified in the SEP who have been engaged by the project/Construction. • Number of stakeholder engagement feedback assessments/evaluations carried out. • Proportion of stakeholder concerns addressed and communicated to them.
Development of an Environmental and Social Risks Management Policy and procedures	• Number of Environmental and Social Risks Management Policy and procedures established, disaggregated by level of SUZA project • Number of E&S Risk Management Policy reviewed and approved, disaggregated by project categories
Grievance Mechanism	• Development and operationalization of a Grievance Mechanism, disaggregated by level o Number of complaints received in a specific period, o Number of complaints resolved,

	○ Number of complaints pending, ○ Number of cases referred to SUZA Management and/or Ministry responsible with education, ○ Number of complaints submitted by age and gender of complainant, and ○ Number of complaints submitted by the member of the community, team member of the project or by local leader
Monitoring and Communication	• Recruitment of a Monitoring and Evaluation Specialist. • Development and approval of an M&E policy. • Number of working and communication tools developed (Newsletters [electronic], Websites, Social Media Platforms, Flayers, Brochures, etc.). • Number of communication tools shared per type of communication tool, disaggregated by type (Newsletters, flayers, brochures, etc.). • Number of visitors to electronic media outlets (Websites, Social Media Platforms [YouTube, Face book, Twitter, LinkedIn], etc.). • Number of documentaries made on the project as part of its stakeholder engagement activities. • Number of external platforms carrying advertisements on the project as part of its stakeholder engagement activities. • Number of times the Stakeholder Engagement List/Profile has been updated. • Communication policy developed and approved by SUZA senior management team. • Recruitment of communication specialist.

4.10.2 Reporting Framework

The implementation of the SEP will be a collaborative effort between the stakeholders and the project implementation team, both before and after the establishment of the SUZA project. The project implementation team will establish a two-way flow of information where information flows from the project to the stakeholders and vice- versa. The project implementation team will conduct mini evaluations to elicit participants' feedback on all workshops, conferences, and stakeholder engagements. In addition, the project implementation team will make monitoring results publicly available and will regularly report on progress of the stakeholder engagements to all stakeholders.

4.10.3 Training

The SUZA PCT will arrange the necessary training associated with the implementation of this SEP. Specialized training will provided to the staff appointed to deal withGRM, and GBV and SEA/H as well as ESSS.

4.11 Conclusion

Raised issues/concern from stakeholders has informed the baseline studies, the identification and assessment of impacts, and the definition of mitigation and management measures. Feedback from stakeholders over the impacts of existing project condition and awareness on HIV/AIDS and GBV. Following the consultations conducted, will significantly reduce the concerns of stakeholders. Consultations have demonstrated how stakeholders have informed the ESIA processes and influenced project design.

CHAPTER FIVE

5 POLICIES, LEGAL AND INSTITUTIONAL CONTEXT

5.1 Environmental Management in Zanzibar

Environmental management is not a Union matter of the United Republic of Tanzania and therefore is handled by the Revolutionary Government of Zanzibar (RGoZ). However, a clean and safe environment is the constitutional right of every Tanzanian citizen (see article 12-28 of the Constitutional of the United Republic of Tanzania, 1977[4] as amended from time to time). Zanzibar has taken considerable stride in integration of environment into socio-economic policies, plans and strategies with the aim of promoting and consolidating sustainable socio-economic development in the country. Regulation on environmental management in the Zanzibar is mainly vested on the Department of Environment (DoE) in the Office of the First Vice President. This section is aimed at reviewing relevant environmental resources and planning legislation and regulations to ensure that the proposed project for the State University of Zanzibar meets World Bank ESF requirements, local policy and legislative criteria, and those relevant requirements are built into project design and implementation.
This ESIA subscribes to the International Environmental and Social Safeguard especially the World Bank Environmental and Social Standards.

[4]Part III of the Constitution of the URT, 1977; contains articles on the Basic Rights and Duties (*The Right to Equality, The Right to Life, The Right to Freedom of Conscience, The Right to Work, Duties to the Society)*

5.2 Legal Framework

5.2.1 The Zanzibar National Act applicable to the Project

	LEGISLATION	EXPLANATIONS ON POTENTIAL IMPACTS	RELEVANCE TO PROJECT	COMPLIANCE
1.	**ENVIRONMENTAL MANAGEMENT ACT NO 3 OF 2015**	The Act makes it mandatory for any person to comply with the environmental and social impact assessment requirements of the Project which includes environmental screening, scoping, preparation of the Environmental Impact Statement and its review before the decision on environmental clearance is made. As per the Act, there is EIA screening, scoping and the review process, while the preparation of the EIA is carried out by the consultant forwarded by the project proponent and only after having been approved by the Authority. The project has to conform to all requirements of environmental clearance and safeguards and they include ESIA, Auditing, Monitoring, and implementation of the environmental and social management plans for the project.	The project development involves the activity which will likely have the significant impact to environment and society. The Act requires the project proponent to select the qualified and registered experts to conduct EIA so that, can be submitted to ZEMA for the issuance of certificates.	The requirements have been met with respect to provisions stipulated in Part IX and Sections 51, 52, 53, 54, 55, 56, 57 and 60 of this Act.
2.	**ZANZIBAR FIRE BRIGADE AND RESCUE ACT NO. 7 OF 1999**	The Act provides powers to Zanzibar Fire Brigade to perform all activities associated with Firefighting, prevention and abating fire accidents, save life and properties or any other duty related to fire and rescue.	The Act empowers the fire-fighting authorities and institutions to enter and inspect premises, facilities, or any other place for the purpose of ensuring fire safety measures in those premises and facilities including all standard measures against fire hazards, availability of fire hydrants, and all other safety measures aimed at saving life and property in the event of a fire tragedy.	**Sections 4:** This stipulates the duties/functions of this special department. **Section 7:** After the Commissioner is satisfied that the premises is prone to fire hazard, He/She can stop the use of premises. **Section 8:** Up on fire accident, the fireman may enter into the premises with fire fighting and safety equipment's to discharge his/her duty.
3.	**ZANZIBAR TOURISM ACT (2009)**	The Zanzibar Tourism Act No. 6 of 2009 empowers the responsible authority to implement tourism policy and master plan; promote, assist and facilitate efficient development of a sustainable tourism planning, promote and develop cultural ecotourism; preserve heritage and coordinate public private partnership in Zanzibar Tourism Industry. The project proponent is required to comply with the Act in order to alleviate any potential disruption that could affect the local tourism industry in the area.	The Act provides Zanzibar Commission for tourism with mandate to regulate tourism and the related activities in the isles.	

4. REGIONAL ADMINISTRATION ACT NO. 8 OF 2014	The Act specifies powers and function of the Regional, District, and Shehia Government administrators. It covers all matters related to the social, economic, and environmental governance in the lower administrative units such as in the Shehia. Section 22 (1) (d) of the Act states that Regional development committees established under this Act have been given a responsibility to mobilize people to participate, contribute, and if possible assist in the use and management of natural resources, protection of environment for sustainable development and in all activities of national development.	The project proponent is required to collaborate with the regional, district and Shehia administration in the implementation of social and environmental safeguards of the proposed project, and coordinate with the community in the implementation of the corporate social responsibility in the areas affected by the operations, if necessary.	Section 22 Section 26
5. LOCAL GOVERNMENT AUTHORITY ACT NO. 7 OF 2014	The Act specifies on establishment of the Local Government Authority structures with their jurisdictional areas, powers and functions. It covers all matters related to the social, economic, and environmental governance within the defined boundaries of the local government authorities. In the context of environment, the Act has emphasized on the local powers prevent and control public nuisance and ensure sustainable management of land and natural resources. If the development has been approved with a permit. Sections 83 and 84 of the Act specify offence under Nuisance and unauthorized land use, respectively. The project proponent needs to comply with all the requirements within the jurisdiction of the local government council in terms of land acquisition, necessary public works and permits, local environmental services clearance, prevention of public and private nuisance, and other activities that require certification and permits, etc.	Section 26 (1) of the Act specifies general functions of the local council which include maintenance of environmental sanitation, promotion of tourism and other investment opportunities available in their areas, keeping record of land and marine transport vehicles and vessels within their jurisdictional areas, control environmental pollution and prevent private nuisance, supervise and ensure measures to combat epidemic diseases; control extraction of stone, sand, wood, and other forms of natural resources, undertake afforestation and urban forestry initiatives, implement the land use plan, and deal with cross cutting issues of climate change, disaster management, and population issues. Section 63 provides powers to enter any premise and check	Section 26 Section 63
6. ZANZIBAR FOREST RESOURCES MANAGEMENT AND CONSERVATION ACT NO. 10 OF 1996	The purpose of the Act is to promote the protection, conservation, and development of forest and wildlife resources for the social, economic and environmental benefit for the present and future generations of the people of Zanzibar. The Act is composed of Section (13) and the most relevant parts in the Act concerning the Environmental Impact Assessment issues include National Forest Resources Planning, Forest Reserves and Nature Forest Reserves, Community Forest Management Areas, Special Forest Management Areas, Licenses, and Conservation of Wild Animals and Plants.	The Act contains names of species which are to be totally protected year-round and which are to be accorded the highest conservation and work priority. These include 41 species of Birds, 13 species of mammals, one amphibian species, seventeen reptilian species including five sea turtles and 13 species of Insects. However, for this project, no forest Preserved area will be impacted.	Section 13: National Forest Resources Planning especially on Conservation of Wild Animals and Plants.

7. ZANZIBAR WATER ACT (2006)	The act provides for an establishment of the water authority for Zanzibar which has the jurisdiction of all matters pertaining to management of water. The Act includes provisions on: - Regulating, controlling, managing, and protecting all catchment areas. Promoting the conservation and proper use of water resources. Managing production and distribution of water on sustainable basis Specifying standards of water quality, effluent and water equipment Advising the Government of Zanzibar in formulation of policies related to the development and conservation of water.	The Act could be the basis of regulating water distribution issues between the project proponent's needs and the community water supply rations in locations where the project could set up its temporary camp facilities. This is important in avoiding any conflict between the project and the users.	
8. ZANZIBAR LAND TENURE ACT NO. 12 OF 1992	With respect to the setting up of the temporary site facilities for the project and in the context of the land regulations, all natural land within the islands of Zanzibar occupied or unoccupied is public land and is vested in and at the disposition of the President, to be held by him, for the use and common benefit, direct or indirect, of the people of Zanzibar. Riparian occupiers along non-navigable waterways are required to accord the right of passage over a strip ten (10) meters in width on each bank. Compensation is to be paid to the persons or communities concerned, compensation shall be equal to the fair market value of the land. All affected people should be compensated accordingly. Another important information regarding this project is those in Section 46 in general, subsection (3) in particular that states that ''Subject to the approval of the investment by ZIPA or other relevant authorities, the Minister may lease any land to any person, Zanzibar or non-Zanzibar intending to use that land for investment purposes''.	The construction of the SUZA proposed projects of Hostel blocks, lab complex building and School of Agriculture (SoA) building will involve the occupation of land. The Act provides the directives on the land use and land acquisition. However, SUZA own the title deed of the area where the proposed projects intends to be implemented.	Section 3 – 6 of this Act Section 46
9. ZANZIBAR EMPLOYMENT ACT NO. 11 (2005)	The Act applies to all employment in the private and public sector. The Act prohibits forced labour or child labour. No employer may discriminate, directly or indirectly against an employee, in any employment policy or practice on any ground including race, gender, colour, religion, social origin or status, age, place of origin, national extraction, political opinion, marital status, pregnancy, disability, HIV/AIDS status real or perceived. The Act prohibits mandatory check on HIV/AIDS status or any form of sexual harassment at workplace. On employment of standards and rights, in all establishments the normal working hours shall not exceed eight hours per day or forty-two hours per week. Every employer shall, at his or her own expense provide for his or her employee's medical facilities if personal injury arises out of and in the course of employment, the employer shall be responsible for	The project will need man power and hence will involve employment. The project proponent will be obliged by this Act.	Part II: Fundamental rights and protection. Part VI: Contracts of service of this Act. Sections 36, 37 and 38: Employment of foreigners and work permits

	all expenses of medical attendance on such employee until such employee recovers; and the employee shall in addition be entitled to such compensation as provided for by the Workers' Compensation Act.		
10. WORKER'S COMPENSATION (AMENDMENT) ACT NO 5 OF 2005	The Act provides procedures and conduct for compensating a worker who has been injured in the line of duty. The Act empowers a medical inspector to initiate required procedures to provide evidence and medical certification that gives ground for legal measures on compensation of an injured worker.	The progress of project will depend upon the effectiveness of the man power in terms of both health and welfare. The project is urged to ensure health and safety of workers is protected for them to perform their duties as required. This will ensure the project proponent meets his/her project goals/objectives during construction and at the operational stage. Either, the Act provides the directives on how to compensate any injured worker or the deceased.	Section 12, First schedule: Percentages for permanent incapacities Section 39, Second schedule: Description of disease or injury.
11. OCCUPATIONAL SAFETY AND HEALTH ACT NO 8, (2005)	The Act empowers the OSHA Authority to enter, inspect and examine any workplace for safety and health of workers related to any process in that workplace from physical environment, handling and storage, application of appliances and tools, use of explosive or highly inflammable materials, chemicals, or machinery, plant, or appliance and make sure that those facilities, equipment or materials are safety-compliant. The Act establishes supervisory committees, legal mechanism of enforcement, and guides on how a workplace environment, protective gear requirements, infrastructure, services and transparency in terms of safeguards and safety performance checks should be implemented without hindrance so as to ensure the occupational safety and health of the workers.	The development of the project will rely on the adequacy of the labour in terms of both health and their general wellbeing. The project is encouraged to guarantee health and safety of labourers is ensured for them to play out their obligations as required from the project initiation to its completion and operations.	Part IV, Sections 27 – 39. Part VIII, Sections 58 – 83. Part IX, Sections 84 – 87: Fire preparedness. Part X, Sections 88 – 95: Hazardous materials and safety. Part XI, Section 96 – 99: Chemical provisions
12. ZANZIBAR ELECTRICITY	The Act provides for regulation of services related to generation, transmission, supply, connection, and management of all electricity	This Act is crucial for the installation, distribution and utilization of electricity	

	CORPORATION ACT NO 3 (2006)	infrastructures in the country. This Act is crucial for the installation, distribution and utilization of electricity supply system for the proposed apartments.	supply system for the proposed Multipurpose port.	
13.	**ROAD (AMENDMENT) ACT NO.17 (2013)**	The Act defines a Road as areas that is open to or used by public and is developed for, or has one of its main uses, the driving or riding of motor vehicles, and include any cart way, pathway, track, pedestrian, paved or unpaved and the like. A Public Road is every carriageway over which the public has a right of way and shall include the pathways on either side therefore, all drains, ditches, embankments, ferries, bridges and appertaining thereto and all land being private property lying within the road reserve of such road. A road reserve is any area of land specified or declared by the Minister under Section 8 of the Act and lying on either side of the roads from the centre of such road. Section 8A classifies road networks as follows: A Trunk Road is a road which primarily links two or more regions while a Rural Road is a road which links one village to another. Urban Road links a trunk road with other roads within town areas while a feeder road is a road which feeds between a village within the same district and which usually originates from the rural or trunk road. Other roads include roads other than trunk, rural, urban and feeder roads. Section 11A empowers the Minister to cause a plan or survey to be prepared of all public roads declared under the Act and shall from time to time cause any deviation or alteration made in any existing public roads to be added to the plan or survey. Section 19A states that a person who considers himself aggrieved by the decision of a Department in respect of the payment or amount of compensation payable as the result of any Act, matter or thin done by a Department under the powers vested in it by Section 13 shall make application in writing in a manner provided for under the Land Tenure Act No. 12 of 1992 any other relevant legislation governing compensation. Section 19(2) states that where there is not legislation governing compensation the aggrieved person shall institute a claim in the court of competent jurisdiction. Section 23A states that the Minister may determine a certain distance from the centre of the road of a particular class to be road reserve. The following distances from the centred of the carriage-way of each class of road on both sides shall be as follows: Main Road: 15 Meters; Secondary Roads: 12 Meters; District	The construction and operation of the port requires access to roads for several purposes including the transport of building materials.	Section 2 and 8: Use of roads for transport of different construction items. Section 19: Roads management and control

	Roads: 10 meters and other roads may be determined by the Roads Department.		
14. ROAD TRANSPORT ACT NO.7 (2003)	The Act provides for regulation of the road vehicles including road and driver's licenses and their classification. Others include vehicular registration, acceptable motor vehicles' operating and performance standards; emissions testing, compliance, and the overall road safety and traffic management. Section 18 (1) of the Act contains provisions pertaining to environmental monitoring and standards for the vehicles' gaseous emissions, waste oils and water disposal, and other wastes. The Act is important for the Plan as it provides guidance and regulatory framework in operation of vehicles during construction phase of the Plan and also during the operational phase where it is crucial to maintain the level of community health and safety along the road.	The project will be required to use the roads for transportation but with consideration of requirements set by the Revolutionary Government of Zanzibar including vehicular registration and drivers licensing	Section 18:
15. DISASTER MANAGEMENT ACT (2015)	The Act complies with regional and international Treaties and Agreements on disaster risk reduction issues. The goal of the Act is to minimize the negative consequences and impacts of disasters to people's life, environment and properties. The Act establishes Disaster Management Commission, committees and Disaster Management Plans at the national, district and sectoral levels. The functions of the Commission include:- Establishing appropriate disaster management policies, regulations, plans, strategies, and guidelines for ensuring timely and effective response to disaster. Facilitating immediate disbursement of funds and other resources during emergency and or disaster. Overseeing the application of the disaster management plans during any period of natural disaster or emergencies and give orders or directives necessary for the plan to be implemented. Co-ordinate all disaster relief operations and preparedness measures. Strengthen the Government capacity to deal with disasters and emergency situations. Mobilize availability of resources within and outside Zanzibar for effective disaster management, etc.	Co-ordinate all disaster relief operations and preparedness measures. Mobilize availability of resources within and outside Zanzibar for effective disaster management, etc.	Section 27: It entails the Sectoral disaster management plan. Part VII: Offences and Penalties

16. ZANZIBAR INVESTIEMNT PROMOTION ACT (2004)	The act stipulates fair treatment of investors. That, any investor (whether foreign or domestic) in Zanzibar will be given an equal position or treatment on issues related to investment provided that, the investor has been approved by Zanzibar Investment Promotion Authority and ready to be obey any other law and regulations of Zanzibar.	Since the project involves one of the biggest investments in Zanzibar (in education sector) especially in this time of which Zanzibar is heading to Blue economy.	Measures to comply with this Act in Zanzibar will be implemented as appropriate.
17. ZANZIBAR MARITIME ACT, 2009.	The act prohibits all forms of land-based and vessel oriented marine pollution. The Act has also provided an insight on regulating marine (economic – transport, fishing) activities including issuance of license to vessels, ships and small crafts so as to ensure safety.	The Zanzibar Maritime Authority (ZMA), as the requirement of this Act especially on issues related to environment; collaborate with Department of Environment in prevention and control of environmental pollution.	

18. THE PREVENTION AND CONTROL OF HIV/AIDS ACT NO. 18 OF 2013	This Act focuses on the prevention, treatment, care, support and control of HIV and AIDS. It also provides for appropriate treatment, care and support using available resources to people who are living with or at risk of HIV and AIDS. Further Section 3 provides the appropriate measures to be taken by the Commission including to inform and educate all population groups including persons with disabilities about HIV, adopt and implement a national HIV prevention, treatment, and management strategy. Further, it stipulates the provisions that promote awareness on the rights and duties imposed under this Act. Sections 8(1) and (2) of the Act describe the necessity for public, private, other actors, in collaboration with government, to ensure that HIV and AIDS education and information and instruction on HIV and AIDS prevention, control and management. Section 12(4) stipulates testing of donated body products that any person who offer to donate tissue or organ be required to provide informed consent to an HIV test and if the person consents to undergo an HIV test, be provided with pre-test and post-test counselling.	The project may involve construction of a workers' camp site, this may lead to the possible interaction between the workers and the local community members, which may lead to the increased transmission of HIV / AIDS to both the workforce and the local communities. In this case proposed projects will have to operate within the requirements of this legislation in adherence to the requirements of its respective regulations in addition to HIV/AIDS Policy.	

19. THE PERSONS WITH DISABILITIES ACT NO. 8 OF 2022	The Act was enacted to provide provisions relating to persons with disabilities and other related matters in the jurisdiction of Zanzibar. Also, the Act provides legal requirements on mainstreaming and inclusion of issues or special needs of persons with disabilities in policies, laws, guidance, programs, and implementation of different systems. In this way, the Act highlights requirement of accessible infrastructures in all places specifically used by the public including roads, air, marine transport, recreation, and conference rooms (section 33(1) of the Act. Moreover, the Act prohibits any form of discrimination against persons with reasons associated from disability in any public or private institutions. For instance, the Act declares an offence for the conduct of denying employing person with reasons of disability. In case, any person commits an offence of denying to employ person with disability and upon conviction be liable to a fine of not less than Three Million Tanzanian Shillings and not more than Five Million Tanzania Shillings (section 47 of the Act).	The provisions of this Act will be very much important in addressing related issues and various activities of the project. SUZA shall ensure equal opportunities to all groups including people with special needs during implementation of the proposed projects.	

5.3 Zanzibar Policies relevant to the proposed project

1. **Zanzibar Vision 2050**	The vision focuses on improving several socio-economic aspects including the management of urban and rural population growth. Adequate shelter on privacy, space, physical accessibility, security, security of tenure, lighting, heating and ventilation, basic infrastructure, including water supply, sanitation and waste management facilities, suitable environmental quality and health related factors. The improved transportation and fishery sectors will have much contribution to the country's socio-economic development especially at this time of which Zanzibar is heading to Blue economy. However, they are much dependent to the availability of port facilities. The development of Hostel blocks, lab complex and School of Agriculture project is very relevant toward blue economy. Regarding this phenomenon, the Vision 2020-2050 has clearly stated that: "Sustainable exploitation of marine-related resources and products within an operational blue economy framework guided by marine spatial planning, environmental preservation and clear investment procedures; and Efficient and reliable maritime infrastructure network and services, including the strengthening of tourism demand". It is therefore, the proposed projects at SUZA Tunguu campus is of great concern towards the success of education, research and agriculture sectors which will have significant effects toward attaining development of Zanzibar,

2. Zanzibar Energy Policy (2009)	The vision of the Zanzibar Energy Policy is to contribute to the sustainable development of a prosperous society with independent reliable and affordable energy for all. The mission of the Zanzibar Energy Policy is to guide the stakeholders in the creation of an enabling environment in Zanzibar that will enhance the transformation of energy markets, facilitate the introduction of new and renewable sources of energy, and contribute to economic development and social equity while protecting the environment. The main objective of the Energy Policy is to meet the energy needs of the Zanzibar population for social and economic development in an environmentally sustainable manner. The specific objectives include: - Increase the energy efficiency within the energy sector of Zanzibar. Increase the supply of energy from indigenous renewable energy sources. Increase the reliability, affordability and independence of modern energy supply in Zanzibar. Implement a regulatory regime for the energy sector in Zanzibar to act as a coherent and coordinated framework for all development efforts within the sector. Achieve free market principles within the energy sector, with only well founded transparent regulatory interventions. Involve all main stakeholders in coordinated actions while considering related documents regarding the future social and economic development and poverty reduction in Zanzibar. On the other hand, the islands are endowed with renewable energy conditions suitable for a development of local supply of energy; such as wind power, solar energy, and sustainable bio-fuel. Such renewable energy sources are not dependent on finite resources, and will reduce harmful impacts on the local as well as the global environment. In addition, the uses of indigenous renewable energy sources are likely to create local employment opportunities. Today Zanzibar is totally dependent on import of electricity and fossil fuels from other regions and on an unsustainable local production of wood fuel. Renewable energy sources therefore constitute a large potential for production of electricity and heat in Zanzibar. Energy from the sun can be obtained through different technologies such as the use of solar water heaters; photovoltaic (PV) systems to generate electricity; cookers for cooking, etc. Despite of being potential energy source, the electricity from ZECO will be crucial during both construction and operational phase of Hostel blocks, lab complex and School of Agriculture (SoA). The operational phase of the project will have great potential in contributing to the development of energy sector by improving the country's GDP.
3. Zanzibar Environment Policy (2013)	The policy focuses on: Ensuring the maintenance of basic ecological processes and productivity, Promoting the sustainable and rational use of renewable and non-renewable natural resources. Preserving the terrestrial and marine biological diversity, cultural richness and natural beauty of Zanzibar's lands. Ensuring that the quality of life of the people of Zanzibar, present and future, is not harmed by destruction, degradation or pollution of their environment and natural resources. Strengthening both institutional mechanisms for protecting the environment and the capabilities of the institution involved in the environmental management. The Proposed project must undergo the entire process of environmental clearance including Environmental and Social Impact Assessment, Mitigation Measures, Analysis of Project Alternatives, and Environmental and Social Management Plan. The proposed project should be subjected to continuous monitoring and inspection programs to ensure that the activities conform to the planning and implementation goals in accordance with Vision 2050 and MKUZA-III (it now a Zanzibar Development Plan 2021/2026). It is therefore, this ESIA is part of implementing this policy and contribute toward its success.
4. Zanzibar Land Policy (2012)	Critical environmental issues with respect to land aspects have come as a result of rapid increase of population growth, uncontrolled encroachment of urban settlements into fertile lands for agriculture, horizontal urban expansion, without considering integration of environmental regulations and guidelines. The

	consequences of land mismanagement could result into land use conflicts, unsustainable land-use practices; and degradation of natural resources. The land policy framework aims at:- • Integration of environmental social and economic development policy frameworks which provide transparent and easy access to land for all. • Facilitating registration of rights on land to secure investments in land and property development • Provision of means to prevent land grabbing and the attached social and economic consequences. • Protecting environment, cultural heritage and use of natural resources. • Guaranteeing good, transparent, affordable and gender responsive governance of land for the benefit of all including the most vulnerable groups. • Addressing the challenges of climate change and related consequences of natural disasters, food shortage, etc., and • Recognizing the trend of rapid urbanization as a major challenge to sustain future living and livelihoods. The Proposed projects are implemented at the plot where owned by SUZA, hence no any resettlement issue will rise.
5. Zanzibar Forest Policy (1996)	The goal of the Zanzibar Forest Policy is to protect, conserve and develop forest resources for social, economic and environmental benefits of present and future generations of the people of Zanzibar. The Specific Goals of Zanzibar Forest Policy are as follows: - • To strengthen the role of forestry in alleviating poverty and increasing equity in resource management and utilization. • To strengthen the role of forest resources in promoting economic development, in meeting demand for forest product, in creating income and increasing national revenues and efficiency. • To protect and conserve forest resources including wildlife and flora, and enhance the role of forest resources in maintaining soil and water conservation and other environmental benefits. There is no flora and fauna of ecological significance that that have been enlisted in the Appendix 1 of the Zanzibar Forest Act. The proposed sites for implementation of hostel blocks, lab complex and School of Agriculture building are surrounded with minimum shrubs and grass.
6. Zanzibar Water Policy (2004)	The policy on water emphasizes the protection of catchment and watershed areas all over Zanzibar. The policy advocates for the adequate supply of quality and safe water and its rational use. The policy advocates that development planning take proper account on the availability of water resources and encourages rainwater harvesting, recycling and artificial recharge practices. This policy is relevant in that sustainable use of fresh water is vital in any development activities. Community support and understanding should be emphasized so that the project avoids conflicts over fresh water around the project zone and its peripheries. SUZA had three boreholes at Tunguu campus, currently use water from only two boreholes. SUZA plan to use water from unused borehole for construction activities.
7. Zanzibar Tourism Policy	The policy objectives are to develop, plan, manage and promote tourism industry that emphasizes sustainability, quality and diversification, and which is culturally responsible, socially desirable, ecologically friendly, environmentally sustainable and economically viable. The image of Zanzibar abroad as a promising exclusive holiday destination, basically for historical, cultural attractions and beach holidays is largely associated with its beach and marine assets (white sands and coral reefs). The project shall be required to work with the tourism industry to protect the surrounding environment from environmental degradation.
8. Zanzibar HIV/AIDS Policy (2004)	The goal of the Zanzibar HIV/AIDS Policy is to prevent new HIV infections in the population; treat care for and support those who are infected; and mitigate the impact of HIV and AIDS on the social and economic status of individuals, families, communities of those living in Zanzibar. Risks of increased infections among workers and the spread of HIV/AIDS in the surrounding communities are significant. HIV/AIDS is one of the community health and occupational risk categories that need serious intervention in minimizing the rates of infections within a project zone. SUZA shall be required to deploy consultant for HIV/AIDS awareness during construction of the proposed projects.

9. Zanzibar Local Government Policy (2012)	The objective of the policy is to ensure that an establishment of an accountable local government that has a capacity to provide better and efficient basic services to the people (Health, water, education, roads, agriculture, natural resources, energy, etc.) and safeguard their livelihoods. The policy ensures that any development plan should recognize upholding of community land and ownership rights and that communities are adequately compensated in accordance with laws of Zanzibar and that the right to information is disseminated to the local communities and those who will be directly and indirectly affected by the proposed project. Local Government Authorities (LGA) are responsible to establish communications and decision making linkages between the local communities and the national sectoral planning in a transparent and accountable manner. The Local Government Policy is in line with Environment Policy and Climate Change Adaptation Strategy of Zanzibar. The Policy recognizes the on-going state of environmental degradation districts and in the communities and promotes control of better management of environment and natural resources. The policy advocates for better sensitization of communities with regard to environment and climate change. The Policy recognizes Climate Change as threat to security and human rights and represents serious challenge to sustainable development initiatives. The Policy mentions floods, droughts, rising sea levels, soil erosion and reduced soil productivity and destruction of catchment areas as climate challenges that need proper and sustainable solutions. The project proponent is required to coordinate with the Local Government Authorities for local operations (at the District, and Shehia Levels) including security and defence matters related to the safety of the communities and of the operators.
10. Zanzibar Health Policy (2010)	The policy envisioned to a healthy population, with reliable, accessible and equitable health care services. The policy mission is to ensure that all Zanzibarians secure their right to quality health services, rendered in a cost-effective and affordable manner. The policy is based on the following main considerations: health service delivery, quality services at the primary health care level; self-reliance for health personnel, rather than continuing the dependence on expatriate medical specialists and other health cadres; investments in health infrastructure; new medical procedures, new technologies, new types of expertise, and new intervention strategies. This policy is vital for ensuring adequate health services including medical insurance for the project workers and affected groups.
11. Zanzibar Transport Policy (2008)	Zanzibar National Transport Policy articulates a course of action for the development of the maritime, air and land transport sub-sectors. The Policy systematically addresses the transport demand, transport services in response to demand, facilities to provide transport services, and the management of the transport sector including development of transport systems and infrastructure. All machines and vehicles used during implementation of the proposed projects for SUZA Tunguu campus must ensure protection and management of the road infrastructure all time by carrying only allowable weight and follow road signs.
12. Zanzibar Employment Policy (2007)	The Policy has been developed to address some of the major constraints in employment and other emerging labour dynamics in Zanzibar. This is in line with the on-going macroeconomic reforms and with greater involvement of the private sector. The policy highlights Zanzibar's economic prospects in tandem with employment growth, the labour force situation, key job sectors, and the Government efforts to generate and encourage decent jobs for the citizens. The policy draws employment challenges in the face of science and technology dynamics, gender inequality, the race of regional (East African) integration, and other development programs. The principal objective of the policy is to increase national productivity while generating gender sensitive and decent jobs for the citizens. The other specific objectives including gender-based employment, equal access to employment opportunities, skills, knowledge, resources and endowments for men and women; promote sustainable employment strategies in line with the national and international labour standards, safeguard

	occupational rights of the people, addressing HIV/AIDS. SUZA shall comply with this policy by ensuring equal employment opportunity between men and woman.
13. Zanzibar Climate Change Strategy (2014)	The objectives of the Zanzibar Climate Change Strategy are: - To provide a coherent and consistent view on the vulnerability and risks from current climate variability and future climate change on the islands, alongside possible opportunities for reduced emissions and low carbon sustainable development. To establish a response framework to enhance Zanzibar's economic, social and environmental resilience to address these risks, and to enhance low carbon sustainable development opportunities. This framework should identify strategic interventions, as well as sectoral, cross-sectoral and cross-cutting (e.g. gender, disadvantaged groups) priorities. To help build capacity and knowledge, raise awareness, and promote climate aware and sustainable livelihoods practices for all of society, with a particular focus on local communities. To guide the mainstreaming of climate change adaptation (and low carbon sustainable development) across government, and provide the enabling environment for all stakeholders (private sector, civil society and communities) to advance relevant activities. To propose ways to develop and strengthen the institutional and coordination arrangements (including the policy and legal framework) for the effective implementation of the climate change strategy and to develop strategies to mobilize internal and external financial support. To encourage the transfer, adoption and diffusion of technologies for increasing resilience and promoting low carbon sustainable development. To guide the integration of climate change in the Zanzibar sustainable development goals, including future development plans. A set of guiding principles have been adopted in developing the strategy, which align the Strategy with current and emerging sustainable development goals, which use participatory approaches and opportunities for engagement with all groups of society, which focus on major areas that promote sustainable development for Zanzibar, but also address key cross-cutting issues of Gender and highly vulnerable groups, and which seeks to integrate the programme across ministries and wider stakeholders including local communities. SUZA shall ensure all strategic used against climate change such as switching off all idle machines/vehicle and adequate maintenances of the vehicles/machine etc. are in place during implementation of the proposed projects.
14. Zanzibar Development Plan (2021/2026)	Among the basic components of ZADEP include Theme, Mission statement, Key result areas, Specific and Defined Outcomes, Flagship programmes, Projects and Initiatives, Key strategic actions and finally ended with Monitoring and Evaluation and Indicators. Theme which was then translated into a clear Mission statement, directs toward Key strategic actions which will help to achieve economic growth and social well-being in Zanzibar through implementation of Sustainable Development Goals (SDGs). The SUZA Hostel blocks, lab complex and School of Agriculture (SoA) building is one of the important strategic projects and/or initiative to ensure enabling environment for good and quality education and agriculture sector will benefits through experts who are going to be produced after establishment of this school at Tunguu Campus.
15. Zanzibar Disaster Management Policy (2011)	The focus of this policy is to have safe and sound livelihood with minimum disaster disruption to social and economic development issues. Thus, this policy aims to develop necessary capacity for coordination and collaboration for comprehensive disaster management programs at all levels. The areas mentioned to have risk of vulnerability to natural environment disasters in this case include unplanned settlement; Degradation of coastal zones; Waste management; and improper environmental management; coastal zone management, risk fire hazards, etc. will affect livelihoods while harming the local biodiversity. The project proponent will be required to abide by the existing regulations on risk and disaster prevention while executing best practices in developing a robust emergency preparedness and response plan. The project needs to establish risk assessment and management plan with respect to the potential hazards and accidents.

5.4 World Bank's Environmental and Social Framework

The World Bank Environmental and Social Framework, 2018 sets out the World Bank's commitment to sustainable development, through a Bank Policy and a set of Environmental and Social Standards that are designed to support Borrowers' projects, with the aim of ending extreme poverty and promoting shared prosperity.

This Framework comprises:

- A **Vision for Sustainable Development**, which sets out the Bank's aspirations regarding environmental and social sustainability;
- The **World Bank Environmental and Social Policy for Investment Project Financing**, which sets out the mandatory requirements that apply to the Bank; and
- The **Environmental and Social Standards**, together with their Annexes, which set out the mandatory requirements that apply to the Borrower and projects.

This ESIA has reviewed the above framework's components' relevance to the Project as shown in the below sub sections;

5.4.1 The World Bank-Environmental and Social Standards

The WB-ESF protects people and the environment from potential adverse impacts that could arise from Bank-financed projects and promotes sustainable development. This new framework provides broad coverage, including important advances on transparency, non-discrimination, social inclusion, public participation and accountability. The ESF also places more emphasis on building Borrower governments own capacity to deal with environmental and social issues.

The Environmental and Social Framework (ESF) enables the World Bank and Borrowers to better manage environmental and social risks of projects and to improve development outcomes. It was launched on October 1, 2018 and replaces the Safeguards Policies.

The ESF offers broad and systematic coverage of environmental and social risks. It makes important advances in areas such as climate change; labour standards; transparency; non-discrimination; disability; public participation; and accountability—including expanded roles for grievance mechanisms. The ESF codifies best practice in development policies. It brings the World Bank's environmental and social protections into closer harmony with those of other development institutions; and encourages Client countries to use, and improve, their own national environment and social policies, when these policies are strong enough. The ESF provides an incentive for countries to develop and build their own environmental and social policies and capacity. The framework has set aside the ten **"**Environmental and Social Standards for Investment Project Financing" which provides for the mandatory requirements of the Bank in relation to the projects it supports through Investment Project Financing, where among other things, the Bank will:

a) Undertake its own due diligence of proposed projects, proportionate to the nature and potential significance of the environmental and social risks and impacts related to the project.

b) As and where required, support the Borrower to carry out early and continuing engagement and meaningful consultation with stakeholders in particular affected communities, and in providing project-based grievance mechanisms.

c) Assist the Borrower in identifying appropriate methods and tools to assess and manage the potential environmental and social risks and impacts of the project.
d) Agree with the Borrower on the conditions under which the Bank is prepared to provide support to a project, as set out in the ESCP.
e) Monitor the environmental and social performance of a project in accordance with the ESCP and the ESSs.

From the preliminary review carried out, it can be concluded that implementing agencies' environmental and social management system and procedures need to be complemented/enhanced to comply with the ESF requirements. The Project will address the gaps through the preparation and implementation of ESCP. The ESCP include the preparation and implementation of ESMPs and Stakeholder Engagement Plans (SEPs) and where required ESIAs.

In this study, the ESS 5, ESS6, ESS 7, ESS8 and ESS 9 are not anticipated to be relevant to this project as the screening criteria developed as part of the ESMF for site selection lists exclusion criteria covering these standards. As per the World Bank, the proponent is urged to observe/consider the following Environmental and Social Standards during the project development:

Environmental and Social Standard 1: Assessment and Management of Environmental and Social Risks and Impacts. In ensuring that the proposed project meets this standard, the proponent shall have to ensure that both environmental and social risks and impacts are assessed and managed to ensure good performance of the project with regards to the hostel blocks project of the State University of Zanzibar.

Among the requirements under ESS1 relevant to the proposed project include:

The borrower will:

- Conduct an environmental and social assessment of the proposed project, including stake holder engagement;
- Undertake stakeholder engagement and disclose appropriate information in accordance with ESS10;
- Develop an ESCP, and implement all measures and actions set out in the legal agreement including the ESCP; and
- Conduct monitoring and reporting on the environmental and social performance of the project against the ESSs

The project will apply the relevant requirements of the Environmental Health and Safety Guidelines (EHSGs) when host country requirements differ from the levels and measures presented in the EHSGs, the Borrower will be required to achieve or implement whichever is more stringent.

The proposed construction of SUZA projects in SUZA has been conducted with ESIA study and has adequately undertaken stakeholders' engagement as required for the project's ownership by the community and sustainability.

Environmental and Social Standard 2: Labour and Working Conditions. This standard focuses on safe and healthy working environment within the project in accordance to this

standard with emphases to employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth.
Among ESS2 objectives include:

- 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.
- To prevent the use of all forms of forced labour.

The project contractor shall adhere to the objectives under regular audits to be conducted by OSHA and the project Supervising Engineer.

Environmental and Social Standard 3: Resource Efficiency and Pollution Prevention and Management in respect to the ESS3 which denotes that the economic activity often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services and the environment. The construction of the proposed projects of SUZA may generate considerable pollutants and therefore the proponent will be supposed to put this aspect into account.
On pollution prevention and management, the Borrower will avoid the release of pollutants or, when avoidance is not feasible, minimize and control the concentration and mass flow of their release using the performance levels and measures specified in national law or the EHSGs, whichever is most stringent.

Environmental and Social Standard 4: Community Health and Safety. In this standard, the WB requires the proponent to consider the ESS4 to manage the potential risks and impacts to community health around or within the project.
ESS4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration or intensification of impacts due to project activities.
ESS4 addresses the health, safety, and security risks and impacts on project-affected communities and the corresponding responsibility of Borrowers to avoid or minimize such risks and impacts, with particular attention to people who, because of their particular circumstances, may be vulnerable.

Environmental and Social Standard 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement. To comply with ESS5, the proponent will be required to observe and abide with all legal requirements associated with land acquisition with consideration to the possibility of the physical displacement (relocation, loss of residential land or loss of shelter), economic displacement (loss of land, assets or access to assets. However, the ESS 5 is not relevant to the SUZA HEET project as the project site does not require land

acquisition, loss of access to natural resources or involuntary physical and/or economic displacement of households. All proposed projects will be implemented at the site owned by SUZA in Tunguu campus.

Environmental and Social Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources. The standard recognizes the importance of maintaining core ecological functions of habitats, including forests, and the biodiversity. The proponent will have to consider the requirements of this standard by ensuring the assessment of impacts and risks associated with this project to the biodiversity of project area in Tunguu. However, the proposed project is constructed within SUZA Tunguu campus which currently in use, hence no significant impacts on biodiversity conservation and sustainable management of living Natural resources. Therefore, the ESS 6 is found not relevant to the proposed project site.

Environmental and Social Standard 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities. The standard applies to all groups and ethnicities within the jurisdiction of the Central District and Zanzibar as a whole, so long this Hostel blocks will serve the students from all Zanzibar Districts of both Unguja and Pemba. However, after the screening process, the ESS 7 is found not relevant to the project as the project site does affect any group of indigenous people in Zanzibar.

Environmental and Social Standard 8: Cultural Heritage. The standard recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. People identify with cultural heritage as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions. ESS8 sets out measures designed to protect cultural heritage throughout the project life cycle. This ESS 8 is relevant in the perspective of chance finds for physical cultural resources, as the project area will be involving excavation activities.

Environmental and Social Standard 9: Financial Intermediaries. The standard recognizes that strong domestic capital and financial markets and access to finance are important for economic development, growth and poverty reduction. The Bank is committed to supporting sustainable financial sector development and enhancing the role of domestic capital and financial markets. The ESS 9 is not relevant to this project.

Environmental and Social Standard 10: Stakeholder Engagement and Information Disclosure. The proposed project development will ensure stakeholder engagement. The proponent will have to ensure the process of Decision-making especially those related to resettlement and livelihood restoration are considered. The ESIA will provide all necessary information from the stakeholders to ensure that their concerns are very well taken into consideration.

5.4.2 A Vision for Sustainable Development

This sets out the Bank's aspirations regarding environmental and social sustainability. World Bank Group is globally committed to environmental sustainability, including stronger collective action to support climate change mitigation and adaptation, recognizing this as essential in a world of finite natural resources. It recognizes that climate change is affecting the nature and location of projects, and that World Bank-financed projects should reduce their impact on the climate by choosing alternatives with lower carbon emissions.

Equally, social development and inclusion are critical for all of the World Bank's development interventions and for achieving sustainable development.

At the project level, these global aspirations translate into enhancing development opportunities for all, particularly the poor and vulnerable, and promoting the sustainable management of natural and living resources. Therefore, within the parameters of a project, the Bank seeks to:

- Address project-level impacts on climate change and consider the impacts of climate change on the selection, siting, planning, design and implementation and decommissioning of projects;
- Maximize stakeholder engagement through enhanced consultation, participation and accountability.

The design of SUZA sub-projects has observed climate change adaptation strategies for sustainability of the project.

5.4.3 The World Bank Environmental and Social Policy for Investment Project Financing.

This policy sets out the mandatory requirements that apply to the Bank. This Environmental and Social Policy for Investment Project Financing sets out the mandatory requirements of the Bank in relation to the projects it supports through Investment Project Financing. The Bank is committed to supporting Borrowers in the development and implementation of projects that are environmentally and socially sustain-able, and to enhancing the capacity of Borrowers 'environmental and social frameworks to assess and manage the environmental and social risks and impacts of projects.

The Bank will assist Borrowers in their application of the ESSs to projects supported through Investment Project Financing in accordance with this Environmental and Social Policy for Investment Project Financing (Policy).

To carry out this Policy, the Bank will:

- Undertake its own due diligence of proposed projects, proportionate to the nature and potential significance of the environmental and social risks and impacts related to the project;
- As and where required, support the Borrower to carry out early and continuing engagement and meaningful consultation with stakeholders, in particular affected communities, and in providing project-based grievance mechanisms;

The Banks shall evaluate the environmental and social risks management plan including the extent of stakeholders' engagement on the project throughout.

5.5 WB-Environmental and Social Health and Safety Guideline

The WBG Guidelines of Environmental Health and Safety (WBGEHS) provide detailed guidance note on health and safety requirement and good practices. The WBG-EHS guidelines are intended to be used in conjunction with National legislation on OHS at construction sites and shall be referred by contractor and supervising consultant while finalizing site specific contractor's EHS management plan.

The World Bank ESF sets out the World Bank's commitment to sustainable development. The ESF protects people and the environment from potential adverse impacts that could arise from Bank-financed projects and promotes sustainable development. The Bank believes that the application of these standards, by focusing on the identification and management of environmental and social risks, will support Borrowers in their goal to reduce poverty and increase prosperity in a sustainable manner for the benefit of the environment and their citizens. 8 out of 10 ESSs are triggered by the project.

- The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new projects / facilities by existing technology at rea sonable costs. Application of the EHS Guidelines to the SUZA proposed projects m ay involve the establishment of site-specific targets, with an appropriate timetable fo r achieving them.
- The applicability of the EHS Guidelines should be tailored to the hazards and risks e stablished for each project on the basis of the results of an environmental assessmen t in which site-specific variables, such as assimilative capacity of the environment, a nd other project factors, are taken into account.
- The applicability of specific technical recommendations should be based on the prof essional opinion of qualified and experienced persons. When host country regulatio ns differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. If less stringent levels or measures than those provided in these EHS Guidelines are appropriate, in view of specific pro ject circumstances, a full and detailed justification for any proposed alternatives are needed as part of the site-specific environmental assessment. This justification shou ld demonstrate that the choice for any alternate performance levels is protective of h uman health and the environment.
- The EHS Guidelines for SUZA project include information relevant to construction, operation and maintenance of large, sealed road projects as well.
- In addition, Environmental, Health, and Safety Guidelines for Construction Materia ls Extraction are also applicable for quarries and borrow pits.

The SUZA proposed projects is expected to achieve these Guidelines through implementation of the projects as it will cause some impacts on Environmental and Social Health and Safety Risks. EHS provide performance levels and measures that are acceptable to the WB Group and that are general considered to be achievable in new facilities at reasonable cost by existing technologies.

The Guidelines it gives specific example of Good International Industrial Practice (GIPP) which is referred in the WB Environmental and Social framework and IFCs performance standards.

5.6 United Nations Environment Programme UNEP (1993 -1994)

UNEP, in partnership with the Government of Tanzania, established a National Cleaner Production Centre/Programme in Tanzania to build local capacity to implement cleaner production and to provide core cleaner production services at the national level. This proceeded after adoption of national environmental policy for Zanzibar of 1992 which identifies major environmental challenges in the country and policy actions to address them. UNEP sets the global environmental agenda, to promote the coherent implementation of the environmental dimension of sustainable development within the United Nations system, and to serve as an authoritative advocate for the global environment; from the global, regional, and to country level. In relation to this project, UNEP emphasize the development of greener infrastructures, retrofitting or reconfiguring existing infrastructure systems and exploiting the potential of smart technologies which can greatly contribute to the reduction of environmental impacts and disaster risks as well as the construction of resilience and the increase of efficiency in the use of natural resources prevention in inventory emissions of greenhouse gases like CO_2, CH_4 and NO_2.

5.6.1 Other International Guidelines Applicable to the Project

CONVENTION	DATE SIGNED, ACCEDED OR RATIFIED	APPLICATION TO THE PROJECT	COMPLIANCE MEASURE
ILO C029: Forced Labour Convention, 1930 (No. 29)	Ratified in January 1962	The SUZA proposed projects will employ skilled and unskilled labour.	Baseline studies considered data on labour conditions. Labour and working conditions mitigation measures including employment policies
ILO C098: Right to Organise and Collective Bargaining Convention, 1949 (No. 98)	Ratified in January 1962	The SUZA proposed projects will employ skilled and unskilled labour.	Baseline studies considered data on labour conditions. Labour and working conditions mitigation measures including employment polices
ILO C105: Abolition of Forced Labour Convention, 1957 (No. 105)	Ratified in January 1962	The SUZA proposed projects will employ skilled and unskilled labour.	Baseline studies considered data on labour conditions. Labour and working conditions mitigation measures including employment polices
1951 Convention Relating to the Status of Refugees and the 1967 Protocol Relating to the Status of Refugees	Ratified in September 1968	The SUZA proposed projects will give due consideration to vulnerable people in project planning and implementation.	Baseline studies incorporated specific consideration of vulnerable people. Assessment of impacts on PACs including vulnerable people and associated mitigation measures Resettlement Policy Framework Summary
International Convention on the Elimination of all Forms of Racial Discrimination	Ratified in 1972	Employment and behaviour of project workers.	Measures to ensure management of workforce including employment policies and codes of worker behaviours

International Covenant on Civil and Political Rights (Including the First Optional Protocol on the ICCPR With Reservations on Article 5)	Ratified in 1976	Employment of workers and interaction with communities during project implementation.	Baseline studies considered data on human rights (Section 6.4.3 and Appendix A11) Measures to ensure management of workforce and project interaction with communities including employment policies and codes of worker behaviours (Section 8.19)
United Nations Convention On International Trade In Endangered Species Of Wild Fauna And Flora (CITES), March 1973	Ratified November 1979	All proposed projects are implemented at the site of no endangered species.	Biodiversity mitigation measures; employee training
ILO C148: Working Environment (Air Pollution, Noise And Vibration) Convention, 1977 (No. 148)	Ratified in May 1983 (has accepted the obligations in respect of air pollution only)	The SUZA proposed projects will employ skilled and unskilled labour. Working conditions on the project may be hazardous.	Baseline studies considered data on labour conditions. Labour and working conditions mitigation measures including employment policies.
Nairobi Convention For The Protection, Management And Development Of The Costal Environment Of The Eastern African Region And Protocol Concerning Protected Areas And Wild Fauna And Flora In The Eastern African Region	Adopted in June 1985	The SUZA proposed projects footprint will include coastal environments in the Western Indian Ocean.	ESIA and mitigation measures
Convention On The Elimination Of All Forms Of Discrimination Against Women (CEDAW)	Ratified August 1985	The SUZA proposed projects will give due consideration to women in project planning and implementation.	Baseline studies incorporated specific consideration of discrimination. Approaches to stakeholder consultation specifically considered women. Assessment of impacts on women and associated mitigation measures.
Bamako Convention on The Ban Of The Import Into Africa And The Control Of Transboundary Movement And Management Of Hazardous Wastes Within Africa, January 1991	Ratified in April 1993	The SUZA proposed projects will generate various types of waste throughout its lifecycle.	Waste management plan will be developed and implemented as part of the ESMP
Basel Convention On The Control Of Transboundary Movements Of Hazardous Wastes And Their Disposal, March 1989	Acceded in April 1993	The SUZA proposed projects will generate various types of waste throughout its lifecycle.	Waste management plan will be developed and implemented as part of the ESMP

Vienna Convention For The Protection Of The Ozone Layer, March 1985, And The Montreal Protocol On Substances That Deplete The Ozone Layer, September 1987	Acceded in April 1993	The SUZA proposed projects will manage limited amounts of chemicals and fuel during construction and operation.	A pollution prevention plan will be developed and implemented as part of the ESMP.
United Nations Framework Convention On Climate Change (UNFCCC), 1992	Ratified in April 1996	Project activities will generate GHG. Key sources of emissions include construction vehicles, equipment and power generators; operation of power generators.	The project GHG emissions will be monitored and reported.
ILO C138; 2 Convention C138: Minimum Age Convention, 1973 (No. 138)	Ratified in December 1998	The project will employ skilled and unskilled labour.	Baseline studies considered data on labour conditions. Labour and working conditions mitigation measures including employment policies.
ILO C081: Labour Inspection Convention, 1947 (No. 81) (Excluding Part Ii)	Ratified in March 1999	The SUZA proposed projects will employ skilled and unskilled labour.	Baseline studies considered data on labour conditions. Labour and working conditions mitigation measures including employment policies.
ILO C087: Freedom Of Association And Protection Of The Right To Organise Convention, 1948 (No. 87)	Ratified in April 2000	The SUZA proposed projects will employ skilled and unskilled labour.	Baseline studies considered data on labour conditions. Labour and working conditions mitigation measures including employment policies.
ILO C182: Worst Forms Of Child Labour Convention, 1999 (No. 182)	Ratified in September 2001	The SUZA proposed projects will employ skilled and unskilled labour.	Baseline studies considered data on labour conditions. Labour and working conditions mitigation measures including employment policies.
ILO C100: Equal Remuneration Convention, 1951 (No. 100)	Ratified in February 2002	The SUZA proposed projects will employ skilled and unskilled labour.	Baseline studies considered data on labour conditions. Labour and working conditions mitigation measures including employment policies.
ILO C111: Discrimination (Employment And Occupation) Convention, 1958 (No. 111)	Ratified in February 2002	The SUZA proposed projects will employ skilled and unskilled labour.	Baseline studies considered data on labour conditions. Labour and working conditions mitigation measures including employment policies.
Kyoto Protocol To The United Nations Framework Convention On Climate Change, December 1997	Ratified in August 2002	Project activities will generate GHG emissions. Key sources of emissions include construction vehicles, equipment and power generators; operation of power generators at AGIs and heat supply to bulk heaters.	The project GHG emissions will be monitored and reported.

Rotterdam Convention On The Prior Informed Consent Procedure For Certain Hazardous Chemicals And Pesticides In International Trade (Rotterdam Convention), September 1998	Ratified in August 2002	The project will manage limited amounts of chemicals and fuel during construction and operation.	A pollution prevention plan will be developed and implemented.
African Charter On The Rights And Welfare Of The Child	Ratified in March 2003	The project will give due consideration to children in project planning and implementation.	Baseline studies incorporated specific consideration of children. Assessment of impacts including vulnerable people and associated mitigation measures.
Cartagena Protocol On Biosafety To The Convention On Biological Diversity, 2000	Ratified in April 2003	The project's activities have the potential to introduce or spread alien invasive species and plant pest and diseases, for example through moving soil, using equipment from outside the area or bio restoration and gardening.	Pest and invasive species control measures.
Stockholm Convention On Persistent Organic Pollutants, 2001	Ratified in April 2004	The SUZA proposed projects will manage limited amounts of chemicals and fuel during construction and operation.	A pollution prevention plan will be developed and implemented.
International Plant Protection Convention (Ippc), December 1951, Amended 1997	Signed in February 2005	The project's activities have the potential to introduce or spread invasive species and plant pests and diseases, for example through the movement of soil, use of equipment from outside the area or bio-restoration.	Pest and invasive species control measures.
United Nations Convention Against Corruption, 2003	Ratified in May 2005	The SUZA proposed projects will require governmental approval.	Project anti-corruption policies and code of conduct.
Protocol To The African Charter On Human And Peoples' Rights On The Rights Of Women In Africa	Ratified in March 2007	The SUZA proposed projects will give due consideration to women in project planning and implementation.	Baseline studies incorporated specific consideration of discrimination Approaches to stakeholder consultation specifically considered women Assessment of impacts on women and associated mitigation measures
Convention On The Prevention Of Marine Pollution By Dumping Of Wastes And Other Matter, 1972 (London Convention), And 1996 Protocol To The Convention	Acceded in August 2008	The project will generate various types of waste throughout its lifecycle.	Waste management plans will be developed and implemented.
Convention On The Rights Of Persons With Disabilities	Ratified in 2009	The SUZA proposed projects will give due consideration to people with disabilities in project planning and implementation.	Assessment of impacts on vulnerable groups and associated mitigation measures.

United Nations Sustainable Development Goals	Adopted in 2015	The SUZA proposed projects may potentially result in significant environmental and social impacts.	ESIA study completed Impact assessment and mitigation measures (Section 8)
Paris Agreement (UNFCCC), 2015	Signed in 2016	Project activities will generate air emissions Key sources of emissions include construction vehicles, equipment and power generators; operation of power generators and heat supply to bulk heaters	Project will comply with national and international air emission standards.

5.6.2 Institutional framework

The institutional arrangements for environmental management relevant to the proposed SUZA projects are as outlined below:

i. Ministry of State, First President Office

This is a Ministry responsible for matters relating to the environment among others, including providing and overseeing the policy guidelines necessary for the promotion, protection, and sustainable management of the environment in Zanzibar. The office supervises the implementation of Zanzibar Environmental Management Act No. 3 of 2015 and Zanzibar Environmental Policy 2013.

ii. Department of Environment (DoE)

The department of Environment work under the Act No. 3 of 2015 and is responsible to develop national strategies and guidelines of environment, recommend environmental standards, and coordinate implementation of international environmental agreements, environmental policy and matters related to climate change.

iii. Zanzibar Environment Management Authority (ZEMA).

The Authority is responsible to undertake enforcement, compliance, review and monitoring of environmental impact assessment. ZEMA develops procedures and safeguards for the prevention of activities which may cause environmental degradation; provide advice and technical support to different stakeholders; enforce and ensure compliance of the national environmental quality standards. ZEMA is also responsible for the registration of ESIA Experts/Firms/Auditors and Issuance of ESIA certificate.

iv. Local Government Authorities (City, Municipal, District, Ward, Shehia)

Perform basic functions including promoting social and economic wellbeing and development of areas and people within jurisdictions including relevant to environmental and social management.

v. **District Administration**

Central District Director is the leader of the LGA while District Commissioner (DC) who is assisted by District Administrative Secretary (DAS) heads the Central Government. The District Commissioner's Office has 12 departments namely; agriculture, health, education,

planning, forestry, sports and culture, livestock, fishery, social welfare, water, construction and nutrition.

vi. Ministry of Lands and Housing Development

The Ministry of Lands and Housing Development is responsible for policy, regulation and coordination of matters pertaining to land and housing in Zanzibar. The Ministry has the following responsibilities:

- Administers the various land acts,
- Conducts Land use planning, management and land delivery activities
- The land surveying and demarcation/parcel/farms, and provision of land ownership and tenancy in both rural and urban areas.

The Land Commission administers most issues related to land allocation, acquisition, registration and land management.

vii. Zanzibar Electricity Corporation (ZECO)

ZECO is responsible for the transmission, distribution, supply and use of electric energy in Zanzibar.

viii. Zanzibar Utilities Regulatory Authority (ZURA)

Water, minerals and energy is regulated by ZURA. It includes regulation of transmission and distribution of petroleum and natural gas, water supply water and mineral explorations such as sand and stone quarry. The regulation process includes; (i) licensing and regulating water supply and sanitation and electricity services (ii) establishing standards, guidelines and tariffs chargeable in relation to water supply and sanitation services (ii) Monitoring water quality.

ix. Labour commission

This commission is responsible for the Occupational Health and Safety in Zanzibar. It oversees safety, health and welfare of persons at work and carries out all workplace inspections: hygiene surveys and measurements, occupational health examinations of workers, offer advice on ergonomics and scrutinize working drawings. It is provided in the ESMP that the Municipal shall engage OSHA expertise for inspections of works places during the operation phase.

x. Zanzibar AIDS Commission

Prevention and control spread of HIV/AIDS, to promote advocacy and education on HIV/AIDS, to protect human and communal rights of people infected with and affected by HIV/AIDS.

xi. The World Bank

The World Bank (WB) Group requires the client to apply relevant levels for measures of EHS Guidelines. This is when national regulations differ from the levels and measures presented in EHS Guidelines which generally give condition on Environmental

Occupational and Safety. The SUZA Hostels and facilities project is expected to achieve this Guideline through implementation of the projects as it will cause some impacts on Environmental and Social Health and Safety Risks

EHS provide performance levels and measures that are acceptable to the WB Group and that are general considered to be achievable in new facilities at reasonable cost by existing technologies.

The Guidelines it gives specific example of Good International Industrial Practice (GIPP) which is referred in the WB Environmental and Social framework and IFCs performance standards.

CHAPTER SIX

6 ASSESSMENT OF THE POTENTIAL IMPACTS

6.1 Introduction

This section outlines the process of impact identification and assessment of the impacts in each stage of the proposed project. The proposed mitigation measures are outlined in chapter seven which the proponent is committed to undertaking to prevent or reduce the identified adverse impacts. This study is conducted for envisaging a roadmap to ensure the investments to be financed by the World Bank are designed and implemented in an environmentally sound and socially acceptable manner that meets both World Bank requirements Zanzibar legislations.

6.2 Impact Identification and Analysis

Identifying the project impacts on its environment and society is the key step for addressing environmental and social management impacts. The impacts are reduced, or eradicated from the overlaying project activities during preparatory phase, construction phase and during operation phase, and the components of the affected domains or environments, biophysical and socio- economic environment.

6.2.1 Environmental and Social Risk Classification of the project as per the World Bank ESF

Environmental and social risks are rated as Substantial due to environmental and social impacts likely to be caused by project activities. An assessment of the impacts in this chapter was done in reference to the World Bank ESS 1-10. The main impacts of the project will emanate from the physical construction activities that SUZA will implement. To meet the ESSs requirements in a manner and within a timeframe acceptable to the Bank, SUZA was committed to conduct the ESIA as per ESS1 for the proposed projects to assess, and provide the management and monitoring of the predicted the environmental and social risks and impacts of the project throughout the project life cycle as elaborated in the subsection of this chapter

The cumulative impact of the works and presence of contractors and machinery at each targeted institution is unknown at the moment, but careful supervision will be needed to avoid accidents, loss of cultural assets and potential conflicts with local communities. Other potential impacts during SUZA implementation of construction activities include (i) waste generated at construction sites (potential solid waste) which can pollute the land; (ii) food residues can attract disease causing organisms; (iii) cutting of trees to use as building material (although this will not be allowed and construction materials will be supplied with the authorized vendor); (iv) road accidents; amongst others.

ESS 1: Assessment and Management of Environmental and Social Risks and Impacts

Assessment and management of environmental and social risks and impacts are required for the proposed project.

The proposed project at SUZA, Tunguu Campus will include civil works to build new facilities at SUZA i.e. laboratory complex building, agricultural block and two students hostel blocks for male and female students. There will be also rehabilitation of ICT labs through installation of teaching and learning equipment including lab equipment and ICT infrastructure.

Accordingly, this Environmental and Social Management Framework (ESMF) at SUZA is developed incorporate the World Bank's ESF requirements.

To adhere with WB ESF, the proponent has developed this ESIA an Environmental and Social Management Plan (ESMP) in line to ESS1 which considers the Environmental, Health and Safety Guidelines (EHSGs) of the Bank to define specific mitigation and prevention measures to prevent and reduce risks and impacts.

ESS 2: Labour and Working Conditions

Based on past practice in projects in Tanzania, potential ESS2 risks include child labour; increased incidence of GBV/SEA/SH and increased transmission of HIV/AIDs, COVID-19 and other communicable diseases among project workers and between project workers and local communities; non-compliance by contractors and other employers with national labour laws and regulations, including in relation working hours, rest period, pay and legally mandated benefits; discrimination in recruitment and employment in relation to disability, including Albinism, gender and other personal characteristics unrelated to inherent job requirements; occupational, health and safety problems.

The Labour Management Procedures (LMP), and a Health, Safety and Environmental (HSE) Plan in line with Good International Industry Practice (GIIP) will be prepared to ensure management of project workers in line with the requirements of national law and ESS2 and ESS4, including in relation to the health and safety of workers and of local communities during the construction, operational and maintenance phases of the project. SUZA will implement measures that will require workers to have contracts, receive regular payments and be subject to terms of employment that are aligned with national law and ESS2. The LMP will also prohibit the use of forced labour and child labour and will require age verification processes to be in place as needed. Occupational health and safety monitoring programs will form part of the HSE plan where records of occupational accidents and diseases and dangerous occurrences and accidents are maintained through the project lifecycle. The LMP will also have detailed information on the work terms and conditions including explicit prohibition and monitoring of child labour and forced labour. The LMP will further ensure that the health and safety of all workers, especially women are given adequate attention with respect to GBV and Sexual Harassment.

The LMP will also include requirements for contractors to prepare various tools such as a Code of Ethical Conduct, Labour Influx Management Plan, COVID-19 Prevention and Risk Management plan and HIV/AIDS Awareness and COVID 19 prevention training programs that will be reviewed by the Project E&S focal team and cleared by the Bank before being implemented. All Contractors' employees and labourers will be required to sign the Code of Ethical conduct and go through trainings on GBV, SEA/SH and HIV/AIDS awareness. Existing SUZA 2023 sexual harassment policy and gender policy will be implemented to address the issues of GBV and sexual harassment at institutional level. Further a project GRM that is attentive to GBV/SEA will be in place to manage project related grievances from project affected people and other stakeholders to address them appropriately.

Occupational Health and Safety (OHS): The project will involve construction works under *proposed project* which will need issues of OHS to be properly managed. During construction contractors and consultants who will be working on behalf of the developer as well as the OHS

staff of the client will be treated in accordance with the Zanzibar Occupational Safety and Health (OSH) Act 2, of 2005, the ESS2 and Good International Industry Practice (GIIP) with respect to OSH. Accidents in the type of construction that the project will support might include road accidents within the project areas especially caused by the construction vehicles, construction related fractures and other injuries.

In all circumstances and at all times during project implementation the project must ensure that Personal Protective Equipment (PPE) are distributed and used. Other measures such as: (i) potential hazards for workers (materials, activities, substances); (ii) protective and prevention measures, (iii) provision of OSH training to workers and other relevant staff; (iv) first aid and (v) hygiene facilities will have to be provided by consultants and contractors as per the OSH Plans which will be prepared prior to commencement of the construction activities. The arrangement to respond to the requirements of ESS2 is detailed in the labour management component and considers the national requirements, the Environmental Health and Safety Guidelines on Occupational Safety and Health and GIIP.

ESS 3: Resource Efficiency and Pollution Prevention and Management

The proposed project at SUZA will use materials supplied by the authorized vendors to avoid any impact or over-use of resources such as water and energy. It is expected that during construction materials such as wood, gravel, sand, and water will be needed. These will be sourced from the authorized borrow pits and vendors. Water is expected to be sourced from Zanzibar Water Authority (ZAWA). During construction the energy used will be electricity supplied by the Zanzibar Electricity Cooperation (ZECO).

Implementation of the project is not envisaged to engage in unsustainable resource utilization but will ensure that trees and the other construction materials are sourced from authorized vendors.

The project will ensure that technical designs take into consideration materials that are easily available and do not increase pressure on natural resources, water provision and proper solid waste management in all the facilities which will be constructed within SUZA.

Management of waste which will be generated from the construction activities will be as collected and disposed of to Kibele landfill. This will be important to avoid pollution from solid and liquid waste. Measures to address health and safety and hazardous substances such as asbestos and lead-containing paint, as necessary will be an integral part of the ESMP.

ESS 4: Community Health and Safety

Normally, the construction activities may lead to safety concerns for the people within the SUZA or community in the vicinity of the construction site. These risks that include road accidents due to potential increase in vehicle movements or local sourcing of materials. The contractor will secure required construction permit through District Construction Unit as prescribed by the Zanzibar urban and rural development policies and from environmental clearance through EIA after ZEMA approval.

Social risks to be addressed in the ESIA and/or ESMP include potential impacts on communities from workers (including labour influx) including sexual harassment and GBV, and the possible spread of communicable diseases such as COVID-19 and Sexually Transmitted Diseases (STDs). These risks will be mitigated through tools such as Codes of Ethical Conduct that will be signed by contractor's workers and through trainings on gender, GBV HIV/AIDS and

COVID-19 awareness. Currently, SUZA has its sexual harassment policy and gender policy, to be used as the tools to address the issues of GBV and sexual harassment at an institutional level, strengthening prevention and response in the university context through both project design and complementary actions included in the Project GBV Action Plan.

Furthermore, the GRM attentive to GBV/SEA is prepared to manage project-related grievances from project affected people and other stakeholders to address them appropriately. It is expected that contractors will hire staff to provide security for their camps and other properties. The SUZA PCT will ensure that contractor (i) make reasonable inquiries to verify that the direct or contracted workers retained to provide security are not implicated in past abuses; (ii) train them adequately (or determine that they are properly trained) in the use of force, and appropriate conduct toward workers and affected communities; and (iii) require them to act within the applicable laws of Tanzania in general and Zanzibar in particular.

ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement

SUZA does not foresee any land acquisition specifically for the purpose construction of new facilities and renovation of existing lecture halls and laboratories. Thus, this ESS 5 is not relevant to the proposed SUZA project.

ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

Field visit of the project area has revealed that, the SUZA construction areas is covered with grasses and fewer tress and coastal shrubs. It is also falling under the coral rag zone, the zone earmarked to constitute several other government offices according to Zanzibar Master Plan.

The standard recognizes the importance of maintaining core ecological functions of habitats, including forests, and the biodiversity. The proponent will have to consider the requirements of this standard by ensuring the assessment of impacts and risks associated with this project to the biodiversity of project area in Tunguu. However, the proposed project is constructed within SUZA Tunguu campus which currently in use, hence no significant impacts on biodiversity conservation and sustainable management of living Natural resources. Thus, this ESS 6 is not relevant to the proposed SUZA project.

ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities

Implementation of construction activities at SUZA project is not envisaged to be outside the University premises, or affects any explicit traditional/local group, hence, it does not require application of ESS7. Nevertheless, reflecting cosmopolitan nature of Zanzibar society and differences in vulnerability conditions considerations to cater for equity will be fully integrated during project design, through curriculum development by SUZA notably via project-wide consultations as per ESS10. During stakeholders meeting and consultation, an implementation of the SUZA project does not interrupt any group of indigenous people or community with underserved history in sub-Saharan Africa history. This ESS 7 is not relevant to the project.

ESS 8: Cultural Heritage

SUZA earmarked sites for project construction activities have not been under any identified areas of cultural heritage importance. The conducting of this ESIA report has confirmed that,

the project is implemented within SUZA area. No significant risk to the cultural heritage risk has been foreseen. The site visit has affirmed the absence of any objects of cultural significance as per the application of ESS 8 during SUZA project implementation. However, since the project will involve excavation activities, chance finds for physical cultural resources is likely. Hence, this ESS 8 is relevant to this proposed project.

ESS 10: Stakeholder Engagement and Information Disclosure

To guide participation of stakeholders during project implementation, the prepared Stakeholders' Engagement Plan SEP will be disclosed accordingly before project implementation. The SEP has guided consultations with various identified stakeholders who will be directly and indirectly affected by the proposed project. The scope of stakeholders includes but not limited to include government ministries, Universities and other institutions benefiting from the project, and professionals working in them, and communities neighbouring the project target facilities.

Additionally, the SEP outlined the proposed Grievance Redress Mechanism (GRM) for the project and refer to mechanisms already in place for members of the public to register complaints related to the project. The GRM integrated also the GBV-sensitive measures, including multiple channels to initiate a complaint and specific procedures for SEA, such as confidential and/or anonymous reporting with safe and ethical documenting of GBV and SEA cases. Through the SEP the project will ensure that information is meaningful, timely, and accessible to all affected stakeholders and particularly populations that are most at risk project sites including the neighbouring community, and the project workers. The SEP also outlines the approach to meaningful engagement with vulnerable groups and individuals to ensure meaningful engagement is achieved this includes measures such as use of local languages, ensuring the use of accessible locations, providing information in accessible formats etc.

6.2.2 Impact significance and evaluation

Impacts identification was done followed by estimation of the magnitude, extent and duration of the impact in comparison with the situation without the project. The matrix method was used. To be able to predict whether impacts are likely to occur as well as their scale, the initial reference or baseline data prior to the project was determined, and the future changes forecasted with or without the proposed project. The impact evaluation was based on experts' knowledge as well as checklists.

The significance of impacts was tested using the following criteria:

i. The magnitude and likelihood of the impact and its spatial and temporal extent;
ii. The likely degree of recovery of the affected environment;
iii. The value of the affected environment;
iv. The level of public concern; and
v. Extensiveness over space and time (magnitude);
vi. Intensiveness in concentration or in proportion to assimilative capacity;
vii. Exceedance of environmental standards or thresholds;
viii. Level of compliance with environmental policies, land use plans, sustainability strategy;
ix. Level of adversity and seriousness in affecting ecologically sensitive areas;

x. Level of adversity and seriousness in affecting heritage resources, other land uses; communities and/or indigenous peoples, traditions and values.

The impacts were further rated at a scale of "–3" to "+3" through "0" in the following manner;

+3	High positive impacts
+2	Moderate positive impacts
+1	Minor positive impact
0	No impacts
-1	Minor negative impact
-2	Moderate negative impacts
-3	High negative impacts

The team focused on significant positive and negative impacts that were rated -2, and -3 and proposed mitigation measures.

The suitability and feasibility of all proposed mitigation measures is included in the assessment of significant impacts. This was achieved through the comparison of the significance of the impact before and after the proposed mitigation measure is implemented. Mitigation measures identified as necessary have been included in ESMP.

6.2.3 Impact Rating Criteria

The above factors were used to create six criteria which were used to determine the significance of the identified impacts, which are;

- **Spatial Scale-** The spatial dimension encompasses the geographical spread of the impacts regardless of whether they are short term or long term. Table 6-2 describes the ratings used in the simple matrix as far as spatial scale is concerned.

Table 6. 1: Spatial Rating

International (I)	Trans-boundary- The impact would affect resources and processes outside the border of Tanzania
National (N)	Within country- The impacts will be of such a nature that it may affect the entire Zanzibar and Tanzania at large
Regional (R)	Within Region- The impacts will be of such a nature that it may affect the Southern region
Local (L)	On and adjacent to site- The impacts will be of such a nature that it may affect the entire Central District
Shehia	The impacts will be of such a nature that it may affect Tunguu area
Study Area	Includes the entire SUZA – Tunguu main campus
Localised	A few hectares in extent. The specific area to which this scale refers is defined for the impact to which it refers
Household	Households in the area could be affected
Individual	Individuals in the area could be affected

(Source: UNEP EIA Manuals, 2002)

- **Temporal Scale-** Temporal boundaries refer to the lifespan of impacts. Table 6-3 describes the ratings used in the Simple Matrix.

Table 6. 2: Temporal Rating

Temporal Scale	Explanation
Short-Term (ST)	During construction
Short term	Less than 5 years
Medium-Term (MT)	Life of project from 5 to 20 years
Long –Term (LT)	Residual impacts beyond life of project between 20 to 50 years
Permanent	More than 40 years, and resulting in a permanent and lasting change.

(Source: UNEP EIA Manuals, 2002)

- **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.
- **Residual Impacts-** These are long term impacts which go beyond the lifetime of the project in other words Residual impacts refer to those environmental effects predicted to remain after the application of mitigation suggested by the ESIA i.e. they are non-mitigable.
- **Phase/Timing-** During which phase of the construction is the impact likely to occur. The phases included Mobilization, Construction, Demobilization and Operation.
- **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. Table 6.2 show types of cummulative impacts;

Table 6. 2: Types and Characteristics of Cumulative Impacts

Type	Characteristic	Example
Time crowding	Frequent and repetitive effects	Forest harvesting exceeds rate of re-growth
Time lags	Delayed effects	Bioaccumulation of mercury
Space crowding	High spatial density of effects	Numerous small mining enterprises on river
Cross-boundary	Effects occur away from the source	Atmospheric pollution and acid rain
Fragmentation	Change in landscape pattern	Fragmentation of habitat by agriculture
Compounding effects	Effects arising from a multiple sources or pathways	Synergistic effect of POPS in humans and rivers
Indirect effects	Secondary effects	Forest areas opened up as a result of new highway
Triggers and thresholds	Fundamental changes in system functioning	Climate change

(Source: UNEP EIA Manuals, 2002)

However, in deciding on the level of significance the team used “best estimate” professional judgment of the experts and case studies as analogous or references. The environmental and social impacts were identified and their potential size and nature were predicted. The prediction of impacts specified the impact’s causes and effects and its secondary and tertiary consequences on the environment and the social aspects.

6.2.4 Impact Prediction

Impact prediction is a simple correlation between the identified impacts and project activities as shown in chapter six and the corresponding summary of the identified impact in Table 6.4.

Table 6. 3: Impact Correlation Matrix for the proposed establishment of SUZA proposed buildings

S/n	Impact	Project activities, phase and Impact Significance																				Impact Rating				
		Construction/Mobilization/Demobilization phase									Operation Phase									Decommissioning phase						
		Design and Risk Hazard Assessment(RHA)	Land acquisition	Site clearance and demolition	Establishment and operation of campsite	Exploitation of quarries/natural resources	Transportation of materials	Trench excavations and casting of foundation	Construction, installations & finishing works	Landscape activities	Teaching /imparting knowledge	Health care provision	Operation of Teaching Theatres and Laboratory	Liquid waste management	Solid waste management	Hazardous waste Management	Provision of utilities	Maintenance works	Operation of Associated facilities	Occupancy/Tenancy	Demolition of structures	Termination of employment	Spatial Scale	Temporal Scale	Reversibility	Cumulative Effects	Residual Impact
Impacts on the physical environment																										
1.	Loss of biodiversity and natural habitats			-3	-1	-2	-2	-1	-2	-1	0	0	-1	+1	+1	+1	-1	-1	-1	-1	-1	0	I	LT	IR		✓
2.	Loss of ecosystems services			-3	-1	-2	0	-1	-2	-1	0	0	0	+1	+1	+1	-1	-1	-1	-1	-1	-1	I	MT	R	✓	
3.	Acceleration of soil erosion	0	0	-3	-1	-3	-1	-1	0	-1	0	0	0	-1	-1	-1	0	-1	0	0	-1	0	L	ST	R	✓	
4.	Generation of liquid waste	0	0	-1	-3	-1	0	-1	-3	0	-2	-2	-3	+3	0	+3	0	-1	-1	-3	0	0	L	MT	R	✓	
5.	Generation of solid waste	0	0	-3	-3	-2	-1	-1	-2	-1	-3	-2	-3	0	+3	+3	0	-1	-1	-3	-3	0	L	MT	R	✓	
6.	Generation of Hazardous waste	0	0	0	-3	-1	0	0	-2	0	-2	-3	0	0	0	+3	+3	-1	-1	-1	-2	0	R	LT	IR	✓	✓
7.	Increased runoff/storm water	0	0	-1	-1	-1	0	0	-2	-2	0	0	0	+1	0	0	0	0	-1	-2	-1	0	R	MT	R	✓	
8.	Land pollution	0	0	-1	-3	-1	-1	-1	-3	-1	-1	-1	-1	+3	+3	+3	0	-1	-1	-2	-3	0	R	MT	R	✓	
9.	Surface and ground Water Pollution	0	0	-1	-2	-2	-2	-1	-3	-1	-1	-1	-1	+3	+3	+3	0	-1	-1	-2	-3	0	R	MT	R	✓	
10.	Air pollution	0	0	-1	-1	-2	-2	-1	-3	-1	-1	-1	-1	0	-1	0	0	-1	-1	-1	-1	0	I	LT	IR	✓	✓
11.	Contribution to Climate change	0	0	-2	-2	-2	-2	-1	-3	+2	-1	-1	-2	+2	+2	+2	-2	-1	-1	-2	-1	0	I	LT	IR	✓	✓
12.	Noise pollution	0	0	-2	-2	-2	-2	-1	-3	-1	-1	-1	-1	0	0	0	0	-1	-1	-2	-2	0	L	MT	R	✓	
13.	Generation of vibrations	0	0	-2	-2	-2	-2	-1	-3	-1	-1	-1	-1	0	0	0	0	-1	-1	-2	-2	0	L	MT	R	✓	
14.	Visual impact	+3	0	-1	-1	-1	-1	-1	-2	-2	0	0	0	0	0	0	0	0	0	0	-2	0	L	LT	IR	✓	✓
15.	Increase pressure on natural resources	0	0	-2	-1	-2	-1	-1	-2	-1	0	0	-1	+3	+3	+3	-1	-1	-1	-2	-2	0				✓	
Impacts on Social Environment																										
1.	Employment opportunities	0	0	+2	+2	+2	+2	+2	+2	+2	+3	+3	+2	+1	+1	+1	+1	+1	+1	+2	+1	-3	I	LT	IR	✓	✓
2.	Increase in income generation opportunities	0	0	+2	+1	+1	+1	+1	+2	+1	+3	+3	+2	+1	+1	+1	+1	+1	+1	+2	+1	-3	L	LT	IR	✓	✓
3.	Changes in lifestyle and quality of life	0	0	+2	+1	+1	+1	+1	+2	+1	+3	+3	+2	+1	+1	+1	+1	+1	+1	+2	+1	-3	L	LT	IR	✓	✓
4.	Increased skills and impart knowledge to local community	0	0	+1	+1	+1	+1	+1	+3	+1	+2	+1	+2	+1	+1	+1	+1	+1	+1	+1	+1	-3	N	LT	IR	✓	✓

S/n	Impact	Project activities, phase and Impact Significance																			Impact Rating				
		Construction/Mobilization/Demobilization phase									Operation Phase								Decommissioning phase						
		Design and Risk Hazard Assessment(RHA)	Land acquisition	Site clearance and demolition	Establishment and operation of campsite	Exploitation of quarries/natural resources	Transportation of materials	Trench excavations and casting of foundation	Construction, installations & finishing works	Landscape activities	Teaching /imparting knowledge	Health care provision	Operation of Teaching Theatres and Laboratory	Liquid waste management	Solid waste management	Hazardous waste Management	Provision of utilities	Maintenance works	Operation of Associated facilities	Occupancy/Tenancy	Demolition of structures	Termination of employment	Spatial Scale	Temporal Scale	Reversibility	Cumulative Effects	Residual Impact
5.	Increase of academic facilities in SUZA-Zanzibar	0	0	0	0	0	0	0	0	0	+3	+2	+2	0	01	0	0	0	0	0	0	-3	N	LT	IR	✓	✓
6.	Increased pressure on social services	0	0	-1	-1	-1	-1	-1	-2	-1	-3	-2	-2	0	0	0	0	-1	-1	-2	-1	0	R	LT	IR	✓	✓
7.	Increase in level of crimes	0	0	-1	-1	-1	-1	-1	-2	-1	-3	-1	-1	0	0	0	0	-1	-2	-2	-2	-2	L	LT	R	✓	
8.	Increased risks of communicable diseases	0	0	-1	-1	-1	-1	-1	-2	-1	-3	+2	-1	+2	+2	+2	+2	-1	-2	-2	-2	-2	I	LT	R	✓	
9.	Change in social values and ethics	0	0	-1	-1	-1	-1	-1	-2	-1	-3	-1	-2	-1	-1	-1	-1	-1	-2	-1	-1	-1	L	I	IR	✓	✓
10.	Increase in conflicts	0	0	-1	-1	-1	-1	-1	-2	-1	-3	-1	-2	0	0	0	0	0	-1	-2	-1	-1	L	LT	R		
11.	Food insecurity	0	0	-1	-1	-1	-1	-1	-2	-1	-3	0	-2	0	0	0	0	0	-1	-2	-1	-1	R	LT	R	✓	
12.	Price inflation of goods and services	0	0	-1	-1	-1	-1	-1	-2	-1	-3	0	-2	0	0	0	0	0	-1	-2	-1	-1	R	MT	R		
13.	Occupation health, safety and security risks	0	0	-1	-1	-1	-1	-1	-2	-1	-3	0	-2	0	0	0	0	0	-1	-2	-1	-1	L	MT	R		
14.	Comm. health and safety risks	0	0	-1	-1	-1	-2	-1	-2	-1	-3	+2	-2	+2	+2	+2	0	0	-1	-2	-1	-1	L	MT	R		
15.	Labour working condition	0	0	-1	-1	-1	-1	-1	-2	-1	0	-1	-2	-1	-1	-1	0	-1	-1	-1	-1	-1	L	MT	R		
16.	Increased incidence of GBV/SEA/SH	0	0	-1	-1	-1	-1	-1	-2	-1	-3	+2	-2	0	0	0	0	-1	-1	-1	-1	-1	L	MT	R		
17.	Increased transmission of STDs, COVID etc	0	0	-1	-1	-1	-1	-1	-2	-1	-3	+2	-2	0	0	0	0	-1	-1	-1	-1	-1	I	LT	R	✓	
18.	Loss of employment	0	0	+1	+1	+1	+1	+1	+3	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	-3	I	MT	IR		
Economic Impacts																											
1.	Increased Revenues to local authorities	0	0	+2	+2	+2	+2	+2	+2	+2	+3	+3	+2	+1	+1	+1	+1	+1	+2	+2	+1	-3	N	LT	R	✓	✓
2.	Increased commercial and social activities around project locations	0	0	+2	+2	+2	+2	+2	+2	+2	+3	+3	+2	+1	+1	+1	+1	+1	+2	+2	+1	-3	L	LT	R	✓	✓
3.	Increased Income to local suppliers and service providers	0	0	+2	+2	+2	+2	+2	+2	+2	+3	+3	+2	+1	+1	+1	+1	+1	+2	+2	+1	-3	I	LT	IR	✓	
4.	Increased land values	0	0	+1	+1	+1	+1	+1	+3	+1	+3	+2	+2	+1	+1	+1	+1	+1	+1	+1	+1	-2	L	LT	IR	✓	✓
5.	Loss of revenue to the government and University	0	0	+2	+2	+2	+2	+2	+2	+2	+3	+3	+2	+1	+1	+1	+1	+1	+2	+2	+1	-3	N	ST	R		

6.3 Potential Environmental and Social Impacts during the Pre-Construction Phase

6.3.1 Potential social impacts

6.3.1.1 Positive social impacts

i. Job Creation and employment opportunities

During this phase, about 30 people shall be employed by the contractor to do mobilization works such as construction of campsites, quarrying and material extraction and transportation activities etc. In additional to that, there will be an increase of self-employment (indirect employment) due to the higher demands and supply of various goods and services for people working in the project. For example, an increase in restaurants, *mama Ntilie* will be obvious to meet the increased number of the people working at this phase. The increased income to the community will enhance their economic status, even though for short while. This impact is perceived to be of medium significance, felt at regional scale within Zanzibar, and will have residual impacts on the community.

ii. Increase in income generation opportunities

This influx of people and particularly skilled and unskilled laborers in the area will provide an opportunity for local people to engage in some sort of business activities that will enable them to get more income compared to the previous time. The project will create a new source of income for both the people within Tunguu, Jumbi, and Ubago communities as well as the surrounding communities of SUZA and Central district in general.

This impact will be moderate and will be a long-term impact in the sense that even at the end of the phase the created income generation opportunities will leave the lives of the beneficiaries improved in one way or another. One of the important things to note is that, after the end of this phase the impacts will never be reversible hence irreversible.

iii. Changes in lifestyle and quality of life

It is expected that, the increase in employment opportunities both formal and informal will result to the rise of high wages among the population in the areas as well as the surrounding communities. This is likelihood to increase their expenditure and consequently alter their living standard. This will also have a multiplier effect in the communities that the workers come from, as they will for example be able to pay for school fees as well as buy assets such as scooters and television. Apart from that, the influx of people in the area will result to an increased number of people with mixed culture hence easy to alter or influence the same to undergo some changes that may be positive or negative.

This impact will be moderate and will affect the project communities of Tunguu, Jumbi, and Ubago communities as well as the surrounding communities of SUZA and Central district in general.

The impact is irreversible and will be a long-term impact in the sense that even at the end of the phase the new lifestyle developed and improved quality of life will persist. After the end of this phase the impacts will never be reversible (irreversible).

iv. Increased Revenues to local and national Authorities

The proposed project development can benefit local communities in terms of income generating employment. This will allow opportunities within the local business community, such as the provision of services and supply of goods such as food, hotel and building materials. The local business community as such would therefore also have more money circulating within it creating additional spin off effects for improvement of the local economy. It is also expected that the increased business and investments in the area will give an opportunity for local government authorities to collect tax and consequently improve

the availability of social services in the area. Overall, as users pay specific taxes and fees for services, the local and national revenue will increase even before the commencement of the operational phase.

This impact will be moderate and will affect entire nation in the sense that revenue collected from the project area will not be used in the local area but rather will contribute to the nation budget and will likely to have a long-term impact in the sense that even at the end of the phase the source of incomes developed prior will persist and grow in terms of size and services.
The impacts will be reversible in the sense that the government may propose and or develop strategies to retain the revenues or even multiplies as the project will be more growing in the stage to follow.

v. Increased commercial and social activities around project locations

It is envisaged that the pre-construction stages of the buildings at Tunguu; Central District which includes but not limited to; site clearance, establishment of campsites, and transportation of materials will attract a number of investors from within and outside surrounding communities to invest in meeting the needs of the increased population as well as people seeking for employment in the area. This is likely to enhance the development of the centres at surrounding areas. It is expect that service providers such as food venders and general kiosks (*maduka)* may be established and increase during construction phase to provide services to both skilled and unskilled labours working in the project site.

This impact will be moderate and will affect the project communities of Tunguu, Jumbi, and Ubago as well as other local communities surrounding SUZA and Central district and will be a long-term impact in the sense that even at the end of the phase the new commercial activities at the project site will persist and grow in terms of size and magnitude of the services to be provided. After the end of this phase the impacts will be reversible in the sense that the owners of these social and commercial activities may develop new strategies to re-construct and re- develop.

vi. Increased income to local suppliers and service providers

The Population of Tunguu Shehia is expected to increase in the next few years as a result of the SUZA building construction. During construction, the project is expecting to employ more than one hundred people from outside Tunguu area. Therefore, Tunguu area will be having more people than before. The change in population level due to influx of workers and labours will contribute to the new market opportunities for small, middle and big business persons. This will increase money circulation at the area leading to high income to the local suppliers and service providers. The impacts will be moderate, and will affect the project communities of Tunguu, Jumbi, and Ubago as well as other local communities surrounding SUZA and Central district and will be a long-term impact in the sense that even at the end of the phase the life for the local suppliers and service providers will remain improved. It is noted that, after the end of this phase the impacts will never be reversible (irreversible).

6.3.1.2 Negative social Impacts

i. Community health and safety risks

The World Bank ESS4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already

subjected to impacts from climate change may also experience an acceleration or intensification of impacts due to proposed project activities. During the site clearance and demolition, establishment of campsite, and trench excavation and casting of foundations will involve some activities that may rise in endangering the lives of the workers, community members living close to those activities. This in turn is likely to cause health and safety risks of the local communities in form of accidents if appropriate measures are not taken. In the areas where raw materials will be taken like sand, stones and water accidents are likely to happen if appropriate measures are not taken on board. On the transportation of raw materials to the site, drivers may fail to observe safety measures along the road something that may result to accidents to other road users like pedestrian, motorcyclist, and *bodaboda* drivers. This impact will be moderate and will be a short-term impact in the sense that at the end of this phase all the risks will die natural death. Furthermore, the impact will not be pilling up and no cumulative effects may be witnessed at the end of this phase. *That, the impacts arising out of this are reversible in the sense that the same can be controlled upon strict use of road safety measures and occupational safety measures*.

ii. Damage to Cultural Heritage

This impact is relevant to the ESS8. It is noted that the ESS8 recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. ESS8 sets out measures designed to protect cultural heritage throughout the project life cycle. In relation to the proposed project, the site area does not contain any historical feature that was observed during assessment. No foreseen objects of cultural heritage importance are expected from SUZA premises. However, it is predicted that, during project site preparation the potential unknown objects (if any) like remaining human bodies/archaeological remains might be found and could be damage.

6.3.2 Potential Bio-physical Environmental Impacts

6.3.2.1 Negative Environmental Impacts

i. Risk of buildings/structural designs to have potential to generate emergency/disaster events

The design of buildings or structural elements which do not consider the emergencies due to technical and financial reasons may be prone to structural failure, fire incidences, flooding, and attraction disease causing agents at the proposed SUZA, Tunguu area. These may ruin the proposed investment plans as well as the health and safety of the students, staffs, service providers, community and physical environment at large. Also, the buildings and structures may not become user friendly due to failure to consider climate, safety and security issues. The incompatibility of the building's design and failure to meet the design capacity may also affect the intended use of the buildings hence becoming a white elephant building. This risk is projected to be moderate during construction and high during operation phase (impacts shall be fully realized during operation phase than the construction phase). The predicted impact is reduced by adherence of ESS2. ESS2 applies to project workers including full-time, part-time, temporary, seasonal and migrant workers. The scale of the impact will be National and Medium term.

ii. Loss/reduction of ecosystem services

The impact is predicted in relevant to the WB ESS 3. The SUZA buildings contain blue, green and grey spaces which are crucial for ecosystem services. It harbours different plant

species which provide ecosystem services to local communities include supporting, regulating, provisioning and cultural services'.

- Vegetation especially trees are lungs of our planet which help to help to mitigate carbon dioxide and other toxic greenhouse gas emissions. Cleaning of the vegetation for developments of physical facilities reduce vegetation cover which is currently sequesters carbon dioxide through photosynthesis process. Lack of plant species especially trees allows a greater amount of greenhouse gases to be released into the atmosphere since vegetation are good carbon sinks or reservoirs. Increasing carbon dioxide levels contributes to greenhouse gases subsequently global warming.
- Presence of pollutants such as dust emanated from construction phase and transportation during both phases might affect the ability of vegetation to survive and maintain effective evapotranspiration, which is very important component in the hydrologic cycle. Trees keep on returning water vapor to the atmosphere.
- Potential soil contamination also might occur during the construction and operational phases due to poor materials and waste handling practices, spillage and leaks from construction equipment. This will affect plant growth and limit their ecological functions.
- Trees help in controlling soil erosion by assisting the land to retain water and topsoil, which also provide the rich nutrients to sustain growth of plants. Plants bind soil together with their root systems makes it harder to be washed away by agents of erosion including water, wind and others. Cleaning of the same will subject the land to soil erosion and floods. Erosion sweeps the soil from one place to another such as water bodies, and if the soil was exposed to contaminants when leach into the water supply systems will affect the quality water.

Extent of spread is the impact is local and medium term; with a negative impact on provision of ecosystem services to community. The impact significant is rated as high without mitigation measures; however, with implementation of proper mitigation measures the impact could be significantly reversed.

iii. Acceleration of Soil Erosion

This ESS 3 sets out the requirements to address resource efficiency and pollution prevention and management throughout the project life cycle consistent with GIIP. Human activities, including land clearing and excavation leave soil vulnerable to erosion. Soil erosion happens when construction equipment destroy/remove vegetation, which provides root systems that hold dirt in place and prevent erosion. Once the soil is loose, the top soils be displaced by both wind and water erosion. The existence of abandoned sandpits at the proposed site increases the risks of water caused soil erosion.

This impact is localized and will be short term, only during the construction phase. The significance of the impact is high; however, the situation is reversible with application of mitigation measures.

iv. Loss of Landscape and scenic view

Like any development, there is a 'zone of visual intrusion' from which it can be seen. These refer to the impacts of landscape change on people: on the views that people have from their homes, offices, footpaths, cars as they drive past, etc. Construction activities shall affect the landscape by removing existing landscape features in place such as trees and replacing them by concrete and gravel surface. If operated at night, the lights will lead to the increase of light pollution. The following components of the landscape can be affected by development:

- Physical factors: geology, landform, microclimate, drainage, soil, ecology; and

- Aesthetic factors: proportion, scale, enclosure, texture, colour views as well as sounds

However, the proposed project components can also change the overall character of an area to make it look more urban.

This impact will be localized at the site, long term during the life of the project and has both cumulative and residual impacts.

v. Land pollution

ESS3 recognizes that economic activity and urbanization often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services and the environment at the local, regional, and global levels. In relation to the proposed SUZA project, the construction activities will generate large quantities of waste materials, both liquid and solid (including hazardous waste), with varying nature, including scrap metal, plastic, wood, concrete, bricks etc. (as described in Chapter two of this report). When these materials are not properly disposed of, it will contribute to the land pollution area. Land could also be polluted by oil spills, from machines an equipment, placement of construction materials on bare land and others.

This impact is assessed to be of local scale and short-term during construction. The significance of the impact is high and reversible.

vi. Impacts on surface and ground water quality

Main sources of construction waste are cleared vegetation and top-soil (overburden) and domestic waste from quarries. The impact is relevant to the ESS3. During quarrying activities, various type of wastes will be generated including debris in air, solid and liquid wastes. The wastes may contaminate land or be washed into local surface and ground water resources and impair the quality of these receiving bodies. During the rainy season, the surface runoff from the site to the ocean. It was indicated that site is water lodged during the rainy season. Therefore, release of any contaminants (solids or liquid) on the land can potentially contaminate surface runoff, and eventually impair the quality of the water by altering its physical- chemical parameters of sea water, which may lead into aquatic life stress. Further, infiltration/percolation of contaminated runoff could potential contaminated groundwater which is the main source of water for the whole surrounding community and Zanzibar at large. Contaminated water could directly affect domestic water quality, render it useless for irrigation, contaminate food chain and also affect living organisms in water.

This impact is assessed to be of regional scale and short-term during construction. The significance of the impact is high and irreversible.

vii. Exploitation of Borrow Pits/Quarries and Other Natural Resources

As required by ESS3, that promote the sustainable use of resources, including energy, water and raw materials, the proposed project will involve extractions of water, construction materials from both authorized borrow pits and quarries on government land, communal land and on private-owned land are associated with rampant degradation with no efforts of restoration/re- vegetation.

6.4 Potential environmental and social impacts during construction phase

6.4.1 Potential Social Impacts

6.4.1.1 Positive social impacts

i. Jobs creation/Employment opportunities

Due the scope of the proposed construction activities, this phase will be labour intensive. The selected Contractor is expected to employ about 100 people (professionals and non-professionals), to be sources both locally and countrywide. There will also be other indirect employment opportunities/self-employment for transported of construction materials, suppliers of various goods and services etc. For example, an increase in restaurants, *mama Ntilie* will be obvious to meet the increased number of the people working at this phase. The increased income to the community will enhance their economic status. This impact is perceived to be of high significance, felt at regional scale within Zanzibar, and will have residual impacts on the community.

ii. Increase in income generation opportunities

This influx of people and particularly skilled and unskilled laborers in the area will provide an opportunity for local people to engage in some sort of business activities that will enable them to get more income compared to the previous time in which most of them depended on agriculture and farming as their only source of income. The project will create a new source of income for both the people within Tunguu and Jumbi and Ubago communities as well as the surrounding communities of SUZA and Central district in general. This impact will be moderate and will be a long-term impact in the sense that even at the end of the phase the created income generation opportunities will leave the lives of the beneficiaries improved in one way or another. Furthermore, the impact will be pilling up with cumulative effects not only to those directly involved but also the one associated with them. One of the important things to note is that, after the end of this phase the impacts will never be reversible hence irreversible.

iii. Changes in lifestyle and quality of life

It is expected that, the increase in employment opportunities both formal and informal will result to the rise of high wages among the population in the areas as well as the surrounding communities. This is likelihood to increase their expenditure and consequently alter their living standard. This will also have a multiplier effect in the communities that the workers come from, as they will for example be able to pay for school fees as well as buy assets such as scooters and television. Apart from that, the influx of people in the area will result to an increased number of people with mixed culture, hence easy to alter or influence the same to undergo some changes that may be positive or negative. This impact will be moderate and will affect the project communities of Tunguu, Jumbi, and Ubago communities as well as the surrounding communities of SUZA and Central district in general and will be a long-term impact in the sense that even at the end of the phase the new lifestyle developed and improved quality of life will persist. After the end of this phase the impacts will never be reversible (irreversible).

iv. Increased skills and impart knowledge to local communities

As noted in the previous paragraph, the construction phase of the proposed buildings will provide a number of opportunities for both skilled and non-skilled laborers. There will potentially be training opportunities or practical learning for local people and people from different part of the country that will secure employment or casual labour in the construction of the new building. It is obvious that different people from the local area and others from different part of the country will be employed in the project particularly technicians and machine operators during this phase and consequently acquire necessary skills that will be of paramount important in their lives, communities and nation in general. This will enable them to improve their economic activities which will lead to higher income and hence improvement of their living standards or may use the skills in improving their lives and life

of their fellow community members in the local areas of Tunguu, Jumbi and the entire nation. This positive impact arising from this will be high and are likely to affect the project communities as well as other local communities surrounding Zanzibar and the nation in general in the sense that even at the end of the phase the new skills acquired will benefit the entire nation in different areas. Furthermore, the impact will be pilling up with cumulative effects not only to those directly involved but also the one associated with them and the nation at large. One of the important things to note is that, after the end of this phase the impacts will never be reversible hence irreversible.

v. Increased Revenues to local and national Authorities

The proposed project development can benefit local communities in terms of income generating employment that will be generated during the construction phase. This will allow opportunities within the local business community, such as the provision of services and supply of goods such as food, hotel and building materials. The local business community as such would therefore also have more money circulating within it creating additional spin off effects for improvement of the local economy. It is also expected that the increased business and investments in the area will give an opportunity for local government authorities to collect tax and consequently improve the availability of social services in the area. Overall, as users pay specific taxes and fees for services, the local and national revenue will increase even before the commencement of the operational phase. The impacts will be moderate, and will affect entire nation, in the sense that revenue collected from the project area will not use in the local area. However, rather will contribute to the nation budget and will likely to have a long-term impact in the sense that even at the end of the phase the source of incomes developed prior will persist and grow in terms of size and services.

Furthermore, the impact will be pilling up with cumulative effects not only to those directly involved but also the entire nation that will benefit from the increased government revenues in terms of improved social services and other government support to the citizen. One of the important things to note is that, after the end of this phase the impacts will be reversible in the sense that the government may propose and or develop strategies to retain the revenues or even multiplies as the project will be more growing in the stage to follow, an operation phase.

vi. Increased commercial and social activities around project locations

It is envisaged that the construction stages of the proposed project include but not limited to; site clearance, establishment of campsites, and transportation of materials will attract a number of investors from within and outside surrounding communities to invest in meeting the needs of the increased population as well as people seeking for employment in the area. This is likely to enhance the development of the centres at surrounding areas. It expected that service providers such as food venders and general kiosks (*maduka*) may be established and increase during construction phase to provide services to both skilled and unskilled labours working in the project site.

This impact will be moderate and will affect the project communities as well as other local communities surrounding Central district and will be a long-term impact in the sense that even at the end of the phase the new commercial activities at the project site will persist and grow in terms of size and magnitude of the services to be provided. Furthermore, the impact will be pilling up with cumulative effects not only to those directly involved but also the one associated with them including local authorities in the area and people they serve. One of the important thing to note is that, after the end of this phase the impacts will be reversible

in the sense that the owners of this social and commercial activities may develop new strategies to re-construct and re- develop or even multiplies the interventions as the project will be more growing in the next stages to follow in the project cycle.

vii. Increased income to local suppliers and service providers

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

The Population of Tunguu Shehia is expect to increase in the next few years because of the building construction. During construction, the project is expecting to employ more than one hundred people from outside Tunguu area. Therefore, Tunguu area will be having more people than before. The change in population level due to influx of workers and labours will contribute to the new market opportunities for small, middle and big business persons. This will increase money circulation at the area leading to high income to the local suppliers and service providers. This impact will be moderate, and will affect the project communities of Tunguu, Jumbi, and Ubago as well as other local communities surrounding SUZA and Central district and will be a long-term impact in the sense that even at the end of the phase the life for the local suppliers and service providers will remain improved. It is noted that, after the end of this phase the impacts will never be reversible (irreversible).

6.4.1.2 Negative social impacts

i. Population Increase and increased pressure on social services

The impact assessment was done based on ESS3. Residences in the project area and surrounding communities limited social and infrastructural services provided to them such as in the areas of health, and water. In view of this, the influx of people in the project area will increase pressure on the already limited social infrastructure and may without the taking of steps to alleviate this place a heavy additional burden on the existing service delivery system. During the construction phase1, expected that more than 100 people will reside within these communities causing burden and pressure on the available limited social services. These negative impacts arising from this will be moderate and are likely to affect the entire region surrounding the project area for a long-term. Furthermore, the impact will be pilling up with cumulative effects not only to those directly involved but also the one associated with them in the region. One of the important things to note is that, after the end of this phase the impacts will never be reversible hence irreversible and will have a residual impact.

ii. Increased in level of crimes

Influx of temporary workers may have a potential increase in crime in the community. This may be experienced if mitigation measures are not introduced however, this can be adhered as per ESS2. With an increase in construction activities and the possibility of job seekers arriving, it may be more difficult to identify strangers in the community. There may also be negative issues that need to be managed such as increases in local prices, increased rents, prostitution or alcohol consumption associated with labour influx or increased incomes of local workers. It expected that, contractors would hire staff to provide security for their camps and other properties. This impact will be negative in nature at a moderate level and will cover the local areas surrounding the project. The impacts arising from this will be moderate and are likely to affect the entire region surrounding the project area for a long-term. One of the important things to note is that, after the end of this phase the impacts will

be reversible in the sense that SUZA in cooperation with local authorities and police force may set up strategies to reduce and combat crimes.

iii. Food Insecurity

The impact was identified as the results of adherence of ESS10. The stakeholders that were involved in this study have raised their concerns about shortage of food that may arise at the project site due to influx of workers during construction phase causing pressure on available areas for sources of food. In our focus group discussion with village council members, they argued that the development of this project would likely to attract many people to come and settle in their villages increasing demand of foods and services. This is likely to cause a lot of chaos and inflation of prices on goods and services including food services. This negative impact arising from this will be moderate and are likely to affect the entire region surrounding the project area for a long-term. Furthermore, the impact will be pilling up with cumulative effects not only to those directly involved but also the one associated with them in the region. One of the important things to note is that, after the end of this phase the impacts will be reversible as relevant strategies may be employed to reduce the state of food insecurity.

iv. Occupational Safety and Health risks

ESS2 and ESS4 address the health, safety, and security risks and impacts on project-affected communities and workers in the project area. On a daily basis, construction workers face dangerous employment conditions. Even though construction workers are trained and know basic safety measures, accidents can still happen. The risks taken every day during regular construction work make it difficult for job sites to remain accident- free. Accidents on site could be caused by defective or collapsing scaffold, electrocutions, falls, falls from ladders, and defective machinery such as forklifts, conveyors, hoists, cranes, malfunctioning tools and other equipment. Accidents can result in serious injuries or death. In case, construction is extensive, the potential significance of the risk to health and public safety will depend on the size of the population and the workers exposed and the degree of exposure. Workers permanently on the site will be exposed to air pollution throughout the construction period. Work accidents during construction work are quite common. This is due to the presence and handling of hazardous equipment and harmful building materials. It is therefore required that before the construction activities, there is need for the materials to be well inspected and harmonized to the occupational health and safety standards.

v. Community Health – Accidents and Injury

During the building works, the risks related on public safety and the personnel could increase. The building works will induce possible harmful effects on public safety. At SUZA, the traffic related to construction will contribute to reduced road safety especially on local roads where some contractor's facilities are located, especially where the traffic passes through settled areas and towns located close to the road. The traffic to construction site will depart from the public roads. Residents from local settlements on these haulage roads will be exposed to increased possibilities for accidents and injuries. Traffic consisting of heavy vehicles and machinery is especially risky. The effects of traffic to public could occur along transportation routes or as a result of the community entering construction sites. Children can be at particular risk of such impacts if they are unaware of project risks the assessment done as per ESS1, ESS2 and ESS4.

On the transportation of raw materials to the site, drivers may fail to observe safety measures along the road something that may result to accidents to other road users like pedestrian,

motorcyclist, and *bodaboda* drivers. This impact will be moderate, and will affect the project communities as well as other local communities surrounding central district and will be a short-term impact in the sense that at the end of this phase all the risks will die natural death.

vi. Community Health – Communicable Disease Transmission

ESS2 and ESS4 address the health, safety, and security risks and impacts on project-affected communities and workers in relation to construction sites. The construction of the project shall be accompanied by in-migration of job seekers and opportunistic businesses and speculators. This will increase social interactions amongst the construction workers and local communities. The presence of a large number of workers can give rise to risk of an increased spread of communicable diseases. This among other factors may also produce an inherent increased risk of transmission of sexually transmitted diseases, HIV/AIDS and other contagious diseases taking into consideration that the project will be implemented within university campuses. In addition, the increase in disease like COVID-19 associated with the entry of a temporary labour force into community could also occur.

vii. Community Safety–Social Conflict

In according to ESS4, it is expected that the increased number of workers and higher concentration of residents near construction sites will have an impact on local communities. Uncontrolled movement of workers will affect residents around the settlements. Also, the construction of the project shall be accompanied by in- migration of job seekers and opportunistic businesses and speculators. This will bring many people in the project areas. This will increase social interactions amongst the construction workers and local communities. The presence of workers increases the risk of SEA/SH (GBV) towards members of the community in particular female students who may be present on campus. Such risks are common to occur on construction projects. Entry of a temporary labour force into an area could cause different negative impacts to the local communities including conflicts between local community members and newly arrived people due to the socio-cultural differences and other issues. The situation when temporary workers come from other regions and they are from different social and cultural backgrounds could easily create conflicts with the local social environment. Increased presence of security personal can lead to community health and safety risks associated with any inappropriate use of force, GBV(SEA/SH) and intimidation of the community.

viii. Labour and Working Conditions

The assessment was carried out as per ESS2. It is predicted that, the contracted workers and those employed in the supply chain are at risk of being subjected to poor labour practices by their employers this may include lack of contracts, irregular pay, working long hours, lack of breaks etc. In addition, the use of child labours in the supply chain (e.g. the production of gravel is known to occur in Tanzania Zanzibar and will be avoided. Women are also at risk of being discriminated against in terms of employment opportunities by contractors. There is also a risk of sexual exploitation of women by their employers/ contractors, which could include demands for sexual activities in exchange for recruitment, keeping their job etc. by male supervisors.

Due to technological developments and investment in labour saving equipment, the skilled and non-skilled workforce will needed. The skilled construction workers will be imported to the area of construction and will reside in labour camps. A smaller number of local low-skilled jobs may be envisaged. These will include protection and guarding of the

construction companies' properties. Low skilled workers are recommended to be hired around the project jurisdiction. Labour camps will be the responsibility of the contractor under the supervision of the consultant and APIUs. In order to ensure that the labour camps comply with the Zanzibar law and ESS4 contractors will be required to prepare camp management plans as well as codes of conduct for workers and compliance will be mandatory for all workers.

6.4.2 Potential Bio-physical Environmental Impacts

The World Bank ESS3 'Resource Efficiency and Pollution Prevention and Management' recognizes that development projects often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services and the environment. The current and projected atmospheric concentration of greenhouse gases (GHG) threatens the welfare of current and future generations. Impacts caused by pollution as described hereunder:

6.4.2.1 Negative Environmental Impacts

i. Air Pollution impact

Construction activities have potential to emit dusts and noxious gases such as CO_2, CO, NOx, SO2, VOC and CH_4. Vehicles and equipment's with internal combustion engines have potential to emit noxious gases. Construction works that are likely to generate dusts are mainly related to the movement of materials and machinery and construction work. When dust is exceptionally fine and when the populations resident undergoes an exposure prolonged and persistent (such as in proximity of a career) there are risks of attacks of the public health. Potential sources of dust at the site and off site are summarized in Table 6.5 below.

Table 6. 3: Project activities and Impacts

Activity	Source of production of dust
On-site building work producing dust and gaseous emissions	
Clearance and terracing ofthe site	• Earthworks • Initial soil spraying after excavation. • The movement of construction traffic and movement of materials Stored materials subjected to wind action
Excavation	The important sources are: • Movement of traffic of construction. • The handling and the storage of waste • The excavation and the transport of materials and potential storage on the site.
Building Foundations	The important sources are; • Foundation excavation • The movement of construction traffic, the handling and the storage of waste • The excavation and the transport of materials and potential storage on the site.

Building Works	• Movement of traffic of construction. • Potential of a certain strongly localized harmful effect if the completion of work requires "smoothing and sanding" of the wall to obtain a desirable completion.
Auxiliary work -	
Off-site building work producing dust	
Main court	• Any movement of traffic on unpaved roads • Surface Materials brought by the wind
Aggregate mixing unit	• Stored materials • Input of the handling of the materials Filtering and another process of materials Handling of materials/loading output • Traffic congestion
Tool maintenance course	• Materials of surface brought by the wind Traffic of construction
Sites of borrow	• Clearing the site Excavation Stored materials • Material loading

With regard to the gaseous emissions, the sources of atmospheric emissions associated with construction activities are mainly from units of construction and the possible generators, by evaluating these sources, the following conclusions can be drawn:

- The majority of the sources are mobile and will generate dispersed emissions and in a temporary way;
- The majority of the emissions will be generated starting from the concentrations of activities which are rather far away from the sensitive receivers; and
- The level of the emissions of the precursory pollutants and the atmospheric pollutants will vary from day to day, according to the type of the activity. Of this fact the intensity of the impact of the building site on air pollution especially by the suspended particles is evaluated like average.

The level of air pollution will be judged in comparison with ambient air quality standards. This impact is of medium significance, international concern, long term and irreversible. Further, the impact has both cumulative (since there are also other existing sources) and residual impacts.

ii. Increased Greenhouse gas generation

The current and projected atmospheric concentration of greenhouse gases (GHG) threatens the welfare of current and future generations. The construction of the proposed project in SUZA at Tunguu area will be associated with GHGN emissions from cars, equipment, plants etc. Various internal combustion engines will release GHGs notably carbon-dioxide (CO_2), methane (CH_4) and small quantities of noxious gases such as Nitrogen Oxides (NOx), Sulphur Oxides (SOx) and hydrocarbons. The generation and emission rate will depend on equipment type, road condition, speed of vehicles, quantities of equipment, duration, and prevailing atmospheric conditions, particularly wind and moisture of the air. The main source of emission of atmospheric pollutants will emanate from mobile sources-the exhaust engines (trucks/tipper, wheel loaders). Table 6.6 shows the emission factors of the various construction equipment and vehicles, and approximated emissions.

Table 6. 4: Emission of construction equipment and vehicles

S/N	Type	Quantity	Emission factors (Giunta *et al.*, 2019)		Total Emission	
			CO-g/hp-hr	NOx-g/hp-hr	CO g/day	NOx g /day
1	Excavator	1	0.75	4.31	0.34	1.90
2	Bulldozer	1	0.94	4.67	0.42	2.09
3	Trucks	5	11.24	15.27	25.12	34.13
4	Motor grader	1	0.75	4.31	0.34	1.90
5	Compactor	1	0.94	4.67	0.42	2.09
6	Crane	2	170	260	340	520

Analysis of baseline air quality indicated that the quality of air is good. Based on these findings, the level of the emissions of the precursory pollutants and the atmospheric pollutants from mobile sources will vary from day to day, according to the type of activity done during construction. However, even if the impact is very limited in time, it does not remain the same depending on the weather conditions. Of this fact, the intensity of the impact of the construction of the project on air pollution was evaluated to be negative, cumulative, global, short term and moderate significance.

iii. Contribution to Climate Changes

Transportation of construction materials and the labour force, use of fossil fuels for energy (combustion engines) and waste management activities have high potential for emission of greenhouse gases such SO_2, CH_4 and CO_2. The project will contribute to climate change in two ways. Firstly, it will be through generation of Greenhouse Gas emissions. Secondly, the project is expected to reduce CO_2 sequestration due to reduction of vegetated area of the campus.

The production of greenhouse gases has long-term consequences on a planetary level. This impact is considered of high significance, long term and of international concern. Further the impact is irreversible, has cumulative impacts (baseline indicated that waste burning is common practices, thus potential for GHG emissions) and has residual impacts.

iv. Increased Noise level during Construction

The baseline noise monitoring indicated that noise level at the site ranged from 40-47 dBA, which is below national and IFC standards for daytime exposure. The Tanzania Standard limits (TZS) guidelines require noise emission levels to be less than 55 dBA during the day within residential/institution areas. The proposed project activities will inevitably increase noise level. Noises from vehicles, equipment, construction crew, etc may rather be significant. Noise beyond some level (70dBA) is itself a nuisance and need to be avoided. This impact is local (at the proposed site) of moderate significance moderate and short term during the construction phase. The impact is reversible, and is cumulative (adding to the existing noise level).

v. Increased vibration

Construction activity can result in varying degrees of ground vibration, depending on equipment and methods employed. Vibration will be produced by construction vehicles,

plant and machinery during delivery of materials, processing of materials, and actual construction work. The Construction activities that typically generate the most severe vibrations are blasting and impact pile driving for foundation. Due to an increase in activities and number of operational vehicles, the impacts of vibration include causing disturbance to neighbours and physical damage to properties near the construction site. *This impact is moderate, localized and will be medium term.*

vi. Generation of Waste and Hazardous during Construction

The construction industry produces a significant amount of wastes. Studies have indicated that construction waste can be as high as 10 to 15% of the materials utilized for the construction works. Thus, the amount of construction waste generated could be as high and the total amount of various materials use in the construction of the proposed buildings. Examples of waste generated could include various building materials such as nails, electrical wiring, shingle, concrete, damaged bricks, insulations, excavated materials, rubble, etc. Some of the adverse impacts of the construction wastes include the following:

- Some of the construction wastes are difficult to dispose of and have no residual value (cannot be re used or recycled. This has impacts on waste management costs in terms of transportation, land required for disposal, and costs for establishing suitable disposal sites.
- Some of the construction wastes when exposed to moist environment, can release *hazardous components* such as lead, and other metal ions (i.e. Cu. Fe, Zn etc), that can contaminate land, and water resources. Such contamination can potentially enter the food chain and cause health effects to humans and other organisms.

Further impacts could also arise from improper disposal of food waste & packaging materials and human wastes generated onsite by the construction workers. Haphazard disposal of food waste will attract scavenged birds, insects and rodents, which are diseases vectors. Human wastes carry infectious pathogens. Improper discharge or open defecation on the environment will contaminate soils, and pathogens can be carried by runoff to receiving water bodies, where they will have contaminated water resources. Contamination of water resources and foods by pathogen can result in eruption of diseases such as cholera, typhoid, dysentery and diarrhoea. *The significance of this impact is high. The spread of the impact is local, and short-term during construction. The impact is revisable, but has cumulative impacts.*

vii. Wastewater Management problems

The types of wastewaters generated during construction activities include sewage, grey water and process water. Sewage effluent will be produced in the sanitary facilities provided and collected on site. Septic waste produced if not well disposed will also pose a problem to human health. This will be particularly severe if the waste is not collected directly and / or is released directly into the environment without any treatment. Grey sewage will pose less of a direct problem to human health but will be produced in large quantities in the camps. Further, process water generated from batching plants, equipment maintenance centres and ordinary sites will contain chemicals with deleterious effects. Wastewater if discharge in the natural environment can pollute environment and causing unhygienic sanitary conditions and nuisances to the human perceptions. Types and sources of wastewater as shown in Table 6.7

Table 6. 5: Types and sources of waste water.

Type	Source
Sewage	Works Camp
	Offices Other elements of the main camp
	Remote secondary facilities
	Sites
Grey water	Works Camp, cooking, personal and clothes washing
	Offices/Other camps
Hunting and process water	Oil spills
	Aggregates and process plants
	Equipment maintenance centres
	Ordinary sites

The significance of the impact is moderate as the impact is localised, short term and reversible.

viii. Erosion of Exposed Surfaces

Inadequate compaction and resurfacing compounded by rain, trampling, vegetation clearance etc. may cause erosion and consequent sediment load in runoffs. This is mostly likely to happen if construction is undertaken during the months of rain seasons -heavy rains.

ix. Landscape and Visual Impacts

Like any development, there is a 'zone of visual intrusion' from which it can be seen. These refer to the impacts of landscape change on people: on the views that people have from their homes, offices, footpaths, cars as they drive past etc. Construction activities shall affect the landscape by removing existing landscape features in place such as trees and replacing them by concrete and gravel surface. If operated at night, the lights will lead to the increase of light pollution. The following components of the landscape can be affected by development:

- Physical factors: geology, landform, microclimate, drainage, soil, ecology; and
- Aesthetic factors: proportion, scale, enclosure, texture, colour views as well as sounds

However, the proposed project components can also change the overall character of an area to make it look harder and urban.

6.5 Potential Impacts during the Operation Phase

6.5.1 Potential Social Impacts

6.5.1.1 Positive Social Impacts

i. Increase of Admission of Students to SUZA

The proposed project components will provide adequate academic facilities to academic institutions, people, and the country at large. These will increase admission of students from high schools and other college as a result more Tanzanian people will be benefited. Also, the proposed project components shall provide adequate and conducive space for meetings, trainings, seminars, workshops etc. In order to maximize benefits, it is essential that increased admissions are inclusive and consider the needs of vulnerable groups and people. To this end it is important that curricula are inclusive, buildings are accessible and persons with disabilities are able to fully participate in learning opportunities.

ii. Increase of Revenue to Academic Institutions

SUZA will increase students' enrolment, which in return will increase revenues through university fees. This will increase SUZA financial standing that will improve good governance and efficient running of the University. Thus, the SUZA aspiration of becoming the catalyst of social change with Zanzibar and Tanzania through research, knowledge delivery and consultancy will be realized.

iii. Job Creation and employment opportunities

The operation of proposed project components will lead in the direct and indirect jobs generation Direct jobs are those related to operational services, cleanliness, stationeries, catering and commercial activities. Indirect jobs are those created by the positive impact institutions to economic sectors. These are agriculture, livestock, and energy and water sector. The ripple effect (or catalyst) on the entire regional and national economy is also the origin of the creation of 'indirect' jobs, for example, an increase in restaurants, hotels, *mama Ntilie* will be obvious to meet the increased number of the people working in the site.

This positive impact arising from this will be high and are likely to affect large area as the project will pileup from the local area to international level (it is expected that some of the students and teachers may come out of the country) and will be a long-term impact in the sense that even at the end of the phase the created employment and business opportunity will leave the lives of those employed improved in one way or another. Furthermore, the impact will be pilling up with cumulative effects not only to those directly involved but also the one associated with them. One of the important things to note is that, after the end of this phase the impacts will never be reversible hence irreversible.

iv. Increase in commercial and income generation opportunities

Construction of the proposed project components is anticipated to attract more businesses in a way that create vibrant businesses within project respective areas. Also, it with cause a growth of the existing businesses around the project location. This influx of people and particularly students at the University calling for higher demand of both staff and non-staff in the area will provide an opportunity for local people to engage in some sort of business activities that will enable them to get more income compared to the previous time in which most of them depended on agriculture and farming as their only source of income.

This impact will be high and will be a long-term impact in the sense that even at the end of the phase the created income generation opportunities will leave the lives of the beneficiaries improved in one way or another. Furthermore, the impact will be pilling up with cumulative effects not only to those directly involved but also the one associated with them. One of the important things to note is that, after the end of this phase the impacts will never be reversible hence irreversible.

v. Changes in lifestyle and quality of life

It is expected that, the increase in employment opportunities both formal and informal will result to the rise of high wages among the population in the areas as well as the surrounding communities. This is likelihood to increase their expenditure and consequently alter their living standard. This will also have a multiplier effect in the communities that the workers come from, as they will for example be able to pay for school fees as well as buy assets. Apart from that, the influx of people in the area will result to an increased number of people with mixed culture hence easy to alter or influence the same to undergo some changes that may be positive or negative.

This impact will be high and will be a long-term impact in the sense that even at the end of the phase the new lifestyle developed and improved quality of life will persist. Furthermore, the impact will be pilling up with cumulative effects not only to those directly involved but also the one associated with them. One of the important things to note is that, after the end of this phase the impacts will never be reversible hence irreversible.

vi. Increased skills and impart knowledge

As noted above, the operation phase of the University will train up to 300 students in different phase till its full capacity of new theatre. In addition to that, there will potentially be training opportunities or practical learning for local people who will be employed in the project particularly staff and non-staff during this phase and consequently acquire necessary skills that will be of paramount important in their lives. During operation, the university will offer some short courses to help people to acquire necessary skills used to perform their daily activities. This will enable them to improve their economic activities which will lead to higher income and hence improvement of their living standards. The impact will be high, and will affect the entire nation as well as education system and will be a long-term impact in the sense that even at the end of the phase the new skills and knowledge acquired will be necessary in improving their own life as well as contributing to the development of the nation. Furthermore, the impact will be pilling up with cumulative effects not only to those directly involved but also the one associated with them. One of the important things to note is that, after the end of this phase the impacts will never be reversible hence irreversible and will have residual impacts.

vii. Increased income to local suppliers and service providers

The Population of Tunguu village is expected to increase in the next few years as a result of the project construction. During operation, the project is expecting to employ more staffs and enrol more students from different part of the country. Therefore, the area will be having more people than before. The change in population level due to influx of workers and labours will contribute to the new market opportunities for small, middle and big business persons. This will increase money circulation at the area leading to high income to the local suppliers and service providers. This impact will be moderate and will be a long-term impact in the sense that even at the end of the phase the life for the local suppliers and service providers will remain improved.

viii. Increased land values

Upon commencement of the operation activities for SUZA will change the land status at Tunguu area, Central district, as well as the land at surrounding villages. Land owners have the understanding that the project will cause their land to add value and therefore they have to plan for it and obtain title deeds. The title deeds will help them to obtain loans from financial institutions, which will use for different purposes like; improving their houses, paying for health services, education services etc. adding value to the land and the same will have a sustainable effect to the people in the local area. This positive impact arising from this will be high and long-term. Furthermore, the impact will be pilling up with cumulative effects not only to those directly involved but also the one associated with them in the local area. One of the important things to note is that, after the end of this phase the impacts will never be reversible hence irreversible and will have a residual impact.

ix. Other related positive Impacts

- An additional positive impact of the proposed SUZA project will involve; and aesthetic value and improve easy flow of natural air as part of the design criteria which could be taken as among the positive environmental impacts.
- An improvement of amenities/ landscaping or overall greening, proper waste management, and health and safety and improved due to project implementation.

6.5.1.2 Negative Social Impacts

i. increased pressure on social services and utilities

Residences in the project area and surrounding communities do not have sufficient social and infrastructural services provided to them such as in the areas of health, education electricity and water. In view of this, the influx of people in the project area will increase pressure on the already limited social infrastructure and may without the taking of steps to alleviate this place a heavy additional burden on the existing service delivery system. During the operation phase, it expected that more students and staffs would reside within these communities causing burden and pressure on the available limited social services. The negative impacts arising from this will be high and are likely to affect the entire region surrounding the project area for a long-term. Furthermore, the impact will be pilling up with cumulative effects not only to those directly involved but also the one associated with them in the region. One of the important things to note is that, after the end of this phase the impacts will never be reversible hence irreversible and will have a residual impact.

ii. Increased in level of crimes

It is expected that the operation phase will recruit more staffs and students from the communities around and other from within and outside the country. In addition, the project will attract people from various areas to come and invest the provisions of good and services. The increase in Population increase will stimulate the growth of the trading centres around the project site. Experience and sociological point of view show that where there is a big concentration of people from various backgrounds and behaviour, levels of crimes and changes in norms and behaviour are common. This is also likely to be the case of the trading centres around the project sites and other nearby areas. These impacts will be negative in nature at a high level and will be moderate, and are likely to affect the entire region surrounding the project area for a long-term. One of the important things to note is that, after the end of this phase the impacts will be reversible in the sense that SUZA in cooperation with local authorities and police force may set up strategies to reduce and combat crimes.

iii. Food Insecurity

The stakeholders that were involved in this study have raised their concerns about shortage of food that may arise at the project site due to influx of employees, students and investors causing pressure on available areas for sources of food. In our focus group discussion with village council members, they argued that the development of this project would likely to attract many people to come and settle in their villages increasing demand of foods and services. This is likely to cause a lot of chaos and inflation of prices on goods and services including food services. These negative impacts arising from this will be high and are likely to affect the entire region surrounding the project area for a long-term. Furthermore, the impact will be pilling up with cumulative effects not only to those directly involved but also the one associated with them in the region. One of the important things to note is that, after the end of this phase the impacts will be reversible as relevant strategies may be employed to reduce the state of food insecurity.

iv. Increased traffic flow and increased risks of road

During the operation, some activities that may rise in endangering the lives of the community members living close to those activities. This in turn will likely to endanger the lives of the local communities in form of accidents if appropriate measures are not taken. In the areas. On the transportation of raw materials and students as well as different individuals to the site, drivers may fail to observe safety measures along the road something that may result to accidents to other road users like pedestrian, motorcyclist, and *bodaboda* drivers. The increased congestion of people and vehicles at the project site as stated above will cause multiple routes on the roads and sea. The multiple routes of vehicles will increase the chances of roads accidents. This may cause loss of people lives that can lead to misunderstanding between local people and their government. This impact will be high, and will be a long-term impact in the sense that at the end of this phase all the risks will die natural death. Furthermore, the impact will not be pilling up and no cumulative effects may be witnessed at the end of this phase. One of the important things to note is that, after the end of this phase the impacts will never be reversible hence irreversible and will have a residual impact.

v. Increased Incidences of Diseases and ill-health

This is applied to ESS2 and ESS4. It is predicted that an influx of students and employees from different part of the country other parts of Tanzania and neighbouring regions will increase interaction, consequently increasing the chances of spreading of sexually transmitted diseases (STDs), HIV/AIDS infections, COVID-19 and other communicable diseases. That, the growth of trading canters in the area will attract different businesses and different people to the extent that the level of prostitution will also increase in the area provided that there will be employees from other areas of the country. Increased prevalence of communicable diseases like HIV/AIDS will likely to happen and consequently result to the increased number of orphans and single parenting in the project area as well as increased level of communicable diseases. This impact will be high and will be a long-term impact. Furthermore, the impact will not be pilling up and no cumulative effects may be witnessed at the end of this phase. One of the important things to note is that, after the end of this phase the impacts will be reversible in the sense that some strategies may be employed to reduce or control the transmission of communicable diseases.

vi. Price inflation of goods and services

Residences in the project area and surrounding communities do not have sufficient social and infrastructural services provided to them such as in the areas of health, education and water. In view of this, the influx of people in the project area will increase pressure on the already limited social infrastructure and may without the taking of steps to alleviate this place a heavy additional burden on the existing service delivery system. The high demand on goods and services by the increased number of people at the project site will lead to the price inflation of goods and services, which will result to failure of some members of the community to buy or access the social services.

During the operation phase it expected that more students and employees of SUZA would resides within these communities' causing inflation of goods and services. These negative impacts arising from this will be high and are likely to affect the local communities for a long-term. Furthermore, the impact will be pilling up with cumulative effects not only to those directly involved but also the one associated within the area. One of the important things to note is that, after the end of this phase the impacts will never be reversible hence irreversible and will have a residual impact.

vii. Increased incidence of GBV/SEA/SH

Normally, the alike project is likely to cause high-risk environment for GBV affecting community members, workers and service users as stated in ESS2 and ESS4. Students in particular female students are at risk of SEA/SH while participating in studies. This can include expectations of sexual favours in return for grades, sexual assault, verbal sexual harassment amongst others. SEA/SH may affect students and teachers and perpetrators can also include faculty staff, other students and none faculty staff. The identification of SEA/SH risks during operation will be considered further as part of the GBV Action Plan.
Moreover, GBV risks can intensify within local communities when there are large influxes of male workers from outside the area. Such workers often come without their families and have large disposable incomes relative to the local community, and can pose a risk in terms of sexual harassment, violence and exploitative transactional relationships. These risks are higher where workers come into close contact with the local community, for example on access routes or when living together in remote areas. Addressing gender-based violence in construction projects improves workers' physical and emotional wellbeing and strengthens occupational health and safety; also builds relationships and social license to operate in communities. This negative impact arising from this will be high and are likely to affect the local communities for a mid-term. Furthermore, the impact will be pilling up with cumulative effects not only to those directly involved but also the one associated within the area. One of the important things to note is that, after the end of this phase the impacts will be reversible hence, no residual impacts.

viii. Change in social values and ethics

During operation phase of the project new people from different places of the country and outside the country will be employed and live at the project site. People with different values and ethics will have to live together with the local communities. In this case it is expected that the local community will have a lot to learn from the people. If the introduced values and ethics will not be good according to the local, national and international standards then the local community will be impacted negatively. Once the community is affected at the project site, the effects will soon be felt at the local and national levels.

During the operation phase it is expected that more students and employees of SUZA will reside within these communities causing change in social values and ethics. These negative impacts arising from this will be high and are likely to affect the local communities for a long-term. Furthermore, the impact will be pilling up with cumulative effects not only to those directly involved but also the one associated within the area. One of the important things to note is that, after the end of this phase the impacts will never be reversible hence irreversible and will have a residual impact.

ix. Health and safety 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 a fire are fuel (combustible substance), heat and oxygen. Some chemicals used in laboratories and training workshops may also cause fire eruption if not handled appropriately. Unless all three are present fire will not occur. Fire can cause the following effects:

i. Loss of lives;
ii. Serious Injuries;
iii. Loss of properties etc.

This impact is moderate, local and will be long term.

6.5.2 Potential Bio-physical Environmental Impacts

The impact has been assessed in accordance to ESS 3 and ESS6. The applicability of this ESS is established during the environmental and social assessment described in ESS1. The measures will be proportionate to the risks and impacts associated with the project and consistent with GIIP, in the first instance the EHSGs

6.5.2.1 Negative Impacts

x. Impacts on surface and ground water quality

This pollution will be mainly a result of sanitation system (Septic tank system) that will be used during project operation. This is due to the fact the proposed project will increase number of students with time. Onsite sanitation systems always cause groundwater pollution due to infiltration of the effluent during disposal. Also, surface water is at risk of pollution due to drainage of contaminated impervious surfaces. In this case, the main pollutants include solid matters, floating and macro waste, heavy metals and organic matters. During the rainy season, the surface waters will drain the pollutants directly towards the natural discharge system if the project does not envisage pre- treatment of rain water. Thus, the risk of water degradation is assessed as important, which may have an indirect impact on the water table too.

This impact is assessed to be regional scale and medium. The significance of the impact is high and irreversible.

xi. Increased runoff/storm water

Development of the propose site, including construction of structures and paved areas will significantly reduce surface area for storm water infiltration and uptake by plants. The vegetation covers of the site of which 30% will be cleared to provide adequate space for physical facilities. The increased surface runoff could potentially accelerate soil erosion and increase sediment transfer and pollution load to the drainage systems and ocean environment. *This impact is of moderate significance, local scale and of long term. The impact is reversible with proper mitigation; however, it is cumulative in nature.*

xii. Contribution to Climate Changes during the operation phase

The operation of the proposed buildings will contribute to Climate change in terms of emissions from energy (use electric appliances, utilisation of biomass/ electricity in cooking); transportation (emissions from diesel and petrol vehicles) and waste management (i.e. CH_4 emission from waste decomposition, CO_2 from waste burners) sectors. There will also be minor emission of hydrocarbons from printing devices. The IFS guidelines on GHGs emissions recognise this sector as major contributors to climate change.

The production of greenhouse gases has long-term consequences on a planetary level. This impact is considered of high significance, long term and of international concern. Further the impact is irreversible, has cumulative impacts (baseline indicated that waste burning is common practices, thus potential for GHG emissions) and has residual impacts.

xiii. Impacts/risks associated with generation of solid waste during operation phase

Operation of the proposed buildings will result in generation of solid wastes, including paper wastes, plastics, rubbish yard wastes, floor sweepings etc. there will also be food wastes from operation in the kitchens and dining areas, food packaging materials and containers.

- Food waste is highly putrescible, and will decompose within few hours, producing foul smells that will attract scavenger organisms, flies and other disease vectors.
- Haphazard disposal of solid waste will be a threat to public health. Scavenger animals can spread the waste to the nearby community areas, and result in eruption of diseases, especially those transmitted by flies and rodents.
- Solid wastes, if they end up in water ways, will block water flow, and interfere the local hydrology.
- The disposal of waste material will be done in the designated waste dump. This has high potential for land contamination by the wastes and leachate (during the rain seasons).

Another impact is on air quality and Climate Change in case waste is burned. Burning of solid waste (which is a common practice in the project areas, due to lack of coordinated waste management services) will result in emission pf greenhouse gases, hence have impacts on local air quality and contribute to the global climate change.

The significance of this impact is high, the scale of impact is local, and medium term. The impact is irreversible, and has cumulative effects.

xiv. Impacts/Risks of liquid waste generation during operation phase

Significant amount of wastewater will be generated from toilets, and laboratory areas. At peak, the theatre will have about 300 people. High volumes of wastes water will be generated and treated onsite before disposal in accumulatively. Improper management of wastewater has a number of impacts/risks as listed hereunder;

- Human wastes (faeces and urine) are rich in pathogens, bacteria and nutrients. If not properly disposed can contaminate food (via flies). When deposited in open land, it can contaminate soils and surface runoff, which will eventually contaminate surface water and ground water. Exposure to contaminated food or water can result into many health problems, including disease outbreaks (i.e. diarrhoea, typhoid and cholera).
- Domestic wastewater is rich in nutrients, hence can cause eutrophication of receiving water bodies;
- Oils and grease in silage, if not separated, removed and treated can cause toxicity in aquatic environment;
- Chemicals in soap detergents can cause toxicity in soil and aquatic organisms;
- Contamination of land and water resources could potentially contaminate the food chain

This impact will be felt locally, but in case of Sea Water contamination, the impact is rated at regional level and of medium term. *The significance of the impact is high. The impact is reversible and has cumulative impacts.*

xv. Generation of Hazardous waste during the operation phase

During the operation phase of the project, hazardous wastes will be generated from laboratory activities, involving the use of chemicals; oils, lubricants and containers, and

contaminated rugs from the training workshop; cut materials (plastics, metals and similar) etc. Hazardous wastes will be generated from the health care facility (i.e. infection wastes, sharp objects, and chemicals). Table 6.8 provides a summary of impacts from various waste types and their associated risks/impacts is presented hereunder

Table 6. 6: Waste types and associated risks

HAZARDOUS WASTE TYPE	IMPACTS/RISKS
Medical Waste generated in the health care facilities	Health-care waste contains potentially harmful microorganisms that can ready infect any exposed person. Some wastes may include drug-resistant microorganisms which may spread from the campus into the environment. Risks and adverse health impacts associated with exposure may include: ▪ Infectious medical waste can cause disease in humans either through direct contact or indirectly by contamination of soil, ground or surface water and air. ▪ Accidents: sharps-inflicted injuries; ▪ Health impacts associated with toxic exposure to pharmaceutical products, in particular, antibiotics and cytotoxic drugs; Further, haphazard burning of medical waste may cause air pollution and health problem associated with inhalation of toxic substances such as mercury gas or dioxins.
Waste Batteries (Single batteries, reachable batteries and automotive batteries)	Most rechargeable batteries contain toxic metals such as ***cadmium, cobalt, lead, nickel, lithium etc***. Improper disposal of batteries may contribute to water and air pollution. When depleted batteries are thrown into the environment, they decay and leak the toxic metals. As batteries corrode, their chemicals soak into soil and contaminate soils, groundwater and surface water. ▪ Leached toxic materials released into the environment may poison food chain and pose serious threats to human health and the environment. ▪ If burned haphazardly, toxic fumes are produced. Long term exposures to the toxic fumes may result to chronic illness, including damage to the respiratory system. ▪ Most heavy metals in the batteries are known ***carcinogens*** i.e. exposure may lead to cancer development.
E-waste (Used/old/ damaged electronic devices including printer, photocopies. Lab equipment, workshop electronic equipment, gadgets etc	E-waste contains a list of chemicals that are harmful to people and the environment, like: mercury, lead, beryllium, brominated flame retardants, and cadmium. When electronics are mishandled during disposal, these chemicals may leach out and end up in soil oils, where it can be washed away with runoff, and contaminate soils, water, and air. • The open-air burning releases toxic fumes, while acid baths leach toxic materials leaching into the environment. • The most dangerous property of heavy metals is their toxicity and tendency to accumulate in the environment. Highly toxic substances such as mercury, lead, beryllium, and cadmium can accumulate in bio water, in plants and animal tissues and pose a significant threat to the environment even in minute quantities Heavy metals.

	Impacts on Climate Change: Failing to recycle e-waste means more primary raw materials need to be extracted and refined, which might lead to an increase in greenhouse gas emissions.
Plastics	Plastics are non-biodegradable. When haphazardly dumped in the environment, it may take up to 1,000 years to decompose, leaching potentially toxic substances into the soil and water. Further, haphazard disposal of plastics on land and open-air burning can lead to the release of toxic chemicals into the air causing public health hazards. ▪ Contamination of water resources: Chlorinated plastic can release harmful chemicals into soils & water resources, and eventually contaminate food chain (micro plastics have been found in soils, water and aquatic organisms) and cause toxic effects.

The scale of this impact is regional. The duration of the impact is long term during the operation phase of the proposed buildings. The significance of the impact is high, requiring sophisticated mitigation measures, as provided in local and international guidelines i.e. the World Bank ESSs. However, with application of the mitigation measures the impact revised. The impact will be cumulative, and will have residual impacts.

6.6 Potential Impacts during Decommissioning Phase

6.6.1 Potential Social impacts

6.6.1.1 Negative impacts

i. Loss of employment and business opportunities

People employed by the project will lose their jobs. This will have significant impact on these people and their families. Other dependents of the project, such as suppliers of various services (e.g. security and cleaning companies) and goods (such as food stuff and stationaries) will lose the business opportunities. Also, SUZA will lose revenue in case of the decommissioning of the project, the revenue generated will cease.

This impact is considered negative, long term and of moderate significance. This impact is high, local and will be moderate term.

ii. Loss of Revenue to Institutions and the Government

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

6.6.2 Potential Bio-physical Environmental Impacts

6.6.2.1 Negative Impacts

i. Land pollution and loss of aesthetic

In the event that decommission of the proposed buildings involve demolition of structures, there is a risk that improper waste management could contaminate land (soils and water resources). This has been assessed and predicted as per ESS3. In case demolition waste is left scattered, it will destroy the aesthetic values of the area, and its neighbouring environment. Abandoned waste management facilities (septic tanks, wetland could

potentially become a breeding area for diesel causing vector, that could transmit infectious disease to the neighbouring community.
The significance of the impact is high. The spatial scale of the impact regional and its duration will be short term.

ii. Generation Demolition waste materials

The Decommissioning of the proposed buildings will generate demolition wastes that are heterogeneous mixtures of building materials such as aggregate, concrete, wood, paper, metal, insulation, and glass that are usually contaminated with paints, fasteners, adhesives, wall coverings, insulation, and dirt. Due to the complex composition of demolition waste, its haphazard disposal on the environment could have deleterious effects. For example, metals, paints when exposed to wet environment can potential release toxic ions (through leaching), thus altering the soils chemistry, and contaminating water resources and the food chain. Other components such plastics and glass are non-decomposable, thus can remain in the environment for years. The waste if improper placed will become a safety hazard.
The significance of this impact is high. The scale of impact is local, and short term. The impact is reversible, and will have cumulative and residual impacts.

iii. Air pollution resulting from demolition works

Demolition activities will potentially generate dusts and other air pollutants. Dust will emanate from gridding, drilling on concrete works, from moving, loading and off-loading of construction materials. Dust will have impacts on the aesthetic value of the area, impair plants photosynthesis and possibly impair visibility. Inhalation of fine particulates (PM) may cause health hazards to receptors (demolition workers).
The significance of this impact is low, of local scale and short term.

iv. Noise pollution from demolishing works

Demolition activities are typically associated with noise levels above the standards. The main noise receptors will be the demolition force and neighbouring community. Noise is nowadays considered a public health concern. Impacts of noise could be physical (such as hearing loss) and psychological (such as frustration and nuisance).
The impact of noise is considered local, of medium significance, short term but could be irreversible.

v. Loss of revenue to institutions and the government

As discussed above both town and Central government will be receiving revenue from the project. In case of the decommissioning of the project, the revenue generated will cease and hence the revenue base of local and central governments will shrink. This impact is high, local and will be long term.

6.7 Cumulative impacts

Cumulative impacts are incremental changes caused by the project together with other presently on-going, or reasonably foreseeable future planned actions/projects within the Project Area. Cumulative impacts act with others in such a way that the sum is greater than the parts. The project will have both positive and negative cumulative impacts during its implementation. The nature of cumulative impacts can be both short term in nature (restricted to the construction phase) and medium term (occurring in both the construction and operation phases). This subsection presents cumulative impacts of the proposed projects

at SUZA, Tunguu campus. The mitigation measures to either prevent or minimise risks related to potential cumulative impacts have been provided in chapter seven.

6.7.1 Cumulative Socio-Economic Impacts

6.7.1.1 Positive Cumulative Socio-Economic Impacts

The proposed construction of the new teaching theatres, and laboratories are likely to have positive impacts during project implementation. The proposed project shall modify the existing Tunguu settlement due to introduction of the state-of-the-art buildings. The project shall enhance the available social services by introducing the health services and education facilities hence contributing to government efforts in providing health and education services to the people. Further, the presence of the SUZA buildings shall increase employment opportunities, increase of income generation activities, changes in life style, and the increase in skills to local community more that the present status.

6.7.1.2 Negative Cumulative Socio-Economic Impacts

The establishment of the proposed project shall attract are students, vendors, and staff from different social backgrounds. The increased number of people will cumulatively increase the impacts of social interactions between students/ staff/vendors and visitors at the campus with local community. Such impacts may include cumulative increase in communicable diseases (HIV/AIDS and other STDs as well as COVID-19 outbreak) and cumulative increase in theft, conflicts, traffic flow, crimes and other security issues.

6.7.2 Cumulative Impacts on Bio-physical Environmental

6.7.2.1 Incremental noise and air pollution

The main sources of noise and air emissions at SUZA are traffic, vehicle movements and standby power generators. The proposed project shall definitely contribute to increase traffic flow within the campus, both during construction and operation. The proposed infrastructure shall be provided with standby power generators as power supply back in case of electricity shortage. These shall cumulatively increase noise levels and exhaust gasses emissions within the University Campus.

6.7.2.2 Greenhouse Gas Emissions and Climate Change

Greenhouse gas emissions have a major influence on climate. Naturally occurring greenhouse gases such as Carbon dioxide (CO_2), Methane (CH4), Nitrous oxide (N2O) and Ozone (O3) play a key role in trapping the sun's heat, thereby maintaining the earth's temperature range necessary for life. Project implementation activities contribute to greenhouse gas emissions through the use of equipment, plants and vehicles during the construction phase. Also, the electricity use is associated with greenhouse gas emissions; since the electricity generation is met by hydropower and thermal generation plant. On the other hand, the increasing vegetation clearance during construction and operation phase reduces Carbon sequestration potential, hence reducing efforts towards climate change mitigation.

6.7.2.3 Acceleration of soil erosion and loss of biodiversity

The proposed project area and the surrounding community have land parcels having affected by erosion due to transportation, agricultural and livestock keeping activities. On the other hand, the biodiversity at the proposed site is already disturbed. The proposed project shall

increase the effect of soil erosion through storm water generation and disturbance of soil material. Thus, the introduction of the new building and infrastructure shall lead to more soil erosion, more loss of biodiversity and associated ecosystem services. In addition, the presence of buildings shall attract land developments which will further intensify the soil erosion and biodiversity loss as well. Theses shall cause cumulative siltation to nearby water bodies and ecosystem services loss.

6.7.2.4 Cumulative impacts of liquid and solid waste generation

The implementation of proposed project shall generate solid and liquid wastes (both hazardous and non-hazardous). The future developments around the proposed site inclined by the presence of the campus shall attract people resulting to cumulative increase in liquid and solid waste generation within and around the campus. If not well controlled, they will lead to land and water pollution, and consequently impacting the public health.

CHAPTER SEVEN

7 CONSIDERATION OF ALTERNATIVES AND RATIONALE OF THE PROJECT

7.1 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 construction materials and alternative roofing materials. These are explained hereunder;

7.1.1 No project alternative

The no project alternative entails retaining the current status quo SUZA site area. Adopting the No Project alternative, this option would mean avoiding the predicted negative impacts of the project implementation, and missing the predicted positive impacts of the project. The HEET project at SUZA 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. It is clear that identified impacts associated with project implementation are mostly temporary, and shorter, and are manageable at the campus level.

7.1.2 Alternative Site

The options to use alternative sites for this project within the same villages can be considered. As presented in Chapter 2 of this report, the proposed structures will be located within SUZA in Tunguu taking into account the sustainability of education sector in Zanzibar along with mission and vision of the State University of Zanzibar. The option of utilising 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;

- The site is owned by State University of Zanzibar (No need to buy a new piece of land);
- The selected area is compatible with the land use
- The site is located on a favourable piece of land; large area with a clear view
- The site is well served with road network and it is easily accessible to public transport; and
- Availability of water and electricity mains supply.

7.1.3 Alternative Energy Sources

The main source of energy for SUZA is Electricity, supplied by the ZECO through national grid. For the proposed infrastructure, the University can consider four alternative sources of energy namely; electricity, diesel power generators, compressed natural gas (CNG) 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 utilise 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 power outages.
- ***Alternative three - Compressed Natural Gas (CNG):*** The University can consider the use of CNG, especially in the laboratories. CNG is the cleanest gas, thus its utilisation would reduce environmental pollution.
- ***Alternative four - Solar energy****:* the last alternative consideration is 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 four 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. Provisions will be made for installing solar panels and connections to CNG in the future. 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.

7.1.4 Water supply Alternative

- ***Alternative one: Water Supply (Groundwater extraction) from the operating water utility Authority***

The Zanzibar Water Authority (ZAWA) is the leading water supplier in the Zanzibar. This is the option considered to be appropriate as the water supply network is near the proposed site, and therefore can guarantee reliable, clean and safe water supply to the proposed SUZA.

- ***Alternative three: 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 ZAWA and rain water harvesting.*
ZAWA water although relatively expensive, it is of most reliable quality. Therefore, ZAWA water will be used for domestic purposes and in the running of laboratory. Rainwater will be used for cleaning and gardens maintenance but shall be complemented by ZAWA water.

7.1.5 Liquid waste Management Alternatives

Five alternatives were considered for liquid waste management, namely stabilization ponds/lagoons; use of up-flow anaerobic sludge blanket (UASB); constructed treatment wetland; septic tank - soakaway system; and direct discharge to the sewer system.

- **Alternative one: Use of stabilization ponds/lagoons**

This refers to the use of a series of ponds/lagoons, which allow biological processes to treat the wastewater to meet effluent quality standards. This method requires a large surface area

on the ground, to facilitate natural treatment (degradation). This option has two major fall-backs:

i) It requires large space and is incompatible with the SUZA master plan
ii) The open ponds will attract scavenger birds and animals to feed into the wastewater. The scavengers will create anaesthetically conditions at the site.
iii) Generation of foul smells from the degradation of wastewater in the lagoons/ponds.

- **Alternative two: Connection existing wastewater treatment plants**

Another alternative considered is connecting to One Up-flow Anaerobic Sludge Blanket (UASB). The system allows recovery of energy from the waste, in terms of sludge, biogas and nutrients rich water effluents. Further, the plant has many other advantages. It will be used for research and experiments; and it generates energy (biogas, manure, and nutrient rich effluent water) that could be used at the university, and save costs.

- **Alternative three: Constructed treatment wetland**

The University considered adoption of constructed wetlands, which are engineered system designed and constructed to copy natural processes taking place in the natural wetlands. Constructed wetlands remove pollutants in wastewater through the combination of physical, biological and chemical processes. They are either subsurface flow where the flow is below the surface of soil or surface flow where the flow of wastewater is above the soil. This alternative is feasible compared to waste stabilization ponds /lagoons given the space available for the proposed project.

- **Alternative four: Use of septic tank and soak pits systems**

This involves the construction of underground tanks for treatment of sludge and is connected to soak pits for disposal of effluent. It is less expensive to construct though regular emptying in large discharge points is required. Septic tanks and soak pits demand little space compared to other options.

- **Alternative five: Discharge direct to the sewer system**

There is no sewerage system in vicinity of the site. This is not feasible and it will cost a lot to make it available.

Conclusion: analysis of the five-alternative showed that alternatives two (Up-flow Anaerobic Sludge Blanket (UASB)) and four (Use of septic tank and soak pits systems) are the most favourable. However, the developer will deploy into septic tank systems. The construction of the infrastructure will include construction of onsite septic tank and soak ways systems for immediate use, and later construct a sewer line, to convey wastewater to treatment facilities.

7.1.6 Solid Waste Management Alternatives

The proposed project will generate a considerable large amount of solid waste from theatre, and laboratories. The University has considered two alternatives namely;

i) Collection and transportation to Kibele landfill for disposal
ii) Collection, sorting, resource recovery and transportation of remaining waste to Kibele final disposal

Alternative i: Alternative one will involve transportation of huge amounts of waste to the dumpsite. Since solid waste management is a service and doesn't generate any revenue, such practice will become a burden to the University. The generated amount will require at least one trip per day to Kibele landfill. Therefore, alternative one was abandoned.

Alternative ii: alternative two will involve integrated solid waste management; where by management will start with:

- Efforts to reduce waste generation:
- Waste segregation and sorting into degradable and non-degradable; and recyclables and non-recyclables.
- Waste recycling: at this stage, all recyclables wastes will be collected and untied in research work within the campus or sold to recycles (includes papers and plastic containers).
- Degradable wastes will be utilised in existing research activities such as composting, biogas generation and maggot production. Staff collect a small amount of food waste as animal feed.
- The remaining non-decomposable and no recyclables will be stored on site in constructed chambers, before it is transported to final disposal.

7.1.7 Alternatives building materials

It is estimated that building materials account for more than 60% of the total building cost, therefore, the selection of affordable building materials cannot be overemphasized.
The University looked into a variety of building materials for different aspects of the proposed infrastructures. Architects consulted with structural engineers on the load-bearing capabilities of available materials. Five common materials namely *concrete, steel, wood, masonry and stone* were considered as briefly described hereunder:

Concrete: Concrete is a composite material made from fine and coarse aggregates, bonded together with cement. Its versatility, cost and strength make it the ideal material for building foundations. It is most preferred since it can carry heavy load and withstand harsh environmental conditions.

Steel: Steel is a metal alloy of iron and carbon and often-other alloying material in its composition to make it stronger and more fracture-resistant than iron. Because it is so strong compared to its weight and size, structural engineers use it for the structural framework of tall modern buildings and large industrial facilities.

Wood: Among the oldest, or perhaps *the* oldest, of building materials, wood has been used for thousands of years and has properties that make it an ideal building material—even in the days of engineered and synthetic materials.

Stones: The longest lasting building material available is the one that's been here for thousands of years: stone. In fact, the most ancient of buildings still in existence in the world are made of stone, like the Stone Town Buildings in Zanzibar.

Brick: Construction that uses individual units (such as bricks or blocks) to build structures that are usually bound together by some kind of mortar. The strongest and most commonly used masonry unit is a concrete block, which may be reinforced with steel. Glass, brick, and stone can all be used in a masonry structure.

Conclusion: A team of Architects and Engineers evaluates these based on criteria such as *strength, weight and durability*, which would make it right for various uses; compatibility with National standards and testing methods that govern the use of building materials in the construction industry; consideration for structural integrity and cost and aesthetics. The University shall opt to use a combination of materials except brick/masonry.

7.1.8 Alternatives roofing materials

Roofing is a crucial part of the building construction. Every construction requires a stable and strong roof and should have the ability to protect the structure from natural conditions. The University considered various options in terms of roofing materials, among these coated *aluminium roofing sheets* and *clay roofing tiles*. The two materials were evaluated based on costs, availability, whether resistance, longevity, flexibility and corrosion resistance.

Conclusion: Although roofing tiles scored, more points in terms of whether resistance, longevity and resistance to corrosion, they found to be more expensive that aluminium roofing (i.e. per square meter). Aluminium roofing sheets scored more point on capital costs, flexibility and less labour-intensive during installation. Therefore, the University opted to use corrugates aluminium sheets for roofing.

CHAPTER EIGHT

8 MITIGATION MEASURES AND ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

8.1 Impact Management plan

An ESMP consists of the set of mitigation, monitoring, and institutional measures to be taken during implementation and operation of a project to eliminate adverse environmental and social risks and impacts, offset them, or reduce them to acceptable levels. The ESMP also includes the measures and actions needed to implement these measures.

Furthermore, the ESMP intends to complement the project ESIA and ensure that commitments made by the proponent to minimize project-related environmental and social impacts are upheld throughout the entire project area and the project phases.

As part of their ongoing commitment to excellence in environmental and social performance for the proposed project, the developer will ensure to:

- Fulfil environmental and social conditions associated with project approvals;
- Develop, promote and foster a shared sense of responsibility for the environmental and social performance of the project;
- Promote environmental awareness and understanding among employees and contractors through training, identification of roles and responsibilities towards environmental and social management and linking project performance to overall environmental performance;
- Encourage an understanding of social and cultural sensitivities in local communities and the importance of minimizing project impacts on local lifestyles and culture;
- Monitor environmental and social performance throughout the project and implement an adaptive management approach to continuous improvement;
- Work with local communities and project-affected stakeholders to ensure that they benefit as a result of project development; and
- Maintain an ongoing commitment to informing, engaging and involving all the stakeholders throughout all phases of the project.

This ESMP has been prepared under the requirements of the World Bank Environmental and Social Standards (ESS1), Zanzibar Environment Management Act 2015 and ZEMA Regulations.

8.2 Roles and Responsibilities for Implementation of ESMP

The implementation of SUZA Project will continue to use existing staff structures and government systems. The key implementers will be MoEST/MoEVT through Project Implementing Unit (PIU) and selection institutions (Figure 8-1).

The responsibility for environmental conservation and protection measures for the Program lies with the project proponent, the Contractor and the Health, Safety and Environment (HSE) Manager. Further policy, legal and technical support may be elicited from the ZEMA to reinforce the established ESMP Plan.

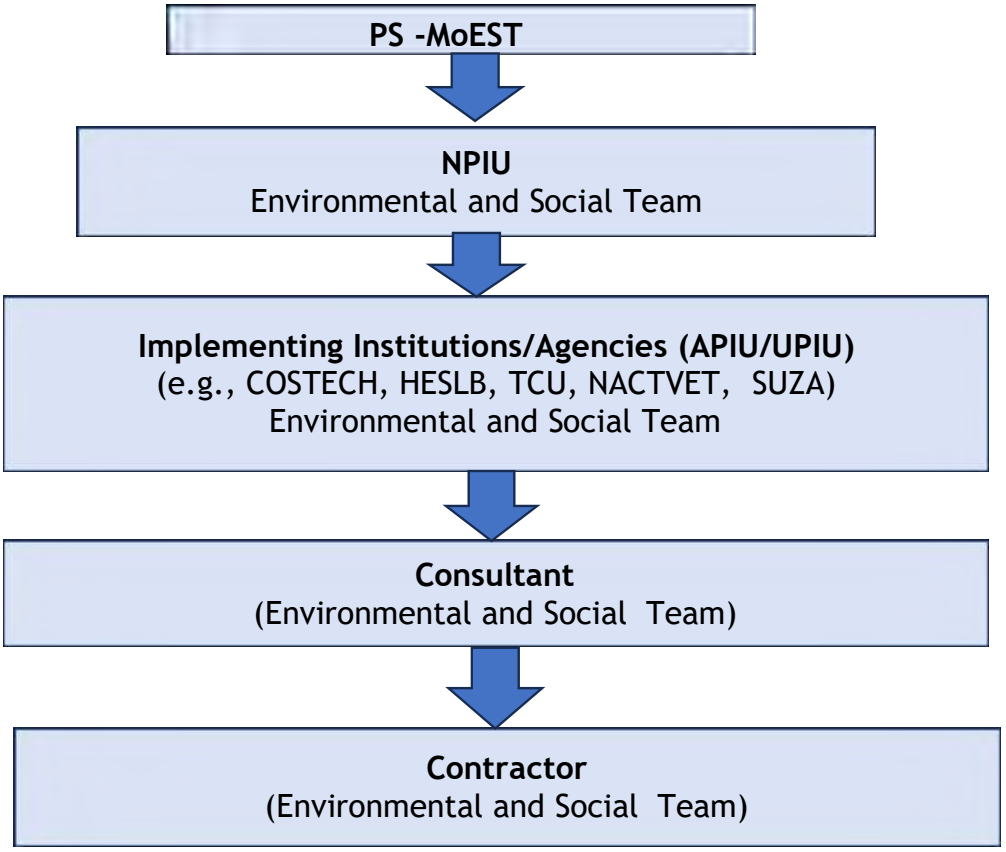

Figure 8. 1: Environmental and Social Management Organization Chart (SUZA ESMF, 2023)

Table 8. 1: Roles and responsibilities of key parties for EMP implementation

Institution	Overall Responsibilities	
Client/SUZA	Is responsible for the overall implementation, administration and enforcement of the recommendations of the ESIA and the ESMP Report.	• Ensure that the ESMP provisions are included in tender documents issued for construction work and activities on site and shall monitor/enforce that the Tenderers/Contractors abides by the specifications. • Coordinating the implementation of the ESMP of proposed projects. • Holding monthly coordination meetings on safeguard implementation with the PIU specialists and preparing meeting minutes that summarise progress, issues, and good practices. • Receiving safeguard compliance quarterly reports and preparing annual environmental progress reports. • Conducting training for institutional capacity building. • Provide ZEMA with reports on environmental and social compliance as part of their annual progress reports and annual environmental monitoring reports. • Report to World Bank on the status of safeguard matters through submission of annual progress reports.
Ministry of Education, Science and Technology:	Will be responsible for the overall management of project activities, providing overall coordination and technical support to SUZA project. The MoEST has established a dedicated Project Implementing Unit considered to be at the national level (NPIU) consisting of its own personnel for the implementation of the proposed SUZA project under HEET.	NPIU specific roles and responsibilities in implementing the HEET project include: • Overall responsibility; • Project planning and budgeting: including overseeing development of sub-project concept, subproject design, sub-projects ESIA, RAP preparation. • Review of plans and budgets • Approval of plans and budgets • Procurement of services of Contractors/ Consultants • Project implementation • Supervision of implementation, monitoring and reporting • Review of project implementation reports • Reporting to MoEST

Participating and Beneficiary Institutions	TCU, HELSB, COSTECH, NACTE, and SUZA will take the primary responsibility of implementing own sub-projects including fiduciary, environmental and social standards, and reporting requirements and are termed as Agency Project Implementing Unit (APIU) and University Project Implementing Unit (UPIU) for universities.	The MoEST/MoEVT will continue to take responsibility of planning and overseeing implementation of prioritized and approved urban upgrading infrastructure.
Project's Local Authorities	The local authorities are crucial for successful implementation of ESMP once some of the mitigation measures are better undertaken by local communities with the support of the local government authorities. It is therefore important that District Council be involved in the implementation of ESMPs (through the PIU environmental and social specialists and City's Environmental Management Officers). The PIU environmental specialist has the responsibility to oversee and monitor adherence to, and implementation of ESMP by the Contractors (which includes compliance with the relevant obligations contained in the ESMPs).	Specifically, District Council's authority's responsibilities include the following: - • Visit and inspect major project site regularly. • To ascertain the level of compliance of works and report back environmental issues. • Maintain inspection reports on files. • Working with the Resident Engineers who have day-to-day interaction through supervisory staff; • Ensures the Contractor/s have all plans, procedures, approvals, and documentation in place to ensure ESMP compliance prior to commencement of any work. • Verifying Environmental compliance and issuing of penalties for contraventions of the ESMPs. • Ordering the removal of person(s) and/or equipment not complying with the ESMP specifications. • Taking decisions in case severe non- compliances to the ESMPs are detected; • Providing input for internal review of the ESMPs. • Stopping works in case of emergency or if significant environmental impacts are apparent or imminent. • Monitoring and verifying that environmental impacts are kept to minimum.

Contractor	The Contractor will be responsible for construction works and ensuring compliance with ESMP requirements. The Contractor shall appoint a Site Engineer.	Contractor shall: - • Ensure that the environmental and social specifications of the ESIA and ESMP (including any revisions, additions or amendments) are effectively implemented. • Notify ZAWA, ZECO Fire Brigades and Engineers immediately, in the event of any accidental infringements of the environmental requirements to enable appropriate remedial action to be taken. • Notify ZAWA, ZECO Fire Brigades and Engineers and other relevant agencies and Engineer, at least ten working days in advance, of any activity he has reasons to believe that may have significant negative impacts, so that mitigation measures are implemented accordingly • Ensure environmental awareness among his/her employees and subcontractors so that they are fully aware of, and understand the environmental and social requirements and the need for them. • Report and record all accidents and incidents resulting in major injuries or death; • Inform ZAWA, ZECO Fire Brigades and other relevant agencies of problems arising when implementing the ESMP and ways of improving the ESMP. • Undertake rehabilitation of all areas affected by construction activities in order to restore them to their original state, as determined by the Engineer. • Undertake the required works within the designated working areas.
Construction Supervision Consultant	The Supervision Consultant will be appointed by Client/proponent and will be responsible for monitoring and supervision of the construction works including implementation of ESMP. The Supervision Consultant will appoint a Resident Engineer. For supervision and monitoring of the implementation of ESMP throughout the construction phase, the implementing agency can engage an Independent Environmental	Supervision activities will comprise: - • Environmental compliance and monitoring, including checking, verifying and validating the overall environmental performance of the project through regular audits, inspection and review of project submissions. Monitoring activities by the resident engineer will comprise: - • Visual observation during site inspection carried out at the same time as the engineering supervision activities. • Site inspections that will take place with emphasis on early identification of any environmental problems and the initiation of suitable remedial action.

	Consultant.	• Where remedial actions have been required on the part of the Contractor, further checks will need to be made to ensure that these are actually being implemented to the agreed schedule and in the required form.
Central District Council Committee/ Grievance Committee	Central District Council committee will support respective project's districts in organizing and implementing the compensation, assistance, and resettlement.	• Overseeing update of project. • Overseeing/monitoring implementation of project including compensation payments. • Implement public disclosure, consultation and participation. • Handling grievance issues and keeping records. • Quarterly reporting to project`s authorities. • Liaise with ward-level grievance desks.

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 SUZA UPIU.

8.2.1 SUZA HEET Project Implementing Unit

SUZA has selected qualified professional from its staff that will be responsible to oversee day to day activities during implementation of the proposed HEET project. The team comprises different area of expertise such as ICT expert, Construction specialist, administration specialist etc. for the purpose of oversee the social and environmental issues during implementation of the proposed HEET project, SUZA has included Social Safeguard expert and Environmental Safeguard specialist in the team. The table 8-2 shows the list of SUZA HEET implementing team and their roles and responsibilities toward the project.

Table 8. 2: SUZA HEET project Implementing Unit

10	Name and Position	Qualification	Experiences	Responsibility
1	Dr Hashim Hamza Chande Project Coordinator	PhD in Agriculture Extension and Education	One-year Project coordinator to response to COVID-19 pandemic SUZA, one and half year Head of Center for Digital Learning (CDL) SUZA, Two years Subject Project Lead (ICT) of ZISP at SUZA, two years Project Coordinator of Urea Molasses Mult-nutrient Block (UMMB) – MALE, two years M&E and communication focal person on Climate Smart Agriculture USAID – MANR, one-year National Consultant - IT Specialist (FAO) in the Project of Support to the Aquaculture Subsector of Zanzibar, one-year National	Coordination and supervision of overall implementation of the Project on behalf of the Vice Chancellor. Serves as Chairperson of PIU meetings in overseeing project execution and manage project financial and other resources.

			Consultant - Social Communication Expert (FAO) in the formulation of the Zanzibar Food Security and Nutrition Social Communication Strategy.	
2	Dr Haji Ali Haji Assistant Project Coordinator	PhD in Computer Science	Dean – SCOPE at SUZA, two years ICT Expert for Development of ICT Books for Secondary and advanced education Subjects in Tanzania, five years e-learning expert in Erasmus+ project EEISHEA, four years ICT expert in Geospatial and ICT Capacities in Tanzania HEIs (Geo-ICT), three years e-learning expert in BSU III, three years Team leader in STEDPEA (AI for DRR), three years Curriculum Developer and Master Trainer – ICT Team on Enhancing the Quality of Secondary School Education through a teaching Math, Science, and English subjects in secondary school in Zanzibar	Serve as a Project Executive Officer with overall responsibility of daily administration of project implementation. Serves as an IPSC meetings and works closely with the Project Coordinator in overseeing the project execution.
3	Mr Shaaban Hassan Haji Project Administrator	MSc in Project Management, Monitoring and Evaluation	10 years national project coordinator in Key Population Project, three months project manager in	Serve as an administrative officer with overall responsibility of assisting project coordination activities, manages schedules, and ensures project deliverables are

			Environmental Health project	completed on time and within budget.
4	Dr Khamis Othman Amour Curriculum/Programs Review and Development	PhD in Physics	Five years member in DALILA project, one-year HoD of Natural Sciences at SUZA	Responsible for coordination and providing technical support and advice regarding curriculum review and development activities.
5	Dr Sara Abdalla Khamis Private Sector Engagement Specialist	PhD in Applied Mathematics and Computer Science and Engineering	Three years master trainer ZISP project, five years member in DALILA project, four years HoD Natural Sciences department at SUZA	Responsible for coordination of implementation of activities under the strengthening linkage with industry. Support the establishment of the IACs and staff attachments in industry.
6	Ms Fatma Ali Kombo Capacity Building Focal Person	MSc in Human Resource Management	Four years as Director of Human Resources at SUZA, five years as administrative office at SUZA	Overall coordination of the long-term and short-term training offered under the HEET Project.
7	Eng Ali Omar Ali Infrastructure Development Specialist	Master Degree in Civil engineering	Head, Department of Property and Services – SUZA, five years' experience of supervision of constructions	Responsible for coordination, technical support, and advice regarding civil works activities implemented under the HEET Project at SUZA. Ensure safe working procedures and practices in construction are undertaken following the set standards.
8	Ms Mwanamrisho Gora Haji Gender and Inclusive Education Specialist	Master of Education in Youth, Gender and Development	Head, department of Educational Foundation – SUZA, Two years Chief Block teaching practice (DEFIL), three years team member of ZISP project, project member NOZA project	Responsible for coordination, technical support and advice regarding gender, inclusivity and anti-sexual harassment in all HEET Project activities. Ensures that various project documents are gender sensitive.
9	Dr Layla Ali Salum Environmental Development Specialist	PhD in climate change and sustainable development	Member of International Association for Impact Assessment (IAIA) since 2010. Also, have fourteen years'	Responsible for coordination, technical support and advice regarding environmental safeguards of the HEET Project activities. Provides comprehensive technical

			experience of teaching EIA and environmental sustainability courses. Five years' experience practicing EIA as an Independent consultant registered at ZEMA.	support including preparation of various environmental safeguard issues.
10	Mr Abdulrahman Mustafa Nahoda Social Development Specialist	Master of Public Administration	Fourteen years development studies lecturer, two years as head of the department of social science, one year grievance handling officer, and six years senior human resource.	Responsible for coordination, technical support, and advice regarding social safeguards of the HEET Project activities. Provides comprehensive technical support including preparation of various social safeguard issues.
11	Mr Khalfan Salim Suleiman Monitoring and Evaluation Specialist	MBA (Finance)	Three years Chief trainer in M&E in South region in Tanzania, 7 years M&E specialist in MACEMP project, six months M&E coordinator in ZGF CCM, six months M&E coordinator in TASAF	Responsible for coordination, technical support and advice on M&E of the HEET Project. Serve as a chairperson of the Monitoring, Evaluation and Lessons Learned (MELL) Committees.
12	Ms Khadija Mzee Rajab Financial Management Specialist	MSc in Finance	7 years financial controller in Institutional Support project for Good Governance (SGG), one-year financial manager BIGZ project, four years project accountant UNFPA	Responsible for managing, providing financial support and advice on financial management for HEET project.
13	Mr Juma Pembe Juma Procurement Specialist	Bachelor in Procurement and Logistics Management	Six years Procurement officer at SUZA	Responsible for coordination, provide technical support and advice on procurement activities of the HEET Project.
14	Dr Omar Haji Kombo Technology and Digital Infrastructure Specialist	PhD in Internet of Things (IoT) – Wireless and Intelligent	Head, Department of Computer science, one-year facilitator of IoT workshop	Responsible for coordination, provide technical support and advice on the implementation of the activities related to ICT infrastructure, e-learning and

		Sensor Networking		management Information Systems (MIS).
15	Mr Salum Simba Salum Communications Specialist	Bachelor in Mass Communication	Three years communication specialist at SUZA	Responsible for coordination, provide technical support and advice communication issues of the HEET Project.

8.3 Capacity Development and Training

8.3.1Training

All employees of the contractor will be provided with basic training on social, environmental, occupational health and safety, labour and security issues. In addition, specialist training will be provided for key personnel involved in different activities such as the separation, storage, transportation and treatment of waste.

Also, during Construction the Environmental expert of the supervision team will conduct on-job training for other Staff. This will strengthen them in participating in the implementation of the action plans (AP). The project will set a budget for this purpose. The environmental expert will design and deliver the environmental training packages. The training will aim to establish good auditing procedures, identify ways in which to successfully implement the ESMP and continually improve environmental performance. The scope of the training would include;

- Weekly EHS toolbox talks;
- Environmental auditing;
- Non-conformance and emergency response procedures;
- Continual performance review and improvement; and
- Document control

8.3.2Awareness and Education

The Contractor should encourage environmental awareness among his foremen before and during implementation of the project. The education will include:

- Provide copies of the EMP and discuss its contents with all construction foremen
- Discuss techniques and answer questions about erosion and pollution control at regular site safety meetings
- Demonstrate proper housekeeping methods
- Inform the foremen of actions to take in the event of spill of hazardous materials (oil, fuel, and concrete)
- Post sign at key locations reminding foremen how to properly store construction materials, handle and dispose of toxic wastes, dispose of wash water, and similar instructions

- Remind foremen of fines, penalties that may be levied against the project by the local permitting agencies control environmental destruction is not adhered to.
- The main Contractor must be aware that he/she is responsible for education and informing all Sub-Contractors (if any).

8.4 Implementation Schedule and Cost Estimates

The principal environmental cost includes the cost of implementing the mitigation measures proposed and that of carrying out monitoring of specific environmental parameters. The costs of the environmental supervisor shall be included in the overall supervision cost of the works. These costs are indicated in Table 9-3. The implementing agency shall cover all the costs proposed in the ESMP.

It should be noted that most of the costs for mitigation measures are included in the bills of quantities of the overall works according to Standard Specification for construction works. Annual costs include all costs which shall be incurred every year during construction and operation phase (i.e mitigation of dust, water pollution etc). One-time costs are costs that are incurred only once, especially before construction start (i.e. Preparation of various plans). These costs have prepared based on consultant's expert judgement and best practice from other projects of similar nature.

The ESMP enforces the WB-ESF and is compatible with its ESSs. As the Bank requirements, the proposed project will apply the ESSs throughout the project life cycle except ESS 7 and ESS 9 which are not relevant to the project. To manage environmental and social risks and impacts, the development opportunities are enhanced.

8.5 Environmental auditing

It is recommended that environmental audits to determine the long-term effects of adopted mitigation measures to be carried out on the project as part of the on-going maintenance Programme. External HSE and social audits will be carried out periodically to assess whether the ESMP implementation has been undertaken according to planned arrangements and that the ESMP itself is being maintained and updated as appropriate. The audit should confirm that identified corrective actions have been undertaken and then assess the effectiveness of such actions.

8.6 Environmental and Social Cost

The principal environmental and social cost includes the cost for implementing the mitigation measures proposed. These costs are indicated in Table 8.3. SUZA- UPIU shall cover all the costs proposed in the ESMP. The methodology used to come up with environmental and social management cost based on the assumptions that the environmental systems management and monitoring as well as the training programs that will be held in SUZA. Other human resources are anticipated to come from other part of Tanzania that require travel allowance and accommodation, others will be coming from institutions, within the Zanzibar and other at local levels

Table 8. 3: Commitments and obligation by the project proponent and the contractor

Information from project proponent and the contractor on Environmental and Social Management Plan for the proposed School of Agriculture, student Hostel and Laboratory project in the State University of Zanzibar		
	SUZA	**Project Contractors**
Before the construction begins.	Shall ensure that: - -Key environmental information, environmental management and environmental audit systems are included in their overall project. -The Contractor is provided with details of commitments made in the ESIA report for the implementation of the ESMP. This includes pollution prevention, community harmony, and the overall obligations towards conservation and protection of the biodiversity. -In addition to the overall Environmental Act for Zanzibar, the Contractor is provided with a copy of the ESIA Report and the commitment in ESMP including a budgeted action plan. -Contractors are provided with details on Institutional Stakeholder and Public Consultations feedback so that they understand and address the socioeconomic and environmental concerns of the surroundings. -A post-ESIA Review meet with the Project Manager or a person handling Environment on behalf is organized. -All certified clearances from the Government of Zanzibar including approval, licensing, and certification from ZEMA, ZAWA, ZECO, Fire Brigade, Ministry responsible for Lands, OSHA, Local Councils, Building Permits, Ministry of Health, etc are secured and ready when requested by authorities.	Should ensure that: - -They are fully aware of and are under obligation to comply with their environmental conservation duty under the approved ESMP in this ESIA report. -All plans and preparations are in place and in line with the ESMP to allow the construction to take place as planned. -All necessary equipment and consumables for the implementation of the ESMP are available; and so, to allow environmental requirements to be fulfilled by all parties involved. -Project Monitoring Plan has been produced and implemented under HSE process including project specific ESMP. -All relevant stakeholders with geographical jurisdiction in the project site areas have been contacted for sustained collaboration towards the implementation of ESMP. (e.g. Shehia, District, Local Councils). -Only licensed and recognized solid/hazardous waste disposal contractors are engaged.
During the construction process.	-Project Contractors implement environmental act and regulations of Zanzibar and are updated with respect to any new environmental and social issues in the areas. This will include submission of internal and external environmental audit reports to ZEMA under HSE and ESMP obligations.	Sub- contractors and staff are updated with respect to any new environmental issues in the areas. This will include submission of internal and external environmental audit reports under the obligations that have been laid down in the HSE and ESMP procedures; and that the ESMP is implemented by sub-

	-The ESMP is implemented by the contractors.	contractors and staff. The ESMP will be monitored and verified by ZEMA -Periodic meetings with ZEMA on the implementation of the ESMP and other HSE obligations are held.

Table 8. 4: Environmental and Social Management Plan for the proposed establishment of SUZA HEET project

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Monitoring frequency	Relative cost (TZS)
Social Impacts - Preparatory phase					
Community health and safety risks	• The contractor shall carefully abide to World Bank ESHS Guideline, ESS2 and ESS4 • Ensure 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; • Institute traffic management and safety programme including, training and testing of heavy vehicles operators and drivers, enforcement of speed limits, maximum loading restrictions and compliance with all Tanzania transportation law and standards; • Awareness campaigns /Education on HIV and STDs shall be provided to workers; • Appropriate working gear (such as nose, ear and mouth mask and clothing) and good construction site management shall be provided; • During construction, the contractor shall ensure that the construction site is fenced and hygienically kept with adequate provision of facilities including waste disposal receptacles, sewage, firefighting and clean and safe water supply; • 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; • Develop and implement an emergency plan including spill response; • Training all contractor staff in emergency planning and spill response; and • Developing a detailed health and safety plan and training all contractor staff on the plan.	SUZA and the Contractor	Preparatory phase	Monthly; as per IEC plan.	5,500,000
Damage to Cultural Heritage	• Contractor shall report in any observable cultural features found during earth works. • Engagement with local leaders and communities to understand the location of locally important cultural heritage • Once cultural/human remains or archaeological materials are found during foundation excavation the contractor will be responsible to protect them and report on any archaeological findings to the Director of Antiquities and the relevant Local Government Authorities.	SUZA and the Contractor	Preparatory phase	Once	-

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Monitoring frequency	Relative cost (TZS)
	• The compliance of ESS8 and Antiquities Act of 1964 and its amendment of 1979 and the Antiquities Rules of 1991 govern archaeological research in Tanzania is required.				
Bio-physical Impacts					
Risk of buildings/structural designs to have potential to generate emergency/disaster events	• Geotechnical studies, Environmental and social impact assessment studies, master plans and feasibility studies have been done by competent professionals to ascertain the project risks hazard profile of the site • Structural elements of a project have been designed and constructed by competent professionals, and certified or approved by competent authorities or professionals. The Structural design have been also taken into account the climate change considerations, as appropriate. • The new building and structures will be accessed by members of the public, the SUZA will consider the incremental risks of the public's potential exposure to operational accidents or natural hazards, including extreme weather events. Where technically and financially feasible, SUZA will apply the concept of universal access to the design and construction of such new building and structures • The project involves provision of services to communities, SUZA will establish and implement appropriate quality management systems to anticipate and minimize risks and impacts that such services may have on community health and safety. In such circumstances, SUZA will also apply the concept of universal access, where technically and financially feasible • SUZA will conduct a risk hazard assessment (RHA) to projects having potential to generate emergency events, as part of the ESS1 Compliance	SUZA and the Contractor	Preparatory phase	Daily	15,000,000
Change of natural habitats Loss of biodiversity a	• The Contractor shall ensure that, the World Bank ESHS Guideline, and ESS6 is highly observed and complied • Clearance of patches of native forest remaining in the neighbourhood of the proposed project components shall be avoided; • Close supervision of earthworks shall be observed in order to confine land clearance within the project site; • Appropriate landscaping programme to help in re-vegetation of part of the project area after construction shall be designed and implemented, • Minimize the cutting or clearing of vegetation to extent possible	SUZA and the Contractor	Preparatory phase	Quarterly	5,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Monitoring frequency	Relative cost (TZS)
Loss/reduction of ecosystem services	• Appropriate landscaping programme to help in re-vegetation of part of the project area after construction shall be designed and implemented. • The Contractor shall ensure that, the ESS6 is highly observed and complied				5,000,000
Acceleration of soil erosion	• Compliance to ESS3 is required • Construction will be done as per engineering design and procedure of which a maximum requirement of compaction strength is achieved during the construction. • Maintain gravel fill and/or re-vegetate around the structures; • Unnecessary ground clearance and sensitive re-alignments shall be avoided; • Directing flow to properly designated channels; • All excavation works shall be properly backfilled and compacted • Most of construction activities will be done during dry weather; • Mulching to stabilize exposed areas; • Designing channels and ditches for post-construction flows • Lining steep channel and slopes (e.g. use jute matting) and • Reducing or preventing off-site sediment transport through use of settlement ponds, silt fences, and water treatment, and modifying or suspending activities during extreme rainfall and high winds to the extent practical.	SUZA and the Contractor	Construction phase	Quarterly monitoring and Verification Report	2,500,000
Loss of Landscape and scenic view	• Appropriate landscaping programme to help in re-vegetation of part of the project area after construction • Light pollution can be reduced by keeping lighting (e.g. of parking lots) to the minimum levels needed for safety, • Observe the ESS 3 and ESS6	SUZA and the Contractor	Construction phase	Quarterly monitoring and Verification Report	3,000,000
Land pollution from solid waste generation	• The contractor shall comply with the ESS 3 • No, on site burial or open burning of solid waste shall be permitted; • Wastes not suitable for incinerations and general municipal waste damping (e.g. Batteries, plastics, rubbers, tyres, etc.) shall be removed for recycling, treatment, and/or disposal by licensed contractor as appropriate; and • Materials that cannot be reused shall be sent to Kibele landfill • To reduce the cost of the project, much of the excavated soil and rubble materials will be	SUZA and the Contractor	Preparatory phase	Daily	3,500,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Monitoring frequency	Relative cost (TZS)
	reused as initial filling materials where levelling of runway, taxiway and apron is required;				
Impacts on surface and ground water quality from wastes	• The contractor shall comply with the ESS 3 • Efficient collection and disposal system based on the principles of reduction, re- use and recycling of materials, shall be instituted at project areas; • No, on site burial or open burning of solid waste shall be permitted; • Wastes not suitable for incinerations and general municipal waste damping (e.g. Batteries, plastics, rubbers, tyres, etc.) shall be removed for recycling, treatment, and/or disposal by licensed contractor as appropriate; and • Introduction of waste disposal bins, warning notices, posted at strategic points; • The contractor shall prepare methodologies for handling hazardous waste such as oils, lubricants and non-combustible waste during bidding process and ensure their compliance during project execution.	SUZA and the Contractor	Preparatory phase	Daily	3,500,000
Exploitation of Borrow Pits/Quarries and Other Natural Resources	• Exploitation of construction materials will be from the authorized source only; • Restoration of the borrow pits/quarries after use constituting levelling the area and seeding or planting of trees and/or grasses will be done in association with local government (natural resources department) and local environmental NGOs. If appropriate the levelled area will be left for natural re-vegetation; • Re-use of the excavated soils and demolition rubbles as part of the sub- base material; • Construction of underground water reserve tank and introducing rainwater harvest system; and • SUZA shall use additional technically feasible water conservation measures, the use of alternative water supplies, water consumption offsets to maintain total demand for water resources within the available supply, and evaluation of alternative project locations. • Extraction of underground water resources. • The contractor shall comply with the WB-EHSGs and ESS3 to optimize energy usage, to the extent technically and financially feasible	SUZA and the Contractor	Preparatory phase	Daily	10,000,000
Sub-total during preparatory phase					**53,000,000**
Construction Phase					
Negative Social Impact					
Increased pressure on social services	• There to WB-EHSGs and ESS 3 to optimize energy usage, to the extent technically and financially feasible ▪ Limit the number of unskilled workers recruited from outside project area	SUZA and the Contractor	Construction Phase	Quarterly monitoring and	5,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Monitoring frequency	Relative cost (TZS)
	▪ Provide First Aid Facilities on site. ▪ Explore alternative sources of domestic water, such as rainwater harvesting. ▪ Link to mandated structures to support improvement of social and infrastructural services in villages at the project area. • Duty to the community requirement may be applied to justify the construction of new social services infrastructures or cooperate with local structures to strengthen the existing social services infrastructures			Verification Report	
Increased level of crimes	• Contractor shall ensure effective security throughout the project period • Central District to strengthen security services by provision of more police stations/posts. • Establish community-based security in collaboration with village/ward leaders. • The contractor shall establish his own security to protect his properties and should establish community policing to support insufficient police force. • The community should be encouraged to participate in security matters by providing information on suspects • The cooperation of local people together will help to lessen theft incidents and maintain security of people and their properties.	SUZA and the Contractor	Construction phase	Daily	1,000,000
Food Insecurity	• Ensure compliance to ESS3 • Encourage traders to supply food and other products to the project area. • Sensitization of the surrounding communities in order to make them aware of the employment and hence income generating opportunities with the proposed project. • Provide more avenues for service providers e.g. cafeteria and restaurants	SUZA and the Contractor	Construction phase	Daily	500,000
Occupational Health and Safety Community Health – Accidents and Injury	• The contractor shall ensure compliance to ESS2 and ESS4 • Implementing good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths • The contractor shall ensure WB ESHS guidelines is well complied • GBV, SEA and sexual harassment training before working on the Project which will be provided by the Community Social Officers from the LGA and on the Child and Gender desk of the police. This will include information on the GBV reporting mechanisms. • The contractor shall adhere to WB ESS 2, ESS 3, ESS 6:	SUZA and the Contractor	Construction phase	Daily	2,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Monitoring frequency	Relative cost (TZS)
Community Health – Communicable Disease Transmission	• Institute good site practices including preventing public access to the construction site by securing equipment and demarcating project boundaries using warning signs with appropriate text (local language) and graphic displays. • Institute traffic management and safety programme including, training and testing of heavy vehicles operators and drivers, enforcement of speed limits, maximum loading restrictions and compliance with all Tanzania transportation law and standards. • Awareness campaigns/education on HIV and STDs shall be provided to workers and the community. • Low-skilled workers will be hired around the project jurisdiction if necessary, to reduce the population of foreigners. • Protect stockpiles of friable material subject to wind through wetting. • Cover loads with friable material during transportation. • Contractors will be provided with signage on issues such as HIV/AIDS, GBV etc which will be posted at worksites. • Contractors/workers will attend education sessions on disease transmission notably HIV/AIDS, and malaria and will implement the control measures needed to protect public health. • Contractors/workers will ensure good housekeeping arrangements on-site to avoid creating breeding grounds for rodents and insects which can spread diseases. • Contractors will ensure access to potable water for all workers. • Contractors will be required to abide by national law about vehicle conditions and movements and behaviour of drivers. • Signage will be erected at construction sites to advise the community of the dangers of entering the site and appropriate barricades (fencing, tape etc) will be put in place, especially around quarries, trenches, etc				
Community Safety–Social Conflict	• Maintain good security in the area with signage like “No employment at the moment”, to keep away job seeker to avoid unnecessary people in project sites • Local workers will be hired to the extent possible to minimise influx • Workers will be required to sign worker codes of conduct. • Contractors will need as part of their C-ESMP to include camp management requirements • Ensure that all stakeholders are aware of the grievance redress mechanism and have access to the same. • Contractor shall adhere to the GBV Action to prevent and respond to project related GBV	SUZA and the Contractor	Construction phase	Daily	1,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Monitoring frequency	Relative cost (TZS)
	risks associated with the community. • The PIU will ensure that contractor (i) make reasonable inquiries to verify that the direct or contracted workers retained to provide security are not implicated in past abuses; (ii) train them adequately (or determine that they are properly trained) in the use of force, and appropriate conduct toward workers and affected communities; and (iii) require them to act within the applicable laws of Tanzania.				
Labour and Working Conditions	• The contractor shall careful abide ESS2 and comply with SUZA Project-Labour Management Procedures to guide the employment of all workers. • Contractors will be required as part of the bidding documents to develop camp management plans and codes of conduct for workers, • The contractor shall ensure he/she prioritizes the employment to the local, unemployed yet willing to work hard, manpower to the extent viable subject to a maximum of 50% unskilled labour. This will ensure that local people are more benefited out of the project; • All workers will have contracts with terms and conditions that are consistent with national labour laws and policies as well as ESS2. • Workers will have access to a specific worker grievance mechanism in line with ESS2, which will be documented in the LMP. • Contractors will be required to apply equal opportunities/ non- discrimination to the employment of workers and not discriminate on the basis of gender or any other personal characteristics. • Contractors will be required to ensure that no children are employed on the site and have in place measures to verify the age of workers. Child under 14 are prohibited from working while children aged 14-18 can only take on light work (which generally excludes work on construction sites). • All workers must have an employment contract, be paid for their work and have the right to resign if they wish. Forced labour will be explicitly prohibited. • Selection of companies in the supply chain will involve due diligence to avoid the use of companies which are involved in child labour. • The contractor shall comply and put into action the GBV Action Plan that includes prevention and response measures. This will include codes of conduct, training and capacity building, awareness raising, access to referral pathways etc. • A list of GBV service Providers to which GBV survivors will be referred, revisions to the	SUZA and the Contractor	Construction phase	Monthly	10,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Monitoring frequency	Relative cost (TZS)
	GRM to ensure it can address GBV complaints, and information on GBV allegation procedures in the workplace.				
Biophysical Environmental Impact					
Air pollution	***Impairment of air quality due to emissions*** • Clearly observe ESS 3: Resource Efficiency and Pollution Prevention and Management and WB-ESHS Guidelines. • Equipment shall be maintained in good running condition and equipment, which generate excessive black smoke shall not be used; • Enforce vehicle road restrictions to avoid excessive emissions from engine overloading, where practical switching off engines will be done when machines are not in use; • There will be routine inspection of equipment; • Turn off engines to reduce idling. ***Impairment of Air Quality Due to Dust*** • Protect stockpiles of friable material subject to wind through wetting; • Cover loads with friable material during transportation; • Minimizing dust from material handling sources, such as conveyors and bins, by using covers and/or control equipment (water suppression, bag house, or cyclone); • Minimizing dust from open area sources, including storage piles, by using control measures such as installing enclosures and covers, and increasing the moisture content • Dust suppression techniques should be implemented, such as applying water or non-toxic chemicals to minimize dust from vehicle movements • Avoiding open burning of solid • Restrict speed on loose surface roads to 30 km/hr during dry or dusty conditions; and, • Douse with water work sites with loose open soil to reduce dust generation when necessary • Clearly observe ESS 3: Resource Efficiency and Pollution Prevention and Management.	SUZA and the Contractor	Construction phase	Daily	3,000,000
Increased Greenhouse gas generation Contribution to Climate Changes	• Contractor shall observe and adhere to ESS3 Equipment shall be maintained in good running condition and equipment, which generate excessive black smoke shall not be used; • Enforce vehicle road restrictions to avoid excessive emissions from engine overloading, where practical switching off engines will be done when machines are not in use; • There will be routine inspection of equipment; • Turn off engines to reduce idling; and • Green spaces shall be maximized in project areas	SUZA and the Contractor	Construction phase	Daily	5,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Monitoring frequency	Relative cost (TZS)
Increased Noise pollution Increased vibrations	• The contractor shall clearly observe ESS 3: Resource Efficiency and Pollution Prevention and Management, ESS2, ESS4 and WB-ESHS Guidelines. • Avoiding or minimizing project transportation through community areas • Vehicles carrying construction materials shall be restricted to work during day time only; • Machine operators in various sections with significant noise levels shall be provided with noise protective gear; and, • Construction equipment shall be selected, operated and maintained to minimize noise. • SUZA shall include in tenders, employment contracts, subcontractor agreements and work method statements clauses that assure the minimization of noise and compliance with directions from management to minimize noise; • The Contractor shall be required to give preference to the use quieter technology or other mitigation measures rather than lengthening construction; • Regularly train workers and contractors (such as at toolbox talks) to use equipment in ways that minimize noise; • Ensure that site managers periodically check the site, nearby residences and other sensitive receptors for noise problems so that solutions can be quickly applied; • Avoid shouting, and minimize talking loudly and slamming vehicle doors; • Keep truck drivers informed of designated vehicle routes, parking locations, acceptable delivery hours and other relevant practices (e.g. minimizing the use of engine brakes and periods of engine idling). • Impact pile driving shall be avoided where possible in vibration sensitive areas; and, • Vibratory rollers and packers shall be avoided.	SUZA and the Contractor	Construction phase	Daily	5,000,000
Generation of Solid waste	***Municipal Solid wastes*** • The contractor shall have adequate facilities for handling the construction waste; and The contractor shall comply with ESS3 and ESHS guidelines • The contractor shall have adequate facilities for handling the construction waste; and • Topsoil shall be stock piled and used for reclamation or re-vegetation practice at the site during landscaping. • Training on waste management shall be done to all personnel, operators and service providers. • All materials which can be reused shall be reused. • Materials that cannot be reused shall be sent to an authorised dumpsite (Kibele landfill).	SUZA and the Contractor	Construction phase	Daily	15,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Monitoring frequency	Relative cost (TZS)
	• The contractor shall have adequate facilities for segregating, handling and storing the construction waste. ***Hazardous Wastes*** • Hazardous waste such as asbestos will be handled with the designated and registered vendor by Zanzibar Environment Management Authority (ZEMA). • Providing adequate secondary containment for fuel storage tanks and for the temporary storage of other fluids such as lubricating oils and hydraulic fluids, • Using impervious surfaces for refuelling areas and other fluid transfer areas • Training workers on the correct transfer and handling of fuels and chemicals and the response to spills • Providing portable spill containment and clean-up equipment on site and training in the equipment deployment • Assessing the contents of hazardous materials and petroleum-based products in building systems (e.g. PCB containing electrical equipment, asbestos-containing building materials) and process equipment and removing them prior to initiation of decommissioning activities, and managing their treatment and disposal • Assessing the presence of hazardous substances in or on building materials (e.g., polychlorinated biphenyls, asbestos containing flooring or insulation) and decontaminating or properly managing contaminated building materials • All hazardous materials shall be handled by registered personnel/company				
Wastewater Management problems	• The contractor shall comply with ESS3 and ESHS guidelines • Contractor shall be instructed to put in place acceptable procedure for handling hazardous waste such as oils, lubricants and non-combustible waste; • Construction workers shall be provided portable/temporary toilets (portapoty) by contractor; and • Training on waste management shall be done for all personnel, operators and service providers.	SUZA and the Contractor	Construction phase	Daily	750,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Monitoring frequency	Relative cost (TZS)
Soil erosion of exposed surface	• Construction will be done as per engineering design and procedure of which a maximum requirement of compaction strength is achieved during the construction. That is maximum dry density (MDD) specified in the design manual by consultant; • Maintain gravel fill and/or re-vegetate around the structures; • Unnecessary ground clearance and sensitive re-alignments shall be avoided; • Directing flow to properly designated channels; • All excavation works shall be properly backfilled and compacted • Most of construction activities will be done during dry weather; • Mulching to stabilize exposed areas; • Designing channels and ditches for post-construction flows • Lining steep channel and slopes (e.g. use jute matting) and • Reducing or preventing off-site sediment transport through use of settlement ponds, silt fences, and water treatment, and modifying or suspending activities during extreme rainfall and high winds to the extent practical.	SUZA and the Contractor	Construction phase	Monthly	5,000,000
Landscape and Visual Impacts	• Light pollution can be reduced by keeping lighting (e.g. of parking lots) to the minimum levels needed for safety, and through the careful choice of light fixtures such as the use of flat-glass lanterns in car parks; and • Locating parts of the development further away from viewers.	SUZA and the Contractor	Construction phase	Quarterly monitoring and Verification Report	5,000,000
Sub-total during construction phase					**69,500,000**
Operation Phase					
Social Impacts					
Increased pressure on social services/facilities and utilities	• The developer shall be committed to comply with the World Bank ESHS Guideline, and ESS3 • Use of water conservatively by instituting technologies (e.g. self-lock water taps) and awareness raising notices to users, etc.; • Construction of underground water reserve tank and introducing rainwater harvest system; • Link to mandated structures to support improvement of social and infrastructural services at SUZA-and communities adjacent to the project area.	SUZA	Operations Phase	Quarterly and as per verification reports	5,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Monitoring frequency	Relative cost (TZS)
	• Duty to the community requirement may be applied to justify the construction of new social services infrastructures or cooperate with local structures to strengthen the existing social services infrastructures • Extraction of underground water resources; • Alternative measures like use of solar power, drilling a borehole at site, water recycling shall be explored and implemented if found feasible. For instance, use of energy savers bulbs shall be given high priority; and • Use of air conditioning shall be kept to a minimum and maintenance of the cool indoor environment using natural ventilation system shall be strongly explored during the design process.				
Increased level of crimes	• Establish community based security in collaboration with village/ward leaders. • The community should be encouraged to participate in security matters by providing information on suspects • The cooperation of local people together will help to lessen theft incidents and maintain security of people and their properties.	SUZA	Operations Phase	Quarterly and as per verification reports	3,000,000
Food Insecurity and inflation of prices on other social services	• Encourage traders to supply food and other products to the project area. • Sensitization of the surrounding communities in order to make them aware of the employment and hence income generating opportunities with the proposed project. • Provide more avenues for service providers e.g. cafeteria and restaurants	SUZA	Operations Phase	Quarterly and as per verification reports	2,500,000
Increased traffic flow and increased risks of road	• Institute traffic management and safety programme including, training and testing of heavy vehicles operators and drivers, enforcement of speed limits, maximum loading restrictions and compliance with all Tanzania transportation law and standards; • 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; • Reporting mechanisms for the public to register concerns or complaints regarding perceived risks to their health and safety due to the construction operation should be put in place; • Emergency contact details in the event of an accident shall be provided;	SUZA	Operations Phase	Daily	2,500,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Monitoring frequency	Relative cost (TZS)
	• Develop and implement an emergency plan including spill response; • Developing a detailed health and safety plan and training all contractor staff on the plan. • Working with relevant authorities and private stakeholders to make sure that road safety/ferry safety measures are intact and implemented accordingly • Develop and maintain an active rescue plan in collaboration with Fire and Rescues offices for both road and water accidents				
Increased incidences of diseases and ill health	• Developer will adhere to The SUZA will comply with World Bank ESHS GuidelineESS2, ESS3 and ESS4 • A safety, health and environment induction course shall be conducted to all students and workers, putting more emphasis on HIV/AIDS, which has become a national disaster as well as other emerging pandemics such as COVID 19 and dengue fever; • The project shall include information education and communication component (IEC) in its budget. This will help to raise more awareness on HIV/AIDS, and means to suppress its incidence; • Environmental sanitation systems shall be regularly improved; and, • Adequate medical services shall be made available at the University dispensary for meeting the population demand.	SUZA	Operations Phase	Quarterly and as per verification reports	15,000,000
Health and safety risks due to fire hazards	• Developer will adhere to World Bank ESHS Guideline, ESS2, ESS3 and ESS4 • Adequate number of portable fire extinguishers shall be placed at strategic locations; • Good housekeeping shall be maintained at all sites to reduce the fire risk; • The design of buildings shall strictly adhere to the Fire Safety Standards; • Regular fire and other disaster drills and awareness training shall be conducted; • Fire detectors and sprinkler system shall be installed in the buildings; and • The proponent shall insure buildings against fire Hazards. • Install water tanks	SUZA	Operations Phase	Daily	20,000,000
Price inflation of goods and services	• Encourage traders to supply food and other products to the project area. • Sensitization of the surrounding communities in order to make them aware of the employment and hence income generating opportunities with the proposed project. • Provide more avenues for service providers	SUZA	Operations Phase	Quarterly and as per verification reports	-

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Monitoring frequency	Relative cost (TZS)
Increased incidence of GBV/SEA/SH	• The SUZA shall adhere to the GBV action plan, World Bank ESHS Guideline and ESS 2 and ESS4. • The project will prepare a GBV Action Plan that ensures project awareness raising strategy (for workers and community members), a list of GBV service Providers to which GBV survivors will be referred, revisions to the GRM to ensure it can address GBV complaints, and information on GBV allegation procedures in the workplace. • This project will ensure that there is involvement of women in project activities.	SUZA	Operations Phase	Quarterly and as per verification reports	2,500,000
Change in social values and ethics	• Ethical training and discussion will be conducted in collaboration with government and non-government stakeholders	SUZA	Operations Phase	Quarterly and as per verification reports	
Bio-physical Impacts					
Impact on Surface and ground water quality	• The developed Surface Water Quality Program and a Spill Prevention and Response Plan will be used to manage and mitigate the pollution of surface and ground water on the proposed construction site. The ESMP describes the measuring and monitoring activities and tracks actions taken to manage surface and ground water discharges; • Septic tank and soak away shall be designed in such a way waste treatment is achieved by 100% before disposal to the authorised disposal sites; • Minimize oil spillage; • Discharge and treat foul drainage and sewage; and Pass run off through oil interceptors. • The design of storm water drainage will be given a high priority; • Where feasible, rainwater harvesting will be used in proposed project sites to minimise generation of surface runoff; and, • The design shall provide sufficient greenery area for facilitating soil infiltration.	SUZA	Operations Phase	Quarterly and as per verification reports	10,000,000
Increased runoff/storm water	• The design of storm water drainage will be given a high priority; • Where feasible, rainwater harvesting will be used in proposed project sites to minimise generation of surface runoff; and, • The design shall provide sufficient greenery area/ rain gardens for facilitating soil infiltration	SUZA	Operations Phase	Quarterly and as per verification reports	10,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Monitoring frequency	Relative cost (TZS)
	• The developed drainage systems shall be cleaned and restricted from solid wastes disposal to avoid its obstruction and blockage				
Contribution to Climate Changes	• The developer shall be committed to comply with World Bank ESHS Guideline, and ESS3 • To change the consumption behaviour in terms of energy and water • Use of renewable energy technologies to minimize the carbon dioxide emission. • Promote use of natural green space at the campus to increase energy saving • The university shall transform to digital software operated work, in order to minimize paper consumption rates. This will greatly influence the educational standards. And will save a great deal to reduce the amount of forest resources consumed.	SUZA	Operations Phase	Quarterly and as per verification reports	5,000,000
Impacts/risks associated with generation of solid waste	• SUZA-PIU shall provide adequate waste handling facilities such as waste bins for temporarily holding waste before disposal. • A private cleanliness firm with adequate number of staff shall be commissioned to ensure cleanliness. • The skip buckets shall be emptied in authorized landfill twice a week. • All hazardous waste shall be handled by registered authorized dealers recognized by ZEMA	SUZA	Operations Phase	Quarterly and as per verification reports	3,000,000
Impacts/Risks of liquid waste generation	• The SUZA will comply with World Bank ESHS Guideline, and ESS3 in wastewater management • The campus shall have liquid waste to collect the wastewater (sewage) to treatment facilities found at the campus • The collected sewage shall be disposed in septic tank systems before final disposal • Septic tank and soak away pits shall be designed in such a way waste treatment is achieved by 100% before disposal to the authorised disposal sites(UASB); and	SUZA	Operations Phase	Quarterly and as per verification reports	5,000,000
Generation of Hazardous waste	• The SUZA will comply with World Bank ESHS Guideline, and ESS3 in hazardous waste management • No, on-site burial or open burning of hazardous waste shall be permitted. • , and/or disposal by a licensed contractor as appropriate. • There should be proper procedure for handling hazardous waste such as oils, lubricants and non-combustible waste • Wastes not suitable for incineration and general municipal waste dumping (e.g. plastics, rubbers, tires, etc.) shall be removed for recycling, treatment, and/or disposal by a licensed contractor as appropriate.	SUZA	Operations Phase	Quarterly and as per verification reports	2,500,000
Sub-total during Operation phase					**86,000,000**
Decommissioning phase					

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Monitoring frequency	Relative cost (TZS)
Social Impacts					
Loss of employment	• Seminars shall be conducted on alternative means of livelihood after termination of job • Ensure that ESS2 is in place	SUZA and the Contractor	Decommissioning phase	once	5,000,000
Loss of Revenue to Institutions and the Government	• The government must find alternative source of revenues • Strengthening revenue collection mechanisms • Awareness creation for the people in the area on the importance of paying revenues even after the end of this phase and subsequent entering of new phase • Enhanced cooperation between the project and local authorities	Contractors and Supervising Consultant, SUZA PIU; UPIU	Decommissioning phase	once	-
Bio-physical Environmental Impacts					
Land pollution and loss of aesthetic	• The contractor shall adhere to ESS3 and ESS2 and ESS4 • The debris resulting from the demolition will either be transported by a licensed waste transporter for dumping at an approved site or used as base material for new construction work; • All the necessary health and safety measures will be implemented including provision of personal protective equipment such as, safety harnesses, helmets, gloves, respirators, safety shoes, coveralls, goggles and ear protectors; and • Restoration of the affected land will involve the filling in of any open pits and grading the land to its natural contours, then plantingappropriate tree species and under cover vegetation to hold the soil in place and to prevent flooding.	Contractors and Supervising Consultant, SUZA PIU;	Decommissioning phase	quarterly	3.500.000
Air pollution resulting from demolition works	• The contractor shall adhere to ESS3 and ESS2 and ESS4 • In the event of dust generation during decommissioning dust suppressors and blockers will be used such as water and fencing of the site during works to avoid dust from spreading to nearby areas.	Contractors and Supervising Consultant, SUZA PIU;	Decommissioning phase	once	5,000,000
Noise and Vibration	• The contractor shall adhere to ESS3 and ESS2 and ESS4 • Planning activities in consultation with local communities so that activities with the greatest potential to generate noise are planned during periods of the day that will result in least disturbance · • Using noise control devices, such as temporary noise barriers and deflectors for impact and blasting activities, and exhaust muffling devices for combustion engines.	Contractors and Supervising Consultant, SUZA PIU;	Decommissioning phase	Daily	5,000,000

Identified Impact	Mitigation Measure	Responsible Institution	Time of mitigation	Monitoring frequency	Relative cost (TZS)
	• Avoiding or minimizing project transportation through community areas • Water sprinkling shall be applied to open earth to reduce dust emission; • Trucks transporting construction materials shall be covered if the load is dry and prone to dust emissions; • The demolition area shall be fenced with iron sheets; this shall prevent the dust at the ground to be picked up by the wind; • Public notifications shall be sent where appropriate especially in nearby residential areas likely to be impacted by dust; • Construction equipment, with noise sinks, shall be used; • Machine operators in various sections with significant noise levels shall be provided with noise protective gear • Construction equipment shall be selected, operated and maintained to minimize noise				
Sub-total during decommissioning phase					**18,500,000**

8.7 Reporting

Daily inspections will be carried out under the coordination of the environmental and social team formed by the Contractor. Any incident detected during these inspections will be recorded and reported monthly. The World Bank, Ministry of Education, HEET PIU and SUZA-UPIU will be promptly notified of any incident or accident related to the Project which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers including but not limited to; incidents and accidents encountered during construction works, environmental spills, etc.

Sufficient detail will be provided regarding the incident or accident, findings of the Root Cause Analysis (RCA), indicating immediate measures or corrective actions taken or that are planned to be taken to address it, compensation paid, and any information provided by any contractor and supervision consultant, as appropriate. It will be ensured that the incident report is in line with the World Bank's Environment and Social Incidence Response Toolkit (ESIRT). Subsequently, as per the Bank's request, a report on the incident or accident and propose any measures to prevent its recurrence will be prepared.
All events and nonconformities will be reported according to the project standards as described in the ESMP.

8.8 Other Management Plans Proposed project

The Construction Environmental and Social Management Plans (C-ESMP) should be prepared by the contractor for the risks and impacts identified as part of ESIA. The plan should include mitigation measures specific to the risks and impacts and where applicable, sets out the framework for other plans and procedures to be developed later in the Project. Contractor will develop and implement their own detailed site specific ESMPs in reflect to World Bank requirements. Also, the Contractor shall prepare specific Management plans together with the plans recommended in the preliminary ESIA like Site Management Plan (SMP), Sub-contractor/Supplier Management Plan and others as described in the following section. The management plans shall include but not limited to the following;

8.8.1 Gender Based Violence or SEA/SH Related Actions

Gender-based violence is a health, social, human rights, and development issue that transcend class, culture, age, race and religion which affects every community in every corner of world. Globally, it has been estimated that at least one in every three women around the world has been beaten, coerced in to sex, or otherwise abused in her lifetime. The public health implications of this violence are enormous: according to a World Development report, violence-is more serious a cause of death and incapacity among women of reproductive age as cancer, and greater cause of ill-health than traffic accidents and malaria combined. Gender-based violence also diminishes women's abilities to protect themselves against HIV/AIDS. As such, violence against women is both an outcome and an expression of women 's subordinate status in relation to men in societies around the world.

The differences in the roles, responsibilities, opportunities, privileges, expectations, and limitations prescribed to males and to females in any culture are socially constructed, context based, and learned through socialization. They determine many aspects of the relationships between males and females, as well as among females and among males. Although gendered

roles and responsibilities can change over time within and across cultures, they are often deeply rooted in long-standing assumptions societies hold about women, men, boys, and girls. *[Strategic Action Plan to End Gender-based Violence Antigua and Barbuda 2011-2015]*

8.8.1.1 GBV Action Plan Implementation Approach

To reduce the risk of such behaviour taking place in relation to the construction project, the SUZA will review the risks associated with GBV prior to project construction and, if deem necessary, will instruct the Contractor and all its project personnel, including foreign workers and international consultants, to sign codes of conduct.

Mechanisms for reporting offensive incidents and redressing related complaints must accompany these measures and to form part of project monitoring for the developer and the Contractor. The Contractor must review the GNP and the guidelines for a GBV in the WB ESSs. Upon signing, the Contractor, its managers, and all workers will be committed to preventing, reporting and addressing GBV within the work site and in its immediate surrounding communities.

Table 8. 5: Key actions are to be ensured during implementation:

S/N	Key Action to address GBV/SEA/SH Risks	By Whom
1.	• Prepare GBV action Plan and seek Bank approval prior to project mobilization. • Sign Codes of Conduct for Contractor, Managers and other personnel. • Establish GBV Compliance Team; • Respond to GBV events as a matter of priority: Abide to reporting requirements as per Codes of Conduct	Contractor/ Supervisor consultant/SUZA PIU
2.	• Clearly define SEA/SH requirements in Bid-documents and also the requirement for a Code of Conduct which addresses SEA/SH, using Standard WB procurement documents	Contractor/ Supervisor consultant/SUZA PIU
3.	• Operationalize or constitute Internal Complaints Committee as per Prevention of Sexual Harassment at Workplace procedure	Contractor/ Supervisor consultant/SUZA PIU
4.	• Implement appropriate project-level activities such as: separate, safe and easily accessible facilities for women and men in the place of work and the labour camps. (e.g. toilets should be located in separate areas, well-lit) display signs that the project site is an area where SEA/SH is prohibited.	Contractor/GBV Focal Point at PIU/Supervisor Eng./ HSE Officer
5.	• Ensure Codes of Conduct (CoC) are clearly understood and signed by those with a physical presence at the project site; • Train project staff on the behaviour obligations under the CoCs and Disseminate CoCs (including visual illustrations) and discuss with employees and local communities.	Contractor/ Supervisor consultant/SUZA PIU
6.	• Undertake regular Monitoring and Evaluation of progress on SEA/SH prevention and response activities, including reassessment of risks as appropriate.	GBV Focal Point at PIU/Contractor/ supervisor Engineer

Implementation costs would include: preparation of sign boards, posters, conducting of awareness trainings by Implementing Agency, supervising consultant and also by the Contractor.

8.8.2 Recruitment and Local Labour Management Plan

The Labour Management Procedures (LMP) are procedures developed to manage labour risks and their impacts, community health and safety during the planning and implementation of SUZA HEET Project. The LMP identifies main labour requirements and risks associated with the project, and help to determine the resources necessary to address the Project's labour issues. The LMP is in line with national requirements as well as the objectives of the World Bank's ESF. The key ESF standards that trigger the efficiency of LMP include the Labour and Working Conditions (ESS2) and Community Health and Safety (ESS4). During project implementation the contractor shall abide to SUZA labour management plan

8.8.2.1 Project Labour Requirements

During implementation the project will engage/hire and manage different categories of workers in accordance with the laws, regulations, guidelines and the World Bank standards as stipulated in the SUZA LMP. It is expected that the Project will engage the following categories of project workers as shown in Table 8.6.

Table 8. 6: Categories of Project workers

Types of Workers	Hiring Authority	Terms and Conditions	Qualifications	Duties and Responsibilities	Number of Workers
Direct Workers	UPIU	Compliance with Zanzibar Labor Laws, Regulations and code of conduct Work full time and fixed renewable Contract	Well experienced and professional in respective field	Specific tasks and responsibilities as defined in Terms of reference (ToR)	To be determined by specific assignment
Contracted Workers	Respective Contractor	Compliance with Zanzibar Labour Laws, Regulations and code of conduct Compliance with ESS2 and ESS4 of the World Bank Work time will vary by assignment with minimum of 6 month	Skilled, well experienced and professional in respective field	As defined in the contract	To be determined by specific assignment
Primary Supply Workers	Respective Primary Supplier	Compliance with Zanzibar Labour Laws, Regulations and code of conduct Compliance with ESS2 and ESS4 of the World Bank	Skilled and experienced in respective field of works	Provision of relevant goods and services	To be determined by specific assignment

		The Zanzibar Public Procurement and Disposal of Public Assets Act No .11 of 2016			
		World Bank Procurement regulations of November 2020			

i. **Assessment of Key Potential Risks**

During the implementation of the Project, workers will likely be exposed with various potential risks. The identified risks will be mitigated in accordance with Zanzibar Labour laws and regulations and the World Bank standards. The detailed risks and mitigation measures are indicated in the Table 8.7.

Table 8. 7: Potential Risks and Mitigation Measures for labourers

Potential Labour Risk	Descriptions	Mitigation Measure	Responsible Party
Child Labour	Child labour refers to work that deprive children of their childhood, their potential and dignity. It is harmful to physical and mental development.	Enforce laws that set a minimum age for employment and regulate working Conditions.	SUZA and Labour Commission
		Monitor operationalization of the GRM.	
		Contractors and primary suppliers will be required to identify the risk of child labour in their work force andtake the appropriate steps to remedy the situation.	
Forced Labour	All work or services which are exacted from any person under the threat of penalty and for which the person has not offered himself or herself voluntarily. This will result lack of investment in human capital, lower government revenue and depletion of natural resources.	Enforce laws that Regulate forced labour.	SUZA and Labour Commission
		Strengthen labour inspection system.	
		Conduct public awareness campaign to educate stakeholder on dangers of forced labour.	
Exploitation of Workers	Abuse of people in work place or in the office in brutal or much obvious. For example, practices such as underpay workers, confiscation of passport and abusing workers.	Strengthen labour inspection system. UPIU to regulate and monitor recruitment agencies (Contractors and Primary suppliers) to ensure transparency and fairness in recruitment process.	SUZA and Labour Commission
		Ensure both workers and employers comply with existing guidelines which guarantee ethical recruitment practices.	

		Advocate for decent work principles. Operationalize GRM. Ensure the availability of affordable legal assistance. Forster tripartite collective agreement.	
Sexual Exploitation and Abuse / Sexual Harassment	A form of GBV and generally refers to acts perpetrated against beneficiaries of a project by staff, contractors, consultants, workers and partners.	Raise awareness regarding GBV (SEA/SH) and training staff on gender, GBV, SEA and sexual harassment.	SUZA Gender Desk and Department of Social Welfare
		Strengthening GRM for workers and stakeholders on SEA and sexual harassment during project implementation.	
Occupational Safety and Health (OSH)	Deals with the prevention of work-related injuries and diseases as well as the protection and promotion of the health of workers. It aims at the improvement of working conditions and environment.	UPIUs will ensure that all project workers comply with all requirements of occupational and safety health legislation of Zanzibar and the World Bank guidelines on Occupational Safety and Health.	SUZA and Labour Commission, OSH Unit

Brief overview of labour legislation: Occupational health and safety

ii. **Responsible Staff**

Table 8. 8: list of key activities with responsibilities:

S/N	Activity	Responsibility
1	Engagement and management of Contractors	University Project Implementation Unit (UPIU)/ Consulting Eng.
2	Engagement and management of Sub-Contractors	Contractor
3	Occupational Health and Safety (OHS)	Social and Environmental Consultants
4	Training of Workers	E&S expert, Site Engineer and Supervising consultant
5	Addressing worker grievances	Contractor (with oversight by Supervising Consultant)

iii. **Policies and Procedures**

These are listed below under the following sub-headings: i) Incidents and Accident Notification; ii) GBV/SEAH related and iii) Occupational Health and Safety;

i) **OSH risk:** In conformity with OSH requirements as set out in Zanzibar Labour Laws, ESS2, the SUZA HEET Project ESMP and WB standard procurement documents. It requires the contractor to engage qualified OSH staffing and ensure enhancement of workplace OSH awareness and training.

ii) **Incidents and Accident Notifications:** The contractor will promptly notify to the supervising Consultant/SUZA- within 24 hours of any major incident or accident having significant impact on the environment, tangible cultural heritage, communities, the public or workers. They will provide sufficient detail regarding the incident or accident, indicating immediate measures taken to address it, and including information provided by any contractor and supervising entity. Further the SUZA will appraise this to Ministry and WB.

iii) **GBV/SEAH related:** More than 95% of the contract labour is expected to be men, and women's participation as contract labour or community labour is going to be very low. Contractors will need to maintain harmonious relations with local communities by ensuring labourers/workers adhere to Code of conduct (CoC). The CoC commits all persons engaged by the contractor, including sub-contractors and suppliers, to acceptable standards of behaviour.

iv) **Child labour:** Set the minimum age of SUZA HEET project workers eligible for any type for work (including construction work) at 18 years.

v) **Discrimination and exclusion of vulnerable or disadvantaged groups: -** Promote no discrimination and equal opportunity with respect to any aspects of the employment relationship.

vi) **Security risks:** Take appropriate and proportionate security measures to minimize the potential risk to the workers.

Table 8. 9: *on-site safety and GBV risk mitigation measures*

S/N	Action	Timelines
1	Separate, safe and easily accessible facilities for women and men in the place of work and the labour camps. (e.g. toilets should be located in separate areas, well-lit)	Throughout construction period
2	Display signs that the project site is an area where SEA/SH is prohibited.	Throughout construction period
3	Ensure Codes of Conduct are clearly understood and signed by those with a physical presence at the project site;	Upon joining
4	Train project staff on the behaviour obligations under the CoCs and Disseminate CoCs (including visual illustrations) and discuss with employees and local communities.	Periodic; every six months

vii) **Occupational Health and Safety**

Supervising consultant/implementing agency is committed to;

- Complying with legislation and other applicable requirements which relate to the occupational health and safety hazards.
- Enabling active participation in OH&S risks elimination through promotion of appropriate skills, knowledge and attitudes towards hazards.
- Continually improving the OH&S management system and performance.

- Communicating this policy statement to all persons working under the control of Implementing Agency/supervising consultant with emphasis on individual OH&S responsibilities.
- Availing this policy statement to all interested parties

To avoid work related accidents and injuries, the contractor will:

- Provide adequate number of good quality appropriate PPEs – helmets, gum boots, safety belts, safety harness, gloves, overalls, ear plugs, face masks, life jackets, etc.
- provide Training to workers on use of appropriate PPEs and how to respond during emergency
- Display EHS instructions at site
- Make provision of First aid boxes with availability and trained first aiders at site
- Ensure availability of portable fire extinguishers
- Ensure safe handling of welding gas LPG, oxygen or acetylene cylinders.
- Inform of assembly area in the emergency scenario
- Provide adequate number of toilets and arrangement for potable drinking water for all workers.
- Ensure proper disposal of solid waste at designated permitted sites/landfill allocated by Local Government Authority;

Further to enforce the compliance of environmental management, contractors will be responsible and liable for safety of site equipment, labours and daily workers attending to the construction site and safety of citizens for each work site, as mandatory measures.

8.8.3 Occupational Health and Safety Monitoring

OHS compliance monitoring will carried out by designated E&S Expert every month. Contractor will provide compliance in initial report to supervising engineer and thereafter submit a compliance report every three months. Following shall be covered as part of OHS monitoring:

- Health check-up records of workers
- Accident hot spots on transport route, if any
- Training and awareness of labour – OHS, Emergency Management, Use of PPEs
- Identification of hazardous working locations and marking
- Emergency response procedure
- Availability of PPEs – types, numbers
- Accident reporting

8.8.3.1 Communication and Consultation (Workers)

Workers consultation will be regular features. However, this aspect shall be as per consultation process defined under other plans and World Bank ESS4.

Training and Records

Contractor will provide training to all workers before start of work and thereafter every three months. He will maintain training records and share the details with E&S experts of the SUZA project as part of his quarterly progress report. The training should cover the following:

- General awareness about the site, type of works to be carried out and risks involved

- Use of appropriate PPEs for different types of works including dust masks and ear muffs
- Following work instructions for hazardous/risky operations as marked on site
- How to act during emergency including basic rescue operations and accident reporting
- Location of first aid boxes and fire extinguishers and how to use them

8.8.4 Emergency Preparedness and Management Plan

Emergency Preparedness and Management Plan shall be followed as given under WB-ESS2. Emergency Response Plan is to establish an organizational structure and procedures for response to major emergencies. Proper planning, preparation, and timely response to emergencies are the most effective ways to minimize adverse impacts to public health, property, and the environment. This Environmental Emergency Response Plan (EERP) contains the requirements and procedures for environmental emergency planning, preparedness, response, and reporting for operations at the grinding plant. The EERP will be designed to ensure timely identification of emergencies, clearly designate responsibilities, and promote effective response actions, with minimal confusion and disruption of operations.

A detailed Emergency Preparedness Plan (EPP) will be prepared and implemented as part of the construction ESMP. The EPP for Common Hazards and Emergency Situations during construction should be structured as such but not limited to:

- Specific emergency situations.
- An emergency monitoring and response management hierarchy and chain of Command with defined responsibilities for operations personnel.
- Emergency response plans for each type of emergency.
- Notification and reporting requirements for emergencies.

The plan will be comprehensive and is designed as an active reference for operations personnel during the life of the lead operation.

1. Objective

To plan for, coordinate, implement and manage a program to protect the environment and the welfare of the public in the event of an emergency at project Area.

2. Potential Emergencies

This EERP will cover environmental emergencies that are considered most potentially likely to affect the cleared and excavated area. Environmental emergencies involve the release, or threatened release, of pollutants such as oil to the soil, water, or air. Releases can be accidental, deliberate, or caused by natural disasters. Environmental emergencies are categorized as technological emergencies, human error emergencies and physical infrastructure emergencies. These emergencies could arise because of:

- Fire.
- Equipment/infrastructure failure.
- Trench collapsing;
- Lightning and electric shock; and

The specific emergencies that are possible during the operation of the plants are should be detailed based on;

3. Technological Emergencies

Technological emergencies result from failure of equipment or facilities or could result from a process or system failure. Possibilities include:

- Hazardous materials handling incident.
- Electric shock incidents
- Pant failure
- Safety system failure.
- Breaking system failure on vehicles.
- Power failure; and
- Emergency notification system failure.

4. Human Error Emergencies

A wide variety of emergencies can be caused by employee error or negligence. Overall, human error is the single largest cause of workplace emergencies and can result from:

- Inadequate training.
- Poor maintenance.
- Negligence in putting into safety gears
- Poor attitude
- Carelessness.
- Misconduct.
- Substance abuse; and
- Fatigue.

5. Physical Emergencies

Physical emergencies relate to the design and construction of the project infrastructure, whereby some condition or factor not accounted for in the design or some element of inadequate construction results in an emergency. Physical features to be considered are:

- The physical construction of the facility.
- Layout of equipment.
- Lighting.
- Excavation area identification
- Evacuation routes and exits; and
- Proximity of shelter areas.

6. The Excavation Area Emergencies

Based on an integrated review of the future project operations and the possible emergencies, a defined set of emergency situations shall be developed. These are the specific emergencies that are anticipated in the implementation and operation of the plant operations during trench excavation for storm drainage systems.

- ✓ **Pollution Control Failure**

Failure of the pollution control facilities can occur around the operational area if the sediments traps and cut off drains fail because of excavated material filling up in the traps or drains. The above scenario can have a significant impact on nearby water bodies environment. Regular inspections will be carried out.

- ✓ **Fire**

Failure to observe safety guidelines at plant site can increase the risk of fire when the volatility and flammability of fuels is taken into consideration. Additionally, fire damage to any project infrastructure can cause release of hazardous materials to the air or ground. Methods and equipment used in fighting fires in the project area needs to take account of the presence of hazardous liquids. Firefighting equipment such as fire extinguishers will be installed in clearly marked places and within easy reach. Adequate training in firefighting coupled with regular fire drills will be conducted to ensure that employees are fully adept with handling emergencies resulting from fire. Lines of command will be established for employees to be aware of who to contact in the event of fire.

- ✓ **Risk of Lightning**

Unbalanced electric charge in the atmosphere can cause lightning which is a massive electrostatic discharge. Humans can be hit by lightning directly especially when outdoors. Lightning strikes can cause hearing damage or trauma or can be fatal.

- ✓ **Emergency Management Elements**

This section of the plan describes the necessary response approach to the primary emergencies identified for the operation. There are two crucial elements to effective emergency response: the early identification of the emergency and a rapid and comprehensive response to address the emergency and minimize negative impacts. The response plans are based on:

- Monitoring and emergency identification.
- Environmental protection.
- Direction and control.
- Communications.
- Safety.
- Property protection.
- Community outreach.
- Recovery and restoration; and
- Administration and logistics.

These elements are the foundation for the emergency procedures that the contractor will follow to protect personnel, the environment, and equipment, and resume safe operations as quickly as possible.

8.8.4.1 Emergency Response Chain of Command

A specified chain of command for immediate response to emergencies as well as formal notification will be required to ensure effective response as well as compliance with appropriate regulations. Although each emergency will have different personnel involved in identifying

and responding to emergencies on the first level, the specified chain of command is common to any emergency. The camp chain of command shall be addressed in the later stages:
An alternate for each position on the chain of command will be assigned. Should any person bin the chain of command takes leave or not be able to carry out his/her responsibilities, then the alternate should be immediately taking over the said responsibilities.

8.8.5 Disaster Risk/Emergency Management plan

SUZA- shall be vulnerable to range of disaster risks, which will pose risk to the students, teacher and other staffs. The proposed project will be vulnerable to fire outbreak, diseases outbreak, traffic accident, robbery, ICT appliance damage and data loss, and chemical explosion. Other disaster risks including; structural collapse and ammunition accident.

8.8.5.1 Hazardous/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 proposed SUZA buildings. 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.

Assumption made in the plan

The disaster risk management plan takes into account the following assumptions;

i. SUZA- 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 loss 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 campus capability.
v. Departments and agencies from the local government, state, and national levels may provide help to protect lives and property.
vi. SUZA will follow all state and local regulations for safety plan and procedure review and inspection.

Table 8. 10: The Disaster Risk Management Plan for the proposed project

Aspect		Responder at SUZA								Responder outside SUZA			
Key responsibilities		Principal office	Deputy Principal	Emergency management team	Students leaders	Health center	Estate manager	Security guards	Community	Fire and Rescue force	OSHA	RED CROSS	Police Force
1.0	**Fire outbreak**												
Steps to be completed in pre-disaster	Post directions on each buildings on how to utilize emergency equipment		**P**	**S**			**S**						
	Post locations of fire alarms and assembly points		**P**	**S**			**P**			**S**			
	Post locations of fire extinguishers		**P**				**P**			**S**			
	Train students, teachers and staffs on use of alarm systems and extinguishers at least once per semester (Refresh annually.)	**P**	**P**		**P**								
	Train all campus community on, and exercise RACE procedures	**S**	**P**		**S**		**S**			**S**			
Steps to be done During event	During fire event, use the RACE procedure R - Rescue residents in immediate danger A - Sound nearest alarm if not already activated C - Close doors behind you to confine the fire E -Utilize fire extinguisher as situation permits or Follow evacuation procedures.	**P**		**P**	**P**	**P**	**P**	**P**	**P**				**P**
	Call # 101 for assistance	**P**		**P**	**P**	**P**	**P**	**P**	**P**				
2.0	Disease outbreak												
Steps to be completed in pre-	Ensure the students, teacher and other staffs Wash hands often	**P**	**S**	**S**	**S**	**P**		**S**					

Aspect		Responder at SUZA								Responder outside SUZA			
Key responsibilities		Principal office	Deputy Principal	Emergency management team	Students leaders	Health center	Estate manager	Security guards	Community	Fire and Rescue force	OSHA	RED CROSS	Police Force
	Provision of vaccination	**P**		**S**		**P**							
	Ensure availability of Ambulance	**P**				**P**	**S**						
	Ensure control of food security at cafeteria	**P**		**S**	**P**								
	Disinfect surfaces; clean and disinfect on the surface which are frequently touched in all buildings			**S**		**P**	**S**						
	Provide education for safer sex (training for sexually transmitted diseases (STDs)		**P**		**S**								
	In case of pandemic disease follow the government guidelines	**P**											
	Provide the location of first aid kit and the dispensary		**P**	**S**			**S**						
Steps to be done During event	Call # _____ (health officer) to the illness								**P**				
	Call#_____ambulance for emergency and serious illnesses								**P**				
	If its communicable disease, record the Number of new cases everyday								**p**				
	Ask for assistance from outside	**P**				**S**			**P**			**S**	
3.0	Traffic accidents												
Steps to be completed in pre-disaster	Provide all traffic signs required in a road and car parking	**P**	**S**					**S**					
	Control all random parking						**S**	**P**					
	Remove all unstable tree parts in car parking						**P**						
Steps to be do	Provide the first aid service to the victim					**P**							

Aspect		Responder at SUZA								Responder outside SUZA			
Key responsibilities		Principal office	Deputy Principal	Emergency management team	Students leaders	Health center	Estate manager	Security guards	Community	Fire and Rescue force	OSHA	RED CROSS	Police Force
	Report him/her to the dispensary or hospital depending to nature of injury								**P**				
	Report the accidents to nearby police station					**P**			**S**				
4.0	Chemical explosion												
Steps to be completed in pre-disaster	Maintain proper storage of all chemicals in laboratory		**P**	**S**									
	Ensure the proper uses of chemicals during experimental practical's			**P**		**S**	**P**						
	Ensure all laboratory rules are followed		**P**	**P**			**S**						
	Provide the first aid kit in all laboratory		**P**	**S**			**P**						
Steps to be done During event	Provide the first aid service to the victim					**P**			**P**				
	Report him/her to the dispensary or hospital depending to nature of injury								**P**				
	Ask for assistance from large hospital, when the case is serious					**P**							
	Sound the nearest alarm								**P**				
5.0	Robbery												
Steps to be completed in pre-disaster	Provide a good number of security guards		**S**	**S**			**P**	**S**					
	Provide light in open areas, buildings and all road within the campus	**S**					**P**						
	Insist students to walk in groups during the night	**P**			**P**			**S**					
	Insist student, teachers and all staffs to wear identification card within the campus	**P**	**S**	**S**				**P**					

Aspect		Responder at SUZA								Responder outside SUZA			
Key responsibilities		Principal office	Deputy Principal	Emergency management team	Students leaders	Health center	Estate manager	Security guards	Community	Fire and Rescue force	OSHA	RED CROSS	Police Force
	The campus should be full protected with fence	**S**					**P**						
Steps to be done During event	Call#_____(Police/security guards) to report the crime event	**P**							**P**				**P**
	Make noise to get assistance from nearby person								**P**				
	Report the event to security guards/policy								**P**				
6.0	Terrorist attack												
Steps to be completed in pre-disaster	The campus should be full protected with fenced	**S**					**P**						**P**
	Insist student, teachers and all staffs to wear identification card within the campus		**S**	**S**	**P**			**P**					
	Ensure the visitors registration	**P**					**P**	**P**					
Steps to be done During event	Call #_____ (Police/security guards) to report the event	**P**											**p**
	Report the event to police	**P**	**P**	**P**	**P**	**P**	**P**	**P**	**P**				
	Follow the government rules and guidelines	**P**	**P**	**P**	**P**	**P**	**P**	**P**	**P**				
7.0	ICT appliances damage and data loss												
Steps to be completed in pre-disaster	Provide a good number of maintenance personnel	**S**					**P**						
	Evaluate back-up generator needs. Consider power needs for critical safety and medical equipment, refrigeration, temperature control, etc.	**S**					**P**						
	Install the alternative source of power such as solar panel	**P**					**S**						
Steps to	Call the power supplier to report outage								**P**				

Aspect		Responder at SUZA								Responder outside SUZA			
Key responsibilities		Principal office	Deputy Principal	Emergency management team	Students leaders	Health center	Estate manager	Security guards	Community	Fire and Rescue force	OSHA	RED CROSS	Police Force
	Notify maintenance staff.								**P**				
	Evacuate the building if danger of fire.								**P**				
	Keep refrigerated food and medicine storage units closed to retard spoilage.								**P**				
	Turn off power at main control point if short is suspected								**P**				
	Turn off all the switch sockets								**P**				
	Disconnect all appliance from the electric power source								**P**				
8.0	**Building collapse**												
Steps to be completed in pre-disaster	Evaluate the campus for potential dangers and fix the problems		**P**				**S**			**S**			
	Remove potential fire risks		**P**	**S**			**S**						
	Train and exercise on “Drop, Cover and Hold”.		**P**	**S**						**S**			
Steps to be done During event	Provide the first aid service to the victim		**P**	**P**		**P**							
	Report him/her to the dispensary or hospital depending to nature of injury		**P**	**P**					**P**				
	Report the accidents to nearby police station		**P**	**P**		**P**			**S**				

Key:
P- Primary;
S- Secondary

8.8.6 Environmental Health and Safety Management plan (EHSMP)

The detailed and specific plan should detail the measures taken by the project Contractor to manage the hygiene conditions and medical care in each of the worker's camps. It should also address occupational health & safety in alignment with Labour law of Tanzania, ILO recommendations, Good Industry Practices. This plan should include (but not limited to) the following topics: (i) Health and safety policy and commitment from management, (ii) Description of organization; human resources, definition of roles and responsibilities, (iii) workers accommodation, hygiene facilities and food supply, (iv) Description of material resources including Personal Protective Equipment (PPE) to be used by workers, (v) Health and safety procedures, (vi) Risk assessment , (vii) Pollution prevention and protection, (viii) Health and safety training, (ix) Monitoring of health and safety performance, and (x) Medical checks.

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 SUZA- operations and responsibilities of every level of management. This plan shall help to implement the Safety and Health direction of the proposed project components. It clearly states the requirements of donors, legislations, suppliers, management and employees in Safety and Health management.

8.8.6.1 Responsibilities

i. **SUZA-PCT:** 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.

8.8.6.2 Training

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

8.8.6.3 Awareness

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

8.8.6.4 Emergency coordination

All actions will be coordinated with the overall emergency plan operated by the Supervisor. The Campus Principal 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 either 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.

8.8.6.5 Assembly Point

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

8.8.6.6 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.

8.8.6.7 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.

8.8.6.8 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.

8.8.6.9 All Clear

Normal work will be resumed only after all clear signal is received from the Supervisor. As such the supervisors shall make all arrangements to meet the concerned authorities.

8.8.7 Air Quality Management Plan

A detailed Air Emissions and Dust Control Management Plan should be prepared and implemented as part of the construction ESMP. The plan should detail all site-specific measures the project Contractor will implement during the construction period to identify and manage and reduce all nuisances caused by air emissions and dust production resulting from the construction activities including from project's traffic along the access roads. The plan should also include specific measures for the reduction of the greenhouse gas emissions in compliance with the national standards and proportionate to the potential impacts referring to greenhouse gas emissions.

8.8.8 Noise & Vibration Management Plan

A detailed Noise & Vibration Control Plan should be prepared and implemented as part of the construction ESMP. The plan should describe how the project Contractor will minimize and manage noise and vibration impacts during construction.

8.8.9 Effluent Management Plan

Effluents consist of liquid discharges from Worksite, transporting a pollutant (dissolved, colloidal or particles). A detailed Effluent Management Plan should be prepared and implemented as part of the construction ESMP. The plan should detail all site-specific measures the project Contractor will implement during the construction period to identify, drain and treat all effluents generated on site from the construction activities.

8.8.10 Waste Management Plan

A detailed Waste Management Plan should be prepared and implemented as part of the construction ESMP. The plan should detail all site-specific measures the project Contractor will implement during the construction phase to identify, collect, transport and treat all waste produced on the Worksites by its personnel.

8.8.11 Hazardous Materials Management Plan

A detailed Hazardous Materials Handling and Storage Management Plan should be prepared and implemented as part of the construction ESMP. The plan should detail all site-specific measures the Contractor will implement during the construction phase to identify and manage hazardous materials planned for use on the Worksite and their disposal.

8.8.12 Excavation Management Plan

A detailed excavation/ spoiled Materials Handling and disposal Management Plan should be prepared and implemented as part of the construction ESMP. The plan should detail all site-specific measures the Contractor will implement during the construction phase to identify and manage materials planned for use on the Worksite and their disposal.

8.8.13 Soil Erosion & Vegetation Management Plan

A detailed Soil Erosion & Vegetation Management Plan should be prepared and implemented as part of the construction ESMP. The plan should detail all site-specific measures the project Contractor will implement during the construction phase to minimize vegetation clearing and prevent an increase in sediment loads being exported from the site.

8.8.14 Materials Management and Spoil Disposal Plan

The project Contractor should prepare and submit a Materials Management Plan that documents how excavated soils and materials are to be handled.

8.8.15 Quarry and Borrow Areas Management Plan

A detailed Quarry and Borrow Areas Management Plan should be prepared and implemented for areas planned to be exploited for rock fill material, aggregates and rip rap material as well as for the other borrow areas (sand, gravel) that details all the environmental and social measures to be implemented for the operation of these sites.

8.8.16 Traffic Management Plan

A detailed Traffic Management Plan should be prepared and implemented as part of the construction ESMP. The plan should (i) define the characteristics of the construction fleet of vehicles and site machinery, (ii) describe the expected Project's traffic (frequency of trips between Worksites, working hours, convoys) and (ii) detail all sites specific measures the project Contractor will implement during the construction period to minimize the nuisances to neighbourhood generated by its fleet and reduce the risk of accident.

8.8.17 Site Rehabilitation Plan

A detailed Site Decommissioning and Rehabilitation Plan should be prepared and implemented as part of the construction ESMP. The plan should detail all site-specific measures the project Contractor will implement at the end of the construction period to rehabilitate all temporary areas disturbed by the works.

8.8.18 Community Health Safety Plan

The project contractor should prepare and implement Community Safety Plan, which includes regular community meetings on safety & construction hazards, announcement in advance of heavy construction activities, restriction of access to working sites, awareness campaigns

project construction related risks, including community dwelling at Tunguu using the area as their access to their premises. The following shall be considered

- Contractors and workers will participate in any and all training related to health and saving including but not limited to:
- GBV, SEA and sexual harassment prior to working on the Project which will be provided by the Community Social Officers from the LGA and on the Child and Gender desk of the police. This will include information on the GBV reporting mechanisms.
- Contractors will be provided with signage on issues such as HIV/AIDS, GBV etc which will be posted at worksites.
- Contractors/workers will attend education sessions on disease transmission notably HIV/AIDS, malaria and will implement the control measures needed to protect public health.
- Contractors / workers will ensure good housekeeping arrangements on site to avoid creating breeding grounds for rodents and insects which can spread diseases.
- Contractors will ensure access to potable water for all workers.
- Contractors will be required to abide by national law in relation to vehicle conditions and movements and behaviour of drivers.
- Signage will be erected at construction sites to advise the community of the dangers of entering the site and appropriate barricades (fencing, tape etc) will be put in place especially around quarries, trenches etc.

8.8.19 Environmental Permitting

The project Contractor should conduct the environmental and social investigations required to obtain the environmental permit and any other authorizations as required by the authorities for the Project components that might not be covered by the ESIA or the construction permit. It should include: - but does not limit to – (i) the electrical transmission lines (ii) ZAWA (iii) Tree clearance;

All these plans should be prepared prior to the actual execution of the construction works based on the Design, and Environmental and Social Impact Assessment Report. However, the preliminary ESIA has prepared some related plans in accordance with the WB ESSs.

CHAPTER NINE

9 ENVIRONMENTAL AND SOCIAL MONITORING PLAN

9.1 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 9-1 to 10-3 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.

9.2 Environmental and Social Monitoring program

The Environmental and Social Monitoring program is based on established universal guidelines on environmental monitoring of the established ESMP framework. The program is to incorporate the following: -

- ✓ Monitoring activities which will include water quality, ambient air quality, and soil quality.
- ✓ Monitoring activities of the impact of the proposed development on the adjacent mangrove zone, heritage areas and other key landmarks.
- ✓ Monitoring of social/community conditions in the area of influence of the project.
- ✓ Monitoring workplace conditions and employees' occupational health.

Environmental and Social Monitoring Program is a continuing program of data gathering, analysis, and verification of the compliance of the project proponent on the stated management plan. This is a long-term process designed to monitor the effects of the proposed development prior, during, and in the decommissioning after the project implementation.

Under the provisions of the Environmental Management Act, the ZEMA has been given the mandate to carry out verification of the environmental monitoring and auditing programs. ZEMA may require the project proponent to submit annual records and reports on compliance

of the stated objectives, as explained in the previous chapter. The project proponent is also required to develop operational procedures and lay a ground work for the monitoring process to enter effect.

9.2.1 Overall environmental monitoring program

The purpose of the monitoring program is to ensure all atmospheric, construction debris, hazardous wastes, and wastewater related releases have been adequately treated to meet the established environmental standards prior to being discharged or disposed of into the environment; and to continually monitor the efficiency of mitigation systems to be able to adjust them easily and quickly when such emissions do not meet the established environmental standards. Periodic Environmental monitoring will include the following: -

- ✓ Ambient air quality
- ✓ Soil monitoring quality
- ✓ Ambient Noise Quality
- ✓ water Quality
- ✓ Occupational safety and Health
- ✓ Wastewater Effluents
- ✓ Waste disposal.
- ✓ Biodiversity management
- ✓ Social impact and management issues

The monitoring program will include communications, employment and business opportunities for local communities, disruption of infrastructure and temporary impacts on land and mangrove systems. Stakeholder's feedback, review of complaints and statistics related to local communities, employment and other related development will be assessed periodically.

The Environmental and Social Management Plan (ESMP) which has been includes monitoring and evaluation mechanisms to assess effectiveness of mitigation measures during and after construction phase. The HSE Officer shall be required to refer to the ESMP aspects which summarizes the anticipated significant adverse environmental and social impacts and which provides the identified mitigating measures, responsibilities, scheduling, predicted costs, monitoring and supervision of the construction works to be appropriately implemented. Sometimes the ESMP is prepared for inclusion into the contract documentation as a stand-alone document which is cross-referenced with the HSE document of the contractor.

The construction specifications of the ESMP should be incorporated into the civil works tender documentation to ensure that it is binding. Furthermore, to give appropriate effect to the environmental controls, it is essential that responsibility for the implementation of the ESMP is clearly defined in the contracts and managed by the Responsible Engineer (in this case through the appointment of the HSE Officer).

9.3 Monitoring aspects of the construction ESMP

Accordingly, prior to the onset of construction phase, an ESMP-Environmental, Social Health and Safety Specification should be compiled taking cognizance of the affected environment and the mitigation measures outlined in the ESIA. The key identified aspects in the construction phase that the HSE shall consider include the following: -

- ✓ To ensure effective and sustainable pedestrian and traffic safety.
- ✓ To conserve, manage and maintain environment and social values at the site.

- ✓ To take measures in easing the impacts of restricted access caused by construction activities and so the local community.
- ✓ Identify and communicate risk of HIV/AIDS and other communicable diseases within project implementation which includes providing educational material and facilitating engagement with community and project staff.

9.4 Key procedures the HSE officer to engage during the construction phase

Key procedures and issues that shall be addressed in the construction phase EMP include the following

- ✓ Material handling, use and storage.
- ✓ Hazardous substances and waste disposal.
- ✓ Eating areas and ablution facilities.
- ✓ Solid waste and waste water management.
- ✓ Noise and Lights control.
- ✓ Fuel (petrol and diesel) and oil storage and management.
- ✓ Workshop, equipment maintenance and storage.
- ✓ Dust pollution.
- ✓ Accommodation of site staff.
- ✓ Environmental awareness training.
- ✓ Construction personnel information including posters, site clearance, site division and site demarcation.
- ✓ Protection of flora and fauna.
- ✓ Cement and concrete batching including earthworks, pumping and bitumen.
- ✓ Safety, Fire control and Emergency procedures.
- ✓ Community relations such as aesthetics and recreation.
- ✓ Crane operations, trenching, drilling and stockpiling.
- ✓ Temporary site closure and rehabilitation.

9.5 Auditing and corrective action

A regular schedule of internal and external audits will be established. Internal audits will be conducted every six months or when requested by senior management, particularly when significant environmental or safety incidents occur. In addition to conformance, internal audits also function to assess the effectiveness of the ESMP and identify opportunities for improvements. Procedures for internal audits will describe the requirements for planning and carrying out internal audits by trained auditors, as well as the analysis, recording, and communication of audit findings to the relevant line managers, the management representative, and senior management. External audits will be conducted by third parties. The purpose of these audits is normally to give senior company management and independent lenders an independent assessment of the effectiveness of internal systems and a report card on compliance with legal requirements, corporate policies and operating procedures and controls at the site.

9.6 Monitoring and measurement

Key aspects of auditing and corrective actions include: -

- Monitoring and measurement.
- Incident and non-conformance reporting, corrective and preventive action.

- Environmental, health & safety and community relations records and
- ESMS audits.

Corrective action plans will be prepared based on the audit findings. Implementation of corrective action plans will be monitored by the SUZA on a quarterly basis.

9.6.1 Health and Safety Monitoring

This shall involve careful observation of health and safety regulations and guidelines.

During the 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.

During the Operation phase;

- SUZA- 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 Teaching Theatres and Laboratory (safe use of chemicals, use of protective gears).

9.6.2 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. SUZA- shall monitor landscape and cultural changes with time, in order to device management mechanism.

9.6.3 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. SUZA- Project Management Unit 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 programmes proposed for the construction and operation phases, is presented in Tables 9-1 to 9-3. Monitoring process will enable SUZA- to understand how environmental performance will change over time and facilitate improvements to the Environmental and social management system.

9.7 Monitoring Responsibility

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's Environmental Manager and SUZA safeguard team will undertake scheduled site inspection. 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 SUZA project. The proponent 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 ZEMA will perform annual EHS reviews in which environmental concerns raised will be reviewed alongside project implementation.

(Note: The allocated budget in this matrix includes the cost required to facilitate external stakeholders during the Monitoring Period. This does not include the budget for EMS which is internal and continuous and which can be verified through either internal or external Environmental Audits)

Table 9. 1: Monitoring programme during the construction phase

Receptor/ Impact	Monitoring activities	Monitoring parameter	Monitoring area	Measurement Units	Target level standards	Timing and frequency	Responsibility	Cost (TZS) per year
Noise level	Noise levels measurement (within 100 m)*	Day and night noise levels	Project site	dBA	Below 60 (WHO Standards)	Quarterly	Contractor	1,500,000
Air quality	Measurement of ambient gaseous pollutants and dust**	CO	Project site		120 For 8 Hours	Quarterly	Contractor	4,000,000
		SO_2,			ZBS, WHO			
		CO2		Mg/Nm3	10 for 8 hours			
		NO_2 and Total Dust (PM 10 & 2.5)		Mg/ Nm3	ZBS, WHO			
		NOX_2		Mg/ Nm3	450 mg/Nm			
Health and safety	Inspection; Voluntary testing;	-Availability and function ability of H & S facilities; -Function ability of sanitation facilities	Project site			Quarterly	Contractor/ Fire/OSHA	8,000,000
	Analyse records of accidents and incidents	Number and types of accidents and incidents	Project site	Number of accident/incidents	Zero Accident/incident	Monthly	Contractor/ SUZA PCT	1,500,000
Grievance	-Analyse records of workers and community grievance	Number and types of grievance reported and solved	Project site	Number of grievances reported	Zero Grievance	Monthly	Contractor/ OSHA/SUZA-PCT	500,000

Receptor/ Impact	Monitoring activities	Monitoring parameter	Monitoring area	Measure ment Units	Target level standards	Timing and frequency	Responsibility	Cost (TZS) per year
Total								**15,500,000**

Table 9. 2: Monitoring programme during operation phase

Receptor	Monitoring activities	Monitoring parameter	Measurement Units	Target level Standards	Timing and frequency	Responsibilit y	Cost (TZS) per year
Underground water	Measureme nt of ground water quality at direct interference (within 100 m)	Physicochemic al and bacteriological parameters (i.e. pH, EC, pathogens, heavy metals)	Mg/l	ZBS, WHO.	Semi annual	SUZA-PCT	2,500,000
Ground/soil	Quality of wastewater discharges	Physicochemic al and bacteriological parameters (i.e. pH, EC, pathogens, heavy metals)	Mg/l	ZBS, WHO.	Semi annual	SUZA - PCT	
Noise	Noise levels measuremen t (within 100 m)	Day and night noise levels	dBA	Less than 60 (WHO STANDARD)	Semi annual	SUZA- PCT	1,500,000

Receptor	Monitoring activities	Monitoring parameter	Measurement Units	Target level Standards	Timing and frequency	Responsibility	Cost (TZS) per year
Community Safety	-Inspection of the emergency and detection systems; - Verification of security system and access to the campus	-Number of accidents and incidents recorded -Function ability, number and location of safety facilities on campus; -Availability of security guards and lighting in proper areas.	Number of accidents/Incident	Zero Accident / incident	Monthly	SUZA- PCT	2,500,000
Safety in the laboratories	Inspection of lab facilities & equipment; - Verification of expertise of laboratory instructors; -Inspection of the Personal Protected Equipment	Visual inspection and records verifying the condition of the safety equipment (life rafts, life jackets, flares, smoke canisters)	Number of accidents/Incident	Zero Accident / incident	As per the manufactures requirements	SUZA- PCT	1,500,000

Receptor	Monitoring activities	Monitoring parameter	Measurement Units	Target level Standards	Timing and frequency	Responsibility	Cost (TZS) per year
	(PPE) and the safety Equipment						
Community Health	Inspection of available health facility in the dispensary; Inspection of sanitation facilities and waste management facilities; Inspection of hygiene conditions in the cafeteria and dormitories	-Availability and function ability of Health facilities; -Function ability of sanitation facilities; -Availability of clean and safe water; -Availability of waste management facilities;	Number of patients	Zero patients	Monthly	SUZA- PCT	2,000,000
		Presence of fire safety management system, Environmental free from Safety and ergonomic hazards	Number fire accident/incident	Zero fire accident/incident	Monthly	SUZA-PCT	

Receptor	Monitoring activities	Monitoring parameter	Measurement Units	Target level Standards	Timing and frequency	Responsibility	Cost (TZS) per year
Monitoring of Health and Safety implementation by the workforce	Efficiency of treatment plant	Physiochemical parameters, Number of dust bins,			Monthly	SUZA-PCT	1,500,000
	Waste generation rates						
	Increased solid waste and liquid waste generation during Operation phase						
Total							**11,500,000**

Table 9. 3**:** Monitoring programme during decommissioning phase

Receptor	Monitoring activities	Monitoring parameter	Timing	Responsibility	Cost
Underground water	Monitoring of ground water Quality	Turbidity / Suspended solids Oil and grease	Weekly One-month after direct interference	SUZA- PCT	2,500,000
	Identification and reporting of leakage events**	Number of leakage events caused during the construction	Continuous	SUZA- PCT	1,000,000
Restoration of areas impacted by the project	Inspection of Landscape, damaged infrastructure, and waste accumulation	Borrow pits, disposal areas, site facilities, workers' camps, stockpiles areas, working platforms	As per the approved contractors decommissioning plan	SUZA- PCT	1,000,000

Receptor	Monitoring activities	Monitoring parameter	Timing	Responsibility	Cost
Noise	Noise monitoring at direct interference (within 500 m)**	Day and night noise levels	Weekly	SUZA-PCT	1,000,000
Health and safety	Health and Safety (H&S) Monitoring and audits. -H&S Performance evaluation -Personal Protected Equipment monitoring	Total recordable incidents, lost time incidents and other H&S indicators. Records verifying the conditions of Personal Protected Equipment	Weekly	SUZA- PCT	2,500,000
	-Inspection of grievance mechanism -Analysis of workers and community grievance trends -Maintaining training Records	-Recorder Grievance, accidents and incidents -Training records	Monthly	SUZA- PCT	2,500,000
Total					**11,000,000**

Note:
** Reference should be made to TZS 845:2005 Air Quality – Specifications*
***Reference is made to EMDC 6 (1733): Limits for Environmental Noise)*
**** Reference should be made to TZS 860:2005 Limits for municipal and industrial wastewaters*
All issues regarding to occupational health and safety should be monitored against the requirements of the OSHA Regulation, 2003

CHAPTER TEN

10 COST BENEFIT ANALYSIS OF THE PROJECT

10.1 Introduction

This chapter presents the cost benefit analysis (CBA) of the proposed new building structures to be built at SUZA, Tunguu Campus. The estimation of cost benefit analysis reflects 99 years of the project design period. The details are not disclosed since they are still confidential in accordance to 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.

10.2 Benefits related to the project

Benefits from the proposed building structures at SUZA project can be classified as direct benefits and indirect benefits to university, neighbour and the government. 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 will be 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 around Tunguu premises, 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; ZECO, ZAWA, ZRA 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.

10.3 Benefits to the SUZA project

The proposed project has positive impacts to SUZA since its benefit is a lifetime process throughout the project life span (99 years). 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. The completion this project is anticipated to improve the university financial capacity and sustainability. Further, the improved financial standing is not only going to promote enrolment but also good governance and efficient running of the University. Other benefits include suitable environment for; Teaching, Research and Public Service and its envisioned centre of excellence in knowledge and dissemination to a wide spectrum of beneficiaries at national and regional levels. The project will also have several intangible benefits to both SUZA and the surrounding community which include improving the university's image.

10.4 Benefit to the Neighbourhood

The proposed construction of SUZA will 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 SUZA 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 dependants.

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

- Utilization of locally available resources;
- Revenue to the Government will increase through payment of the various taxes (indirect and direct).
- Boosting the infrastructure and economy of the Zanzibar and surrounding communities in which the project is located.

10.5 Benefit to the Government

The project will benefit the government in different aspects. These includes budget saving due to the relatively decrease in SUZA financial dependence on the government. It is anticipated that during the operation phase the project will improve SUZA 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 SUZA for other government development plans. Further the ability of SUZA- in contributing towards the realization of National Policies such as Education Reforms through expansion of enrolment of students into various degree programmes is going to increase. The increase in the number of enrolments means 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 SUZA-. This will create the potential of the government to use internal resources (home country experts) in different future projects rather than contracting foreign experts.

10.6 Costs related to the project

The estimated costs for implementing enhancement measures, impact management process is outlined estimated to TZS 226,000,000 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.

10.7 Costs to community

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

10.8 Costs to Government

The Government of the United Republic of Tanzania through the Ministry of Education, Science and Technology (MoEST) has secured fund from World Bank to promote higher education as a catalytic force in the new Tanzanian economy. The project is designed to revitalize the key areas for innovation, economic development, and labour market relevance. Also as already mentioned the Government will directly and indirectly benefit from taxes generated during both phases of the project. Apart from tax generation, the investment will also enhance the economic growth, enhancement of industrialization and businesses.

10.9 Environmental Cost

Environmental cost benefit analysis is assessed in terms of the negative and positive impacts. Furthermore, the analysis is considering whether the impacts are mitigatable and the costs of mitigating the impacts are reasonable. The total cost per annum for environmental risks and impacts monitoring will be TZS 15,500,000 during the construction phase and TZS 11,500,000 during operation phase, while for the environmental and social impact management its cost is estimated to TZS 332,000,000.

10.10 Project cost benefit analysis

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

CHAPTER ELEVEN

11 DECOMMISSIONING OR CLOSURE PLAN

11.1 Introduction

Since decommissioning will take place in later years, the specific conditions for mitigation are generally inherently uncertain. Due to this uncertainty, specific mitigation measures pertaining to environmental impacts of decommissioning works cannot be proposed at the moment with a reasonable degree of certainty.

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

11.2 Preliminary Decommissioning Plan

This Section describes a brief outline of the works required to demolish the proposed project components on the site in case it happens. This Plan shall be used as a reference document that provides the framework to ensure that demolition activities on the site do not adversely affect the health, safety, traffic or the environment of the public and neighbouring properties. The Contractor shall be required to prepare a detailed Demolition Plan and Construction Management Plan to the satisfaction of the proponent and relevant Authorities prior to the commencement of works on site.

11.3 Components to be Demolished

The project components to be demolished shall generally be constructed with load bearing masonry walls with steel or timber framed roofs and metal roofs.

11.4 Demolition Methods

The Contractor shall prepare a detailed Demolition Plan prior to the commencement of work on site, however, the indicative demolition methods shall be as follows:

- The strip out and removal of non-structural elements shall be undertaken utilising manual labour and small plant including – bobcats, 3-5t excavators and dingo type loaders.
- The materials shall be removed from site using small to medium sized trucks.
- The structures shall be demolished using larger plant and equipment including 15-40t hydraulic excavators. These machines shall be equipped with rock breakers, pulverisers and the like which would be used in a sequential manner.
- The engineer shall be engaged to provide further engineering advice in relation to temporary support or back propping of the structure during demolition.
- During the demolition process erosion control measures shall be established. These shall include treatment of dust and potential discharge into storm water systems.

11.5 Materials Handling

Materials handling shall be done by mechanical plant (including excavators and wheel loaders) loaded into trucks (bogie tippers and semi-trailers). The debris shall be hauled offsite to an approved waste facility or recycling centre.

The contractor shall submit a Demolition Waste Management Plan to SUZA- which outlines the objectives of:

- Maximisation, reuse and recycling of demolition materials/wastes
- Minimisation of waste disposal and maximization of waste treatment such as composting organic demolition wastes

- Evidence of implementation for specified arrangements of waste management

Reusable materials shall be stored at the site. Recycling and disposal containers shall also be accommodated at this location for collection vehicles. Hazardous materials shall be treated separately. A hazardous materials inspection shall be undertaken by an accredited consultant and a report issued. Hazardous materials shall be removed in accordance with Zanzibar Environmental Management Act, 2015. A final clearance report shall be provided by the hygienist who shall include the provision of tip dockets from waste centres.

11.6 Proposed Sequence

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

- Rapid assessment
- Construction Waste Management Plan
- Demolition Management Plan

In principle, the demolition process is undertaken in the reverse sequence as construction. Essentially, internal finishes shall be stripped out first. Service amenities shall then be removed including air conditioning, pipework and conduits. The facades shall be removed where necessary and the structure shall then be demolished using the larger plants and equipment. It is estimated that it shall take 3 months to demolish and clear the site.

11.7 Protection Measures

An A Class hoarding shall be erected around the perimeter of the construction site prior to the commencement of demolition works. Additionally, wherever the risk arises of material falling into public areas, overhead protection shall be provided in the form of a B Class hoarding. Scaffolding shall be erected to facades where materials could fall in excess of 4m. The scaffolding shall be clad with chain wire and shade cloth to enclose debris and dust onto the site. During the demolition, dust control measures shall be used to minimise the spread of dust from the site. The Contractor shall have a senior representative on site at all times to ensure compliance with the safety guidelines and agreed work methods.

11.8 Traffic Management

The management of construction traffic during the decommissioning phase shall be subject to the provision of a detailed traffic management plan. This plan shall be prepared by the Contractor for the various stages of demolition. During demolition, all traffic shall be held within the site boundaries. The site shall remain closed to pedestrian traffic and shall be generally manned by security.

11.9 Occupational Health and Safety

Detailed OH&S measures shall be provided by the Contractor prior to work commencement. A detailed Site Safety Plan shall be prepared for the specific project. The plan shall highlight important issues as stipulated in the IFC general EHS guidelines for project decommissioning

11.10 Environmental Management Plan

A detailed Environmental Management Plan pertaining to demolition works shall be provided by the Contractor prior to the commencement of the work.

11.11 Potential Impacts and Mitigation Measures

11.11.1 Dust, Noise and vibration Pollution

The demolition activities for the remained part (foundation structure) shall be accompanied with emission of a lot of dusts, noise and vibration since the demolition works are expected

to be carried out by conventional method using mechanical breakers and jackhammers. However, alternative methods of demolition including explosive techniques can be used.

Mitigation Measures

i. Water sprinkling shall be applied to open earth to reduce dust emission;
ii. Trucks transporting construction materials shall be covered if the load is dry and prone to dust emissions;
iii. The demolition area shall be fenced with iron sheets; this shall prevent the dust at the ground to be picked up by the wind;
iv. Public notifications shall be sent where appropriate especially in nearby residential areas likely to be impacted by dust;
v. Construction equipment, with noise sinks, shall be used;
vi. Machine operators in various sections with significant noise levels shall be provided with noise protective gear
vii. Construction equipment shall be selected, operated and maintained to minimize noise.

Costs to Undertake Mitigation Measures: Approximately TShs. 20,000,000

11.11.2Increased Waste

A lot of demolition waste is expected to be generated as a result of demolition of this project. Non-hazardous solid waste will include excess fill materials from grading and excavation activities. Hazardous wastes during decommissioning include release of petroleum-based products, such as lubricants, hydraulic fluids, or fuels during their storage, transfer, or use in equipment. These shall include blocks, concrete, reinforcements, pipes, etc. Most of the building materials shall be salvaged and recycled.

Mitigation Measures

i. All materials that can be reused shall be reused;
ii. Materials that cannot be reused shall be sent to an authorised dumpsite.

Type of waste	Management Procedure
Overburden materials	-Avoid unnecessary excavation of land - Stockpile and store most of overburden produced for site rehabilitation -Use rest of overburden materials for land reclamation activities at the project sites
Debris and demolished wastes	-Temporary collect the waste materials at the site; - Distribute the recyclable and re-usable materials (i.e. containers; timber, pipes, etc.) to local community members in Central District and through their local governments; - Dispose the waste materials at an authorized and certified Kibele landfill
Liquid wastes from sanitary facilities	-Disinfect wastewater from the onsite sanitary facilities with chlorine or any other approved disinfectant; - Empty the liquid wastes (including slurry and sludge) in the existing sanitary facilities; - Safely dispose the wastewater (including slurry and sludge) at authorized and official wastewater treatment facilities in Zanzibar

Steel / metal structures and piping materials Concrete from civil structures	-These materials will be transported to recyclers where the metals and steel parts will be recycled and re-used. -Concrete materials will be broken down and transported by the contractor to landfill or site and roads rehabilitations

(Source; Consultant, 2023)

Costs to Undertake Mitigation Measures: Approximately TZS 25,000,000

11.11.3Loss of Employment

Many people shall suffer loss of employment if it happens that the buildings have to be decommissioned, including members of staff (academic and administrative Staff), security guards, cleaners, etc.

Mitigation Measures

i. Prior notice shall be given to all those who are going to be affected;
ii. Credit and Savings account shall be established; and,
iii. Proper compensation shall be given to those who deserve it.

Costs to Undertake Mitigation Measures: Approximately TZS 10,000,000

CHAPTER TWELVE

12 CONCLUSION AND RECOMMENDATIONS

The proposed project is suitably located in an institutional area and is located at a site that is adequately accessible such that all heavy equipment and trucks may reach the site easily. The proposed project will contribute to socio-economic benefits to both SUZA and the nation at large. These socio-economic benefits include: Creation of employment opportunities; increase income to the SUZA and the Zanzibar as whole. On the other hand, the proposed project will entail some adverse environmental impacts of which adequate mitigation measures have been proposed and incorporated in the project design. The environmental impacts identified from this project include but not limited to: Increased noise levels; increased dust levels; waste management problems, storm water generation and safety and health risks.

It is, therefore, concluded that the proposed SUZA buildings project will entail no significant impacts provided that the recommended mitigation measures are adequately and timely implemented. The identified impacts will be managed through the proposed mitigation measures and implementation regime laid down in this ESIA. SUZA-PIU will implement all the recommendations given in this ESIA and carry-out the environmental auditing and monitoring schedules.

ANNEXES

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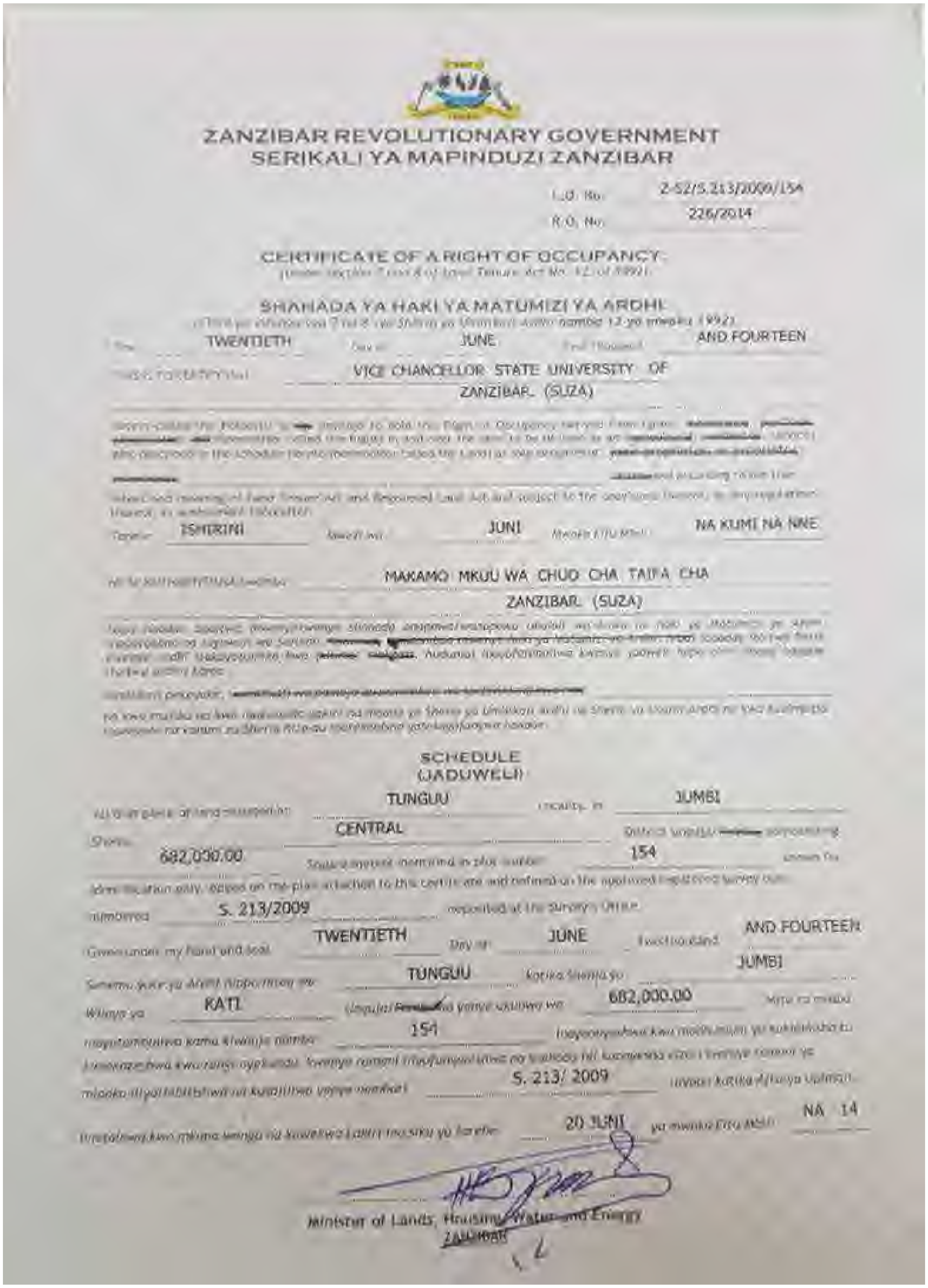
APPENDICES

Appendix I: Right of Occupancy



ZANZIBAR REVOLUTIONARY GOVERNMENT
SERIKALI YA MAPINDUZI ZANZIBAR

L.O. No. 2-52/S.213/2009/154
R.O. No. 226/2014

CERTIFICATE OF A RIGHT OF OCCUPANCY

SHAHADA YA HAKI YA MATUMIZI YA ARDHI

TWENTIETH JUNE AND FOURTEEN

VICE CHANCELLOR STATE UNIVERSITY OF ZANZIBAR (SUZA)

ISHIRINI JUNI NA KUMI NA NNE

MAKAMO MKUU WA CHUO CHA TAIFA CHA ZANZIBAR (SUZA)

SCHEDULE
(JADUWELI)

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Minister of Lands, Housing, Water and Energy
ZANZIBAR

Appendix II: CONTRACTOR'S OBLIGATIONS ON HSE AND ESMP

In general contractors, sub-contractors and their employees will be responsible for ensuring the following: -

1. All works are carried out in accordance with all relevant health, safety and environment (HSE) legislation, the approved ESMP, codes of practice, standards and guidance notes issued in relevance to the laws of Zanzibar.
2. All project contractors adhere to site specific policies and procedures, in line with the requirements outlined in this ESIA document, and all statutory requirements including the contractor's own HSE policies and procedures.
3. Providing appropriate on-site training and supervision of the employees so that they don't degrade the local environmental systems.
4. All the contractors meet the necessary qualification requirements so that they understand the environmental and social obligations required from them under the commitments and pledged made in the ESIA mitigation, ESMP, and the monitoring plans.
5. Ability to identify health and safety hazards associated with the specific work being undertaken and to identify and implement appropriate control strategies.

1.1. Site induction procedures

In relation to the site construction activities, prior to commencement of work on site, all persons working within the site shall attend a site induction which may include information on the following:-

1. Review and explanation of the HSE requirements as directed in this document or its associated HSE manuals of operations.
2. Details on relevant HSE policies, procedures and requirements for specific parts of the construction activities.
3. Site emergency procedures.
4. Hazard and incident reporting procedures.
5. First aid procedures.
6. Hazards associated with the task and with the location of the task.
7. Location of hazardous materials.
8. Security and access, etc.

1.2. Addressing conventional hazards of the construction site

Anyone accessing a reclamation perimeter shall be appropriately qualified to access such environments. The contractor shall carry out a pre-entry risk assessment prior to entering the excavation and reclamation perimeters. The pre-entry risk assessment shall take into consideration the following:-

1. The nature and inherent hazards of the site to be excavated and reclaimed.
2. The work required to be done, including the need to enter the workplace perimeter.

3. The hazards and the associated risks involved with the actual method selected and equipment proposed to be used during the excavation, clearing, lifting, hoisting, etc.
4. Emergency response procedures associated with accidental spill or any other physical or environmental injury.
5. The competence of persons to undertake the work, and
6. Selection of appropriate environmental control measures.

1.3. Contractor's vehicles and permit to transport quarry materials

Vehicles plying between the quarry sites and the construction site shall observe all site speed limits where they are imposed, right of way, timings, and shall not block any access or egress points to and from the premises especially within the Mbweni Road. All kinds of physical load (murram, sand, rocks, etc.) should be appropriate secured. Permits for supply of Non-Renewable Natural Resources (NRNR) must be made available.

1.4. Drugs and alcohol

Alcohol and non-prescription or illegal drugs shall not be allowed in the project site, or to be consumed, whilst under the engagement of site construction activities or anywhere within the jurisdiction of the project site. Any person suspected to be under the influence or in the possession of such substances will be reported, requested to leave the property and immediately cease works in the area.

1.5. Safety from risk of electrocution

Immediately prior to the commencement of any work involving electrical equipment, contractors shall ensure appropriate safety tags including "danger" and "out of service tags" to be provided as warning signs. Such tags shall only be removed by the person who originally affixed the tag or by another person under their direct instruction, provided all relevant checklists have been completed prior to removal of the tags. All electrical leads shall be connected to the nearest electrical point and not be overloaded. All power tools and leads are to be tested, and tag by a licensed electrician prior to be use on site, and regularly checked. Leads must be located and protected to prevent damage from vehicles, construction equipment, sea waves, water etc and must be fitted with special devices. Leads must be suitably positioned to ensure they do not create a trip hazard.

1.6. Fire protection

Fire protection requirements must be considered prior to the commencement of work. The contractor must conduct work in a manner so as to prevent the proliferation of fire. This may involve careful selection of tools, work methods and materials. Contractors are also responsible for ensuring flammable liquids remain closed when not in use and be stored in appropriate facilities.

1.7. First aid kit

Prior to the commencement of work, the contractor shall ensure that provisions are available for prompt treatment of injured workers in the event of an injury. In an emergency, first aid equipment shall be available on site.

1.8. Hazardous materials

Where hazardous materials are present, the contractor shall ensure that all relevant details, location and condition of such materials are documented and managed. Any work on hazardous materials shall only be undertaken by an appropriately licensed and qualified contractor and in compliance with statutory requirements.

1.9. Hazardous substances and dangerous goods (HS/DGs)

Contractors are responsible for ensuring that their employees have been provided with the appropriate training for the storage and handling of dangerous goods. Hazardous substances or dangerous goods shall be stored, handled and labelled in accordance with all relevant statutory requirements.

1.10. HSE performance monitoring

Contractor's health and safety performance shall monitored via one or more of the following means:-

1. Inspections of the work area to ensure compliance with HSE, ESMP, OSHA Guidelines or regulatory requirements.
2. 2Submission of reports detailing hazards, incidents and injuries occurring on the work site.
3. 3Review of contractor's insurances and licenses.

Such monitoring shall be undertaken by an HSE Officer at any time. The HSE officer is required to report to the project management in view of a non-compliance by an individual or a contractor.

1.11. Housekeeping

Contractors shall maintain a high standard of housekeeping at any premises in which they are conducting works. It is the responsibility of the contractor to maintain their materials, tools and other equipment in an orderly manner on site. All debris and waste resulting from contractor activity on site shall be removed by the responsible and certified waste contractor. All materials and debris must not be dumped or left to be dumped into the sea. A working area shall be barricaded off and appropriate warning notices erected.

1.12. Personal protective equipment

The contractor shall-

1. Assess the suitability of the PPE, prior to the commencement of works, required to allow them to undertake the works safely.
2. Supply PPE appropriate for the hazards identified.
3. Supervise the use and maintenance of the PPE.
4. Ensure that all PPE complies with Zanzibar's OSHA Guidelines, Codes of Practice, etc.
5. Ensure that PPE is worn in accordance with contractor's health and safety procedures or signage throughout the property.

1.13. Workplace harassment and violence

No person shall be discriminated against during execution of the works because of race, religion, color, sex, age, etc. Sexual harassment in any manner or form is expressly prohibited. The HSE officer shall be required to report any incident of a workplace harassment. The contractor shall report, suspend and dismiss anyone found to harass a fellow worker during working hours and within the construction site.

1.14. Communications, training and awareness programs

The Management shall be responsible for ensuring both internal and external communications with the workers and stakeholders, respectively. These will include information disclosure, updates with the progress of the implementation of the project, community-oriented emergency, and Public Relations clearing. HSE Officer shall ensure that workers have received appropriate "in-house" training before being mobilized to the project. Minimum training shall include, but not be limited to OSHA (Occupational Safety and Health Administration) Mandated Training in:-

1. New Employee Orientation.
2. Personal Protective Equipment.
3. Fall Protection.
4. Accident Prevention Signs and Tags.
5. Accident/Incident Reporting.
6. Crane Operation (assigned workers, as required).
7. Lifting and Manual Handling.
8. Drug & Alcohol Awareness.
9. Medical fitness of employees (in line with Persons with Disabilities Policy of Zanzibar).
10. HIV/AIDS Awareness and mainstreaming.

1.15. Emergency response

The Management shall be responsible for ensuring rapid emergency response communications with relevant authorities. These will include Emergency No's:-

1. Ambulance: 112.
2. Police: 112.
3. Fire: 114.

4. Mnazi Mmoja Hospital: +255 24 2231071.

1.16. Regulatory compliance

Legislation requirements for the Project will be obtained and maintained by the Contractor. For compliance procedures, the Contract for the intended objective shall be the basis of the series of the established HSE compliance documents. Other generic specifications shall also form part of the HSE procedure whenever required under the regulatory compliance.

1.17. Equipment control & site maintenance

The contractor shall be responsible for the safe and efficient operations of the construction equipment and ensuring the safety of the personnel. Equipment Inspections & Preventative Maintenance shall be under the responsibility of the operations contractor. The equipment to be used shall meet with statutory and client requirements, together with additional safe operating standards. Any known hazard or risk related deficiency shall be reported as soon as practically possible. The following Inspections shall be carried out at the construction site:-

1. Carrying out regular checks of the site and document the inspections.
2. Periodic inspections of the life-saving equipment, fire-fighting and other safety equipment.
3. Making regular inspections of the common toilet/shower facilities.
4. Engineers making regular visual inspection of the lifting and other construction.

1.18. Incident reporting investigation

The person in charge of the workplace will report incidents, accidents and near misses in accordance with the established reporting format.

1.19 ESMP and HSE reports / documentation

Every effort will be made to ensure all HSE reports and documentation are accurate and in compliance with all the requirements of the contract vis a vis HSE.

1.20. ESMP and HSE audits and reviews

The HSE Management System shall be carried out or adopted in accordance with the following standard risk control: -

1. Eliminate or reduce risks using prevention and mitigation measures.
2. Combat risks at source by engineering controls and giving collective protective measures.
3. Minimize risk by the design of suitable systems, and ensure all employees are properly trained to handle all relevant types of hazards and risks associated with the construction activities.
4. Eliminate risks, by means of physical engineering controls and safeguards that can be more reliably maintained.

1.21. Community engagement and institutional collaboration

The Contractor shall be committed to work in close conjunction with all main institutional and community stakeholders in order to ensure full inter-institutional and community collaboration that addresses the HSE policy statements and that the work practices are within the ambit of the local regulatory compliance. The contractor shall promote a safe and sound environment and assist all parties (institutional and community) in contributing towards HSE compliant operations. In addition, the contractor shall work strongly in the promotion of a good working relationship within the local community.

Appendix III: WATER SAMPLE ANALYSIS REPORT

[illegible]

FAX: [illegible]

[illegible] LABORATORY

Water Analysis Results

Client: DR. SAID BAKARI
Date Received: 05 September 2022
Source: Water (ZANZIBAR)

No.	PARAMETER	Units	G1	G2	G3	G4	G5	G6	[illegible]	[illegible]	[illegible]	[illegible]
1	pH		7.16	7.08	6.90	7.15	7.31	7.26	[illegible]	[illegible]	[illegible]	[illegible]
2	Temperature	°C	25.10	31.50	[illegible]	29.02	22.80	22.80	[illegible]	[illegible]	[illegible]	[illegible]
3	Turbidity	NTU	6	0	0	[illegible]	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	Colour	TCU	10	0	0	0	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	Salinity	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.10	0.12	[illegible]	[illegible]	[illegible]	[illegible]
6	Electric conductivity	µS/cm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	Total Dissolved solids	mg/l	150.60	100.50	321	471.6	100.90	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	Phosphate	mg/l	1.33	0.54	0.42	0.56	[illegible]	0.96	[illegible]	[illegible]	[illegible]	[illegible]
9	Nitrate-Nitrogen	mg/l	0.40	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	Nitrite-Nitrogen	mg/l	0.0144	[illegible]	0.0111	0.0121	0.0150	0.0145	[illegible]	[illegible]	[illegible]	[illegible]
11	Ammonia-Nitrogen	mg/l	0.150	[illegible]	0.150	0.156	[illegible]	0.156	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	mg/l	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	mg/l	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
14	[illegible]	mg/l	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15	[illegible]	mg/l	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	mg/l	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	mg/l	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16	[illegible]	mg/l	<0.01	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	mg/l	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

S/N	PARAMETER	Units	G11	G12	G13	G14	G15	G16	G17
1	pH		8.98	6.94	7.04	7.11	7.30	7.21	7.12
2	Temperature	°C	22.50	22.6	22.80	22.60	22.40	22.4	22.5
3	Turbidity	NTU	0	0	0	9	1	0	6
4	Colour	TCU	0	0	0	1	0	0	5
5	Salinity	% (ppt)	0.21	0.47	0.21	0.21	0.19	0.21	0.31
6	Electric conductivity	µS/cm	427	538	424	423	384	449	623
7	Total Dissolved solids	mg/l	213.50	269	214	211.50	192.0	209.50	313.0
8	Phosphate	mg/l	0.36	1.41	0.60	1.53	0.66	0.70	1.00
9	Nitrate-Nitrogen	mg/l	2.30	0.30	0.80	0.60	1.40	2.70	1.90
10	Nitrite –Nitrogen	mg/l	0.0164	0.0168	0.0157	0.0164	0.0176	0.0160	0.0154
11	Ammonia-Nitrogen	mg/l	0.131	0.299	0.174	0.169	0.168	0.112	0.202
12	Sulphate	mg/l	6.20	20.70	<1.0	1.0	1.00	7.70	2.50
13	Lead	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
14	Copper	mg/l	<0.01	<0.01	<0.01	0.012	<0.01	<0.01	<0.01
15	Zinc	mg/l	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
16	Nickel	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
17	Chromium	mg/l	<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01
18	Cadmium	mg/l	0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
19	Oil & grease	mg/l	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Appendix IV: SOIL SAMPLE ANALYSIS REPORT