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PROPOSED CONSTRUCTION OF LECTURE THEATRE AND LABORATORY
BUILDINGS AT PLOT NO. 483/2, KUNDUCHI BEACH, UDSM SoAF CAMPUS
KUNDUCHI, KINONDONI MUNICIPAL COUNCIL, DAR ES SALAAM REGION

**Environmental and Social Impact Assessment
(ESIA) Report**

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EXECUTIVE SUMMARY

Introduction

The SoAF Kunduchi Sub-project is one of the Higher Education for Economic Transformation (HEET) Projects being implemented by the UDSM at various locations in the country under the World Bank Financial Support. The HEET Project is divided into two lots: Lot 1 covers the MJNM Campus, CoICT-Kijitonyama, and SoAF-Kunduchi, and Lot 2 covers the Ngongo Site in Lindi Municipality, Likunja Site in Ruangwa District, and IMS Buyu in Zanzibar.

According to the WB requirements, the environmental and social impacts assessment must be conducted for this project in accordance with the World Bank Environmental and Social Framework (ESF), Environmental and Social Safeguarding Policies and relevant Environmental and Social Standards (ESSs), which aim to offset the anticipated social and environmental risks and impacts.

Therefore, in compliance with the WB requirements, the ESIA study was conducted for the SoAF-Kunduchi Project. The objective of the ESIA study was to identify potential environmental and social risks/ impacts associated with the project and thereafter propose appropriate mitigation measures for the identified adverse (negative) impacts and enhancement measures for the identified beneficial (positive) impacts. The intention is to maximize the project benefits and avoid or minimize adverse impacts, and to ensure the project is being implemented in an environmentally friendly and socially acceptable manner.

The ESIA study involved a review of relevant project documents, including national policies, legislations, and World Bank Safeguard Documents such as the Environmental and Social Framework (ESF), ESH Guidelines, and Environmental and Social Standards. The document review was followed by fieldwork, which was mainly conducting a visual inspection of the project site to establish the existing baseline conditions and conducting stakeholder consultation to obtain their views/concerns/opinions regarding the project. Therefore, the purpose of this executive summary is to present some major findings from the ESIA study.

Project Description

The objective of this project is to undertake the construction of Lecture rooms and Fisheries/Aquatic Laboratory Building at the University of Dar Es Salaam (UDSM) School of Aquatic Sciences and Fisheries (SoAF)-Kunduchi Campus. The building will be comprised of the Ground Floor and First Floor, whereby the Ground Floor will consist of two wings. The First Wing will be comprised of a Lecture Theatre with Sanitary Facilities. The Second Wing will comprise of a Cold Room, General Storage Room, Chemical Room, Lab Scientist's Office, Fisheries and Aquatic Sciences Lab, Working Room, and Sanitary Facilities. On the First Floor, the building will be comprised of two Lecture Rooms with associated Sanitary Facilities.

The total construction cost of the proposed building is estimated to be Tanzania Shillings (TZS) 1,231,405,000.00. The project will be funded by the Government of Tanzania and the World Bank (WB) through the Ministry of Education, Science and Technology (MoEST) under the project named Higher Education for Economic Transformation (HEET-P166415). The UDSM will be the implementing Agency through the dedicated Project Implementation Unit (PIU).

The construction period is estimated to be about 18 Months, whereby 1 month will be for the mobilization period, 16 months will be for the construction period, and 1 month will be for the demobilization period. After the construction period, the Campus infrastructure will be operated for an estimated period of 50 years. Thereafter, the Campus infrastructure will have to undergo renovation. The campus is subject to expansion depending on the funding in future.

Policy, Legal and Institutional Arrangement

The relevant Acts, policies and legislations relevant to this project are listed hereunder:

- Environmental Management Act No. 20 of (2004)

- The Water Supply and Sanitation Act No. 12 of 2009
- Land Act no 4 (1999), Cap. 113 R.E. 2019
- The Urban Planning Act (2007)
- Occupation Health Safety (2003)
- Employment and Labour Relations Act No. 6 of 2004
- Engineers Registration (Amendment) Act, 2007
- The Contractors Registration Act (1997)
- The Architects and Quantity Surveyors Act (1997)
- The HIV and AIDS (Prevention and Control) Act of 2008
- The Local Government Laws (Miscellaneous Amendments) Act (1999)
- The Tanzania 2025 Development Vision
- Environmental Impact Assessment and Auditing (Amendment) Regulations (2018)

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

World Bank's new Environmental and Social Framework (ESF);

The World Bank Environmental and Social Safeguarding Policy for Investment;

WB relevant Environmental and Social Standards. This ESIA study has applied 6 relevant standards out of 10 Environmental and Social Standards (ESSs), which are:

- ESS1- Assessment and Management of Environmental and Social Risks and Impacts;
- ESS2 - Labor and Working Conditions;
- ESS3 - Resource Efficiency and Pollution Prevention and Management;
- ESS4 - Community Health and Safety;
- ESS8 – Cultural Heritage; and
- ESS10 - Stakeholder Engagement and Information Disclosure

Baseline Environmental and Social Conditions

The project site forms boundaries with Fish Hatchery to the east; access road to the west, north-west, and north-east; and Block Fence Wall to the south-east, hence demarcating the boundary of SoAF Campus from Kunduchi Wet "N" Wild Park. The proposed SoAF Building Site can be accessed through a 250 m unpaved road connected to the Kunduchi Road.

The project site is located about 200 m from the shoreline, considered an environmentally sensitive area. However, Section 57(1) of the EMA Cap 181 prohibits human activities or construction within Sixty (60) meters of the shoreline. Therefore, it can be concluded that the location of the proposed building complies with the requirements of Section 57(1) of the EMA Cap 191.

The project site is a built-up environment with several planted trees and short grass with patches of bare areas. In addition, there is marshland on the eastern side of the project site, which is used to discharge wastewater from sanitary facilities. There is no any important wildlife inside the project site, although the presence of birds cannot be overruled due to the presence of trees.

The important features that are found within the proposed construction site include 3 electricity power poles. The electricity power poles will be relocated before the commencement of construction works, hence resulting in the disruption of the electricity power supply. There are several trees, mainly *Cocos nucifera*, *Azadirachta indica* and *Mangifera indica*, inside the proposed construction site, and about 30 trees were counted during the site investigation. The trees will have to be removed before the commencement of construction works, hence resulting in the loss of ecological functions and landscape quality.

Stakeholder Identification and Consultation

The following are the identified stakeholders during the EIA study:

- Ministry of Education, Science and Technology (MoEST)
- University of Dar Es Salaam
- Division of Environment in the Vice President's Office (VPO-DOE)
- National Environment Management Council (NEMC)
- Tanzania Fire and Rescue Force
- Occupation Safety and Health Authority (OSHA)
- Kinondoni Municipal Council (KMC)
- Kunduchi Ward Development Committee
- Mtongani Street ("Mtaa") Development Committee
- Tanzania National Electric Supply Company (TANESCO)
- Tanzania Telecommunication Company Limited (TTCL)
- Local Community Members

In general, stakeholders do support the project because they believe it will benefit them and the nation as a whole. However, the stakeholders have raised some issues and concerns regarding the project. The raised issues/concerns were analysed to determine the most affected VEC based on the number of issues/concerns raised for each affected component. The analysis indicates the stakeholders were mainly concerned about the provision of infrastructure to SoAF; sharing of research results; solid and liquid wastes management; reduction of GBV, avoiding child labour, HIV/AIDS prevalence; employment, air pollution, and noise nuisance.

In general, the stakeholders support the project because they believe it will benefit them and the nation. However, the stakeholders have raised some issues and concerns regarding the project.

Identified Issues/concerns by Stakeholder Representatives

The following is the summary of identified issues/concerns by the consulted stakeholder representatives:

- The project is very useful because it will increase the number of students taking fisheries courses and these students are potential employees in our research industry.
- The project will give more rooms for exchanging and improving research results for both TAFIRI and SoAF.
- In a near future, TAFIRI and SoAF will sign a Memorandum of Understanding (MoU) for TAFIRI to also use the lecture theatres and conference rooms.
- TAFIRI also invites the potential students for field attachment in our institute as young or senior researchers.
- The project is very useful for TAFIRI and our office will collaborate with SoAF in research and conducting laboratory tests.
- The proposed building is close to the Wet and Wild Hotel and we expect the hotel owners to use contemporary devices to minimize sound which may disturb students during lecture sessions.
- The Contractor must apply for temporary power for construction and during completion application must be submitted for the operational stage.
- During construction dust and noise emission must be minimized to so that customers at the Wet and Wild Hotel are not affected.
- During lecture sessions the music sounds will be minimized through sound proof devices not to disturb the students and college staff in general
- During lecture sessions the music sounds will be minimized through sound proof devices not to disturb the students and college staff in general.

- The project is very important and we encourage the University to construct many hostels for girls, because girls living off campus face many challenges including unwanted pregnancies which results into single mothers, and street children.

Identified issues/concerns by Local Community Members.

The following is the summary of identified issues/concerns raised by the consulted local community members:

- There will be a spread of HIV/AIDS and other sexually transmitted infections because of labour influx.
- During construction, many people will come as employment speculators, and the security of the properties and people may be at stake. Moreover, the rate of crime may increase as a result of the influx of people.
- There is an increase in Gender Based Violence (GBV) in our community, where women are forced into sexual relations when selling goods to construction workers and sometimes abusive language and touching without the consent of women.
- Our experience shows that the influx of people or job speculators poses a threat to the supply of medicine, including drugs, in our dispensary. We would like to encourage the Contractor to supplement medical facilities/equipment and drugs to meet the demand of newcomers and local communities
- We expect the project will assist the TPDC Community in the construction of pit latrines in our schools

Recommendations from Stakeholder Representatives

The following are some of the recommendations provided by the consulted stakeholder representatives:

- The access road should be improved to allow workers and tourists to visit old graves of different nations. The area is the only place where Swahili civilization is portrayed.
- The contractor must be cautioned not to use/utilize water from the old wells found in the antiquity area because it is one of the historic and heritage assets.
- During construction, Contractor workers and the school community in general must be educated on the spread of HIV/AIDS and STDs.
- We recommend the Contractor use the TAFIRI laboratory for material testing, and if possible, some of the TAFIRI employees can conduct on participate in the SoAF project as trainees in soil and rock testing.
- The design must provide appropriate means of collecting liquid waste because the number of students will increase, and the current sewerage system cannot accommodate much liquid waste.

Recommendations from Local Community Members

The following are some of the recommendations provided by the consulted Local Community Members:

- The contractor should give priority to employment to the people hailing along the project site during the construction. The residents (youth & women) may be involved in some activities as labourers during the construction phase. Furthermore, carpenters and masonry in the community should get first priority in getting skilled labour in the construction.
- UDSM must ensure the entire workforce at the construction site is covered by appropriate insurance policies. Also, first aid should be provided at work, as per the CRB's requirement.
- The Contractor should minimize noises, dust and vibration caused by heavy machines during construction.

Project Alternatives

The following project alternatives were considered for this project based on the techno-economic, environmental and social criteria:

- “No Project Alternative”; VS “Project Alternative”-The project Alternative was selected in favour of the: No Project Alternative” due to its long-term social and economic benefits
- Labour Intensive VS Machine Intensive Construction Methods “Labour Intensive Method” and “Machine Intensive Method” were considered to be useful but with more emphasis on labour-intensive due to their ability to create temporary employment with less environmental, health, and safety risks than the “Machine Intensive Method.
- Diesel Engine Alternative VS Solar Power Alternative -The Sola Power Alternative was selected in favour of the diesel engine due to its less environmental impact than the diesel engine alternative.
- WSP Alternative VS Connection to Central Sewerage System. (CSS) The CSS Alternative was selected in favour of WSP due to the lack of space for WSP.

Potential Environmental and Social Impacts

The following are the identified beneficial (positive) and adverse (negative) environmental and social impacts that are likely to occur during the construction and operation phase. The details on enhancement measures for the identified positive impacts and mitigation measures for negative impacts are provided in Chapter 7 of the ESIA Report.

Environmental Impacts

- Creation of air pollution due to dust and exhaust emissions.
- Creation of noise nuisance and vibration effects.
- Landscape degradation and loss of aesthetic value of the surrounding environment.
- Loss of ecological functions and landscape quality.

Social Impacts

- Creation of employment opportunities for local people due to recruitment of construction workers.
- Creation of income generation opportunities for local people due to increased demand for food from construction workers.
- Increased enrolment of students and revenue for the institute due to the availability of space after the construction of lecture rooms and laboratory building
- Increased revenue for infrastructure/ utility service providers due to increased power and water supply demand.
- Risk of construction-related accidents.
- Increased prevalence of HIV/AIDS and STI transmission
- Increased risk of COVID-19 transmission
- Occupational health and safety risks.

Environmental and Social Management Plan

The purpose of ESMP is to ensure that the project is being implemented with minimum adverse environmental and social impacts. The ESMP focuses on the avoidance of impacts or mitigation of potential impacts associated with project-related activities and the enhancement of project benefits. It specifies mitigation and institutional measures to be taken during the construction and operation phases to eliminate any adverse environmental and social impacts, offset them or reduce them to acceptable levels.

In order to be effective, the ESMP has specified roles and responsibilities of various institutions. The responsible institutions for ESMP implementation include the University of Dar Es Salaam (UDSM) on behalf of the Government of the United Republic of Tanzania; the World Bank (WB); Supervision Consultant; Contractor; Division of Environment in the Vice

President's Office (VPO); National Environment Management Council (NEMC) and Local Government Authority (LGA).


The ESMP also recognizes the important role being played by various stakeholders, whether directly or indirectly. The important stakeholders/agencies identified in this ESMP include the Dar Es Salaam City Council (DCC); Kinondoni Municipal Council (KMC); Fire and Rescue Force, Occupation Health and Safety Authority (OSHA); Ward and Villages Development Committees, and Non-Governmental Organisations (NGOs)/Community-Based Organisations (CBOs) dealing with project-related environmental and social aspects in the project area.

The successful implementation of ESMP also requires a financial commitment. In this regard, cost estimates for implementation of mitigation measures have been taken into consideration. Therefore, the cost of implementation of mitigation measures has been estimated to be TZS **97,900,000.00**. These costs will be included in the Bill of Quantities during the preparation of the Bidding Document.

Conclusion

The project is expected to have both beneficial (positive) and adverse (negative) impacts. However, most of the beneficial (positive) impacts will be long-term and will occur during the operation phase, and most of the negative impacts will be short-term and will occur during the construction phase. Therefore, it can be concluded that the project benefits (positive) will outweigh its adverse (negative) impacts because most of the negative impacts will be short-term and their mitigation measure can be easily implemented through design and good engineering practices. Moreover, the environmental management plan has been formulated to ensure the implementation of outlined mitigation measures. The project benefits will be maximized by enhancing the beneficial (positive) impacts.

THE ESIA TEAM

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¹ All the listed Experts are Registered as EIA Expert by the Natinal Environment Management Council (NEMC) of Tanzania

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ABBREVIATION AND ACRONYMS

AIDS	: Acquired Immunodeficiency Syndrome
CBOs	: Community-Based Organisations
C-ESMP	: Contractor's specified ESMP
DOE-VPO	: Division of Environment in the Vice President's Office
EHSO	: Environmental, Health and Safety Officer
EIA	: Environmental Impact Assessment
EMA Cap 191	: Environmental Management Act Cap 191
EMO	: Environmental Management Officers
ESHS	: Environmental, Social, Health, and Safety
ESIA	: Environmental and Social Impact Assessment
ESMP	: Environmental and Social Management Plan
ESU	: Environmental and Social Unit
GBV	: Gender-Based Violence
GN	: Government Notice
GOT	: Government of the United Republic of Tanzania
GRM	: Grievances Redress Mechanism
GRP	: Grievance Redress Plan
HEET	: Higher Education for Economic Transformation
HIV	: Human Immunodeficiency Virus
HSMP	: Health and Safety Management Plan
KMC	: Kinondoni Municipal Council
LAA	: Local Assessment Area
LGAs	: Local Government Authorities
LHS	: Left Hand Side
MCDO	: Municipal Community Development Officer
MEO	: Mtaa Executive Officer
MoEST	: Ministry of Education Science and Technology
NEMC	: National Environment Management Council
NGOs	: Non-Governmental Organisations
OSHA	: Occupation Safety and Health Authority
PAPs	: Project Affected Persons
PDA	: Project Development Area
P-ESMP	: Project ESMP
PIU	: Project Implementation Unit
PM ₁₀	: Particulate Matter with diameters that are generally 10 micrometres and smaller.
PM _{2.5}	: Particulate Matter with diameters that are generally 2.5 micrometres and smaller
RAA	: Regional Assessment Area
RAP	: Resettlement Action Plan
SEA	: Sexual Exploitation and Assault
SEU	: Safety and Environment Unit
SGO	: Social and Gender Officer
SH	: Sexual Harassment
STIs	: Sexually Transmitted Infections
TAFIRI	: Tanzania Fisheries Research Institute
TAWA	: Tanzania Wildlife Authority
TOR	: Terms of Reference
UDSM	: University of Dar Es Salaam
UEA	: University of East Africa
UTM	: Universal Transverse Mercator

VECs : Valued Environmental Components
WB : World Bank
WEO : Ward Executive Officer

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

University of Dar es Salaam (UDSM) is the oldest public University in Tanzania. The University was established in 1961 as an affiliate College of the University of London, after the independence in 1963, the University became an affiliate of the University of East Africa (UEA), and eventually became independent in 1970 after the split of UEA. UDSM currently is located in Ubungo Municipal Council, Dar es Salaam Region.

Among others, the UDSM is also responsible for infrastructure development including learning equipment, upgrading curriculum, and introducing innovative pedagogical methodology; promoting applied research and innovation capacity; building function linkage with the industry; strengthening the use of digital technology; promoting self-generated income; and building the capacity of both academic staff and the university leadership.

Through the continuation of developing and delivering higher education services to location where the services are not available, the UDSM has received financial support from the World Bank (WB) through the Ministry of Education, Science and Technology (MoEST) under the project named Higher Education for Economic Transformation (HEET-P166415). The Project Development Objective (PDO) of the HEET Project is to strengthening the learning environment and labour market alignment of priority programmes at beneficiary higher education institutions and improving the management of the higher education system.

From the received financial support, sufficient resources have been allocated including a dedicated Project Implementation Unit, Office; and a conducive environment for managing and administering the HEET project. Under HEET project, the project activity implementation covers Lot 1: Dar Es Salaam Campus (Mwalimu Julius Nyerere Mlimani - MJKNM Campus Sites; CoICT-Kijitonyama, SoAF-Kunduchi), and Lot 2: Out of Dar Es Salaam Campuses (Ngongo Area - Lindi Campus; IMS-Buyu, Zanzibar Site; and Likunja Site - Ruangwa).

In this regard, the Government of the United Republic of Tanzania through UDSM (hereinafter referred to as “the Client”) has carried out this Environmental and Social Impact Assessment (ESIA) for the Proposed Construction of Lecture Rooms and Laboratory Building at the University of Dar Es Salaam (UDSM) School of Aquatic Sciences and Fisheries (SoAF) Kunduchi Campus, in Kinondoni Municipal Council, Dar Es Salaam Region.

1.2 Project Rationale

In the past 10 years Tanzania has witnessed a remarkable change in basic education. For instance, enrolment at the primary level has increased to 24.5% from 8,116,488 in 2015 to 10,111,671 pupils in 2018 and 10,601,616 in 2019. In the year 2013/14 the enrolment trend in secondary education showed a positive increase in the number of students transitioning to post-primary education. According to PAD of 2021, student demand for higher education is expected to increase by 2030, therefore the tertiary education system (public and private) must expand and be of better quality to accommodate these additional students.

Despite the fact the country has successfully recorded an increase in basic education, there is prevalent acknowledgement among policy makers that the overall outcome of the successful performance in basic education is the demand for subsequent levels of education and particularly higher education. In this regard, the main challenge is inability of the system to absorb the expanding number of graduates in basic education inspired and capable of joining the higher education subsector. Of immediate need is the expansion of investment in infrastructure, facilities and quality assurance system in Engineering (agro-processing, mechanized agriculture, railway, hydropower, aeronautic etc.), Medical Science and

Technology, Agriculture and Allied Sciences, Energy and Minerals, Forestry and Natural Resource Management

According to the HEET Project Appraisal Document (PAD, 2021) the challenges in the current higher education system include:

- Gender inequality in lower levels of education (especially upper secondary) that persists up to the university level, although the gender parity index in higher education has improved from 56.5 percent in 2013 to 67.4 percent in 2018;
- University graduates struggle to find jobs, at least in part due to skills mismatches;
- Demand-side considerations underscore the need for greater numbers of students in disciplines and programs sought after by employers, such as engineering, agribusiness, tourism, and climate change. The overall quality of post-secondary academic programs is low and does not prepare university graduates adequately for current and future formal jobs or self-employment;
- Shortage of well-trained lecturers, and the majority of academic staff use traditional teaching methodologies;
- Most of higher education institutions are not currently able to access or use modern technologies to deliver training; and
- The global pandemic has reinforced the need for higher education institutions to develop thoughtful resiliency plans.
- Technology, skills and education combined together will help Tanzania to develop its productive sectors and create jobs for youths entering the labour market every year (PAD, 2021).

To address these issues, the World Bank has launched the Higher Education for Economic Transformation (HEET) project. The main objective of the project is to improve the quality, relevance, and equity of higher education in Tanzania. It supports the development of academic programs, research centres, and partnerships in priority areas. It also provides scholarships, grants, and loans to students and institutions. The project is expected to benefit over 100,000 students and 3,000 faculty members by 2028.

The HEET project will invest in infrastructure, facilities, and quality assurance systems in fields such as engineering, medical sciences, agriculture, energy, and natural resources and improve the operational capacities of public universities and be in line with the economic needs of the country and continue to fuel sustainable economic growth through their missions, objectives, and core values.

1.3 The Objectives of HEET Project

The main objective of the project is to strengthen the learning environment and labour market alignment of priority programs at beneficiary higher education institutions and improve the management of the higher education system (PAD, 2021). The stipulated objective is in line with UDSM Rolling Five Years Strategic Plan 2020/21 – 2024/25 and UDSM Vision 2061 which focuses on expanding infrastructures to match with increase in the student's enrolment. This calls for the need to expand its facilities including infrastructures so as to create supportive environment towards achieving its goal.

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

In complying with World Bank's ESF and national legislations, the project beneficiary UDSM through a consultancy service has prepared this ESIA report to identify potential environmental and social risks/impacts and propose appropriate mitigation measures.

1.4 Proposed Activities for UDSM HEET Project at SoAF-Kunduchi

The aim of this project is to undertake the construction of Lecture Rooms and Laboratory Building at the University of Dar Es Salaam (UDSM) School of Aquatic Sciences and Fisheries (SoAF)-Kunduchi Campus. The project will involve Construction of Classrooms, Lecture Rooms and Laboratory Building with a total floor area of about 952.56 Square metres (SQM), at UDSM SoAF-Kunduchi Campus. The building will be comprised of the Ground Floor and First Floor, whereby the Ground Floor will consist of two wings. The First Wing will be comprised of Lecture Theatre with Sanitary Facilities. The Second Wing will be comprised of Cold Room; General Storage Room; Chemical Room; Lab Scientist's Office; Fisheries and Aquatic Sciences Lab; Working Room and Sanitary Facilities. In the First Floor, the building will be comprised of two Lecture Rooms with associated Sanitary Facilities.

1.5 The Objectives and Scope of the Assignment

1.5.1 The Objectives of the Assignment

The purpose of the ESIA study is to identify the environmental and social effects/impacts of the proposed project activities before their actual implementation. The study therefore shall address the social, economic and environmental issues associated with the project activities. The study will also provide a relevant Environmental and Social Management Plan (ESMP) as well as Health and Safety Management Plan (HSMP) in order to prevent or minimize adverse impacts and devising how they can be incorporated into project design and implementation plans, identify organizational capacity and competence needed and monitor the plan's effectiveness.

The main objective of the consultancy services is to prepare ESIA and develop the ESMP and HSMP for the proposed construction activities at the UDSM SoAF-Kunduchi Campus.

Specifically, the objectives of the assignment are as follows:

- To carry out environmental screening and scoping study in order to identify social and environmental issues in the project site and nearby environment;
- To identify, analyse and assess the environmental and social impacts of the proposed construction project;
- To describe the pertinent regulations and standards governing; environmental quality, health and safety, protection of sensitive areas, protection of endangered species and land use control at international, national regional and local levels;
- To recommend cost-effective measures for minimizing or eliminating adverse impacts of the proposed construction, operation and maintenance of the project; and
- To prepare an Environmental and Social Management Plan (ESMP) and Health and Safety Management Plan (HSMP) for the construction, operation and maintenance phases of the Project.

According to the Terms of Reference (ToR) the ESIA should comply with environmental regulations of Tanzania as per the provisions of the Environmental Management (Environmental Impact Assessment and Audit) Act No. 20 of 2004 and (Amendment) Regulations of 2018. In addition, the ESIA study must comply with the World Bank Environmental and Social Framework with Environmental and Social Standards (ESSs). The details on the scope of the assignment are provided in the Terms of Reference.

The Consultant was required to assess the environmental and social impacts that might be caused by the projects during construction and after construction, and thereafter recommend mitigations measures to prevent or minimize adverse impacts as well as developing ESMP and HSMP whose recommendations will be used to inform the design of the proposed project.

1.6 Methodology of the ESIA Study

Key methods used in this study include (i) literature review both secondary data, policies, laws, regulations, Development Plans (ii) conduct meeting for open discussions and focus group discussions (iii) Field visit (iv) other methods such as use of assessment tools such as checklists and matrices. The information collected were main baseline information which was also used as a basis for analysis of impacts. The ESIA team also used a participatory approach in order to involve key players in this study.

1.6.1 Desk Study

The EIA team reviewed relevant documents related to proposed projects. Such documents include Maps, Buildings designs, existing land uses of the areas, climatic and ecological data, relevant policies, laws, regulations, strategies at national level, District Development Plans, Socio-economic Profiles etc, related to environmental and social issues. Literature review aimed at acquiring relevant information on issues that are important and could be related to the project implementation, identification of stakeholders that might be affected by the project, collection of relevant secondary information that might provide insights of the impacts and benefits of the project.

1.6.2 Field Work

The ESIA team visited the site and made observation and assessment of the biophysical conditions, social, economic and environmental characteristic of the project area, proposed sites and layout, as well as key areas of the projects. The survey also included conducting interviews with local people encountered flanking the project area. The collection of baseline data was conducted by defining the scope of the EIA. Data collected during detailed ESIA study allowed the study team to determine whether more detailed information on environmental conditions at the development site and its surroundings are needed and where such information can be obtained. Furthermore, information on socio-economic condition of the local people was collected and used to determine the poverty levels, hence their vulnerability due to labour influx into the project area.

The information on Gender Based Violence (GBV), Sexual Exploitation and Sexual Harassment was collected through face-to-face interviews with representatives of government agencies, local government authorities and local NGOs/CBOs. The collected baseline information was used to assess the risk of GBV/SEA and SH due to prevalence of different forms of violence.

1.6.3 Measurement of Baseline Data

1.6.3.1 Selection of Measured Air Quality, Noise and vibration stations

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

1.6.3.2 Measurement of Ambient air quality, Noise and Vibrations

The measured parameters include: (i) Dust as particulate matter in terms of TSP, PM₁₀ and PM_{2.5}; (ii) Ambient pollutant gases i.e., Sulphur dioxide (SO₂), Nitrogen dioxide (NO₂), Carbon monoxide (CO), Hydrogen Sulphide (H₂S) and Volatile Organic Compounds (VOCs); (iii) ambient noise, and (iv) ground vibrations.

(a) Dust as particulate matter in terms of TSP, PM₁₀ and PM_{2.5}

Dust levels were measured by using Aeroqual Series 500 (S-500). Particulate matter (TSP, PM₁₀ and PM_{2.5}) was measured per manufactured procedure that meets ISO 9835:1993 and ISO 9835:1993 Protocols for TSP, PM₁₀ and PM_{2.5}. During measurements, the device was

fixed at a breathing height of about 1.5 meters from the ground, which is assumed to be the breathing zone of people in their respective locality or working environment. Dust levels were measured at the established station during the daytime and night-time hours. The recorded data were calculated to get the average and were compared with National Environmental (TBS) and WHO/IFC guidelines to check for compliance.

(b) Ambient pollutant gases

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

(c) Noise levels

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

(d) Ground vibrations

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

1.7 Collection of Socio-Economic Data

To determine the cultural and social factors associated with the construction and operation of the proposed project, members of the communities in the general vicinity of the project were interviewed and a review of economic and social literature was conducted. Further, rapid field appraisal techniques in conjunction with desk research were employed to investigations of the socio-economic considerations within the project area. These were undertaken to ascertain information to satisfy the following factors as outlined in the terms of reference provided:

Population and settlement characteristics

- Land uses and livelihoods
- Community structure, employment and income
- Developments underway
- Infrastructure in place
- Water supply and other utilities
- Waste management practices
- Recreational activities

- Energy supply
- Public health and safety
- Access to and delivery of health, education and social services

1.8 Stakeholder Consultation and Public Engagement Programme

The objectives of stakeholder consultation and public engagement programme are to inform interested and affected parties about the Project; to assist in the identification of key issues and concerns in respect of the Project; to obtain information that may assist in carrying out baseline or predictive studies for the EIA; to collect information in respect of the current use of land and resources for traditional purposes by local people; and to ensure that sufficient information in respect of the Project is available to stakeholders and the general public

1.9 Identification and Assessment of Impacts

The identified potential environmental impacts are based on the interaction between the Project Related Activities and Selected Valued Environmental Components (VECs). The selection of VECs was based on existing project environment (environmental baseline conditions), opinions/views obtained from stakeholder consultations, and consultant's professional judgement. For this project the selected VECs include Atmospheric Environment; Acoustic Environment; Terrestrial Environment; Public Health and Safety; Labour and Economy; and Community / Public Services Infrastructure / Utilities.

The identified impacts have been assessed by using Environmental Impact Assessment Matrix. The EIA Matrix helped to determine the significance of impacts based on the following criteria:

- **Importance** – whether important to national, regional, or international interest or site specific.
- **Magnitude of Change** – whether Positive or Negative
- **Permanence** – whether condition is permanent or temporary.
- **Reversibility**- reversible or irreversible.
- Whether **Cumulative / Synergistic** for positive and negative impacts, respectively.

The significance of impacts also took into consideration existing by-laws, national and international environmental standards, legislation, treaties, and conventions that may affect the significance of identified impacts.

These techniques have been used in order to have a logical and systematic way of identifying, assessing, and analysing environmental impacts. The techniques also allowed subjective judgments to be quantitatively recorded and therefore make the assessment of impacts become more objective.

1.10 The Report Format

The report is presented according to the format given in Section 18 (1 and 2) of the Environment Impact Assessment and Audit (Amendment) Regulations, 2018. It is presented as follows:

- (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 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
13. References
14. Appendices

CHAPTER TWO

2.0 PROJECT DESCRIPTION

2.1 Location

The proposed University of Dar Es Salaam (UDSM) SoAF Kunduchi Campus is located in Kunduchi Ward, Kinondoni Municipal Council, Dar Es Salaam Region. The Dar Es Salaam Region forms boundaries with Pwani Region to the west and the Indian Ocean to the north, east and south. The map showing the location of Dar Es Salaam Region is provided in **Figure 2.1-1**.

The Kinondoni Municipal Council forms boundaries with Pwani Region to the west, Indian Ocean to the south, and east; Dar Es Salaam City Council to the south-east; and Ubungo Municipal Council to the south. The map illustrating the location and boundaries of Kinondoni Municipal Council is provided in **Figure 2.1-2**. Finally, the Kunduchi Ward forms boundaries with Wazo to the west; Bunju and Mbweni Wards to the north-west; the Indian ocean to the north and east; and Mikochei to the south. The map showing the location and boundaries of Kunduchi Ward is provided in **Figure 2.1-3**.



Figure 2.1-1: Location of Dar Es Salaam Region
https://sw.wikipedia.org/wiki/Picha:Tanzania,_adm_inistrative_divisions_-_sw_-_colored.svg

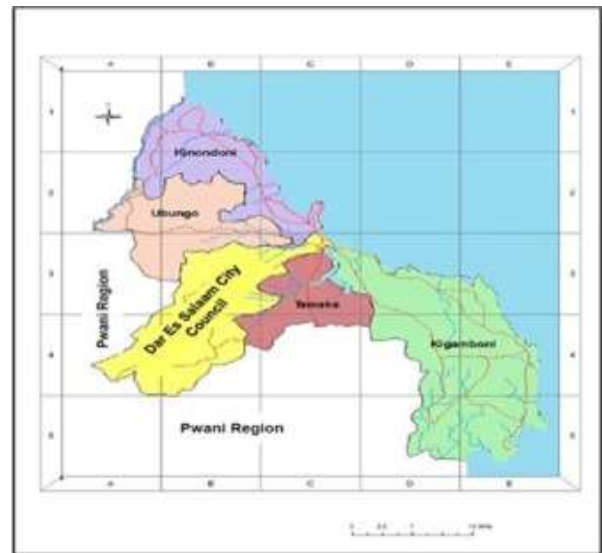


Figure 2.1-2: Location of Kinondoni Municipal Council.
 Source: 2012 Population and Housing Census



Figure 2.1-3: Location of Kunduchi Ward.

2.2 Description of the Project Sites

2.2.1 Location

The proposed project is located at UDSM SoAF-Kunduchi Campus in Kinondoni Municipality, Dar Es Salaam Region. The UDSM SoAF-Kunduchi Campus is located at Latitude -6.664238° and Longitude 39.217900°. The boundaries of the project site are defined by the following UTM Coordinates (Zone 37L):

Points	Eastings	Northings
A	523920.38 m E	9263805.34 m S
B	524245.73 m E	9263303.92 m S
C	524201.34 m E	9263276.37 m S
D	524177.17 m E	9263316.34 m S
E	523950.66 m E	9263111.15 m S
F	523788.26 m E	9263647.48 m S
G	523806.72 m E	9263726.07 m S

The SoAF Kunduchi Campus occupies a total area of about 148,523 Square metres (SQM) and forms boundaries with undeveloped land to the west; a site under construction to the northwest; the Indian Ocean to the east; Kunduchi Wet "N" Wild Water Park to the southeast. The map illustrating the boundaries of SoAF Kunduchi Campus is provided in **Figure 2.2-1**.

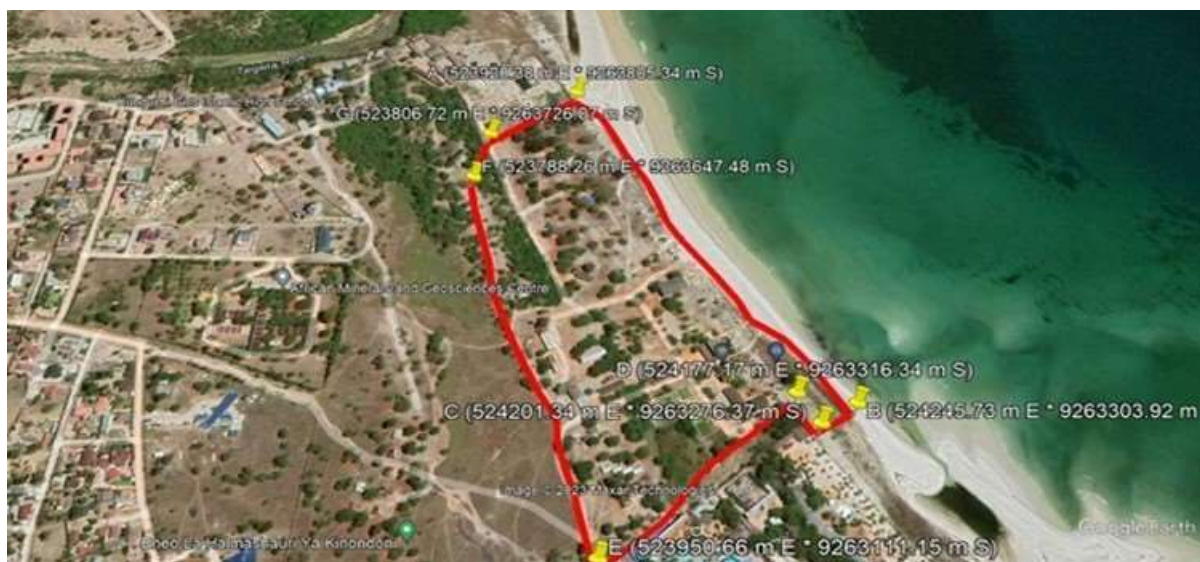


Figure 2.2-1: Boundaries of the Project Site.

2.2.2 Layout of the Project Site

The site layout showing the topography and location of the proposed Lecture Rooms and Aquatic Sciences Laboratory Buildings at SoAF Kunduchi Campus is provided in **Figure 2.2-2**.

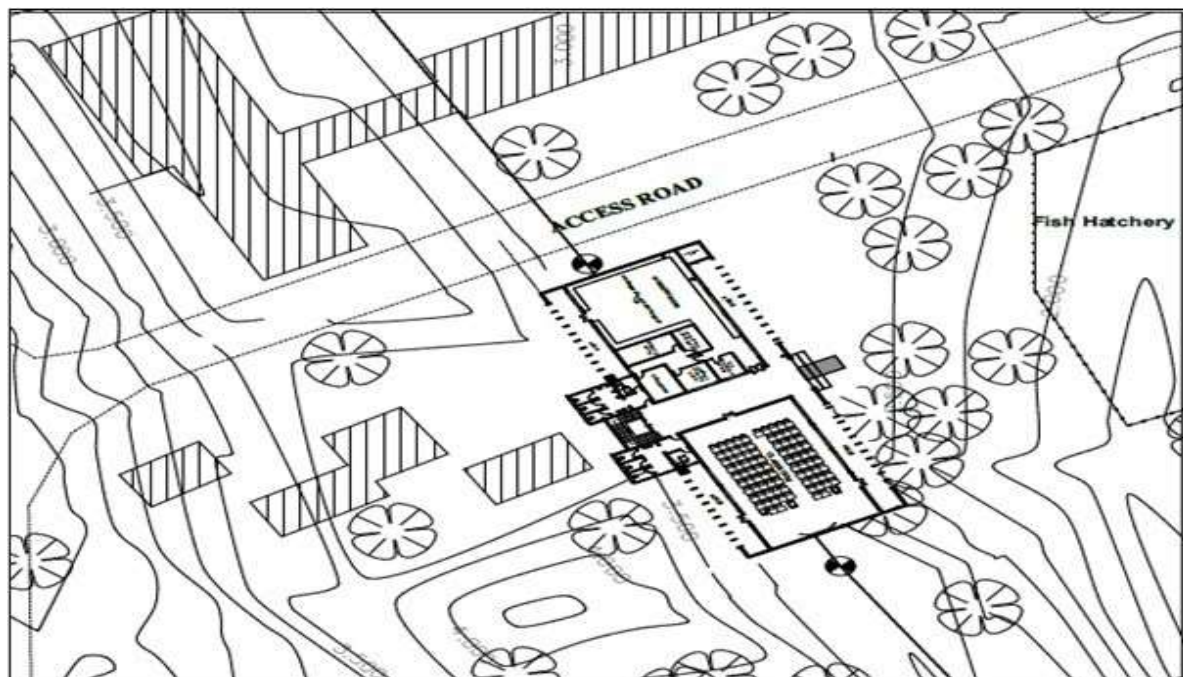


Figure 2.2-1: Layout of the Project Site

2.2.2 Land Ownership and Requirement

UDSM SoAF Kunduchi Campus is the registered owner of the Plot no 483/2 Kunduchi beach, with Title Deed No. DSMT10346690, covering a total area of 351,673 Square Metres (SQM). The development in the area is compatible with the designed land use of the title. The Title Deed for UDSM SoAF Kunduchi Campus is provided in **APPENDIX 1**. The total floor area of the proposed building is estimated to be about 952.56 Square metres (SQM), which is about 0.27% of the total area occupied by SoAF Kunduchi Campus.

2.2.3 Current Land Use and Important Features

2.2.3.1 Important Features

The project site is located about 200 m from the shoreline, which is considered environmentally sensitive area. However, section 57(1) of the EMA Cap 181 prohibits human activities or construction within Sixty (60) meters of the shoreline. Therefore, it can be concluded that the location of the proposed building complies with the requirements of Section 57(1) of the EMA Cap 191. The project site forms boundaries with Fish Hatchery to the east (**Plate No. 2.2-1**); access road to the west; north-west, and north-east; and Block Fence Wall to the south-east demarcating the boundary of SoAF Campus from Kunduchi Wet "N" Wild Park (**Plate No.2.2-2**).

The important features found inside the proposed construction site include 3 Electricity Power Poles. In the south-eastern boundaries, there is an overhead electricity power transmission line, power transformer and overhead telephone cables. In addition, there several trees namely during the field investigation, a total of about 30 trees were identified. These include 20-Neem trees *Azadirachta indica*; 7-Coconut trees (*Cocos nucifera*); 2-Pawpaw trees (*Asimina triloba*); and Tamarind trees (*Tamarindus indica*). All crop trees and other vegetation will be cleared from the site before the commencement of construction works.



Plate No. 2.2-1: Fish hatchery on the eastern boundaries of the project site.



Plate No. 2.2-2: Wet "N" Wild Water Park on the south-eastern boundaries of the project site.

2.2.3.2 Access Road

The proposed SoAF Building Site can be accessed through a 250 m unpaved road (which is connected to the Kunduchi road).

2.3 Project Designs

The total floor area of the proposed building is estimated to be about 952.560 Square metres (SQM) and will be comprised of the Ground and First Floors. The details on the area occupied by each of the proposed facilities are provided in **Table 2.3-1** and **Table 2.3-2**, respectively. In addition, the 3-D Model of the proposed building is provided in **Figure 2.3-1**.

Table 2.3-1: Details of the Proposed Facilities on the Ground Floor.

S/n	Proposed Facilities	Area (m ²)
1.	Female Toilet Room with 3 WCs (Eastern) and 4 Hand Washing Sinks and 1 Special Needs Toilet with 1 WC (Western) and 1 Hand Washing Sink	16.920
2.	Male Toilet Room with 3 WCs (Eastern), 2 Hand Washing Sinks, 2 Urinals, and 1 Special Needs Toilet with 1 WC (Western) and 1 Hand Washing Sink	16.920
3.	Staircase Area	35.250
4.	Lecture Room (96 Students)	286.500
5.	Entry Lobby	57.000
6.	Cold Room	10.395
7.	General Storage Room	10.395
8.	Technician's Office Room	8.820
9.	Chemical Room	24.000
10.	Lab Scientist's Office Room	10.000
11.	Fisheries and Aquatic Science Lab	87.450
12.	Working Room	45.050
13.	Corridor Areas	23.175
14.	Aisle Area 1 (LEFT)	36.500
15.	Aisle Area 2 (LEFT)	47.750
16.	Aisle Area 1 (RIGHT)	36.500
17.	Aisle Area 2 (RIGHT)	47.750
18.	Total:	765.125

Source: Architectural Drawings, 2023

Table 2.3-2 Details of the Proposed Facilities on the First Floor.

S/n	Proposed Facilities	Area (m ²)
1.	Female Toilet Room with 3 WCs (Eastern) and 4 Hand Washing Sinks and 1 Special Needs Toilet with 1 WC (Western) and 1 Hand Washing Sink	16.920
2.	Male Toilet Room with 3 WCs (Eastern), 2 Hand Washing Sinks, 2 Urinals, and 1 Special Needs Toilet with 1 WC (Western) and 1 Hand Washing Sink	16.920
3.	Staircase Area	35.250
4.	Lecture Room (96 Students)	286.500
5.	Entry Lobby	57.000
6.	Cold Room	10.395
7.	General Storage Room	10.395
8.	Technician's Office Room	8.820
9.	Chemical Room	24.000
10.	Lab Scientist's Office Room	10.000
11.	Fisheries and Aquatic Science Lab	87.450
12.	Working Room	45.050
13.	Corridor Areas	23.175
14.	Aisle Area 1 (LEFT)	36.500
15.	Aisle Area 2 (LEFT)	47.750
16.	Aisle Area 1 (RIGHT)	36.500
17.	Aisle Area 2 (RIGHT)	47.750
Total:		765.125



Figure 2.3-1: The 3-D Model of the proposed building.

2.3.1 Climate Change Risks Mitigation and Adaptation

- Low energy use, rainwater harvesting, storm water management systems, adequate natural ventilation and lighting, and green space infrastructures shall be accommodated in the design of the SoAF Kunduchi Centre in order to mitigate and adapt the climate change risks (e.g., heat, drought, water scarcity, etc) as described below;

- Park and open space: Trees will be planted in the park and public open spaces to maximize the tree canopy cover and shade provided by trees in the area for more provision of ecosystem services. In doing so native trees will be given first priority to maintain the natural ecosystem.
- 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.
- Green areas: Green areas are distributed in every zone/ block to allow cross fresh air into the buildings. Due to the topographical nature and nature vegetation cover, green belt and conservation zone intend to preserve the ecosystem and control land degradation. Trees and grasses will reduce soil erosion in sloping plains and all areas prone to soil erosion.
- The building with low energy use; Provisions for adequate openings for cross ventilation, that will ensure easy flow of clean air and reduce energy use (thus reducing emissions); provisions for motion sensors in public areas, to enable auto switch ON/OFF of lights; installation of presence sensors in offices, class rooms, laboratories and workshop areas; proper orientation to reduce indoor discomfort and capture natural air as much as possible and minimization of the sun effects (installation of fans; and provisions for solar lights along the pathways for sun shading); maximizing the potential of utilization of renewable energy options such as solar and wind; Utilization of biogas from the wastewater treatment plant for cooking; buildings to be oriented and constructed to take advantage of natural lighting and cross ventilation as a means of minimizing energy consumption during operation;
- The buildings with low footprint. This increases green spaces; and accommodation of rainwater harvesting, storm water and waste management systems and embracing water-efficient processes.

2.3.2 Disaster Management

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

2.3.3 Gender Inclusivity

The University structures shall be designed to be intelligent and inclusive to all genders, with special attention to accommodating individuals with special needs (e.g. physical, learning impairment, emotional and behavioural). These include provisions of ramps, toilets, etc.

2.3.4 Occupational Health and Safety (OHS)

During pre-construction phase

The structural elements of a project will be designed and constructed by competent professionals, and certified or approved by competent authorities or professionals. Where the

project includes new buildings and structures that will be accessed by members of the public, the UDSM 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, UDSM will also apply the concept of universal access to the design and construction of such new buildings and structures.

During construction phase

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

During operation phase

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

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 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.

2.4 Project activities

2.4.1 Mobilization Phase

The mobilization phase is the initial stage of the project cycle, during which the Contractor will start to mobilize equipment and workforce for the project. For this project, the following are some of the major activities to be carried out by the Contractor:

- Topographical survey and geotechnical investigations.

- Establishment of Contractor's Site Office and Materials Storage Yard.
- Recruitment of construction workers and administrative staff.
- Relocation of overhead electricity power lines, water supply pipelines, etc.
- Soil excavation and removal of existing vegetation/tees from the construction site.
- Transportation of excavated soil materials, construction related solid wastes and demolition solid wastes to the dumping site.
- Transportation of construction materials and equipment/machinery to the site.
- Installation of safety/security fence around the construction site and installation of temporary safety sign boards.

2.4.2 Construction Phase

The second stage is the construction phase, which overlaps with the mobilization phase, whereby some of the activities from the mobilization phase will continue during the construction phase. During construction, the following activities will be performed;

- Earthworks including vegetation clearance, removal of top soils, excavation of the foundation for the proposed facilities and storm water drainages system.
- Filling of parking facility bed with gravel/base course materials, compaction and laying of concrete pavements.
- Transportation of construction materials, machinery, and equipment to new construction sites
- Collection and transportation of soil/spoilt materials and demolition wastes to the dumping site.
- Transportation of construction materials such as gravel, sand, aggregates, cement bags, and reinforcement bars to the materials storage yards.
- Fabrication of concrete slabs, curb stones, and concrete lining of storm water drainages,
- Installation of permanent road and safety signs, security lights, and traffic lights.
- Installation of CCTV cameras for security purposes
- Construction of the proposed facilities for SoAF.
- Painting of the Campus facilities
- Rehabilitation of the access road
- Construction wastewater collection and disposal facilities
- Construction of solid waste collection facilities

2.4.3 Demobilization Phase

This is the third stage of the project cycle, which involves restoring the project site at least to its original conditions. The following are some of the major activities to be carried out by the Contractor during the demobilisation phase:

- Removal of temporary infrastructure, and equipment from the construction site;
- Disposal of contaminated materials including used oil, sewage, and solid wastes (plastics, wood, metal, papers etc.) to the authorized dumping place;
- Disassembling and transportation of construction equipment/machinery from the construction sites; and
- Landscaping of the open areas.

2.4.4 Operation Phase

The operation phase is the fourth stage in the project cycle, which involves the operation of the constructed infrastructure. The following are some of the major activities to be carried out during the operation phase:

- Operation of campus hostel
- Periodic maintenance of the Campus infrastructures,
- Preparations of farms for researches
- Operation of cafeteria

- Operation of labs and offices
- Landscaping of the open areas

2.5 Material Requirements

2.5.1 Crushed Stone Aggregates

The amount of crushed stone aggregates is estimated to be 3,150 m³ and is expected to be delivered to the site by private dealers by using trucks.

2.5.2 Sand Materials

The amount of sand materials is estimated to be 1,500 m³ and will be obtained from private dealers. The sand materials will be delivered to the site by private dealers using trucks.

2.5.3 Construction Water

The amount of water required during construction purposes is estimated to be about 20,000 Litres/Day and will be obtained from DAWASA. This amount will involve water use for concrete works, curing and dust suppression.

2.5.4 Manufactured Materials

Manufactured materials like cement, lime, bitumen, and steel bars will be required in the construction works. All these materials are available in bulk quantities from various dealers in the country.

2.5.5 Equipment

The type of equipment to be required will depend on the prevailing conditions on the site. However, the most common equipment for construction works includes lorry tippers, bulldozers, concrete plants, rollers and plate compactors, wheeled loaders, hydraulic excavators, vibrators, concrete mixers, fuel and water tankers (bowsers), graders, pokers, vehicles, trucks, dewatering pumps, site dumper, hydraulic cranes, etc.

2.5.6 Labour Force

The project is expected to deploy skilled, semi-skilled and unskilled labours to execute the work. The estimated 10 skilled labour will be deployed from both Contractor and Supervision Consultant, while 30 semiskilled and 100 unskilled will be employed by the Contractor. The actual number of labours to be deployed during the project execution will be determined during mobilisation phase. The expected working hours for the workforce is 8 hrs from the starting hours including lunchtime.

2.6 Project Boundaries

2.6.1 Spatial Boundaries

The spatial boundaries of the project environment have been divided into Project Development Area (PDA), Local Assessment Area (LAA), and Regional Assessment Area (RAA). The spatial boundaries of the project environment are illustrated in **Figure 2.6-1**.

2.6.1.1 Project Development Area (PDA)

The Project Development Area (PDA) is the most basic and immediate are of the Project. The PDA is limited to the anticipated area of the physical disturbance associated with the Construction and Operation of the Project. For this Project, the PDA consists of the area to be occupied by the lecture rooms and laboratory building, which is estimated to be about 952.56 Square metres (SQM).

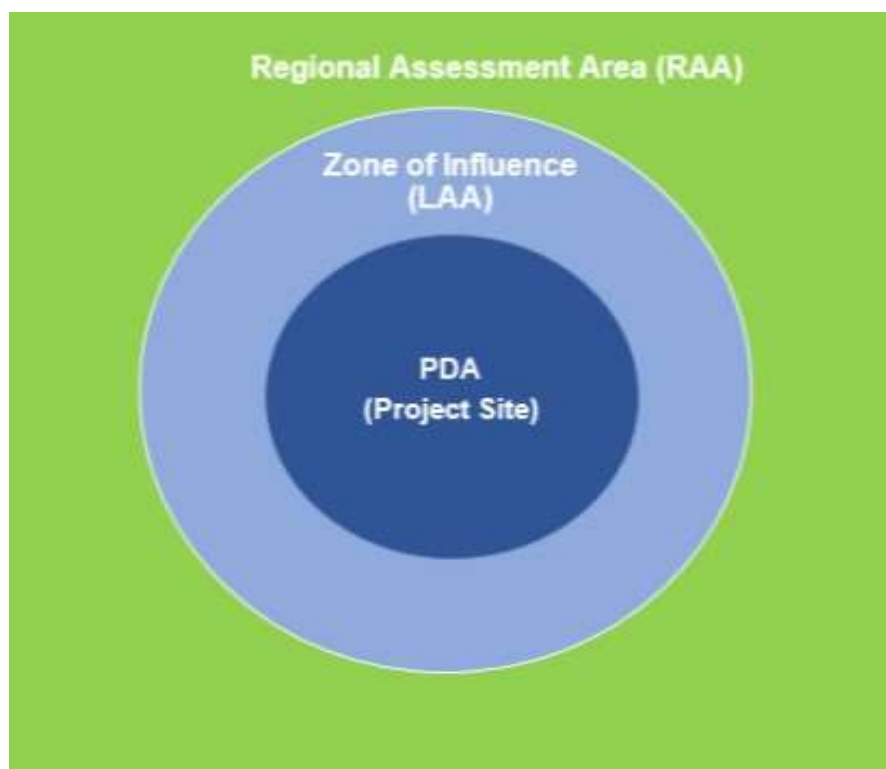


Figure 2.6-1: Spatial boundaries of the Project Environment.

2.6.1.2 Local Assessment Area (LAA)

The Local Assessment Area (LAA) is the maximum area within which Project-related environmental effects can be predicted or measured with a reasonable degree of accuracy and confidence. The LAA is commonly referred to as the “Zone of Influence” of the Project and may include areas that could experience Project environmental effects that arise beyond the area of physical disturbance by the Project.

The LAA includes the PDA and any flanking areas to the project site, where Project-related environmental effects may reasonably be expected to occur. The definition of LAA varies from one VEC to another, depending on the local conditions, biological characteristics, socio-economic factors, cultural values and other factors.

2.6.1.3 Regional Assessment Area (RAA)

The Regional Assessment Area (RAA) is the area within which the Project’s environmental effects may overlap or accumulate with the environmental effects of other projects or activities that have been or will be carried out such that cumulative environmental effects may potentially occur. The RAA is defined for each VEC depending on the physical and biological conditions and the type of and location of other past, present, or reasonably foreseeable projects or activities that have been or will be carried out.

2.6.2 Temporal Boundaries

The temporal boundaries of the project refer to the timing and duration of the Project. The temporal boundaries of the project consist of the durations for the mobilization, construction, and demobilisation phases of the project. In addition, the temporal boundaries are the design periods of the road pavement and its associated bridges and other drainages structures.

The following are the temporal boundaries of the project during the mobilization, construction, and demobilisation phases:

Activities	Duration
Mobilization phase:	1 month
Construction phase:	16 months
Demobilization phase:	1 Month
Defect liability period:	12 Months
Operation phase:	50 years and more (Life span of the project or design period).

The Decommissioning Phase of the project is not expected to occur so long as the need for university facilities and services is operational. Instead, the building will continue to be undergoing regular maintenance and improvement depending on future requirements.

2.6.3 Institutional Boundaries

Institutional boundaries for the project refer to various institutions, government agencies, and local government authorities that are relevant to the project implementation. It specifies the roles and responsibilities of each institution for environmental management at the national, regional, district, ward and street ("mtaa") levels. The following are the relevant institutions for the implementation of this project:

- Ministry of Education, Science and Technology (MoEST)
- University of Dar Es Salaam (UDSM)
- Division of Environment (VPO-DOE)
- National Environmental Management Council (NEMC)
- Kinondoni Municipal Council
- Ward and Mtaa Development Committees

2.7 Waste Management

2.7.1 Mobilization Phase

The most common types of solid wastes to be generated during the mobilization phase will be mainly soil materials and debris from site excavations. The amount and type of solid wastes will depend on the depth of the area to be excavated and number of buildings to be demolished from the site.

The Contractor's office is expected to generate sanitary wastes, mainly wastewater from the kitchen, bathrooms, and toilets. Types of solid wastes to be generated include food residues, waste papers, plastic bottles, food cans, etc. The amount of wastewater and solid wastes will depend on the number of people occupying the Contractor's Office. Other types of wastes will be generated from construction activities and construction machinery/equipment operation. These include cement bags, pieces of bricks/blocks, wood, and metals, oils, grease and paint containers.

Some of the solid wastes like cement bags, paint containers, waste oils, and pieces of bricks and wood can be re-used during construction or handed over to local people. Non-re-usable wastes will be disposed into the approved site by the Resident Engineer.

2.7.2 Construction Phase

During the construction phase, the operation of the Contractor's Office is expected to generate wastewater from kitchen, bathrooms and toilets. The type of solid waste to be generated from the camp site will comprise food residues, plastic bottles, plastic papers, food cans, broken glass and waste papers, etc. The construction activities will result in soil materials from excavations, cement bags, metals, waste oils, paint containers, bricks and wood.

However, the number of solid wastes and wastewater to be generated during construction phase is not expected to be significant compared to similar types of wastes being generated in the municipality. The waste oils and other hazardous wastes will be collected by authorized dealers. The non-reusable solid wastes will be disposed of as prescribed by the Resident

Engineer. The estimated quantities of various types of wastes likely to be generated during construction phase is provided in **Table 2.7-1**.

Vehicle and construction equipment's emissions, which are carbon dioxide CO₂, small amounts of noxious gases such as sulphur dioxides SO_x, nitrogen oxides (NO_x), hydrocarbons and particulate matter (PM) associated with transport, excavation and construction and also exhaust fumes from construction plant, machinery and vehicle. These Green greenhouse gases (GHGs) are known to interfere with temperature regimes and cause climate change effects. Regular maintenance of vehicles and construction equipment and deploying of qualified drivers and construction equipment operators will help to combat the impacts.

The construction works are also expected to generate hazardous wastes such as Paints, Waste Oils, and Used Batteries. All hazardous wastes will be handed over to an authorized

The following methods will help to reduce the magnitude of the anticipated impact: Prevention, if possible, Reuse, Recycling, Recovery, and Disposal.

Vehicle and construction equipment emissions and hazardous waste are significant in the construction phase but short term, while throughout the mobilization and demolition phases, the impact is insignificant and short term.

Table 2.7-1: Quantity of Wastes to be Generated during Construction Phase.

Category of waste	types	Quantity	Treatment Disposal
Solid Waste (Degradable)	General garbage (food remains, cardboards and papers etc.)	35 kg/day (based on generation rate of 0.25kg/day/person and 140 workers)	To be collected in skip bucket then disposed at the Municipal dumpsite
	Vegetation	30 Nos. trees. Namely Neem trees (20), Coconut trees (7), Pawpaw (2), and Tamarind tree (1).	Tree logs will be handed over to local people.
	Pieces of timber	Variable	Will be collected for re-use by the Contractor for other projects or handed over to local people.
Solid Waste (Non-Degradable)	Plastics	Variable	Will be collected and handed over to recyclers
	Tins, glasses	Variable	Will be collected and handed over to recyclers
Hazardous Wastes	Scrap metals, materials packaging, paint buckets, corrugated iron sheets, oil filters and etc.)	Variable	To be collected and handed over or sold to the registered hazardous waste dealers by NEMC or VPO
Liquid waste	Sewage	4.48 m ³ /day (Based on 80 people, water consumption rate of	To be discharged into the central sewerage system

Category of waste	types	Quantity	Treatment Disposal
		40L/capita/day and wastewater discharge factor of 80%)	
	Oils and greases	Variable	To be collected and handed over or sold to the registered hazardous waste dealers by NEMC or VPO

2.7.3 Demobilization Phase

The waste to be generated includes pieces of bricks, concrete rubbles, pieces of wood, scrap metals. All these wastes will be transported to Kunduchi Dump Site, about 1 km from SoAF-Kunduchi Campus.

2.7.4 Operation Phase

The types of solid and liquid wastes to be generated during operation include food remnants from cafeterias, wastewater from toilets and baths; papers; and plastic. Wastewater will be treated in onsite sanitation systems; solid wastes will be collected and transported to the Kunduchi Dump Site, about 1 km from the proposed site. Food wastes will be vended to livestock keepers nearby the project area. Plastic waste will be collected and sold to recyclers for recycling and send back to the market for the same or different use.

CHAPTER THREE

3.0 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

Preamble

This Chapter provides the description of relevant National Policies, Legislations and World Bank Environmental and Social Standards, and Institutional Framework for environmental management in the country as well as relevant regulations, strategies, standards, international conventions and/or treaties/agreements. It also considers compliance with relevant National Policies and World Bank Environmental and Social Standards (ESS), legal requirements, and international conventions/agreements/treaties to which the country is a signatory.

3.1 NATIONAL POLICIES

3.1.1 Cross-cutting Policies

3.1.1.1 National Environmental Policy (2021)

The National Environmental Policy (NEP) of 2021² is the main policy document governing environmental management in the country. The overall objective of NEP (2021) is to provide a national framework for guiding harmonized and coordinated environmental management for the improvement of the welfare of present and future generations.

The policy provides a broad range of measures and actions responding to key environmental issues and challenges. It provides the framework for an integrated approach to planning and sustainable management of the environment in the country. It also recommends strong institutional and governance measures to support the achievement of the desired objectives and goals.

Therefore, the policy addresses the following key environmental issues and challenges:

- land degradation;
- lack of accessible good quality water for urban and rural inhabitants;
- environmental pollution;
- loss of wildlife habitats and biodiversity;
- deterioration of aquatic ecosystems;
- deforestation;
- environmental pollution;
- climate change; and
- safe use of modern biotechnology.

The policy also identifies the following crosscutting issues as challenges facing environmental management in the country:

- Inadequate environmental Good Governance at all levels;
- Inadequate financial resources for Environmental Management; and
- Inadequate Gender consideration in environmental management.

The policy recognises the role and responsibilities of key players for successful achievement and implementation of policy objectives. The key players include the Ministry Responsible for Environment, Ministry of Finance, Sector Ministries, Government Departments and Agencies, Regional Secretariats, Local Government Authorities (LGAs), National Environment Management Council (NEMC), National Environmental Advisory Committee (NEAC), Environmental Appeals Tribunal, Civil Society Organizations, Academic and Research Institutions, Local Communities, Media, Development Partners, Regional and International Bodies,

² The United Republic of Tanzania. Vice President's Office. National Environmental Policy, 2021. October 2021. <https://www.vpo.go.tz/uploads/publications/en-1644923087-NATIONAL%20%20ENVIRONMENTAL%20POLICY%202021%20new.pdf>

Relevance / Compliance

The project is being implemented by UDSM under the Ministry of Education, Science and Technology (MoEST), which is recognized by the policy as one of the key players in the implementation of NEP (2021). The project proponent will ensure mainstreaming of the NEP objectives and strategies into the project and will ensure there is a collaboration with other stakeholders as required by the policy.

3.1.1.2 National Policy on HIV/AIDS (2001)

The National Policy on HIV/AIDS (2001) was formulated by the Government of Tanzania (GOT) under technical support from the World Health Organization Global Programme on AIDS (WHO-GPA) led to the establishment of the National HIV/AIDS Control Programme (NACP) under the Ministry of Health.

The overall goal of the National Policy on HIV/AIDS is to provide a framework for leadership and coordination of the National multi-sectoral response to the HIV/AIDS epidemic.

The policy outlines several specific objectives, however, the relevant objectives, which focus on sectoral roles and financing are:

- To strengthen the role of all the sectors, public, private, NGOs, faith groups, PLHAs, CBOs and active participation of all stakeholders in HIV/AIDS prevention and control.
- To provide a framework for coordination and collaboration of HIV/AIDS work.
- To influence sectoral policies so as to address HIV/AIDS.

Relevance / Compliance:

The project is likely to lead into HIV/AIDS transmission due to interaction between construction of workers and students or local community members. Therefore, the project proponent will ensure the Contractor develops and implements HIV/AIDS prevention and control programme for construction workers and students.

3.1.1.3 National Human Settlements Development Policy (2000)

The overall goal of the National Human Settlement Development Policy (2000)³ is to promote the development of sustainable human settlement and to facilitate the provision of adequate and affordable shelter to all people, including the poor. The policy outlines a number of objectives; however, the relevant objective is to protect the environment within human settlement and natural ecosystems against pollution, degradation, and destruction with the aim of attaining sustainable development.

Relevance / Compliance:

The project is likely to lead into environmental pollution due to dust emission and generation of liquid and solid wastes. The project proponent will ensure dust emission is minimized during transportation and storage of dusty construction materials. The project proponent will also ensure proper disposal of solid wastes and liquid wastes to avoid pollution of the surrounding environment.

3.1.1.4 Women and Gender Development Policy (2000)

The objective of the Women and Gender Development Policy (2000)⁴ is to provide a directive to ensure the planning, strategies, and various activities in each sector and institution take into consideration gender equality. The policy outlines eleven specific objectives, but the most relevant ones for this project include:

- To ensure development plans take into consideration gender equality

³ National Human Settlements Development Policy (2000). United Republic of Tanzania. Ministry of Lands and Human Settlement Development. Dar Es Salaam, January, 2000.

⁴ Jamhuri ya Muungano wa Tanzania. Sera ya Maendeleo ya Wanawake na Jinsia. Wizara ya Menedeleo ya Jamii, Wanawake and Watoto. S. L.P. 3448, Dar Es Salaam, TANZANIA. Mwaka 2000.

- To identify the role of women and men to ensure their participation in development activities for the benefit of society.

In general, the policy aims at establishing strategies for poverty eradication by ensuring that both women and men get access to existing resources for their development. It values the role played by women in bringing about development in society.

Relevance / Compliance

The project has the potential to create employment for people during construction. The project proponent will ensure the Contractor provides equal employment opportunities between women and men, and will avoid any kind of discrimination in the workplace.

3.1.1.5 National Employment Policy (2008)

The overall objective of the National Employment Policy (2008)⁵ is to stimulate national productivity, to attain full, gainful, and freely chosen productive employment, to reduce unemployment, and underemployment rates, and enhance labour productivity. The policy outlines several specific objectives but the most relevant ones are:

- To promote equal access to employment opportunities and resources endowments for vulnerable groups of women, youth, and People with Disabilities (PWDs).
- To address cross-cutting issues related to the environment, gender, and HIV/AIDS in employment

Relevance / Compliance

The project has the potential to create employment for youth and women and to create adverse environmental impacts as well as the prevalence of HIV/AIDS. The project proponent will ensure the Contractor provides equal employment opportunities for women and men with a focus on vulnerable groups. The project proponent will also ensure the Contractor minimizes HIV/AIDS prevalence through formulation and implementation of HIV/AIDS preventive and control programme.

3.1.1.6 Occupational Health and Safety Policy (2009)

The main objective of the Occupational Health and Safety Policy (2009)⁶ is to reduce the number of work-related accidents and diseases in Tanzania. The policy outlines eight specific objectives, but the most relevant ones are:

- To improve occupational health and safety skills and resources in the public and private sectors.
- To enhance education and training on occupational health and safety at all levels.
- To mainstream cross-cutting and cross-sectoral issues at workplaces.

Relevance / Compliance

The project has the potential to create occupational health and safety risks during implementation. The project proponent will ensure the provision of Personal Protection Equipment (PPE) to the construction workers and regular training on OHS issues to the construction workers.

3.1.1.7 National Plan of Action to End Violence against Women and Children

The National Plan of Action to End Violence Against Women and Children (NPA-VAWC, 2017/18-2021/22)⁷ emphasizes the actions needed for both preventing and responding to

⁵ The United Republic of Tanzania. Ministry of Labour, Employment and Youth Development. National Employment Policy 2008. Dar Es Salaam, Tanzania 2008.

⁶ The United Republic of Tanzania. Ministry of Labour, Employment and Youth Development. National Occupational Health and Safety Policy. 2009.

⁷ NATIONAL PLAN OF ACTION TO END VIOLENCE AGAINST WOMEN AND CHILDREN IN TANZANIA. December, 2016. <file:///E:/DOCS/BRT%20PHASE%204%20PROJECT/LITERATURE/NATIONAL%20PLAN%20OF%20ACTION%20TO%20END%20VIOLENCE.pdf>

violence and recognizes that investing in violence prevention initiatives has a positive impact on inclusive growth.

Thus, the diverse investments being made by the government, development partners, and stakeholders on the lives of women, children, and families and subsequently on communities and Tanzania as a whole, is of paramount importance.

The NPA-VAWC is grounded in the Tanzanian context and envisages improved coordination, delivery of quality services, implementation of viable prevention and response measures and application of innovative solutions to end all forms of violence against women and children.

Relevance / Compliance

The project is likely to result into the risk of emergence of Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH) due to interpersonal and social interactions among the construction workers. The project proponent will ensure the Contractor prevents the emergence of GBV/SEA and SH. This will include awareness creation on GBV/SEA and SH for construction workers.

3.1.1.8 National Disability Policy (2004)

The policy was drafted by the ministry of labour, Youth Development and sports. It set the objective of the policy which are;

- Encourage the development of the people with disabilities
- Empower families of people with disabilities
- Review /amend legislations that are not disability friendly
- Improve service delivery
- To allow the participation of people with disability in decision making and implementation of important disability friendly activities
- To enable families of people with disabilities and society at large to participate in decision making and implementation of important disability friendly activities.

Relevance / Compliance:

The project will observe this act in order to provide accessible infrastructure to people with disabilities.

3.1.1.9 Education Training Policy (2014)

Tanzania aims to improve the quality of education. This is through collaboration with all education stakeholders to modernise the curriculum at all levels and ensure it meets requirements. The education training policy of 2014 stressed that to improve the quality of education in Tanzania, there should be a shift from using many textbooks to using a single textbook for each subject. The policy also emphasises all private schools need to have affordable school fees on the basis of "Unit per course" and analyse its operation as well. The school fees should relate to the service offered by the school. This project aligns with this policy as it will modernise education training and implement state-of-the-art equipment for training. In addition, the university fees will be affordable to all people.

3.1.1.10 The National Gender Policy (2002)

The key objective of this policy is to provide guidelines that will ensure that gender-sensitive plans and strategies are developed in all sectors and institutions. While the policy aims at establishing strategies to eradicate poverty, it is relevant to the project as it emphasises gender quality and equal opportunity for both men and women to participate in development undertakings and to value the role played by each member of society. It also requires that women and men are given equal employment opportunities in the project whenever possible. This project shall ensure that women will be adequately involved at all project planning and implementation levels.

3.1.1.11 Urban Planning and Space Standards Policy 2012

The policy guides the continuing delivery of a high-quality pedestrian and other people-friendly public realm within the city centres to support the city centres' economic, social, cultural and environmental attractiveness to businesses, residents and visitors. The policy explains more as space management is a key foundation of the asset management strategy. Also, providing appropriate space is becoming even more important as institutions increasingly compete in urban areas.

Relevance/Compliance

The project will plan to utilise the area during its implementation properly.

3.1.2 Sectoral Policies

3.1.2.1 Construction Industry Policy (2003)

The vision of the Construction Industry Policy (2003)⁸ is: To have a dynamic, efficient, and competitive local construction industry that is able to undertake construction projects of any magnitude and participate effectively in providing its services in the regional and global market place.

The mission is to create an enabling environment for the development of a vibrant, efficient, and sustainable local industry that meets the demand for its services to support sustainable economic and social development objectives. The policy outlines several objectives; however, the relevant policy objective is to improve the capacity and competitiveness of the local construction enterprises (contractors, consultants, and informal sectors). The project proponent has been involved in the service of local consultants in the design, preparation of bidding documents and supervision. During construction, priority will be given to local contractors or joint ventures/associations between the local and firms from abroad, local people, as well as, the use of locally available materials, as emphasized in the policy.

3.1.2.2 National Land Policy (1995)

The overall aim of a National Land Policy (1995)⁹ is to promote and ensure a secure land tenure system, to encourage the optimal use of land resources, and to facilitate broad-based social and economic development without upsetting or endangering the ecological balance of the environment. The policy outlines several specific objectives; however, the most relevant policy objective to this project is to protect land resources from degradation for sustainable development. The project has the potential to create land degradation through soil excavations, and accumulation of construction solid wastes into the surrounding environment. The project proponent will ensure proper disposal of construction solid wastes and restoration of the landscape after construction. The Engineer will ensure construction activities are confined within the permitted areas in order to minimize land degradation.

3.1.2.3 National Mineral Policy (2009)

The National Mineral Policy also addresses that mining activities should be undertaken in a sustainable manner. Reclamation of lands after mining activities is recommended. As far as this project is concerned, mining activities are directed to quarrying activities for obtaining stones and aggregates. Fine and coarse aggregates for the proposed project will be strictly purchased from authorised vendors.

3.1.2.4 National Energy Policy (2015)

The Vision of the National Energy Policy (2015)¹⁰ is to have a vibrant Energy Sector that contributes significantly to economic growth and improved quality of life of Tanzanians. The

⁸ Construction Industry Policy (2003). The United Republic of Tanzania. Ministry of Works. November, 2003.

⁹ National Land Policy (1997). The United Republic of Tanzania. Ministry of Lands and Human Settlements Development, Dar Es Salaam, Tanzania. Second Edition 1997.

¹⁰ National Energy Policy (2015). The United Republic of Tanzania. Dar Es Salaam. December, 20015.

Mission is to provide reliable, affordable, safe, efficient and environmentally friendly modern energy services to all while ensuring the effective participation of Tanzanians in the sector. The main objective of the policy is to provide guidance for sustainable development and utilization of energy resources to ensure optimal benefits to Tanzanians and contribute towards the transformation of the national economy. The policy outlines sector specific issues, statements, and objectives. With regard to energy efficiency and conservation, the policy objective is to promote energy efficiency and conservation in all sectors of the economy.

Relevance/Compliance

The relevant issues to this project are energy efficiency in the transport sector and the residential and commercial sectors. The project falls under the buildings construction sector which is recognized by the policy as one of the energy consuming sectors. The design and construction of buildings will be carried out in such a way as to optimize energy efficiency.

3.1.2.5 National Health Policy (2003)

The National Health Policy (2003)¹¹ outlines several objectives but the most relevant one is to reduce the burden of disease, maternal and infant mortality and increase life expectancy through the provision of adequate and equitable maternal and child health services, facilitate the promotion of environmental health and sanitation, promotion of adequate nutrition, control of communicable diseases and treatment of common conditions.

Relevance/Compliance

The project has the potential to create a spread of communicable diseases due to interaction between the construction workers and local community members. The project proponent will ensure provision of sanitary facilities for construction workers.

3.2 LEGAL FRAMEWORK

3.2.1 Environmental Management Act (EMA), 2004

The Environmental Management Act No. 20 of 2004 is the principal legislation governing environmental management in the country. The Act was established to address the environmental management priorities set in the NEP (1997). The Act provides a legal framework for managing environment in the country. The Act sets provision of environmental management tools namely: Environmental Management (Environmental Impact Assessment and Audit) Regulations 2005 (Amendment), 2018; Environmental Management (Hazardous Waste Control and Management) Regulations (2009); and Environmental Management (Soil Quality Standards) Regulations (2007).

The EMA requires an Environmental and Social Impact Assessment (ESIA) to be carried out for the development of any project which is likely to have a significant impact on the environment. The ESIA provides the institution responsible for environment sufficient information to justify, on environmental, social and community development grounds, the acceptance, modification or rejection of the project and its implementation. Moreover, the ESIA is targeted to provide the basis for guiding subsequent actions of the project life cycle which - through management and monitoring plan - will ensure that the proposed project is carried out considering the environmental, socio-economic issues, and resettlement initiatives identified along with requirements for compliance throughout the project's life cycle.

The Act makes it mandatory for any person to comply with the environmental and social impact assessment requirement 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 ESIA screening, scoping and the review process, while the preparation of the EIS is carried out by the registered expert forwarded by the project proponent and only after having been approved by the National

¹¹ The United Republic of Tanzania. Ministry of Health, National Health Policy, Ministry of Health, October 2003.

Environmental Management Council (NEMC). The HEET project has to conform to all requirements of environmental clearance and safeguards and they include EIA, Auditing, Monitoring, and implementation of the environmental and social management plans for the project. The Act is relevant to the project because it is expected to have some negative impacts to the environment during its implementation. The act requires the EIA report to be submitted to NEMC for review and subsequently issuance of Environmental Impact Assessment Certificate.

3.2.2 The Environmental Management Act Cap 191

The Environmental Management Act Cap 191 (EMA Cap 191)¹² is an Act to provide for legal and institutional framework for sustainable management of environment; to outline principles for management, impact and risk assessments, prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and enforcement; to provide basis for implementation of international instruments on environment; to provide for implementation of the National Environment Policy; to repeal the National Environment Management Act, 1983 and provide for continued existence of the National Environment Management Council; to provide for establishment of National Environmental Trust Fund and to provide for other related matters. Sub-section 81(1) requires any developer of a project to undertake Environmental Impact Assessment study at his/her own cost Sub-section 81(2) requires Environmental Impacts Assessment to be carried out prior to the commencement or financing of a project or undertaking. The project falls under those projects that require EIA to be carried out prior to the commencement of construction works. This EIA is an indicator of compliance with the requirements of the EMA Cap 191.

3.2.3 The Environmental Impact Assessment and Audit Regulations (2005)

The Environmental Impact Assessment and Audit Regulations (2005)¹³ are made under Environmental Management Act No. 20 of 2004. The regulations provide basis for undertaking Environmental Impact Assessment (EIA) and Environmental Audit for various development projects with significant environmental impacts in the country. These regulations provide the procedures for carrying out Environmental Impact Assessment, Environmental Monitoring and Environmental Audits.

Regulation 4 prohibits any developer or proponent from implementing a project which is likely to have a negative environmental impact without conducting Environmental Impact Assessment study.

Relevance / Compliance

The project falls under those projects that require Environmental Impact Assessment (EIA) study. The Project Proponent will adhere to the procedures for conducting EIA study as prescribed in these regulations.

3.2.4 The Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations (2018)

The Environmental Management (Environmental Impact Assessment and Audit) (Amendment) Regulations, 2018 is read as one with the Environment Impact Assessment and Audit Regulations (2005). These provide some amendments to the EIA and Audit Regulations (2005) and classify projects into Four (4) Categories based on the magnitude of impacts on the environment. These include Category "A"; Category "B1"; Category "B2" and "Special Category". The regulations provide the procedures for registration of each category of project.

Relevance / Compliance

¹² Environmental Management Act No. 20 of 2004. The United Republic of Tanzania. Vice President's Office. 11th November 2004.

¹³ Environmental Impact Assessment and Audit Regulations (2005). The United Republic of Tanzania.

The project falls under Category A in accordance with the classification provided in the amendment regulations. The Project Proponent already complied with project registration procedures as prescribed in these regulations.

3.2.5 The Architects and Quantity Surveyors Act (1997)

The law requires architects and quantity surveys to be registered with the Board before practising. Only registered architects and quantity surveyors shall be involved in implementing the proposed project.

3.2.6 The Occupational Health and Safety Act (2003)

The Occupational Health and Safety Act No. 5 of 2003¹⁴ is an Act to repeal the Factories Ordinance; to make provisions for the safety, health, and welfare of persons at work in factories and other places of work; to provide for the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with activities of persons at work; and to provide for connected matters. The project involves construction activities that are likely to create occupational health and safety risks. The project proponent will follow the provisions given in the Act to safeguard the health and safety of workers. This will include ensuring that the contractor conducts risk assessment including providing Personal Protective Equipment (PPE) to construction workers. The contractor will also develop occupational health and safety management plan

3.2.7 The Public Health Act (2009)

The Public Health Act No. 1 of 2009¹⁵ is an Act to provide for the promotion, preservation, and maintenance of public health with a view to ensuring the provisions of comprehensive, functional, and sustainable public health services to the general public and to provide for other related matters.

Section 32(1) requires the occupier or owner of any premises shall cause any drainage system to be properly protected or inspected to the satisfaction of an authorized officer in order to prevent the ingress of mosquitoes, vermin, and other disease-causing agents. According to Sub-section 32(2), any person who contravenes the provisions of this section commits an offence and on conviction is liable to a fine not exceeding one hundred thousand shillings.

Section 101(2) deals with the connection of private drains or sewers with public sewers. It prohibits direct or indirect discharge of any matter from a manufacturing process or factory other than domestic or storm-water into the public sewer without a written agreement with the Authority.

Relevance/Commitment:

The operation of buildings is expected to generate sanitary wastewater from toilets and washrooms. The wastewater treatment system and sewer pipelines will be designed in such a way that waste water will be directed into the soak way pit.

3.2.8 The HIV and AIDS (Prevention and Control) Act (2008)

The HIV and AIDS (Prevention and Control) Act No. 28 of 2008¹⁶ is an Act to provide for the prevention, treatment, care, support and control of HIV and AIDS, for the promotion of public health in relation to HIV and AIDS; to provide for appropriate treatment, care and support using available resources to people living with or at risk of HIV and AIDS and to provide for related matters. Section 6(3) requires the project proponent to design and implement HIV/AIDS prevention and control programme and to submit it to TACAIDS before implementation for coordination and advice.

¹⁴ Occupational Health and Safety Act (2003). The United Republic of Tanzania. Ministry of Labour. 13th February 2003.

¹⁵ The Public Health Act No. 1 of 2009.

¹⁶ HIV and AIDS (Prevention and Control) Act (2208). The United Republic of Tanzania. Ministry of Health and Social Welfare. 1st February 2008.

Relevance / Compliance:

The project is likely to create increased transmission of HIV/AIDS due to interaction between construction and the flanking local community members. Thus, the project proponent will ensure the contractor formulates and implements HIV/AIDS prevention and control programme.

3.2.9 The Employment and Labour Relations Act of 2004

The Act prohibits forced labour and discrimination of any kind in the workplace. It provides employment standards such as contracts with employees, hours of work, remuneration, leave, unfair termination of employment and other incidents of termination. The Act makes provision for core labour rights, to establish basic employment standards, framework for collective bargaining, prevention and settlement of disputes and other related matters. The Act strictly prohibit child labour, it provides that no person shall employ a child under the age of fourteen years, it further provides that a child under eighteen years of age shall not be employed in any worksite including construction were, that being a case. The Act prohibits discrimination, being direct or indirect in any employment policy or practice on any of the following grounds; colour, nationality, tribe or place of origin, race, national extraction, social origin, political opinion nor religion, sex, gender, pregnancy, marital status, or family responsibility, disability, HIV/AIDS, age or situation of life. It is an offence for this provision to be contravened by any employer. The proposed project will follow this Act requirements in matters related to labour and employment, during its implementation. In the Employment and Labour Relations Act, Section 7(1) provides details on conditions of a good and reliable employment environment.

Furthermore, sections 11-91 make provision for wage determination that stipulates a minimum term and condition of employment as shall be the employment standard. Section 11(2) and 14(1) provide detail on employment contractual conditions, while sections 19(1), (2), (3) and (5) state the working duration and overtime conditions. Moreover, section 31 provides information on employment leave and sections 32(1), (2) and (3), provide information on sick and maternity leave. UDSM will ensure that it operates within the requirements of this legislation and will comply with stipulated conditions of the Employment and Labour Relations Act, 2004 for ensuring that employee is motivated in discharging their duties for maximum productivity.

3.2.10 The Worker's Compensation Act (Cap. 263 RE 2025)

The Workers' Compensation Act (Cap. 263 RE 2025)¹⁷ is an Act to provide compensation to employees for disablement or death caused by or resulting from injuries or diseases sustained or contracted in the course of employment; to establish the Fund for administration and regulation of workers' compensation and to provide for a related matter.

Section 34(1) requires an employer to, within seven days after receiving a notice of an accident from the employee or having learned in some other way that an accident has occurred, report the accident to the Director- General in a prescribed form.

Sub-section 34(2) requires an employer; at the request of an employee or the dependant of an employee furnish the employee or dependent with a copy of the notice of the accident furnished by the employer to the Director-General in respect of a claim for compensation by the employee or dependant.

Section 71(1) requires an employer carrying on business in Tanzania shall within the prescribed period and in the prescribed form register himself to the Director-General and furnish the Director-General with-

- (a) the prescribed particulars of the employer's business; and
- (b) any additional particulars he/she may require.

¹⁷ The United Republic of Tanzania. Chapter 263. The Workers' Compensation Fund Act. (Principal Legislation). Revised Edition of 2015.

Section 72(1) requires an employer to keep a register or other record of the earnings and other prescribed particulars of all employees and to produce the register or record or a satisfactory reproduction on demand to an authorized person for inspection.

Relevance/Commitment:

The project proponent will adhere to the objectives of the Act. This will include submission employees' records of earnings and monthly contributions.

3.2.11 The Contractors Registration Act (1997)

The Contractors Registration Act No. 17 of 1997¹⁸ is an Act to provide for the registration of contractors and to establish a Board to regulate the conduct of contractors and for the related matters.

Section 12(l) prohibits non-citizens of the United Republic from forming a local contracting firm unless the majority of its shares are owned by the citizens of the United Republic of Tanzania. Otherwise, it will be registered as a foreign firm or company.

Section 23(1) prohibits any body of persons, whether corporate or unincorporated, from carrying out the business of contractors, unless at least one of the partners or directors who shall also be a shareholder has, as prescribed by the Board, the required technical qualifications, skills, and experience.

Relevance / Compliance

The project will engage the services of contractors during construction. Therefore, the project proponent will ensure only qualified and registered contractor is engaged in the execution of the project.

3.2.12 The Contractors Registration (Amendment) Act (2008)

The Contractors Registration (Amendment) Act No. 15 of 2008¹⁹ is an Act to amend the Contractors Registration Act, to provide provisions for effective regulation of activities and maintenance of professional conduct and integrity of contractors and for related matters. The Act shall be read as one with the Contractors Registration Act, hereinafter referred to as the "principal Act."

Sub-section 22(4) prohibits an employer or developer from engaging unregistered firms or persons. If found guilty is liable to a fine of not exceeding ten per cent of the contract sum or project value but not less than one per cent of such contract sum or project value or five million shillings, whichever amount is greater or to imprisonment for a term of not less than three years or to both.

Relevance /Commitment

The project will require engagement of contractor during construction. The project proponent will comply with the requirement of the Act by employing only a qualified and registered contractor.

3.2.13 The Engineers Registration Act (1997)

The Engineers Registration Act No, 15 of 1997²⁰ is an Act to repeal and re-enact with modifications the Engineers (Registration) Act of 1968, to establish a Board to regulate the conduct of engineers, to provide for their registration and for related matters. Section 12(1)

¹⁸ Contractors Registration Act No. 17 of 1997. United Republic of Tanzania.

¹⁹ Contractors Registration (Amendment) Act No. 15 of 2008. United Republic of Tanzania.

²⁰ Engineers Registration Act No. 15 of 1997. United Republic of Tanzania.

prohibits any person or body of persons who are not citizen of the United Republic from being registered as a local consultant or consulting firms unless:

- in the case of a natural person, he is a citizen of the United Republic;
- in the case of a company, it is incorporated in Tanzania and the firms.

Relevance /Commitment

The project involves consultancy services during contract supervision. In this regard, the project proponent will engage only a qualified and registered engineering consultancy firm.

3.2.14 The Engineers Registration (Amendments) Act (2007)

The Engineers Registration (Amendment) Act No. 25 of 2007²¹ is an Act to amend the Engineers Registration Act of 1997 and shall be read as one with the Engineers Registration Act, hereinafter referred to as the "principal Act"

Sub-section (1) any person from employing as an engineer any person who is not a professional engineer or consulting engineer, or causing to undertake engineering works or services without employing the services of a professional engineer or consulting engineer.

Sub-section (2) prohibits any person from taking up or continuing in any employment as an engineer, or carrying out engineering works or services, unless he is a professional engineer or consulting engineer.

Relevance /Commitment

The project will require services of engineers during construction. In this regard, the project proponent will ensure only qualified professional engineers are employed.

3.2.15 The Land Act (1999)

The Land Act No. 4 of 1999 is an Act to provide for the basic law in relation to land other than the village land, the management of land, settlement of disputes and related matters. Section 156 of the Land Act 1999 requires compensation to be paid to any person for the use of land of which he/she is in lawful or actual occupation as a communal right of way and with respect to a way leave. These include: any damage suffered in respect of trees, crops, and buildings as a result of the creation of way leave; and damage due to surveying or determining the route of that way leave. It is the responsibility of the government department of the Ministry, Local Government authority or corporate body that applied for the right of way to pay compensation.

Relevance / Compliance

The project will involve the construction of lecture rooms and laboratory in government land. Therefore, the project proponent will not be required to pay any compensation. On the other hand, the proponent is required to instruct the contractor to compensate for any damage that will be caused by the ongoing works on the adjacent lands.

3.2.16 The Land Use Planning Act (2007)

The Land Use Planning Act No. 6 of 2007²² is an Act to provide for procedures for the preparation, administration, and enforcement of land use plans, to repeal the Land Use Planning Commission and to provide for related matters.

The Act has distinctive authorities of land use planning in Tanzania and establishes land use planning authorities. It outlines their functions and powers conferred upon them. The authorities established under the Act include:

²¹ Engineers Registration (Amendments) Act No. 25 of 2007. United Republic of Tanzania.

²² Land Use Planning Act (2007). The United Republic of Tanzania. Act Supplement No. 10 22nd June, 2007. to the Gazette of the United Republic of Tanzania No. 25 Vol. 88, dated 22nd June, 2007.

- Village Councils – that are responsible for planning and managing village lands.
- District Councils – that are responsible for planning and managing all lands in the district and assist Village Councils to plan and manage their areas of jurisdiction.
- Land Use Planning Commission – which prepares national land use planning framework plan and assist the lower echelon to prepare plans and manage their lands.

Relevance / Compliance:

The project proponent will make consultation with the district land use planning authorities before implementing the project in the areas of jurisdiction. The project proponent will implement the project in accordance with the current land use plans in the project area to avoid any possible conflicts or incompatibility with current and future land use plans.

3.2.17 The Urban Planning Act (2007)

The Urban Planning Act No. 8 of 2007 regulates land use in the country. It requires the occupier to pay land rent in order to get the Certificate of Occupancy. The Act, among others, requires the submission of drawings, elevations, and plans to the urban authority. The Act gives the Commissioner for lands absolute discretion to give or withhold building consent.

Relevance / Compliance

The project proponent will comply with the requirements of the Act by submitting drawings to the urban authority.

3.2.18 The Education (Amendment) Act (1995)

Act amended the Education Act, of 1978 that establish the Higher Education Accreditation Council, to provide the procedure for accreditation and other related matters. Among other functions, the council accredits higher education institutions; approve admissions into state institutions of higher education, to examine and approve proposals for courses of study and course regulations submitted to it by institutions of higher education; make regulations in respect of admission of persons seeking to enrol in state institutions of higher education and to provide a central admission service to higher education institutions; and make visitations and inspection of higher institutions.

Relevance/Compliance

The project is under the University of Dar es Salaam, therefore will be monitored by Higher Education Accreditation Council.

3.2.19 The Standard Act (2009)

The Act aims at the promotion of specifications of commodities and services, re-establish the Bureau of Standards (TBS), the designated national standards authority established under Tanzania the TBS Act 1975 and repealed by this act. TBS is responsible for developing all kinds of national standards, including environmental standards.

Relevance/Compliance

The project will adhere to this Act, through use of the building materials that are approved by the TBS.

3.2.20 The Universities Act (2005)

An Act to make provision for the establishment, composition and function of the commission for universities, the coordination and rationalization of the types and categories of universities, the promotion and financing of higher education, establishment and governance of universities and for other related matters.

The amends the Education Act, 1978 by repealing the whole of Part IX and amending section 33. repeals the following acts;

- (a) The Muhimbili University College of Health Science Act,1991;
- (b) The Mzumbe University Act,2001;
- (c) The Open University of Tanzania Act,1992;
- (d) The Sokoine University of Agriculture Act,1984 and
- (e) The University of Dar es Salaam Act,1970

Relevance / Compliance:

The project will deal with construction of university campus in Tanzania mainland and Zanzibar.

3.2.21 The University of Dar Es salaam Act (1970)

The objectives and function of university of Dar Es salaam are to preserve, transmit and enhance knowledge for the benefit of the people of Tanzania in accordance with the principles of socialism accepted by the people of Tanzania; to create a sense of public responsibility in the educated and to promote respect for learning and pursuit of truth; to prepare students to work with the people of Tanzania for the benefit of the nation; to assume responsibility for university education within the united Republic and make provision for places and centres of learning, education, training and research; to co-operate with the Government of the United Republic and the people of Tanzania in the planned and orderly development of education in the United Republic; to stimulate the promotion intellectual and cultural development of the united Republic for the benefit of the people of Tanzania; and to conduct examination for, and grant, degrees, diplomas, certificates and other awards of the University.

Relevance/Compliance

The project proponent will ensure compliance with the requirements of the Act during construction and operation phase.

3.2.22 Workers Compensation Act (No.20), 2008

The Act focuses mainly on:

- Provision for adequate and equitable compensation for employees who suffer occupational injuries or contract occupational diseases arising out of, during their employment, and in the case of the death of their dependents.
- Provision for the rehabilitation of employee who has suffered occupational injuries or contacted occupational diseases in order to assist in restoring their health independence and participation in society.
- Provide a framework for the effective, prompt and empathetic consideration, settlement and payment of compensation benefits to employees and their dependents.
- Provide for establishing, controlling and administrating workers to compensation fund and the legal framework for the contribution to, and payment from, the fund.
- Give effectiveness to international obligations with respect to compensation.
- Promote prevention of accidents and occupational diseases.

This Act provides the right to compensate workers for occupational injury in sections 19(1) - (5) or accidents in sections 20 and 21. Also, in sections 22(1) - (5), an employee has the right to compensation for occupational diseases. The proposed project activities at UDSM will operate within the requirements of this legislation and abide by all relevant sections provided by this Act.

3.2.23 The Personal with Disabilities Act (2010)

The Persons with Disabilities Act 2010: An Act to make provisions for the health care, social support, accessibility, rehabilitation, education and vocational training, communication, employment or work protection and promotion of basic rights for the persons with disabilities and to provide for related matters. A person with disabilities has the right to:

- be respected, recognized and treated in a way which does not lower his dignity;
- an education through special equipment and participate in social affairs;
- have infrastructure and environment which allow him to go wherever he pleases, use transport facilities and get information;
- use sign languages, written language by the aid of special machines or other methods that are appropriate;
- learn with persons without disabilities; and
- Get a job and contest leadership posts in various sectors.

Section 31(1) “requires employers to hire and maintain the employment of people with disabilities and establishes a work force quota under which every employer with a work force of 20 or more individuals must employ persons with disabilities at a rate of at least 3% of the employer’s total workforce.”

Relevance/Commitment

Incorporating the principles and provisions of the Persons with Disabilities Act into a project demonstrates a commitment to social inclusion, human rights, and sustainable development. We will create an environment where individuals with disabilities can fully participate, contribute, and benefit from the opportunities provided by the project.

3.2.24 Social Security Act No. 135, 2018

The general objective of the Act is to ensure that every citizen is protected against economic and social distress resulting from substantial loss in income due to various contingencies. The Act outlines the legal framework for the establishment, operation, and regulation of social security schemes and programs also the act is a kind of collective measures or activities designed to ensure that members of society meet their basic needs and are protected from the contingencies to enable them maintain a standard of living consistent with social norms.

Relevance/Commitment

As the project is involve the aspect related to social welfare, labour rights, and employee benefits. Integrating the provisions of the act into project planning and implementation can lead to better compliance with legal requirements, improved social protection, and more equitable outcomes so the project will provide social security to the workers and people involved.

3.2.25 Marriage Act 2015

Sections 10(2), 13(1) and 15 of Tanzania’s Law of Marriage Act, CAP 29 [R: E 2015] allow men to contract polygamous marriages, and permit the marriage of 15-year-old girls, while the minimum age of marriage for boys is 18 years. Also, in the act the state the marriage of free will as no marriage shall be contracted except with the consent, freely and voluntarily given, by each of the parties.

Relevance/Commitment

When young girls are forced to marry, they face potentially subjected to state sanctioned rape and are at risk of increased domestic violence, early pregnancy and negative health consequences while being denied education and economic opportunities as project as it concerns it will prevent early and forced marriage by provide education to the community and give the young girl education opportunities.

3.2.26 Fire and Rescue Act (2007)

According to the Act, among others, the functions of the force are to: ‘(a) Extinguish fire (b) grade cities, municipalities, townships and villages into various fire and rescue services levels (c) conduct fire inspection and investigations for purposes of obtaining information relating to

the causes of fire and loss inflicted by fire (d) Conduct studies on investigation of arson and accidental fire (e) Conduct training for fire department personnel, other officers and voluntary fire-fighters (f) Prepare fire statistics and fire service information (g) Conduct fire tests on protection facilities, equipment and materials. Section 3(1) (g) covers the premises of the facility used to store flammable liquids, gas or chemicals. The Act also obliges the owners and managers of the structures to set aside places with free means of escape and install fire alarm and detection systems or other escape and rescue modalities in the event of fire. Design and construction of all buildings shall take into strict consideration the requirements specified in this Act.

3.3 Other Relevant Legislations

The following are other relevant legislations to which the project will comply with during implementation:

- The Environmental Management (Air Quality Standards) Regulations 2007 (GN No. 237/2007)
- The Environmental Management (Water Quality Standards) Regulations, 2007 (GN No. 238/2007);
- The Environmental Management (Soil Quality Standards) Regulations 2007 (GN 239/2007)
- The Environmental (Solid Waste Management) Regulations, 2009 (GN No. 263/2009)
- The Environmental Management (Quality Standards for Control of Noise and Vibration Pollution) Regulations, 2015.

3.3.1 International Conventions

3.3.1.1 ILO Conventions

The ILO Conventions cover a wide area of social and labour issues including basic human rights, minimum wages, industrial relations, employment policy, social dialogue, social security, and other issues.

(a) Working Environment (Air Pollution, Noise, and Vibration) Convention, 1977 (No. 148²³)

The Convention got entry into force on 11 Jul 1979, and Tanzania signed the Convention on 30 May 1983 and accepted the obligation of the convention in respect of air pollution only²⁴. According to Article 3, the term air pollution covers all air contaminated by substances, whatever their physical state, which is harmful to health or otherwise dangerous; the term noise covers all sound which can result in hearing impairment or be harmful to health or otherwise dangerous; The term vibration covers any vibration which is transmitted to the human body through solid structures and is harmful to health or otherwise dangerous.

Article 4 requires national laws or regulations to prescribe measures to be taken for the prevention and control of, and protection against, occupational hazards in the working environment due to air pollution, noise, and vibration; and to have provisions concerning the practical implementation of the measures so prescribed may be adopted through technical standards, codes of practice and other appropriate methods.

Relevance / Compliance:

The project has the potential to create occupational health and safety risks due to the handling of hazardous construction materials and equipment. The project proponent will ensure the Contractor provides relevant PPE to construction workers.

²³ [https://en.wikipedia.org/wiki/Working_Environment_\(Air_Pollution,_Noise_and_Vibration\)_Convention,_1977](https://en.wikipedia.org/wiki/Working_Environment_(Air_Pollution,_Noise_and_Vibration)_Convention,_1977)

²⁴ https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11300:0::NO::P11300_INSTRUMENT_ID:312293

(b) Worst Forms of Child Labour Convention, 1999 (No. 182)²⁵

The Convention concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour, known in short as the Worst Forms of Child Labour Convention, was adopted by the International Labour Organization (ILO) in 1999 as ILO Convention No 182. It is one of eight ILO fundamental conventions. Tanzania signed the Convention on 12 September 2001.

By ratifying this Convention No. 182, a country commits itself to take immediate action to prohibit and eliminate the worst forms of child labour. Article 1 requires member countries to take immediate and effective measures to secure the prohibition and elimination of the worst forms of child labour as a matter of urgency.

Relevance / Compliance:

The project has the potential to create employment, and there is a possibility of children trying to seek employment during construction. The project proponent will ensure the Contractor does not employ children aged 14 years or below.

(c) Discrimination (Employment and Occupation) Convention, 1958 (No. 111)²⁶

The Convention concerning Discrimination in Respect of Employment and Occupation or Discrimination (Employment and Occupation) Convention (ILO Convention No. 111) is an ILO Convention on anti-discrimination. It is one of eight ILO fundamental conventions. The convention requires states to enable legislation that prohibits all discrimination and exclusion on any basis including race or colour, sex, religion, political opinion, national or social origin in employment, and repeal legislation that is not based on equal opportunities.

Article 2 requires each Member Country to declare and pursue a national policy designed to promote, by methods appropriate to national conditions and practice, equality of opportunity and treatment in respect of employment and occupation, to eliminate any discrimination in respect thereof.

Relevance / Compliance:

This project will employ different people of different origins in terms of nationalities, tribes, races religious affiliations, and gender. The Contractor will ensure there is no any kind of discrimination based on nationality, tribe, race, religion, or gender.

3.3.1.2 Workmen's Compensation (Accidents) Convention, 1925 (No. 17)²⁷

Workmen's Compensation (Accidents) Convention, 1925 is an International Labour Organization (ILO) Convention, which was adopted on June 10, 1925, and came into force on April 1, 1927. Tanzania signed the convention on 30 January 1962.

Article 1 requires each Member Country to ensure that workmen, who suffer personal injury due to an industrial accident, or their dependents, shall be compensated on terms at least equal to those provided by this Convention.

Relevance / Compliance:

This project has the potential to cause accidents or death during construction. The project proponent will ensure that the Contractor is registered by the Workers Compensation Fund, which is responsible for the payment of compensation in case of injury or death of any worker in the course of work.

²⁵ https://en.wikipedia.org/wiki/Worst_Forms_of_Child_Labour_Convention

²⁶ [https://en.wikipedia.org/wiki/Discrimination_\(Employment_and_Occupation\)_Convention](https://en.wikipedia.org/wiki/Discrimination_(Employment_and_Occupation)_Convention)

²⁷ [https://en.wikipedia.org/wiki/Workmen%27s_Compensation_\(Accidents\)_Convention,_1925](https://en.wikipedia.org/wiki/Workmen%27s_Compensation_(Accidents)_Convention,_1925)

3.3.5 Relevant International Agreements, Conventions and Treaties

International agreements, conventions and treaties which are relevant to this project include the United Nations Framework Convention on Climate Change (1992).

3.3.1.3 United Nations Framework Convention on Climate Change (1992)

The United Nations Framework Convention on Climatic Change (UNFCCC) aims to stabilise greenhouse gas (GHG) concentration in the atmosphere at a level that allows ecosystems to adapt naturally and protects food production and economic development. Article 4 commits parties to develop, periodically update, publish and make available national inventories of anthropogenic emissions of all GHGs not controlled by the Montreal Protocol (by source) and inventories of their removal by sinks, using agreed methodologies. It commits parties to mitigate GHG as far as practicable. Since Tanzania is a Party to the Convention, she will have to account for all sources of GHG in her future National Communications. Undertaking this ESIA study will enable the country to identify some GHG the project activities will emit. UDSM HEET Project will abide by the requirements on control and prevention of greenhouse gases by emphasising using soft copies instead of hard copies in teaching and learning.

3.4 World Bank Environmental and Social Framework

The World Bank Environmental and Social Framework (ESF) review has been necessary because the project will receive funding from the World Bank. The ESF ensures that all projects financed by the World Bank are developed and implemented in an environmentally and socially responsible manner. The ESF ensures that environmental and social risks of World Bank-funded projects are properly identified and evaluated, any significant environmental and social risks are reduced or mitigated, and that key information about the project is disclosed and shared with key stakeholders.

There are ten (10) World Bank Environmental and Social Standards (ESS). The ESS set out the requirements for Borrowers relating to E&S risks and impacts associated with projects. The standards are intended to support Borrowers in reducing poverty and sustainably increasing prosperity for the benefit of the environment and their citizens. According to the HEET Environmental and Social Management Framework (ESMF), the HEET Projects are applicable to nine ESS, namely ESS1, ESS2, ESS3, ESS4, ESS5, ESS6, ESS7, ESS8, and ESS10.

The review and screening of WB ESSs has been carried out to find out which of those ten standards are relevant to this project (**Table 3.1-1**). The results indicate five out of ten ESSs, namely the Environmental and Social Standard 1 (ESS 1), Environmental and Social Standard 2 (ESS 2), Environmental and Social Standard 3 (ESS 3), Environmental and Social Standard 4 (ESS 4), Environmental and Social Standard 8 (ESS 8) and Environmental and Social Standard 10 (ESS 10) are applicable to this project.

Table 3.1-1: Applicable WB Environmental and Social Standards

S/n	Safeguard Policy	Applicable? (Yes /No)	Remarks
1.	ESS 1: Assessment and Management of Environmental and Social Risks and Impacts	Yes	The project is likely to create some environmental and social risk/impacts.
2.	ESS 2: Labour and Working Conditions	Yes	The project will involve recruiting construction workers, creating temporary employment opportunities for local people. The presence of construction workers will result into increased demand for food, hence

S/n	Safeguard Policy	Applicable? (Yes /No)	Remarks
			creation of income generation opportunity for local people.
3.	ESS 3: Resource Efficiency and Pollution Prevention and Management	Yes	The Project is likely to create air pollution due to dust emission from construction activities. The project will also result into consumption of finite land-based resources like sand, gravel, and crushed stone aggregates.
4.	ESS 4: Community Health and Safety	Yes	The project is likely to create health and safety risk to the local community members. For example, the project is likely to create construction related risk of accidents due to trespassing of unauthorized people into the construction site.
5.	ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	No	The project will not result into land acquisition or resettlement of people. The construction site is located within the SoAF Kunduchi Campus, which is owned by the Government of Tanzania.
6.	ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	No	The construction site is located within already built-up urban environment at the UDSM-SoAF-Kunduchi Campus. Moreover, the proposed construction site is currently occupied by planted trees; hence no important critical habitat in the area.
7.	ESS7 Indigenous Peoples	No	There is no Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities in the project area as defined in paragraph 8 and 9 of ESS7
8.	ESS 8: Cultural Heritage	Yes	The construction site is located in already built-up urban environment with no history of archaeological or paleontological findings. There are no any important historical, cultural, scared or religious features or natural landscape features within the construction site, however the project is considering this ESS since <i>chance finds</i> are possible.
9.	ESS 9: Financial Intermediaries	No	There is no international waterway involved in the project area.
10.	ESS 10: Stakeholder Engagement and Information Disclosure	Yes	This ESS is applicable because the project is likely to affect various stakeholders directly or indirectly and positively or negatively. Therefore, stakeholder engagement and consultation will be necessary at all stages of the project implementation.

3.4.1 ESS1: Assessment and Management of Environmental and Social Risks and Impacts.

The ESS 1 sets out the Borrower's responsibilities for assessing, managing and monitoring E&S risks and impacts associated with each stage of a project supported by the Bank through Investment Project Financing, in order to achieve E&S outcomes consistent with the ESS safeguards.

Objectives of ESS 1:

- To identify, evaluate and manage the E&S risks and impacts consistent with the ESSs.
- To adopt the mitigation hierarchy approach (avoid, minimize, rehabilitate/restore, compensate/offset);

- Ensure disadvantaged or vulnerable people are not disadvantaged in sharing benefits and opportunities from the project.
- To utilize national legislative frameworks in the assessment, development and implementation of projects, whenever appropriate.
- To promote improved environmental and social performance.

The ESS 1 will be applicable because the project is likely to create some environmental and social risk/impacts and therefore EIA has to be conducted in accordance with the requirements of ESS 1.

3.4.2 ESS 2: Labour and Working Conditions

The ESS2 recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. Borrowers can promote sound worker-management relationships and enhance the development benefits of a project by treating workers in the project fairly and providing safe and healthy working conditions.

Objectives of ESS 2:

- To promote safety and health at work.
- To promote 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 and child labour.
- To support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law.
- To provide project workers with accessible means to raise workplace concerns.

This ESS is applicable because the project will involve the recruitment of construction workers, hence the creation of temporary employment opportunities for local people. The presence of construction workers will result into increased demand for food, hence the creation of income-generation opportunities for local people.

3.4.3 ESS 3: Resource Efficiency and Pollution Prevention and Management

The ESS 3 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.

The current and projected atmospheric concentration of greenhouse gases (GHG) threatens the welfare of current and future generations. At the same time, more efficient and effective resource use, pollution prevention and GHG emission avoidance, and mitigation technologies and practices have become more accessible and achievable.

Objectives of ESS 3:

- To promote the sustainable use of resources, i.e., energy, water and raw materials.
- To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities.
- To avoid or minimize project-related emissions of short and long-lived climate pollutants.
- To avoid or minimize the generation of hazardous and non-hazardous waste.
- To minimize and manage the risks and impacts associated with pesticide use.

This ESS will be applicable because the project is likely to create air pollution due to dust emissions from construction activities. The project will also result into the consumption of finite land-based resources like sand, gravel, and crushed stone aggregates.

3.4.4 ESS 4: Community Health and Safety

The 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.

Objectives of ESS 4:

- To anticipate and avoid adverse impacts on the health and safety of project-affected communities during the project life cycle from both routine and non-routine circumstances.
- To promote quality and safety, and considerations relating to climate change, in the design and construction of infrastructure, including dams.
- To avoid or minimize community exposure to project-related traffic and road safety risks, diseases and hazardous materials.
- To have in place effective measures to address emergency events.
- To ensure that the safeguarding of personnel and property is carried out in a manner that avoids or minimizes risks to the project-affected communities.

This ESS will be applicable because the project is likely to create health and safety risk to the local community members. For example, the project is likely to create construction related risk of accidents due to trespassing of unauthorized people into the construction site.

3.4.5 ESS 10: Stakeholder Engagement and Information Disclosure

The ESS 10 recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice. Effective stakeholder engagement can improve the E&S sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation. Objectives of ESS 10:

- 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.
- 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.
- To promote and provide means for effective and inclusive engagement with project-affected parties throughout the project life cycle on issues that could potentially affect them.
- To ensure that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format.

This ESS will be applicable because the project is likely to affect various stakeholders directly or indirectly and positively or negatively. Therefore, stakeholder engagement and consultation will be necessary at all stages of the project implementation.

3.5 INSTITUTIONAL FRAMEWORK

3.5.1 At National and Local Authority Level

The institutional framework for environmental management in Tanzania is well established from local government level to national level. The organisational structure for implementation

of environmental management matters from national to local government authorities' level is provided in in **Figure 3.5-1**. The institutional responsibilities for implementing environmental management matters from national to local authority (LA) level are outlined in **Table 3.5-1**.

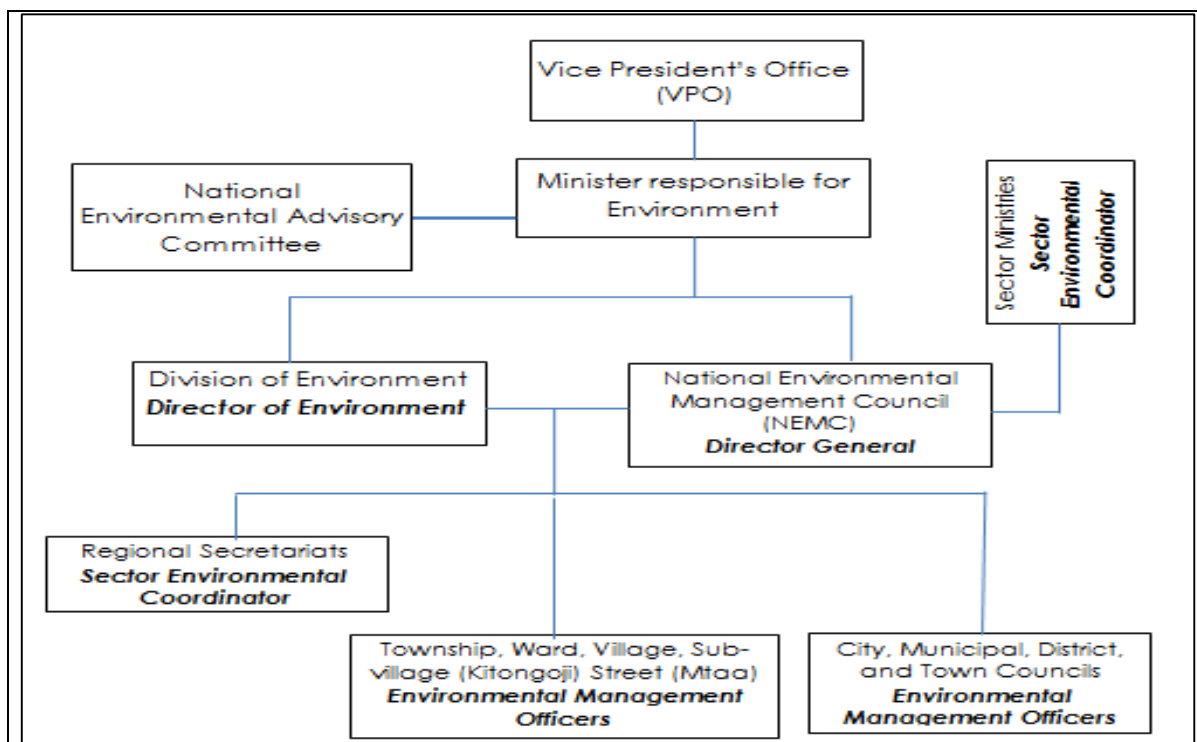


Figure 3.5-1: Organizational Structure for Environmental Management in Tanzania.

Table 3.5-1: Institutional Responsibilities from National to LGA Level.

Institution	Roles and responsibilities	Relevant Legislations
A. National level		
A1. Ministry of Education, Science and Technology (MoEST)	<ul style="list-style-type: none"> • Policy formulation at sectorial level and overseeing implementation of national environment policy within the sector ministry and collaborates with the national environmental agencies. • The ministry through its Sector Environmental Coordinator is responsible for: <ul style="list-style-type: none"> - Ensuring the line ministry's compliance with Environmental Management Act Cap 191 (EMA Cap. 191); - Ensuring all environmental matters contained in other 	<ul style="list-style-type: none"> ▪ Section 30 Environmental Management Act Cap. 191 - which establishes Sector Environment Section within Sector Ministry. ▪ Section 31 of the EMA Act Cap 191-which stipulates the functions of the Sector Environment Section.

Institution	Roles and responsibilities	Relevant Legislations
	<p>laws falling under the jurisdiction of the sector ministry are implemented and reported to NEMC; and</p> <ul style="list-style-type: none"> - Liaising with NEMC on all environmental matters in order to achieve cooperation and shared responsibility for environmental governance. 	
A2. University of Dar es Salaam (UDSM)	<ul style="list-style-type: none"> • Financing and implementation of the project on behalf of the Government of the United Republic of Tanzania (GOT). • Ensuring that environmental and social issues are taken into consideration during project planning, design, construction and operation. 	<ul style="list-style-type: none"> ▪ Section 3(1) of the Executive Agencies Act (Cap 245)-which establishes the agency.
A3. Division of Environment (VPO-DOE)	<p>The DOE which is headed by Director of Environment is responsible for:</p> <ul style="list-style-type: none"> • Formulation of environmental policy. • Coordination and monitoring of environmental issues. • Review and approval of ESIA report and issuance of EIA Certificate 	<ul style="list-style-type: none"> ▪ Section 14 of the EMA Act Cap 191-which establishes the position of the Director of Environment. ▪ Section 15 of the EMA Cap. 191- which stipulates the functions of the Director of Environment.
A4. National Environmental Management Council (NEMC)	<ul style="list-style-type: none"> • Undertaking enforcement, compliance, review and monitoring of environmental impact assessment (EIA), including the facilitation of the public participation process in environmental decision making. • Ensuring that the project is being implemented in an environmentally friendly and socially acceptable manner. 	<ul style="list-style-type: none"> ▪ Section 16 of the EMA Cap. 191- which establishes NEMC. ▪ Section 17 of the EMA Cap.191- which stipulates the object for establishment of NEMC. ▪ Section 18 of the EMA Cap. 191- which stipulates the function of NEMC.
B. Municipal Council Level		
Kinondoni Municipal Council	<p>The Municipal Council through the Environmental Management Officer (EMO) is responsible for:</p> <ul style="list-style-type: none"> • Coordination of environmental 	<ul style="list-style-type: none"> ▪ Section 36 of the EMA Cap. 191- which stipulates the functions of the Environmental Management Officers.

Institution	Roles and responsibilities	Relevant Legislations
	management matters at city level. <ul style="list-style-type: none"> • Land use planning and issuing of development permits within the city. • Monitoring the implementation of environmental mitigation measures by the Contractor 	
C. Ward / Mtaa Level		
D1. Ward and Mtaa Development Committees	The Ward and Mtaa Development Committees are responsible for: <ul style="list-style-type: none"> • Environmental management issues within their jurisdictional boundaries. • Monitoring the implementation of environmental mitigation measures by the Contractor through their respective Environmental Management Officers (EMOs). 	<ul style="list-style-type: none"> ▪ Sub-section 31(1) of the Local Government (District Authorities) Act of 1982-which establishes the Ward Development Committee. ▪ Sub-section 38(1) of the EMA Cap 191-which stipulates the functions of the Ward Development Committee. ▪ Sub-section 38(2) of the EMA Cap 191-which stipulates the functions of the Village Development Committees. ▪ Section 39 of the EMA Cap. 191- which establishes the position of Ward and Village Environment Management Officers. ▪ Section 40 of the EMA Cap 191- which stipulates the Ward and Village Environment Management Officers.

3.5.2 At Project Level

The institutional framework for environmental and social management at project level is comprised of World Bank (WB), Ministry of Education, Science and Technology (MoEST), National Project Implementation Unit (NPIU), UDSM Project Implementation Unit (PIU), Consultant and Contractor. The UDSM responsibilities for implementation of environmental and social management issues at project level is provided in **Table 3.5-2**.

The WB is responsible for financing the project and ensuring that the project is carried out in accordance with the WB Environmental and Social Framework (ESF), safeguarding policy and Standards.

The MoEST is responsible for environmental and social monitoring and surveillance of all project components investments that will be undertaken by project and reporting the results to the WB.

UDSM PIU is responsible for coordination of consultant's activities (preparation of ESIA and ESMPs), providing support to the procurement department within the implementing institution and ensuring that the Contractor complies with environmental, social, health and safety requirements, including appointment of a qualified environmental and social experts.

The Consultant through its Environmental and Social Safeguard Team is responsible for liaising with NPIU and UPIU in ensuring the environmental and social requirements for the proposed project are met. These include conducting ESIA study, preparation of ESIA report

and corresponding ESMP, and assisting UPIU in obtaining relevant permits and certificates for project implementation.

The Contractor through its Environmental and Social Team is responsible for complying with environmental and social requirements, including allocation of adequate budget for preparation and implementation of HSMP and C-ESMP based on project ESMP provided in the Bidding Documents. The Contractor is also responsible for liaising with UPIU and Supervision Consultant and reporting of any accidents or incidents.

Table 3.5-2: Institutional Responsibilities at Project Level.

Institution	Roles and responsibility
World Bank	<ul style="list-style-type: none"> The funding organization will have an overarching responsibility to ensure that the project is carried out to the highest environmental standards strictly in accordance with the ESMF and ESIA project report and the mitigation measures set out therein. Additionally, the funding Institution requires that environmental and social impacts are managed in accordance with the World Bank ESF and its ESS.
PS-MoEST	<ul style="list-style-type: none"> E&S monitoring and surveillance of all project components investments that will be undertaken by project. The ministry will report results of this monitoring to the World Bank.
NPIU Environmental and Social Team	<ul style="list-style-type: none"> Coordinate different activities to ensure that, the project meets the country legal and World Bank requirements in regard to Environment and Social Framework
Implementing institutions (UDSM PIU) Environmental and Social Team	<ul style="list-style-type: none"> PIU is established by Article 3 (2) (ii) of the Grant Agreement between The Ministry of Education Science and Technology (MoEST) and the University Dar es Salaam, which states that: Maintaining the PIU chaired by the Deputy Vice Chancellor (Planning, Finance and Administration) and assisted a senior university staff at the level of at least Deputy Vice Chancellor, assisted by a qualified and experienced staff in adequate numbers and under terms of reference as outlined in the Project Operational Manual (POM). The PIU is vested with the responsibility of the day-to-day implementation of the respective UCIP activities including financial management, procurement, environmental and social risk management, governance and anti-corruption, monitoring and evaluation, and reporting; Coordinate specialist/consultants for any support missions or attend different meetings and provide any guidance in the bid to ascertain that the different challenges identified for each sub-project/activity are duly covered from risk.

Institution	Roles and responsibility
	<ul style="list-style-type: none"> • Support the procurement officer at UDSM in making sure that the bidding documents clearly cover the health, safety and environmental component with appropriate provisions of the same for the contractors to bid. • Coordinate preparation of ESIA and environmental and social management plans (ESMPs) done by consultant and site-specific ESMPs (SSESMP). • Ensure that contractors have an Environmental Health and Safety Officer (EHS), who are familiar with the compliance requirements, including WB EHS guidelines
Consultant (Environmental and Social Team)	<ul style="list-style-type: none"> • Work with the NPIU/UPIU to understand the requirements of the environmental and social assessment; • Conduct initial site visits with the NPIU/UPIU to understand the sub-project setting and site-specific requirements; • Prepare the ESIA and ESMPs based on the procedures described in the ESMF including carrying out an alignment walk, alternatives analysis and baselines studies, identifying the E&S risks and impacts, developing mitigation measures and monitoring plans incorporating EHS requirements; • Cost all the mitigation and management measures proposed in the ESMPs and SSEMPs • Propose a capacity building plan for the implementation of the sub-projects for all actors involved with cost estimates and schedule; • Carry out public consultations; • Conduct trainings as needed; • Assist the UPIU in preparing documentation to obtain certification from NEMC for the ESIA and ESMPs.
Contractors (Environmental and Social Team)	<ul style="list-style-type: none"> • Compliance with relevant environmental and social legislative requirements (project-specific, district- and national level), including allocating adequate budget for implementation of these requirements;

Institution	Roles and responsibility
	<ul style="list-style-type: none"> • Work within the scope of contractual requirements and other tender conditions; • Prepare CESMPs based on the ESMP in the bidding documents and contracts; • Train workers about EHS (including relevant WBG EHS Guidelines) and the site specific environmental and social measures to be followed; • The EHS officer of the contractor will participate in the joint site inspections with the UPIU and Environmental Supervision Engineer/consultant; • Immediate notification of the NPIU and supervision engineer of any significant social or environmental health and safety incident linked with the project, and indication about the measures taken or that are planned to be taken to address the incident as well as propose any measures to prevent its recurrence. • Carry out any corrective actions instructed by the Supervision Engineer/consultant; • In case of non-compliances/discrepancies, carry out investigation and submit proposals on mitigation measures, and implement remedial measures to reduce environmental impact; • Propose and carry out corrective actions in order to minimize the environmental impacts; • Send weekly reports of non-compliance to the Supervision Engineer/consultant; • Send monthly progress reports to the Supervision Engineer/consultant

CHAPTER FOUR

4.0 ENVIRONMENTAL BASELINE CONDITIONS

4.1 Physical Environment

4.1.1 Topography

The topography of the project area is characterized by flat terrain with altitude ranging from 1 m above sea level (m.a.s.l.) to 5 m.a.s.l. There is a marshland area with an altitude of about 1 m.a.s.l., hence making it to be seasonally flooded, because the shoreline is on the higher altitudes (i.e., 2 to 3 m).

4.1.2 Climate

The project area experiences a modified type of equatorial climate. It is generally hot and humid throughout the year with an average temperature of 29°C. The hottest season is from October to March while it is relatively cool between May and August with temperature around 25°C.

There are two rain seasons, the short rain season from October to December and the long rain season between March and May. The average annual rainfall is 1300mm. Humidity is around 96% in the mornings and 67% in the afternoons. The climate is also influenced by the Southwest monsoon winds from April to October and Northeast monsoon winds between November and March.

4.1.3 Climate Change

In the project area, deforestation is one of the contributing factors to climate change due to the destruction of natural vegetation, which is important for Carbon dioxide reduction from the atmosphere due to sequestration (absorption) effects. In 2010, Kinondoni District had 4.34kha of tree cover, extending over 8.1% of its land area. In 2021, it lost 20.1ha of tree cover, equivalent to 10.5kt of CO₂ emissions²⁸.

The proposed area for the construction of buildings is estimated to be 962.560 Square metres (SQM). Therefore, assuming this area is currently covered by green vegetation (trees), the removal of existing vegetation cover will contribute into 0.05kt of CO₂, which is about 0.5% of the CO₂ emissions in 2021. This amount is considered to be negligible.

Implication for the project

The project is not likely to significantly contribute into CO₂ emissions due to vegetation removal from the project site. However, the project will utilize climate change information in the design of building structures. The project will also contribute to the reduction of GHG emissions by prohibiting the use of ozone depleting substances.

4.1.4 Geology and Soils

The geology of the project area is dominated by continental and lacustrine sedimentary formations²⁹. The sub-soil is dominated by marine limestone, mainly comprised of sandy clay and clayey sands. The project area is comprised of Mesozoic rocks, limestone, sandstone, shales and mark.

4.1.5 Ground and Surface Water Resource

4.1.6 Ground Water Resource

The project site is within the Coastal Sedimentary Aquifer, which is typically five to 30 meters thick, with a water depth of 10 to 35 meters below ground. Water quality varies, with periodic

²⁸ <https://www.globalforestwatch.org/dashboards/country/TZA/2/2>

²⁹ GEOLOGY AND MINERAL MAP OF TANZANIA. Patrice PINNA, Sospeter MUHONGO, Boniface A. MCHARO, Elizabeth LE GOFF, Yves DES CHAMPS, Francis VINA UGER and Jean Pierre MILESH, December 2004

nitrate and salinity issues and better productivity from limestone and sandstone, compared with shale and marl³⁰.

4.1.7 Surface Water Resource

The Indian Ocean is the only available surface water resource close to the project site. This implies the project will have to obtain construction water from Dar Es Salaam Water and Sewerage Authority (DAWASA) source.

4.1.8 Ambient Noise and Vibration Levels

4.1.8.1 Dust Level Measurement

The daily average concentrations of 0.012 mg/m³ for TSP, 0.009 mg/m³ for PM₁₀ and 0.004 mg/m³ for PM_{2.5} were recorded at UDSM-SoAF Kunduchi Campus site (**Appendix 5a**). The findings indicated that, the measured TSP, PM₁₀ and PM_{2.5} concentrations were below the prescribed Tanzania and WHO standards.

4.1.8.2 3.2 Ambient Pollutant Gases

The measured Carbon monoxide (CO), Sulphur dioxide (SO₂), Volatile Organic Compounds (VOCs), and Nitrogen dioxide (NO₂) concentrations were below the prescribed TBS and WHO/IFC limits at all stations (**Appendix 5b**). However, Hydrogen sulphide (H₂S) concentrations were very low with its impacts considered insignificant, taking into account that H₂S has no limit specified in both the Tanzania standards and/or international guidelines. Generally, the ambient air quality in the area did not exceed the national or WHO/IFC Standards.

4.1.8.3 Noise Levels

The recorded daytime and night-time noise levels were 46.8 dBA and 43.7 dBA, respectively (**Appendix 5c**). The results suggested that the recorded noise levels are acoustically safe for people residing nearby the project site as the measured daytime and night-time noise levels found to be well below the WHO/IFC acceptable noise levels.

4.1.8.4 Ground Vibrations

The recorded vibration level of 0.004 mm/s PPV was recorded at the station established within UDSM-SoAF Kunduchi project site (**Appendix 5d**). The anticipated impact resulting from the measured vibrations is considered insignificant as the measured level does not exceed 0.15 mm/sec PPV criteria established to evaluate the extent that can easily be detected by human, TBS and British Standard limits. In that regard, the measured ground vibration level is low and thus is not likely to impact negatively any sensitive receptors.

4.2 Biological Environment

4.2.1 Flora

The project site is mainly comprised of planted exotic trees and short grass with patches of bare areas (**Plate No. 4.2-1**). During the field investigation, a total of about 30 trees were identified. These include 20-Neem trees (*Azadirachta indica*); 7-Coconut trees (*Cocos nucifera*); 2-Pawpaw trees (*Asimina triloba*); and Tamarind trees (*Tamarindus indica*). In addition, there is marshland or wetland vegetation on the eastern side of the project site, which is currently being used for discharging wastewater from sanitary facilities (**Plate No. 4.2-2**). The marshland provides a potential for development of constructed wetland for wastewater treatment, if it can be properly designed.

³⁰ Hydrogeology of Tanzania. http://earthwise.bgs.ac.uk/index.php/Hydrogeology_of_Tanzania



Plate No. 4.2-1: Vegetation cover of the project site.



Plate No. 4.2-2: Marshland vegetation used for wastewater discharge.

4.2.2 Fauna

There is no any important wildlife in the project site due to human activities. During the site investigation no any wildlife was identified in the project area. In addition, there is no any important wildlife habitat or endangered, rare, or unique wildlife in the project area due to the fact that the project is a built-up environment with intensive human activities.

4.3 Socio-Economic Environment

4.3.1 Population

The project area is located at Mtongani sub-ward, Kunduchi ward in Kinondoni municipal where the construction of Lecture Theatres and Fisheries and Aquatic Sciences Laboratory building is proposed. According to the 2022 National Population and Housing Census Kinondoni has a population of 982,328 where male is 474,825 and female 507,503. The annual growth is 2.1% and households are 299184 with an average of 3.3 members per household. The sex ratio is 94. In Kinondoni MC projected population density is estimated to be 3,881 people per square kilometre. The population in the project ward is 89814 male 43232 female 45582 with 26125 households and a sex ratio is 93.

4.3.2 Status of land acquisition and suitability of the location

Unlike other projects which are implemented on individual lands, this particular project is implemented on the land already acquired by the University of Dar Es Salaam. In this case, there is no compensation required. The building will be constructed in the midst of other buildings used for academic purposes so it will add value in academics and research as a whole.

4.3.3 Planned Development Activities

The SoAF site as part of the University of Dar Es Salaam has some plans to expand/increase other buildings for academic use when financial resources are available. At this juncture through the financial assistance from World Bank under the HEET programme has managed to construct one building comprised of research laboratories as well as lecture theatres.

4.3.4 Community Structure

The main organization of Mtaa government in the study area is the Mtaa Assembly and Council. The Mtaa Assembly is made up of the adult members of the community and the Mtaa council is composed of 5 members comprised of men and women representatives. The Mtaa council is responsible for overseeing day-to-day activities in the Mtaa (sub-ward) as well as making decisions on matters concerning the whole community. The functions of the Mtaa Assembly are the maintenance of peace and order the promotion of social welfare and economic development. The Council manages the mtaa and implements decisions made by the assembly.

Like the Municipal council, the mtaa government is arranged into a series of committees and overseen by the mtaa chairperson, mtaa Executive officer (MEO) lead members of the council. The main committees include Finance and Planning, safety and security, construction and finally Education, and social services. The sub-committee of the latter includes the water and sanitation committee, health committee, Environment committee and school committee.

4.3.5 Employment

Employment patterns in the project area reflect urban characteristics whereby formal and non-formal employment is dominant. Employment in the project area (according to anecdotal data) reflects that the private sector occupies 61%, self-employment 35% and the public sector covers only 4%. Looking at Mtongani sub-ward fisheries and fishing products are the main occupational activities followed by enterprises ranging from petty trading, shops and transportation.

4.3.6 Distribution of Income, Goods and services

The socio-economic survey carried out between 2016 to 2018 indicated that, in the project area majority of residents earn income between TZS 50,000 and 200,000 about 71% of which 28% earned monthly income ranging from TZS 50,000 to 100,000, 21% earn income between TZS 100,000 and 200,000 and 22% ranging between TZS 200,000 and 400,000. Only 15% of the residents earn income above TZS 400,000 and 14% earn income below TZS 50,000.

4.3.7 Goods and Services

The supply of goods in the project area is dominated by industrial goods coming from outside the project area to the shops and mini-markets. Goods are of two categories which are consumables comprised of food stuff, cosmetics and decorations while others are building materials. Means of supply depend solely on road transportation. Goods from the project area are insignificant except fish from Kunduchi Fish Auction market. On the other hand, the provision of basic amenities is also essential to livelihood and human development.

4.3.8 Education

Around the project area there are two primary schools and one Girl secondary school but in the entire Wards of Kunduchi there are 9 Primary School, 8 Secondary School. The primary and secondary schools are owned by the government and private. Also, within the ward there 5 Colleges.

4.3.9 Health

Health is one of the key sectors of which people depend on it when seeking their health status. The HEET project will also require services from the health sector as construction workers will have to seek treatment when get injuries or for the sake of knowing their health status. The KMC currently has a total of 188 health facilities of which 27 are government-owned, while the remaining 161 are privately owned.

It is within this context that many dispensaries, health centres and referral hospitals like Hebert Kairuki Memorial hospital, Lugalo TPDF hospital, Masana hospital and Rabininsia hospital are found near the project area. It means during construction all severe accidents and major injuries will be attended to without much problems since many health facilities are close to the project area.

Looking at the morbidity rate in the project area shows that ten common diseases which are reported in health facilities (out patients) birth asphyxia and anaemia are the leading diseases to majority of communities in the project area.

4.3.10 Water Supply

The main source of water for Dar Es Salaam Region and particularly in the project area is from Lower Ruvu scheme which is managed by Dar-Es-salaam Water and Sewerage Authority

(DAWASA). In KMC the water from DAWASA system contributes 81% of water being consumed daily and the rest is contributed by deep wells owned by both private and community.

4.3.11 Energy

Electricity is the power source for domestic, commercial premises, institutions and industries. The project area is also connected to the National grid. The power supply line connects almost whole ward under project. Electricity is commonly used for lighting, cooling drinks and cooking. In recent years cooking with natural gas is practiced in many households in the project area. Low- and medium-income earners in the project area use charcoal and fuel wood. Charcoal is the most important form of energy used for domestic purposes such as cooking.

4.3.12 Solid Waste Disposal

In regard to solid waste collection and transportation, there has been an increase in rates of solid waste collected and transported to the disposal site since 2000, when Councils opted to work in partnerships with the private sector as contractors of solid waste collection and transportation, the collection rate decreased from 650 tons in 2015 to 550 tons per day 2018

4.3.13 Recreation

Recreation in the project area is commonly found in areas with hotels, Bars and Restaurants and night clubs. The areas along the coastal strip tourist hotels, swimming pools and sea swimming are commonly found. However, in the project area there is a tourist hotel Wet and Wild (formerly Kunduchi hotel) and small and medium hotels and bars making recreational events particularly in week-ends.

4.3.14 Gender specific needs and Disadvantaged/Vulnerable groups

Gender empowerment ensures that, all sexes particularly women are fully participating in policy and decision-making processes and in all aspects of economic, socio-cultural, participation in managerial, political, professional and technical personnel. It is within this context women are encouraged to participate fully in this HEET project from the planning stage, construction and operation stages as one of the most beneficiaries of employment in the project. In the project area women are significantly involved in implementing activities especially in economic activities besides horticulture, 60% of the interviewed women were engaged in business activities such as selling of food crops, local brewing, food vending and alike.

The unequal access to economic opportunities such as sharing of household income and other family/clan wealth existing between men and women leaves women with minimal options for earning their lives decently. It is reported that sometimes some of the women resort to promiscuity in order to meet their needs. With the prevalence situation of HIV/AIDS, they place themselves in a high-risk. Furthermore, women and girls are more vulnerable as they face early pregnancies, school dropouts, early marriages, raping, unequal gender roles and the prevalence of STDs among them.

4.3.15 Prevalence of HIV/AIDS and STDs

According to Tanzania HIV/AIDS and Malaria Indicator Survey (THMIS, 2017/18), Tanzania is experiencing some recent decline in national HIV prevalence. Between 2004 and 2012, the overall adult prevalence rate fell from 7% to 5.0 (from 6% to 3.8% for men and from 8% to 6.5% for women). Declines in HIV prevalence was also observed among pregnant women attending antenatal clinics and among blood donors.

The downward trend in levels of HIV infection correlates with the reduction in behaviours known to have a high risk of transmitting HIV. For example, in the 15-49 age group, casual sex with non-marital, non-cohabiting partners declined from 46% to 29% among men, and from 23% to 16% among women. (National HIV and AIDS Policy, 2013).

The HIV/AIDS pandemic is still considered a killer disease in all regions including Dar Es Salaam. It was revealed from the reported cases that in 4 years from 2015 to 2018, people were tested as follows: In 2015, a total of 208 persons were tested, 314 in 2016, 2,445 in 2017 and 9,397 in 2018. The same report reveals that expectant mothers 49,823 were also tested for HIV/AIDS status as well as their new-born in 2018 which indicated that 2.7% were HIV/AIDS positive. The number of children born with negative status were 40312 and 1521 children was HIV positive.

Regarding the life style of the people and socio-cultural and traditional practices, the project area is not different from other communities with similar traditions which in one way or another early marriage, raping cases and early pregnancies are indicators of activities fuelling the prevalence of HIV. With the coming project stern measures should be taken to prevent the spread of it through HIV awareness campaigns including safe sexual relations and fidelity to couples.

4.3.16 Cultural and Historic Sites

The existence of cultural and historical assets is not found in the project area (SoAF site) but the old Persian graves are located near the project area – Kunduchi ruins. Tourists and Historians who visit the graves pass through the gate of SoAF to Kunduchi ruins.

4.3.17 Gender Based Violence (GBV)

Gender-Based Violence has been defined as “any harmful act that is perpetrated against a person’s will and that is socially ascribed (gender) differences between males and females. GBV has a greater impact on women and girls, as they are most of often the survivors and suffer of great physical damage than men.

Kinondoni Municipal Council like other councils in Tanzania is not exceptional on prevalence of GBV. It was reported that in 2022 there were 248 cases reported at Gender Desk Department (under Municipal Medical Officer – Social Welfare). Out of all cases reported 184 cases were physical violence against women and 21 cases physical violence against men, 29 cases raping (women) and 14 cases were psychological violence against women. From January to March 2023 GBV cases were 75 and all fall under physical and psychological violence as shown in the **Table 4.3-1** below.

Table 4.3-1: The Status of GBV in Kinondoni MC from January to March, 2023.

S/n	Month	Status of GBV from January to March, 2023 KMC			Total
		Male	Female	Type of Violence	
1	January	17	14	Physical and Psychological/Emotional	31
2	February	7	6	Physical and Psychological/Emotional	13
3	March	18	13	Physical and Psychological/Emotional	31
	Total	42	33		75

Source: Field data May, 2023

The main challenge of such violence in the project area is basically on economic constraints, attitudes, norms and behaviours that are deep-rooted in the families, homes and communities and institutionalized at all levels and consequently producing a culture of social acceptance of gender violence, especially violence against women. It is within this context that the project at hand, must apply GBV protective mechanism to reduce the violence against women particularly during construction.

CHAPTER FIVE

5.0 STAKEHOLDER ENGAGEMENT

5.1 Stakeholder Identification and Analysis

The identified stakeholders can be categorized into Developers; Decision makers; Interested parties; and Affected parties positively or negatively and directly or indirectly. The stakeholder analysis matrix is provided in **Table 5.1-1**. The identification of stakeholders was based on how they are related to the project, how the project is going to affect them and why should they be consulted.

5.1.1 Developers

The developers of this project are the Ministry of Education, Science and Technology (MoEST); and the University of Dar Es Salaam (UDSM). These are responsible for funding and implementation of the project. Therefore, as developers, they are responsible for ensuring that the project will be implemented in compliance with the environmental and safety requirements in accordance with relevant national policies and legislations.

5.1.2 Decision makers

The decision-making authorities are those government authorities, agencies or institutions that are responsible for overseeing environmental, health and safety management in the country and for issuance of development permits or certificates. Therefore, they can decide whether the project should be implemented or should not be implemented. These include the Division of Environment in the Vice President's Office (VPO-DOE) and the National Environment Management Council (NEMC).

The VPO-DOE is responsible for approval of the Environmental Impact Assessment report and issuance of the Environmental Impact Assessment (EIA) Certificate. The National Environmental Management Council (NEMC) is responsible for screening and registration of the project, review and approval of scoping report and review of the environmental impact assessment report and submission to the VPO-DOE for approval.

5.1.3 Interested parties

The interested parties are those stakeholders who are not directly or indirectly affected by the project but they can influence the success or failure of the project or can provide advice to the project. For this project, the interested parties include the Kinondoni Municipal Council (KMC); Kunduchi Ward Development Committee and Mtongani Street ("Mtaa"). All these are considered as Local Government Authorities (LGAs) are responsible for overseeing environmental management issues and land use planning within their jurisdictional boundaries; and in the case of KMC, it is responsible for issuing of development or building permits and certificate of occupancy or title deeds.

The Occupational Safety and Health Authority (OSHA) and Commissioner for Fire and Rescue Force are also considered interested parties. The OSHA is responsible for health and safety inspections and issuance of compliance licences and electrical inspections. The Commissioner for Fire and Rescue Force is responsible for fire inspection and issuance of fire inspection certificates.

5.1.4 Affected Parties

These are those stakeholders who can be directly or indirectly affected, whether positively or negatively by the project. Tanzania Electricity Supply Company Limited (TANESCO), Tanzania Telecommunications Company Limited (TTCL), and Dar Es Salaam Water and Sewerage Authority (DAWASA) are indirectly affected parties because the project will result into increased demand for electricity power and water supply during construction and operation phase. Ultimately this will result into positive impacts due to increased revenue for the utility service providers.

The local residents living adjacent to the project site will be directly and indirectly affected, positively or negatively. It is expected that during construction some of the local residents will get temporary employment opportunities, hence considered to be directly and positively affected parties.

The adjacent local residents are also indirectly and negatively affected due to environmental, health and safety effects associated with the project activities. It is anticipated that during construction the project is likely to create some air pollution, noise nuisance, and risk of health and safety hazards to the local residents and therefore, considered to be indirectly and negatively affected parties.

Table 5.1-1: Stakeholder Identification and Analysis Matrix.

S/n	Stakeholders	Categorization
1.	Ministry of Education, Science and Technology (MoEST)	
2.	University of Dar Es Salaam (UDSM)	
3.	Division of Environment in the VPO	
4.	National Environment Management Council (NEMC)	
5.	Kinondoni Municipal Council (KMC),	
6.	Kunduchi Ward Development Committee (WDC)	
7.	Mtongani Street ("Mtaa") Development Committee (MDC)	
8.	Occupation Safety and Health Authority (OSHA)	
9.	Fire and Rescue Force	
10.	Tanzania Electricity Supply Company Limited (TANESCO)	
11.	Tanzania Telecommunications Company Limited (TTCL)	
12.	Local Community Members	
KEY:		
	Developers	
	Decision Makers	
	Interested Parties	
	Affected Parties (Directly Positively)	
	Affected Parties (Indirectly Positively)	
	Affected Parties (Directly Negatively)	
	Affected Parties (Indirectly Negatively)	

5.2 Stakeholder Consultation

The stakeholder consultation involved face-to-face interviews with representatives of relevant government and private institutions, agencies and local government authorities. These include UDSM including the School of Aquatic Sciences and Fisheries (SoAF); TANESCO; TTCL; DAWASA; Mtongani Street ("Mtaa") Executive Officer; Kinondoni Municipal Council (KMC) Officials. In addition, stakeholder consultations were held with TAWA, TAFIRI, African Minerals and Geo-sciences Centre and Wet & Wild Hotel (former Kunduchi Hotel).

The consultation with adjacent Local Community Members involved stakeholder consultation meetings. The adjacent local community members are mainly the local residents of UDSM Sub-ward.

5.3 Results of Stakeholder Consultations

5.3.1 Consultation with Stakeholders Representatives

The consultation with stakeholder representatives was conducted on from 11th April to 02nd May 2023. In general, the stakeholders do support the project because they believe it will benefit them and the nation as a whole. However, the stakeholders have raised some issues

and concerns regarding the project as shown in **Table 5.3-1**. The issues raised were then analysed to determine the most affected VEC based on the number of issues/concerns raised for each affected component as shown in **APPENDIX 2**.

According to the analysis the consulted stakeholder representatives were more concerned about Labour and Economy (7 Issues) followed by Public Health, Safety and Security (5 Issues); Acoustic Environment, Public Services Infrastructure/Utilities, and Current and Resources Use (3 Issues@); and lastly Atmospheric Environment, Transportation, Terrestrial Environment, and Historical/Cultural Resources (1 Issue@). The finding indicates the stakeholder representatives were mainly concerned about solid and liquid wastes management, GBV rates, child labour, HIV/AIDS prevalence; employment and finally air pollution and noise nuisance.

.Table 5.3-1: Record of Issues/Concerns Raised by Stakeholder Reps.

Date	Stakeholder	Raised Issues/Concerns	Response by the Consultant
11/04/23	TAWA	<p>Since TAWA and SoAF share the same entrance and access road, we propose the entrance and the access road to TAWA to be improved to allow easy access by workers and Tourists who visit old graves of different nations. The area is the only place where Swahili civilization is portrayed</p> <p>During construction the contractor must be cautioned not to use/utilize water from the old wells found in the antiquity area because it is one of the historic and heritage assets.</p>	<p>The access road will be improved and shared as before the project Water from the old shallow well will be preserved for tourism purposes.</p>
11/04/23	Kunduchi Islamic Girls secondary School	<p>During construction, Contractor's workers and school community in general must be educated on the spread of HIV/AIDS and STDs. Our girl students do go for shopping on Sundays where they can meet with workers of the project and create relationship. Workers should be reminded to abide by the laws and not to engage themselves with students.</p>	<p>HIV/AIDS and STDs education to workers at and surrounding communities will be provided during construction</p>
13/04/23	TAFIRI	<p>The project is very useful because it will increase number of students taking fisheries courses and these students are potential employees in our research industry.</p>	<p>The college will be encouraged to collaborate with TAFIRI in some researches and share research results. During field work we believe SoAF will send some students to get experience from TAFIRI</p>

Date	Stakeholder	Raised Issues/Concerns	Response by the Consultant
		<p>The project will give more rooms for exchanging and improving research results for both TAFIRI and SoAF.</p> <p>In a near future, we will develop an MoU of utilizing lecture theatres and conferences for training and meetings (local and international) on Fisheries related issues.</p> <p>We also invite the potential students for field attachment in our institute as young or senior researchers.</p> <p>As a negative impact is on one of our supporting staff who is engaged as office security, resides in SoAF staff quarters and now because of the project the houses will be demolished so our employee has to reside away from the office and security obligations will be difficult.</p>	
13/04/23	African Minerals and Geo-sciences centre	<p>The project is very valid and our office will collaborate with SoAF in research and particularly in laboratory testing.</p> <p>During construction we urge the Contractor to use our laboratory for material testing because we believe we have best laboratory equipment for material testing.</p> <p>If possible, some of our employees can study in SoAF especially in rocks and soils.</p>	We will advise the Contractor to use your laboratory for construction materials testing particularly soil, aggregates and bricks
18/04/23	UDSM	<p>Regarding the supporting staff residing in the project area, the Employer (UDSM) served with a notice indicating the intention of the employer utilizing the land for other uses. The notice is given as per laws governing resident/employee vacation</p> <p>The Master Plan of SoAF does not include residential quarters.</p>	The relocation process was a humanitarian one and we encourage the Employer abide by the agreement made between two parties.

Date	Stakeholder	Raised Issues/Concerns	Response by the Consultant
13/04/23	UDSM SoAF	<p>The proposed building is close to the Wet and Wild Hotel and we expect the hotel owners to use contemporary devices to minimize sound which may disturb students during lecture sessions.</p> <p>On liquid waste the design must provide appropriate means of collecting liquid waste because number of students will increase and the current sewerage system cannot accommodate much liquid waste.</p>	We encourage the hotel administration to adhere to environmental pollution rules and guidance in providing relevant sound proof devices.
04/05/23	TANESCO	<p>The Contractor must cross-check the architectural drawings to observe the power load.</p> <p>The Contractor must apply for temporary power for construction and during completion application must be submitted for operational stage.</p>	The Contractor will be advised accordingly
02/05/23	TTCL	<p>The project is good in terms of increasing the number of employees in fisheries sector.</p> <p>During construction, the Contractor must observe the underground cables, antennas, sewerage system (if any), and other utilities. It is ideal to contact TTCL if there are underground cables.</p>	The Contractor will be advised to contact TTCL before clearing the site.
11/04/23	Wet & Wild Hotel	<p>During construction spread of dust and noises must be minimized so that our customers will not be embarrassed.</p> <p>During lecture sessions the music sounds will be minimized through sound proof devices not to disturb the students and college staff in general</p>	We encourage the hotel administration to adhere to environmental pollution rules and guidance in order of minimizing sound pollution.
24/04/23	Kinondoni MC	The project is very important and we encourage the University to construct many hostels for girls. Girls studying at the university staying off campus face	The case of GBV will be taken care of when developing ESMP and provide budget for this particular issue. The UDSM and private sectors will also be encouraged to

Date	Stakeholder	Raised Issues/Concerns	Response by the Consultant
		<p>many challenges including unwanted pregnancies which results into single mothers, street children and other GBV in general.</p> <p>During construction respective Municipal Authorities to take lead in HIV/AIDS awareness campaign and GBV. When budgeting for HIV programmes, the same should be done to GBV. The poverty level of communities adjacent to the project area, when seeking temporary employment especially women may face <i>sexual abuse</i> reflecting; rape, dishonesty in relationship, forced unprotected sex, touching of private parts of a person without his/her consent <i>psychological violence</i> includes verbal abuse, scolding, isolating, verbal humiliation, gesture, annoyance, slandering and disgracing. It needs a thorough awareness campaign and follow-up in construction sites to make sure Contractors abide by the laws and have plans and policies for example Sexual harassment policy, GBV policy and Labor influx plan to eradicate any kind of sexual abuse.</p>	<p>construct more hostels for girl students who are seemed to be more vulnerable when staying off campus.</p>

5.3.2 Consultation with Local Community Members

The stakeholder consultation meeting involved the Mtongani Local Residents, whereby Mtaa Government Council members attended the consultation meeting. The record of issues / concerns raised during consultation with local community members is provided in **Table 5.3-2**. The analysis of issues/concerns indicate the consulted local community members were more concerned about Public Health, Safety and Security (4 Issues) followed by Labour and Economy (3 Issues); and Atmospheric and Acoustic Environment as shown in **APPENDIX 3**.

The findings indicate that the project is likely to create spread of HIV/AIDS and other sexually transmitted diseases, health and safety risks, increased criminal incidences and increased pressure on the existing medical facilities. They were also concerned that the project is likely to create noise nuisance and dust generation.

Table 5.3-2: Record of Issues/Concerns Raised by Local Community Members.

S/n	Issues/Comment from community	Remarks by Consultant
1	Employment Opportunities. The contractor should give the priority of employment to the people hailing along the project site during the construction. The residents (youth & women) may be involved in the some activities as labourers during the construction phase. Furthermore, carpenters and masonry in the community should get first priority in getting skilled labour in the construction.	Construction of SoAF building will stimulate individual's income for those who will be employed by the project. Skills acquired during recruitment and construction will remain an asset to community members. However, employment opportunities will only be provided to those people aged 18 years and above. The women are also encouraged to participate in the road construction activities
2	There will be spread of HIV/AIDS and other sexually transmitted infections because of labour influx.	<p>The contractor will identify local capacity in dealing with HIV/AIDS and arrange for HIV/AIDS prevention programme targeting both the construction camp and local communities.</p> <p>Positive discrimination in favour of resident workers to minimize risk of increased infection among local population. Programme on HIV/AIDS will target groups at risk such as food vendors, and business women in the construction camp.</p> <p>There will be a separate consultant to implement and manage HIV/AIDS alleviation programs. The contractor will implement HIV/AIDS programs on his part by allowing his employees to attend awareness seminars and campaigns and carrying out any directives of the Consultant in this regard.</p>
3	UDSM must ensure the entire workforce at the construction site is well covered by appropriate insurance policies. Also, first aid should be provided at work as per requirement of CRB.	It is illegal to practice the construction activity without appropriate insurance cover. The construction contract stipulates minimum insurance the Contractor must affect. The contract also requires the Contractor to follow the Tanzania labour laws without material deviation.
4	Security and increase of crime. During construction many people will come as employment speculators and the security of the properties and people may be at stake. Moreover, the rate of crime may increase as a result of influx of people.	The community will be encouraged to strengthen communal security (Ulinzi shirikishi) whereby police and community members practise security in their respective areas.
5	There is increase of Gender Based Violence (GBV) in our community where women are forced in sexual relations when selling goods to construction workers and sometimes abusive language and touching without the consent of women.	It is proposed that the community around the project area being educated on their rights and encouraged to report to the leaders when such violence occur. At work places suggestion boxes and telephone numbers will be provided for the victim to report the violence or grievances.
6	Labour influx and shortage of drugs- Our experience shows that the influx of people or job speculators pose a threat on supply of medicine including drugs in our dispensary. We would like to encourage the Contractor to supplement medical facilities/equipment and drugs to meet the demand of new comers and local communities	The Contractor will be advised to supplement or establishing a mobile dispensary to meet the demand of workers.

S/n	Issues/Comment from community	Remarks by Consultant
7	Corporate Social Responsibility- We expect the project will assist the Mtongani Community in construction of pit latrines in our schools or improve Kunduchi Fish market etc.	The Contractor will be advised to leave a footmark in the project area as one of corporate social responsibility.
8	Noise, dust and vibration- The Contractor should minimize noises, dust and vibration caused by heavy machines during construction.	The Contractor will be advised to abide by the regulations of OSHA during construction.

5.4 Stakeholders Engagement During Implementation

During Project implementation, engagement activities will be undertaken in relation to project activities. At this stage, the study will conduct a number of structured and formal meetings, focus group discussions, community meetings, one to one interview and site visits that will involve a number of stakeholders.

Timings for conducting the above meetings will be determined by the progress of the project implementation and when deemed necessary to invite stakeholders for their comments and observation. However, the sharing of information and progress with stakeholders will be subject to scrutiny with regards to the kind of information to be shared and how the same will be communicated to stakeholders.

Furthermore, at this stage, the UDSM will ensure equal and effective participation from project preparation to implementation stages. To ensure stakeholders' views and concerns are well captured, the SEP will have different methods of collecting and sharing information based on their needs i.e. disadvantaged or vulnerable groups. The summary of stakeholder engagement and means of communication during project implementation is provided in **Table 5.5-1**.

Table 5.5-1: Stakeholder engagement during project implementation.

S/n	Project Phase	Objective	Messages	Means of Communication
1.	Project Preparation Phase	To present the draft SEP (for comment) and final versions of the instruments.	<p>Presentation of the Project and its implementation schedule</p> <p>Present potential environmental and social impacts reports and its enhancement and mitigation plan.</p> <p>Describe Grievance Redress Mechanism</p>	<p>Organized public meetings /Consultations based on Stakeholders needs and circumstances (FGD, one on one meetings etc.)</p> <p>Disclosure on UDSM Website</p> <p>Emailing to respective stakeholders.</p> <p>Email copies of the instruments to Non-State Actors and other institutions.</p> <p>Sharing of executive summaries in hard copy during meetings.</p>

S/n	Project Phase	Objective	Messages	Means of Communication
				.
			Present a list of identified stakeholders and describe an approach of their engagement.	For stakeholders who are illiterate, information will be presented verbally during meetings in local language. Disclosure of Project documentation in appropriate and accessible manner
				The instruments will be disclosed in Swahili language in project offices and hard copies will be accessible to stakeholders
2.	Project Preparation Phase	ESIA / ESMP Preparation and Disclosure	To inform the preparation of the Environmental Statement/ ESMP etc. and present findings when drafted to all the identified stakeholders	Face to Face Meetings Community Meetings Site Visits based on stakeholders needs and circumstances. Disclosure on UDSM Website. FGD Disclosure of Project documentation in appropriate and accessible manner. The instruments will be disclosed in Swahili language at the University, Kinondoni Municipal Council (KMC) and in the offices of the identified stakeholders or public meetings
3.	Construction Phase	To conduct a meeting to alert or inform the stakeholders on the commencement of the project.	Public Meetings Face to Face Meetings Groups Discussions based on stakeholders needs and circumstances.	Meeting to Alert stakeholders to the

S/n	Project Phase	Objective	Messages	Means of Communication
4.	Construction Phase	Alert stakeholders of any new activities and Provide updates on project progress (every month)	Inform public about any emerging issues; provide information on risks and impacts. GRM, workers code of conduct etc.	Public Announcements Focus Group Discussions Community Meetings Meetings with TPDC Mtaa Community Members.
5.	Construction Phase	Contact with the Project Coordination Team	Provide phone number/WhatsApp account and email for stakeholders to submit questions and give out comments	Meetings with Kunduchi Ward and Mtongani Maa Leaders.
6.	Throughout the Project Implementation Period.	Information dissemination	General information on the implementation of SoAF-Kunduchi project.	Posting on bulletin boards; Information leaflets, banners Outreach activities with TPDC Mtaa Community Members where presentations, workshops and public meetings will be conducted. Sharing on UDSM social media and website
7.	Throughout the Project Implementation Period.	Contact with the Project Coordination team	Maintain website with contact box, email, social media accounts and phone number for people to submit questions, comments and concerns.	UDSM's Websites UDSM's phone number for HEET activities and concerns will be shared to project sites and all stakeholders. UDSM's phone number for HEET activities and concerns will also be found at Kunduchi Ward Office.

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

5.5 Stakeholders Communication Strategy

Information disclosure strategies attempt to increase the availability of information on the proposed construction of the UDSM Main Campus and the entire HEET project. The public disclosure of the information will be very useful in motivating and improving the performance of the project. During implementation, when new activities are being developed engagement will be undertaken to inform the development of the specific sub-project and plans. Further engagement on the frameworks will also be undertaken. Depending on the issue at hand,

UDSM 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. The summary of stakeholder communication strategy is provided in **Table 5.6-1**.

Thus, depending on the need of each stakeholder, UDSM will use the following methods;

- **Focus Group Meetings/ Discussions** – UDSM will employ FGD when aiming to bring together stakeholders with the same interests or common characteristics into a meeting to discuss specific topics or project components in a focused manner. FGD will be employed to explore issues that are relevant to specific groups or sub-groups of a community – such as youth, the elderly, women, students and people with disabilities. The intention of using this approach is centred upon establishing of similarities and differences among people of the same or different groups.
- **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.
- **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.
- **Distribution of pamphlets** – This is a way of sharing information to a wide range of individuals.
- **Site visits** – These visits are focused on identifying and discussing stakeholder concerns and to disclose project information within communities.

Table 5.6-1 Summary of Stakeholders Communication Strategy.

S/n	Stakeholder Group	Specific Needs	Language	Communication Means
1.	Government Entities and Implementing Institutions and Agencies (TANESCO, DAWASA, FIRE, OSHA)	i. Inclusion in the decision-making processes and implementation role of the project ii.	Kiswahili	<ul style="list-style-type: none"> • Correspondence by phone/email • meetings • Roundtable discussions
2.	Communities and local government authorities of Kianda village	i. Sensitization as to the project, its benefits and their role. ii. Information on the Project and approach to managing environmental and social issues.	Kiswahili	<ul style="list-style-type: none"> • Community meetings • Outreach activities • Flyers • Banners
3	Students, Students government and people with disabilities at SoAF	i. Sensitization as to the project, its benefits and their role. ii. Information on the Project and	Kiswahili	<ul style="list-style-type: none"> • Meetings • Roundtable discussions • Community meetings • Group discussions • Outreach activities • Flyers

S/n	Stakeholder Group	Specific Needs	Language	Communication Means
	Kunduchi Campus.	<p>approach to managing environmental and social issues.</p> <p>iii. Consideration of their decision-making processes</p>		<ul style="list-style-type: none"> Banners
4	Vulnerable Groups (women, youth, elders and the disabled) at project site surrounding areas	<p>i. Sensitization as to the project, its benefits and their role.</p> <p>ii. Information on the Project and approach to managing</p>	Kiswahili	<ul style="list-style-type: none"> Disclosure of Project documentation in a culturally appropriate and accessible manner. Community meetings. Group Discussions
5.	Government Entities and Implementing Institutions and Agencies (TANESCO, DAWASA, FIRE, OSHA)	<p>i. Inclusion in the decision-making processes and implementation</p> <p>ii. role of the project</p>	Kiswahili	<ul style="list-style-type: none"> Correspondence by phone/email meetings Roundtable discussions
6	Communities and local government authorities of Kianda village	<p>i. Sensitization as to the project, its benefits and their role.</p> <p>ii. Information on the Project and approach to managing environmental and social issues.</p>	Kiswahili	<ul style="list-style-type: none"> Community meetings Outreach activities Flyers Banners

5.6 Stakeholders' Engagement Plan (SEP)

The engagement plan will be reviewed and updated throughout the project implementation. During this process, the focus and scope of the SEP may change to reflect the varying stages of project implementation and to encompass any changes in project design and lessons learnt from previous phases of the Project. However, it is important to develop a guiding framework that may act as roadmap for stakeholders' engagement as shown in **Table 5.7-1**.

Table 5.7-1: Stakeholders' Engagement Plan.

Target Stakeholders	Objective	Messages/ Agenda	Means of Communication	Schedule/frequency	Responsible person/ group
Project Preparation and Pre-Construction Phase					
Representatives of implementing institutions and agencies (TANESCO, DAWASA, OSHA); Local NSAs; Community groups representatives from Kunduchi Area. Students and Student organisation, UDSM staff, service providers and private sector surrounding project site	To disclose finalized ESMF, SEP, LMP and ESCP and ESIA	Email message to advise Stakeholders of disclosure and where to access the disclosed documents. 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	
Representatives of implementing institutions and agencies (TANESCO, DAWASA, OSHA); Local NSAs; Community groups representatives from Kunduchi Area, Students and Student organisation, UDSM staff, service providers and private sector surrounding project site	To inform stakeholders of any new activities, unexpected impacts etc. during construction. To Provide updates on project progress	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	UDSM Monitoring and evaluation team, E&S coordinator
Representatives of implementing institutions and agencies (TANESCO, DAWASA, OSHA); Local NSAs; Community groups representatives from Kunduchi area,	Inform stakeholders of any new activities, unexpected impacts etc. during construction. Provide updates on project progress	Inform public about any emerging issues Information and education on the risks and impacts, GRM, workers code of conduct etc. Updates on project progress etc.	Public Meetings Focus Groups Discussions. Face to Face Meetings	At least once per each stage of the project or once when there are changes or revision	UDSM Monitoring and evaluation team, E&S Coordinators
Representatives of implementing institutions and agencies (TANESCO, DAWASA, OSHA); Local	Inform stakeholders of any new activities, unexpected impacts etc. during construction.	Inform public about any emerging issues Information and education on the risks	Public Meetings Focus Groups Discussions.	At least once per each stage of the project or once when	UDSM Monitoring and evaluation team, E&S Coordinators

NSAs; Community groups representatives from Kunduchi area, Students and Student organisation, UDSM staff, service providers and private sector surrounding project site	Provide updates on project progress	and impacts, GRM, workers code of conduct etc. Updates on project progress etc.	Face to Face Meetings	there are changes or revision	
Community groups representatives from Kunduchi area, Students and Student organization, UDSM staff, service providers and private sector surrounding project site	Resolve grievances received	To address grievances related to construction activities Refer persons affected by project related GBV/SEA to services To promote accountability for violations of GBV by project staff.	Face-to-face meetings Confidential and safe face to face referral for GBV survivors Meetings and aggrieved persons	Every time a grievance is received	E&S coordinators, UDSM Monitoring and evaluation team, UDSM Gender Unit and Gender Desk at Kinondoni council and police station
Representatives of implementing institutions and agencies (TANESCO, DAWASA, FIRE, OSHA); Community groups representatives from Kunduchi area, Students and Student organization, UDSM staff, service providers and private sector surrounding project site	Contact with the Environmental and Social Project Experts	Sharing of phone number and WhatsApp number to submit questions and other comments.	Phone number WhatsApp number	At least once per each stage of the project or once when there is changes or revision	E&S coordinators
Throughout the Project Implementation Period (All Components)					
Representatives of implementing institutions and agencies (TANESCO, DAWASA, OSHA); Community groups representatives from Kunduchi area, Students and Student organisation, UDSM staff, service providers and	Information dissemination	To share general information on project, activities	Posting on bulletin boards; Information leaflets Community meetings Outreach activities – Focus groups. One to one meeting	At least once per each stage of the project or once when there are changes or revision	E&S Coordinators and PO-RALG Office.

private sector surrounding project					
Representatives of implementing institutions and agencies (TANESCO, DAWASA, OSHA); Local NSAs; Community groups representatives from Kunduchi Area. Students and Student organisation, UDSM 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 are changes or revision	E&S coordinators

CHAPTER SIX

6.0 ASSESSMENT OF IMPACTS AND ANALYSIS ALTERNATIVES

6.1 Identification of Impacts

The identification of impacts considers both positive and negative impacts which result from the interaction between the Project related activities and Valued Environmental Components (VECs)³¹. For the purpose of this report, the term “environmental effects” will be taken to be synonymous with the term “environmental impacts” as referred to in the EIA and Audit Regulations (2005). As such, the EIA study considers environmental effects and impacts as defined by the national legislation. However, for convenience, the term “impact(s)” shall be used throughout this report, unless otherwise specified.

The identified potential environmental impacts are based on the interaction between the Project Related Activities and Selected Valued Environmental Components (VECs)³². The selection of VECs were based on the existing project environment (environmental baseline conditions), opinions/views obtained from stakeholder consultations, and the consultant’s professional judgement. For this project, the selected VECs include the Atmospheric Environment; Acoustic Environment; Wetland Environment; Terrestrial Environment; Public Health and Safety; Labour and Economy; and Public Services Infrastructure / Utilities. The potential interactions between the Project Related Activities and the Selected VECs for each phase of the project implementation are illustrated in **Table 6.1-1**.

Table 6.1-1: Potential Interactions of the Project with VECs.

Valued Environmental Components	Project Phase			
	Mobilization	Construction	Demobilization	Operation
Atmospheric Environment	-	✓	-	-
Acoustic Environment	-	✓	-	-
Water Resources	-	-	-	-
Aquatic Environment	-	-	-	-
Wetland Environment	-	-	-	✓
Terrestrial Environment	-	✓	-	-
Public Health and Safety	-	✓	-	✓
Labour and Economy	-	✓	✓	-
Community/Public Services Infrastructure / Utilities	-	-	-	✓
Transportation	-	-	-	-
Current Land and Resources Use	-	-	-	-
Current Use of Land and Resources by Indigenous Peoples ³³	-	-	-	-
Cultural and Historical Heritage Resources	-	-	-	-
Legend:				
✓ No Substantial Interaction				
- Possible Interaction				

³¹ Valued Environmental Components can be physical, biological, social, economic, or cultural

³² Valued Environmental Components can be physical, biological, social, economic, or cultural

³³ Defined as members of those cultures which have historic, ancestral, spiritual, and functional connection to the land on which and from which they live. Distinguished from members of those cultures whose connection to the land on which they live is limited to the historical period.

6.2 Assessment of Impacts

The identified impacts have been assessed by using Environmental Impact Assessment Matrix³⁴ provided in **APPENDIX 4**, The EIA Matrix helped to determine the significance of impacts based on the following criteria:

- **Importance** – whether important to national, regional, or international interest or site-specific.
- **Magnitude of Change** – whether Positive or Negative
- **Permanence** – whether condition is permanent or temporary.
- **Reversibility**- reversible or irreversible.
- Whether **Cumulative / Synergistic** for positive and negative impacts, respectively.

The significance of impacts also took into consideration existing by-laws, national and international environmental standards, legislation, treaties, and conventions that may affect the significance of identified impacts.

These techniques have been used in order to have a logical and systematic way of identifying, assessing, and analysing environmental impacts. The techniques also allowed subjective judgments to be quantitatively recorded and therefore make the assessment of impacts become more objective.

6.3 Environmental Impacts

6.3.1 Construction Phase

6.3.1.1 Air pollution due to dust and exhaust emissions

The project will interact with Atmospheric Environment during the construction phase through excavation and stockpiling of excavated soil materials during preparation of construction site. This is likely to result into increased air pollution due to dust emission, especially during dry seasons, hence affecting the the construction workers and nearby people. Air pollution will also occur due to exhaust emissions from operation of construction equipment/machinery.

The impact has been assessed to be direct and negative with Low Significance. It is expected to be short-term and temporary, occurring only during the construction phase. If it occurs, its effects on human health will be reversible.

6.3.1.2 Noise nuisance and vibration effects

The project will interact with the Acoustic Environment during the construction phase through the operation of mobile equipment/machinery. This is likely to result in noise nuisance and vibration effects. Due to the high noise emission from construction equipment/machinery, the most affected people will be the construction workers and other people close to the construction site. The impact has been assessed to be **direct** and **negative** with **Low Significance**. It is expected to be short-term and temporary, occurring only during the construction phase. Its effects on human health will be reversible and non-cumulative if it occurs.

6.3.1.3 Risk of overloading the wetland ecosystem

The project will interact with the existing wetland environment during the operation phase through the discharge of raw sewage water from sanitary facilities. During the site investigation, it was noted that the sewer manholes are directed towards the existing wetland area. This practice is anticipated to continue during the operation of Lecture Rooms and Laboratory Facilities.

Raw sewage wastewater contains a high concentration of nutrients, particularly nitrates (NO₃-) which promotes the growth of algae (a process known as eutrophication). The discharge of raw sewage into the wetland area is likely to result in overloading of the wetland ecosystem.

³⁴Environmental Impact Assessment Using the Rapid Impact Assessment Matrix (RIAM). Ed. Kurt Jensen. Published by Olsen & Olsen, 1998.

This is evidenced by the overgrowth of algae, which results in increased biological oxygen demand (BOD), and reduced light penetration, ultimately leading to the death of wetland-dependent flora and fauna.

The impact has been assessed to be **direct** and **negative** with **Medium Significance**; and is expected to be **long-term** and **permanent** as it will occur throughout the operational phase. However, its effects on the flora and fauna will be **reversible** if it occurs. The impact is considered to be **non-Cumulative** as it will not interact with discharge from outside the project site.

6.3.1.4 Landscape degradation and loss of aesthetic value of the surrounding environment

The project will interact with Terrestrial Environment during construction phase through excavation and stockpiling of excavated soil materials and demolition materials. This will result into the accumulation of construction related solid wastes and demolition wastes into the surrounding environment. The accumulation of excavated soil materials, construction solid wastes and demolition wastes is likely to result into landscape degradation and loss of aesthetic value of the surrounding environment.

The impact has been assessed to be **indirect** and **negative** with **Very Low Significance**; and is expected to be **short-term** and **temporary** as it occurs only during the construction phase. Its effects on the surrounding environment are **Reversible** because the surrounding environment can be restored to its original condition after the removal of the impact or completion of the project. The impact is considered to be **non-Cumulative** the impact will occur only within the boundaries of the construction site.

6.4 Social Impacts

6.4.1 Construction Phase

Public Health is a condition of the environment that relates to the physical health and well-being of the public /local community surrounding the Project. The potential for public health concerns includes those associated with chemical emissions, human health factors, potable water supplies, and several types of accidents, malfunctions, and unplanned events.

The project will interact with Public Health and Safety to create the following impacts during construction phase:

- Increased prevalence of HIV/AIDS and STIs due to interaction between the construction workers and local community members.
- Creation of occupational health and safety risks to the construction workers due to handling /operation of hazardous construction materials/equipment.
- Creation of risk of construction related accidents due to trespass by unauthorized people into the construction sites.
- Increased risk of traffic accidents at the junction of access roads due to frequent movement of construction vehicles to and from the construction site.
- Increased risk of Covid-19 transmission due to influx of people into the construction site.

6.4.1.1 Increased prevalence of HIV/AIDS and STIs

The project is likely to result into increased prevalence of HIV/AIDS and STIs in the project areas due to social interaction between construction workers and local community is likely to result into increased prevalence of HIV/AIDS and STIs among the local community members of the project area.

The impact has been assessed to be **indirect** and **negative** with **High Significance**; and is expected to be **long-term** and **permanent** as it continues to occur even after construction

phase. Its effects on the human health are **Irreversible** because there is not yet any known treatment for HIV, apart from Ant-retrovirus (ARV) drugs, which helps to increase resistance against HIV. The impact is considered to be **Cumulative** because it will be additional to the current situation on HIV/AIDS prevalence in the project area.

6.4.1.2 Occupational health and safety risks

The project will involve construction workers handling and operating hazardous construction materials and equipment. This will likely result in occupational health and safety risks for the workers. These include physical injury from construction equipment like jackhammers, exposure to dusty construction materials like dry cement, sand, and aggregate, and hand injury due to exposure to wet cement, etc.

The impact has been assessed to be **direct** and **negative** with **Low Significance**. It is expected to be short-term and temporary as it occurs only during the construction phase. Its effects on human health will be reversible because damage occurs only within the boundaries of the construction site.

6.4.1.3 Construction-related risk of accidents.

The project involves the movement of mobile construction equipment, like bulldozers, graders, and heavy-dumper trucks, around the construction site. Therefore, unauthorized people trespassing into the construction site are likely to result in the risk of construction-related accidents. For example, a person may be overrun by backwards-moving mobile construction equipment/machinery, especially if it is not fitted with a sounding alarm device.

The impact has been assessed to be indirect and negative with Low Significance; and is expected to be short-term and temporary as it occurs only during construction phase. However, its effects on human health may be Irreversible because the impact may result in fatal injury (death) or non-fatal injury, which results in the loss of an organ (E.g., legs, arms, etc.). The impact is considered to be non-cumulative because it will occur only within the boundaries of the construction site.

6.4.1.4 Increased risk of traffic accidents

The project will involve the movement of heavy trucks to and from the construction site during the transportation of construction materials or spoil/soil materials from the construction site to the dumping site. The frequent movement of heavy trucks to and from the construction site is likely to result in the risk of traffic accidents at the junction between the access roads to the construction site and the local main road. The impact has been assessed to be **indirect** and **negative** with **Low Significance** and is expected to be short-term and temporary as it occurs only during the construction phase. However, its effects on human health may be Irreversible because it may result in fatal injury (death) or non-fatal body injury and irreversible damage to property. The impact is considered to be **Cumulative** because it will be additional to the current situation of traffic accidents along the local roads.

6.4.1.5 Increased risk of Covid-19 transmission.

The project is likely to induce influx of people into the project site, in terms of job seekers, small business operators, etc. This will result into increased number of people around the project site, hence resulting into increased risk of transmission of Covid-19, if precautions are not taken.

The impact has been assessed to be **indirect** and **negative** with **High Significance**; and is expected to be **long-term** and **permanent** as it continues to occur even after construction phase. Its effects on the human health are **Irreversible** because there is not yet any known treatment for Covid-19., apart from Vaccine, which helps to increase resistance against Covid-1p Virus. The impact is considered to be **Cumulative** because it will be additional to the current situation on Covid-19 pandemic in the project area.

6.4.1.6 Creation of temporary employment for local people

The project is will involve recruitment of local residents during construction, hence creation of temporary employment to the local people during construction. The project is expected to employ at least 50 people during construction. The employment of local people into the project will also benefit their dependant families. For example, if the project employs 50 people and if each individual has an average of 5 dependants, then the project is likely to benefit about 250 people.

The impact has been assessed to be **direct** and **positive** with **Medium Significance**; and is expected to be **short-term** and **temporary** as it occurs only during construction phase. However, it can have **Long-term** effects on the socio-economic conditions of the local people. The impact is considered to be **Synergistic** because it is a positive impact, which will be additional to the current situation on employment creation in the project area.

6.4.1.7 Increased income generation opportunity for local people.

The presence of large number of construction workers will result into increased demand for food and other items, hence resulting into increased income generation opportunity for local people.

The impact has been assessed to be **indirect positive** with **Medium Significance**; and is expected to be **short-term** and **temporary** as it occurs only during construction phase. However, it can have long-term effects on the socio-economic conditions of the local people. The impact is considered to be **Synergistic** because it is a positive impact, which will be additional to the current situation on income generation in the project area.

6.4.1.8 Emergence of GBV/SEA and SH among the project employees

Differences in gender and socio-economic status among the project employees are likely to result into emergence of Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH). For example, some corrupt senior project staff may demand sexual favours from female job seekers or demand sex from female employees.

The impact has been assessed to be **indirect negative** with **High Significance**; and is expected to be **short-term** and **temporary** as it occurs only during construction phase. However, it can have long-term socio-psychological effects of the affected people. The impact is considered to be **Cumulative** because it will be additional to the current situation on GBV/SEA and SH in the project area.

6.4.2 Demobilization Phase

6.4.2.1 Loss of temporary employment by local people.

During demobilization or closure of the project, the construction workers will be retrenched, hence loss of employment. The effect is not likely to be significant due to the fact that the retrenched people will be from within the project area and are likely to revert back to their initial economic activities. Nevertheless, if their terminal benefits are not paid the effect is likely to be significant.

The impact has been assessed to be **direct negative** with **Low Significance**; and is expected to be **short-term** and **temporary** as it will occur during construction phase. The impact is considered to be non-**Cumulative** because will occur within the project area.

6.4.3 Operation Phase

6.4.3.1 Increased revenue for infrastructure/utility service providers.

The project will involve the construction of new building structures and associated facilities, hence increased power and water supply during construction. The project will also result into increased demand for power and water supply during operation due to the increased number of students, staff and operational activities. This is considered to be a beneficial or positive

impact because the increased demand for infrastructure/utility services will result into increased revenue for infrastructure/utility service providers such as TANESCO, DAWASA, TTCL and Mobile Phone Companies.

The impacts have been assessed to be *indirect* and *positive* with **Medium Significance**, and are expected to be *long-term* and *permanent* as it will continue to occur throughout the operation phase. The impact can be considered to be *non-Cumulative* because it will occur only within the project site due to operation of Lecture Rooms and Laboratory Building.

6.4.3.2 Increased enrolment of students and revenue collection.

The project will involve the construction of new lecture theatres, laboratory building and associated facilities. This will result into increased revenue due to increased enrolment of students at SoAF Kunduchi Campus.

The impacts have been assessed to be *indirect* and *positive* with **High Significance**, and are expected to be *long-term* and *permanent* as it will continue to occur throughout the operation phase. The impact can be considered to be *Synergistic* because it will add positively to the current situation on revenue collection at the SoAF Kunduchi Campus.

6.5 Summary of Identified Significant Impacts

The summary of identified significant impacts in **Table 6.3-1** indicates most of the negative impacts will occur during construction phase and their significance ranges from Low, Medium to High and most of the positive impacts will occur during operation phase and their significance ranges from Medium to High.

Table 6.3-1: Identified Significant Impacts.

Impacts	Significance	MP	CP	DP	OP
Increased air pollution due to dust emissions from construction activities.	Low	-	✓	-	-
Creation of noise nuisance to the nearby sensitive receptors due to the operation of construction equipment/machinery.	Medium	-	✓	-	-
Risk of overloading the wetland ecosystem due to discharge of raw sewage wastewater from sanitary facilities.	Medium	-	-	-	✓
Creation of landscape degradation and loss of aesthetic value of the surrounding environment due to accumulation of construction/demolition solid wastes.	Low	-	✓	-	-
Loss of ecological and landscape value of the surrounding environment due to removal of existing vegetation /trees	Medium	-	✓	-	-
Increased HIV/AIDS and STIs prevalence due to social interaction between construction workers and local community members.	High	-	✓	-	-
Increased occupational health and safety risks due to handling /	Low	-	✓	-	-

Impacts	Significance	MP	CP	DP	OP
operation of hazardous construction materials/equipment.					
Increased risk of exposure to Covid-19 due to influx of people into the construction site.	High	-	✓	-	-
Increased risk of construction related accidents due to trespassing by unauthorized persons into the construction site.	Low	-	✓	-	-
Increased risk of traffic accidents due to movement of heavy trucks to and from the construction site.	Low	-	✓	-	-
Creation of employment opportunities for local people due to recruitment of construction workers.	Medium	-	✓	-	-
Risk of Emergence of Gender Based Violence, Sexual Exploitation and Sexual Harassment due to social interaction among project employees.	High	-	✓	-	-
Increased income generation opportunities for local people due to increased demand for food from construction workers.	Medium	-	✓	-	-
Loss of temporary employment opportunities for local people due to closure or completion of the project.	Low	-	-	✓	-
Increased enrolment of students due to operation of Lecture Rooms and Laboratory Facilities.	High	-	-	-	✓
Increased revenue for infrastructure and utility service providers due to increased demand for services.	High	-	-	-	✓
KEY:					
	Very High Positive Impact		Very High Negative Impact		
	High Positive Impact		High Negative Impact		
	Medium Positive Impact		Medium Negative Impact		
	Low Positive Impact		Low Negative Impacts		
	Very Low Positive Impact		Very Low Negative Impact		

6.6 Impacts of the Environment on the Project

The effects/impacts of the environment on the Project are associated with risks of natural hazards and influences of nature on the Project. Typically, these are a function of project or infrastructure design in the context of its receiving environment, and ultimately how the project is affected by nature. These effects/impacts may arise from physical conditions, landforms, and site characteristics or other attributes of the environment which may act on the project such that the project components, schedule, and/or costs could be substantively and adversely changed.

In this report, the assessment of the effects of the environment focuses on the environmental attributes that are considered to have potential effects/impact on the Project. These are based on regulatory consultation, public and stakeholder input, a review of the known past and existing conditions, and knowledge gained through projections of potential future conditions.

For example, potential effects of climate change, severe weather such as wind; precipitation; floods; electrical storms; seismic activity; and external fires resulting from causes other than the Project. This section provides a summary of the identified environmental effects of the Project. In general, the effects of the environment on the Project during the construction phase have been rated not significant.

6.6.1 Impacts of Climate Change on the Project

The Project area may experience extreme weather conditions during construction and operational life of the Project due to increasing climate change events. To assess the environmental effects of climate on the Project, current climate and climate change must both be considered. Current climate conditions are established by compiling relevant historical data and establishing a climatological background for the project area. The historical and projected extremes in temperature, intense precipitation, or other storm events, are important considerations that must be accounted for in the design of the Project and in all other aspects of construction.

The study on climate projections indicates in the present century (2011–2040) Dar Es Salaam is projected to feature decreased minimum temperature in the range of -0.1°C to 0°C ; and increased rainfall in the range of 0.25 to 0.5 mm/day³⁵.

Forecasted changes in climate may affect construction and operation in both positive and negative ways and may vary from nominal to extreme effects. Climate changes that could potentially have residual effects on the project include:

- increased incidence of soil erosion and flooding.
- increased frequency and magnitude of heavy precipitation events;
- increased frequency of extreme storms accompanied by heavy precipitation, thunderstorms, and strong winds; and
- Extreme atmospheric temperatures and weather conditions.

Each of these effects must be considered in terms of how they may adversely affect the Project if they are not planned, engineered, and designed to account for such effects. Such effects could cause:

- reduced visibility and inability to manoeuvre operation equipment;
- delays in shipment of materials, supplies and/or products;
- changes to the ability of workers to access the site (e.g., if a road were to be washed out);
- damage to infrastructure;
- increased structural loading; and/or
- loss of electrical power resulting in potential loss of production.

Mitigation measures

The potential effects of climate on construction will be considered in the planning and designs of the building structures and in the scheduling of construction activities to limit delays, prevents damage to infrastructure and the environment, and maximize the safety of construction staff. Compliance with design and building codes and standards are expected to account for weather extremes through built-in factors of safety to prevent undue damage to infrastructure from such events. **Table 6.4-1** provides the general mitigation measures against climate change effects. **Table 6.4-2** outlines the specific mitigation measures against the potential effects/impacts of climate change on the construction of Lecture Theatres and Laboratory Facilities Building at SoAF Kunduchi Campus.

The predicted effects of climate change on the project will be carefully taken into account in the planning, design, and construction activities. These include the location of the construction

³⁵ Climate Change Projections for Tanzania Based on High-Resolution Regional Climate Models from the Coordinated Regional Climate Downscaling Experiment (CORDEX)-Africa. Philbert Modest Luhunga, Agnes L. Kijazi, Ladislaus Chang'a, Afredy Kondowe, Hashim Ng'ongolo and Habiba Mtongori. <https://www.frontiersin.org/articles/10.3389/fenvs.2018.00122/full>

site, the selection of materials to be used; and the operating plans for the project to ensure the long-term viability and sustainability of the project. The likely adverse effects on the project during construction and operation will be taken into consideration in the planning and design of the project (or managed adaptively as appropriate as information regarding climate change evolves. As a result, substantive damage to the project or interruption to the project schedules is not anticipated.

Table 6.4-1: General Climate Change Effects and Mitigation Measures.

Event	Effects	Mitigation measures
(a) Extreme temperature variations	Reduced ductility of construction materials and increased susceptibility to brittle fractures.	The specification of construction materials must be in compliance with the applicable standards and codes and must maintain structural integrity at the anticipated minimum and maximum ambient temperatures
(b) Rising or increasing sea water levels.	Soil erosion along the shorelines due to rising sea water level that results into shifting of sea shorelines towards the inland and creating damage on the building structure.	Design should consider the appropriate distance between the construction site and the shorelines and the provision of structure that will protect the building from rising sea water levels. The effect is not anticipated because the proposed construction site is about 250 m from the shoreline.
(b) Extreme wind storm and severe precipitation resulting to soil erosion and flooding.	Reduced visibility and inability to manoeuvre construction equipment/machinery.	Make predictions of short delays and make allowance for them to be included in the construction schedule.
	Disruption of construction activities and delays to the construction schedule. Delays in the transportation of construction materials to the site.	Scheduling of tasks that require precise movement of equipment (e.g., positioning steel I-beams in place with cranes) to periods when the weather conditions are favourable.

Table 6.4-2: Potential Climate Effects on the Building and Mitigation Measures.

Climate event	Risks to the Building	Mitigation Measures
(a) Heavy rain for longer periods	The elevation of the project site range between 3-5 m.a.s.l and that of adjacent marshland range between 1-2 m.a.s.l.	The area that is not going to be covered with the building should be provided with grasses and trees to control soil erosion and sedimentation of the marshland area.
	The movement of water is therefore towards the marshland area, hence	The foot paths and car parking areas should be paved by using porous interlocking concrete blocks

Climate event	Risks to the Building	Mitigation Measures
	<p>resulting into soil erosion and sedimentation of the marshland area.</p> <p>In the long run sedimentation will result into reduced water retention capacity of the marshland, hence increasing flood risk around the building structures</p>	to minimize surface run-off and overloading of the marshland area.
(b) Storm events (Typhoons, Cyclones) and extreme winds	Possible removal of the roof and other building structures.	<p>Compliance with specifications during roof construction and other structural members.</p> <p>Planting of trees around the building to act as wind barriers.</p>

6.6.2 Impacts of Seismic Activity on the Project

The construction site is not located within an area with high seismic hazard³⁶ and therefore, the likelihood of a major seismic event in the immediate vicinity of the construction site that could cause damage to the building structure or interrupt operations during any project phase is low.

6.6.3 Impacts of External Fires on the Project

In the event that an external fire did occur in close proximity to the Project, there is a potential risk of contact with fuel storage tanks, thereby potentially creating a risk of fire with petroleum products which are by their nature highly flammable.

Mitigation measures

The presence of a fence wall established around the materials storage yard will help to reduce the likelihood of an external fire causing substantive damage to the Project. In addition, firefighting capabilities (including appropriate equipment) on-site will be at a high level of readiness. The safety and security personnel will be in place in collaboration with Fire and Rescue Department to provide for rapid detection and response to any fire threat.

The materials to be used for construction will be inherently fire resistant. For example, the facility structures can be constructed primarily of concrete and steel, which are not typically affected by fire.

6.7 Analysis of Alternatives

The purpose of the project is to undertake construction of lecture theatres and laboratory building and associated facilities at the SoAF Kunduchi Campus. The justification for the project has been prompted by the need for strengthening 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 three alternatives have been considered in this study based on technical, economic, environmental and social criteria. That means selected alternative must be technically feasible, economically viable, environmentally friendly and socially acceptable. The analysis of alternatives considered the following alternatives:

³⁶Map updated by U.S. Geological Survey National Earthquake Information Centre. 13 September 2016.
<https://reliefweb.int/sites/reliefweb.int/files/resources/20160910.pdf>

- No Project Alternatives-which considered whether the project should be implemented or not.
- Project Alternative-which requires the project to be implemented.
- Construction Method Alternatives-which considered what type of construction methods (Labour intensive or Machine-intensive method)

For comparison of these alternatives the multi-Criteria Analysis has been used, based on Technical, Economic (Techno-economic), Environmental and Social Criteria.

6.7.1 No Project Alternative VS Project Alternative

The purpose of the project is to improve the learning environment in line with the requirements of the labour market at the beneficiary higher education institutions and improving the higher education system. This objective will be achieved through construction of Lecture Rooms and Laboratory Building, hence increasing the number of students' enrollment at SoAF Kunduchi Campus.

Therefore, the "No project" Alternative" means the project should not be implemented at all and we should continue using the existing training facilities, hence continue with the current enrolment level. The comparison of alternatives based on techno-economic, environmental and social criteria is summarized in **Table 6.5-1**.

From techno-economic point of view the "No Project Alternative" will have no or less investment cost, because the existing facilities will only continue to be used. The "No Project Alternative" means the higher learning institution will continue to experience low enrolment of students, low revenue collection from fess and low productivity.

The "Project Alternative" will result into increased revenue due to fee collection from increased student's enrolment, and increased productivity due to operation of modern learning facilities. In addition, the Project Alternative is likely to create temporary employment and income generation opportunities for some local people during construction. Therefore, from techno-economic point of view the "No Project Alternative" should be rejected and the "Project Alternative" should be selected.

From economic point of view the "No Project Alternative" will have long term negative impacts due to continued low students' enrolment level and low productivity due to continued dependence on old learning facilities. The "Project Alternative" will have long term economic benefits due to improved learning facilities, increased revenue from fee collection as a result of increased student's enrolment level, good quality training with increased output of highly qualified professionals.

From environmental point of view the "No Project Alternative" will have fewer negative impacts than the "Project Alternative". The "Project Alternative" will result into more negative impacts than the "No Project Alternative. However, the construction related impacts will be short-term and temporary as they occur only during construction phase and could be minimized through engineering design and good construction practice. Therefore, from environmental and social point of view the "No Project Alternative" should be rejected and the "Project Alternative" should be selected.

Table 6.5-1: No Project Alternative VS Project Alternative.

Evaluation Criteria	No Project Alternative		Project Alternative	
	High	Low	High	Low
(a) Techno-economic				
- Investment Costs	-	-	-1	-
- Students' enrolment level	-	-2	+2	-

Evaluation Criteria	No Project Alternative		Project Alternative	
	High	Low	High	Low
- Revenue collection for fees	-	-2	+2	-
- Productivity	-	-2	+2	
(b) Environmental and Social				
- Construction related environmental and social impacts.	-	-	-1	-
Total Score:	0	-6	+4	0
Overall Net Score:	-6		+4	
KEY:				
+1 = Short-term Positive Impact				
-1 = Short-term Negative Impact				
+2 = Long-term Positive Impact				
-2 = Long-term Negative Impact				
1.1.1.1.1 Conclusion:				
The “No Project Alternative” has been found to have an overall score of -6 and the Project Alternative an overall score of +4. Therefore, the “Project Alternative” should be selected and “No Project Alternative should be rejected.				

6.7.2 Labour Intensive Alternative VS Machine Intensive Alternatives

The use of labour-intensive construction method is compared against machine-intensive construction method. The comparison of alternatives based on techno-economic, environmental and social criteria is summarized in **Table 6.6-1**.

From a techno-economic point of view the labour-intensive construction method makes use of manual labour and therefore likely to create employment opportunity to a large number of adjacent local residents than machine-intensive method, hence improving the local economy. The employment creation will have multiplier effect as it will also benefit their families, hence socially acceptable. However, the use of mobile equipment / machine is more costly than labour-intensive method, but it is more efficient than labour-intensive method.

From environmental and social point of view the labour-intensive method will have minimum risk of construction related risk of accidents to construction workers and the local community, unlike the use of mobile equipment / machinery during excavation works, Labour-intensive method has less environmental impacts compared to machine-intensive method. For example, the use of mobile equipment / machine is likely to create more dust emission than labour-intensive method.

The use of mobile equipment/machine will also create air pollution and noise nuisance than labour-intensive method. The use of mobile equipment will have will create more landscape degradation than labour-intensive method.

From the analysis it can be seen that the labour-intensive method should be selected and machine-intensive method should be rejected. However, due to the nature of the project and limitations of labour-intensive method, the combination of the two methods should be more favourable.

In this case, the contractor should give priority to labour-intensive method for those activities that could be done manually. For, example, excavation of roadside drainages could be done manually instead of using an excavator.

Table 6.6-1: Labour-Intensive VS Machine-Intensive Methods.

Evaluation Criteria	Labour-intensive method		Machine-intensive method	
	High	Low	High	Low
(c) Techno-economic				
- Cost of hiring equipment / machinery	-	+1	-1	-
- Employment creation	+1	-	-	-1
- Efficiency and time saving	-	-1	+1	
- Work productivity	-	-1	+1	-
(d) Environmental and Social	-	-	-	-
- Dust emission		+1	-1	-
- Exhaust emission	-	-	-1	-
- Landscape degradation		+1	-1	
- Risk of construction related accidents	-	+1	-1	-
- Social acceptability	+1	-	-	-1
Total Score:	+2	(-2) +(+4) = +2	(-5) +(+2) = -3	-2
Overall Net Score:	+4		-5	
KEY: +1 = Positive Impact -1 = Negative Impact				
Conclusion: The “labour-intensive method]” has been found to have an overall score of +4 and machine-intensive method an overall score of -5. The “Labour-Intensive Construction Method” seems to be favourable than “Machine-Intensive Construction Method”. However, due to the nature of the project the labour-intensive method has been found to have some limitations, and therefore the combination of the two methods should be considered. However, during construction more emphasis will be given on the labour-intensive method in order to promote employment of the local people. For example, excavation of storm water drainages, relocation of utilities, etc.				

6.7.3 Alternative Site

The option of selecting alternative site was not considered because the existing site is already being owned by the project proponent. Therefore, selecting an alternative location was found to be uneconomical due to cost implication. Moreover, the existing site is compatible with urban land use planning by the Kinondoni District Council. Also, the site is well located far from the noisy urban centre and free from land use development pressure. The site is easily accessible by road and can be easily connected to electricity power and water supply which runs along the road. Finally, the site is on the raised ground and therefore free from flooding events and soil material is suitable for construction.

6.7.4 Energy Alternative

It is assumed that the project will largely depend on electricity power supply from TANESCO because it is readily available and affordable. However, the power supply from TANESCO is not reliable as evidenced by frequent power outage. In this regard, there is a need for emergency power source.

In this case two alternatives for emergency power source have been considered. The most common and easily affordable is the use of diesel engine generator. However, the diesel engine generator is not environmentally friendly due to noise, air pollution and greenhouse gas emissions.

The use of solar power could be a preferable option to diesel engine generator. However, the use of solar power is restricted by its high investment cost, especially when it is used for large area. It is therefore recommended that a diesel engine generator should be used temporarily and then replaced by solar power when investment cost becomes affordable.

6.7.5 Waste Water Treatment Alternatives

Alternative 1: Use of Wast Stabilization Ponds (WSP)

This refers to the use of a series of ponds/lagoons which allow several biological processes to take place, before the water is released back to the water body. However, the project site does not have adequate land for establishment of WSP. Therefore, this alternative should not be further considered for this project.

Alternative 2: Constructed Wetland

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

The site investigation indicates there is a marshland area on the eastern side of the proposed construction site. The marshland is currently being used for discharge of raw sewage from the sanitary facilities. Therefore, there is a potential for using this marshland area for establishment of constructed wetland. However, the constructed wetland will be used in combination with Septic Tank/Soak Pits, whereby treated water from Soak Pits will be discharged into the constructed wetland before being discharged into the sea. The discharged treated wastewater from the constructed wetland will be monitored periodically to ensure the discharged effluent meets the Tanzania Standards

According to the Tanzania Standards sewage disposal field must not be less than 100 m from a water source. The marshland area is more than 200 m from the shoreline, hence complies with the prescribed minimum distance from a water source.

The sea water is considered as Category 2 receiving water body in accordance Water Utilization (Control and Regulation) (Amendment) Act, 1981. Therefore, effluent discharged from the Constructed Wetland must meet the Maximum Permissible Concentration (MPC) for Category 2 receiving water body (MPC-2). The MPC-2 in the receiving water must be measured below the mixing zone of the effluent discharge.

CHAPTER SEVEN

7.0 ENHANCEMENT AND MITIGATION MEASURES

Preamble

In general, the project has been found to have both beneficial (positive) and adverse (negative) effect/impacts. However, the positive impacts have been found to outweigh the negative impacts. Moreover, most of the identified negative impacts are short-term, as they occur only during construction phase, but most of the identified positive impacts are long-term as they continue during the operation phase. The positive impacts will be enhanced in order to maximize the project benefits.

The identified positive impacts include creation of temporary employment and income generation opportunity for local people during construction; increased revenue for infrastructure/utility service providers; and increased enrolment of local and foreign students due to improved learning facilities at the SoAF Kunduchi Campus. The employment opportunities can be increased by emphasising on labour-intensive construction methods. The labour-intensive construction methods apart from increasing employment opportunities for local people, it helps them build some skills for future employment and creates some sense of project ownership by the local community.

The identified negative impacts include creation of air pollution due to dust emission from construction activities; creation of noise nuisance due to operation of construction equipment/machinery; overloading of wetland ecosystem due to discharge of raw sewage wastewater from sanitary facilities; landscape degradation and loss of aesthetic value of the surrounding environment due to accumulation of excavated soil materials; loss of ecological functions and landscape quality due to removal of existing vegetation/trees;; increased HIV/AIDS prevalence due to social interaction between construction workers and students/local community members; increased risk of exposure to Covid-19 due to influx of people into the construction site; increased risk of exposure to construction related accidents due to trespassing of unauthorized persons into the construction site; increased exposure to occupational health and safety risks due to handling/operation of hazardous construction materials/equipment; increased risk of traffic accidents due to movement of heavy trucks to and from the construction site; loss of temporary employment by local people due to closure or completion of the project.

The purpose of this Chapter is to outline enhancement and mitigation measures for the identified positive and negative impacts, respectively. In order have easy understanding the information is presented in a tabular form showing the identified impacts (positive or negative) and proposed enhancement or mitigation measures during the project implementation phases (i.e. mobilization, construction, demobilization and operation phase).

7.1 Enhancement Measures for Positive Impacts

7.1.1 Creation of temporary employment opportunities for local people

The following enhancement measures will be taken by the Contractor to maximize the project benefits:

- Giving employment priority to the local people during recruitment of construction workers.
- Giving equal employment opportunities to males and females and avoid any kind of discrimination based on gender, race, religion, etc.
- Ensure all workers are served with Employment Contracts which stipulates all workers' rights under the labour laws such as maternity leave, sick leave, etc.

- Ensure workers are paid not less than minimum wage as stipulated by the government.
- Ensure payment of monthly contributions to the National Social Security Fund (NSSF) and Workers Compensation Fund (WCF) as required by the national laws.
- Ensure all workers are made aware, understand and follow the Code of Ethical Conduct.

7.1.2 Increased income generation opportunities for local people

Provide enabling environment for food vendors to sell their food in a clean and hygienic environment by providing shelter and water supply.

7.1.3 Increased enrolment of students and revenue for the institute

The UDSM Vice Chancellor in collaboration with Principal of ColCT Kijitonyama Campus will promote marketing of the institute at national and international levels.

7.1.4 Increased revenue for infrastructure/ utility service providers

UDSM will maintain regular cooperation and consultation with infrastructure/utility service providers for efficient utilization of services from the infrastructure and utility companies.

7.2 Mitigation measures for Negative Impacts

7.1.5 Creation of air pollution due to dust and exhaust emission from construction activities.

The following mitigation measures will be taken by the Contractor during construction to minimize air pollution from dust and exhaust emissions:

- Application of water on dusty areas and dusty construction materials.
- Minimize stockpiling of excavated soils within the construction site by immediate removal and transportation to dumping site.
- Trucks hauling excavated soil materials and dusty construction materials must be covered with tarpaulins.
- Carry out regular maintenance of vehicles and avoid the use of old vehicles and mobile construction equipment which emit black smoke.

7.1.6 Creation of noise nuisance and vibration effects

The following mitigation measures will be taken by the Contractor during construction to minimize noise nuisance:

- Limiting noisy construction activities only to day time hours.
- Fencing of the construction site with corrugated iron sheets to minimize transmission of noise to the sensitive receptors.

7.1.7 Landscape degradation and loss of aesthetic value of the surrounding environment

The following mitigation measures will be taken by the Contractor to minimize land degradation:

- All stockpiled soil materials and demolition solid wastes must be immediately removed and transported to the permitted dumping site.
- Useful soil materials can be retained for landscaping purpose, but must be properly stockpiled.

7.1.8 Loss of ecological functions and landscape quality of the surrounding environment

The following mitigation measures will be taken by the Contractor to minimize destruction of vegetation cover/trees:

- Avoid vegetation clearing beyond the boundaries of the construction site, and avoid cutting any tree without permission from the Resident Engineer.

- Ensure proper landscaping by planting grass and trees in open areas around the buildings after construction. However, precaution must be taken to avoid trees species that can cause damage to the building foundations³⁷.

7.1.9 Increased prevalence of HIV/AIDS and STIs

The following mitigation measures will be taken by the Contractor to minimize transmission of HIV and STIs among the construction workers and local community members:

- Formulation and implementation of HIV/AIDS prevention and control programme.
- Giving employment priority to local people to minimize the number of new comers, hence minimizing the likelihood of new HIV transmission.
- Collaboration with local NGOs/CBOs dealing with HIV/AIDS to promote awareness and education campaigns.

7.1.10 Increased risk of Covid-19 transmission

The Contractor will take necessary precautions as stipulated in the ESF/Safeguards Interim Note: Covid-19 Consideration in Construction/Civil Works Projects.

7.1.11 Increased risk of construction related accidents

The following mitigation measures will be taken by the contractor during construction:

- Fitting all mobile construction equipment / machinery and trucks with sounding alarm and signal device to warn people, especially during backward movement.
- Putting a written warning sign boards in Kiswahili and English languages at strategic locations to prohibit or prevent entrance of unauthorized persons into the construction site.
- Restrict operation of mobile construction machinery / equipment to trained personnel only.
- Fencing the construction site to prevent people from entering the construction site. This will include putting a written warning in both English and Kiswahili at a strategic location to prevent unauthorized people from entering the construction site.

7.1.12 Creation of occupational health and safety risks

The following mitigation measures will be taken by the Contractor to minimize exposure of construction workers to health and safety risks:

- Provision of Personal Protective Equipment (PPE) such as reflective vests, hand gloves, welding goggles, safety boots, etc.
- Avoid prolonged use of hand-held equipment by workers beyond the prescribed 8 hours in accordance with Tanzania Standards³⁸.

7.1.13 Increased risk of traffic accidents due to movement of heavy trucks

The Contractor will develop and implement traffic management plan. This includes deploying flag persons to guide traffic movement at the junction of the main road and access road to the construction site. The involvement of traffic police will be useful, whenever possible.

7.1.14 Risk of emergence of GBV/SEA and SH among the project employees

- Ensuring there are codes of conduct in place that forbid and place penalties for GBV/SEA and SH.
- Disseminating information that raises awareness on the prohibition of GBV/SEA and SH among the construction workers, students/local community members.
- Contractor will develop a code of conduct on ESHS, GBV/SEA and SH that will be attached to the Employment Contractors.

³⁷ This effect has already been noted during the site investigation at CoET Site.

³⁸The United Republic of Tanzania. The Environmental Management (Standards for Control of Noise and Vibration Pollution) Regulations (2010). THIRD SCHEDULE (Made Under Regulation 15(1)).

- Grievances Redress Mechanism will be in place to deal with GBV/SEA and SH for construction workers and students/local community members.

7.1.15 Risk of overloading the wetland ecosystem

The following mitigation measures will be taken to minimize the risk of overloading the existing wetland ecosystem:

- Prohibit discharge of raw sewage wastewater from sanitary facilities into the existing wetland area.
- Convert the existing wetland area into a constructed wetland for receiving treated wastewater from the septic tank / soak pit treatment system.
- Ensure the quality of discharged wastewater from septic tank/soak pit treatment system meets the Tanzania Standards for Water Effluents and Receiving Waters³⁹.

Before commencement of site clearing the Contractor will make consultation with the affected students to identify new location for construction of concrete desks. The new location must be almost the same or better off than the old one.

7.1.16 Loss of temporary employment opportunities

The following mitigation measures will be taken by the Contractor to minimize the effect of retrenchment after project completion or closure:

- Giving employment priority to local people, because after project closure they will easily revert back to their normal economic activities.
- Ensure that all construction workers are registered with social security funds and are paid their terminal benefits immediately before retrenchment from jobs.
- Remittance of monthly NSSF contributions for all workers and submission of payslips to the Resident Engineer on monthly basis.

³⁹ Water Utilization (Control and Regulation) (Amendment) Act, 1981. WATER QUALITY STANDARDS. (First Schedule Made under Section 21(1)1.)

CHAPTER EIGHT

8.0 HEALTH AND SAFETY MANAGEMENT PLAN (HSMP)

8.1 The Need for HSMP

The UDSM SoAF Kunduchi Project will involve construction activities which are likely to create environmental health and safety risk to construction workers, visitors, and adjacent local community members. Thus, during construction phase, the Contractor is required to prepare Health and Safety Management Plan (HSMP) in order to mitigate or minimize health and safety risks associated with the project during construction.

Thus, the purpose of this Health and Safety Management Plan (HSMP) is to guide the Contractor to prepare site specific HSMP to manage health and safety issues at workplace and the construction site. The Contractor's HSMP will provide detailed measures to eliminate or minimize health and safety risks to construction workers, visitors, and safeguard the workers' welfare.

8.2 The Objectives of HSMP

The overall goal of HSMP is to protect employees, the public, the environment and to comply with applicable laws and protect the Company's reputation⁴⁰. HSMP has two general objectives: prevention of incidents or accidents that might result from abnormal operating conditions on the one hand and reduction of adverse effects that result from normal operating conditions on the other hand.

Thus the Contractor will be required to prepare a project specific HSMP, which details on how the environmental health and safety requirements, will be implemented and managed at the construction site. The Contractor's HSMP will provide details on how the contractor will mitigate construction health and safety impacts/risks and documents the contractor's response to inspection, monitoring, verification, internal auditing and correcting or improving environmental health and safety performance.

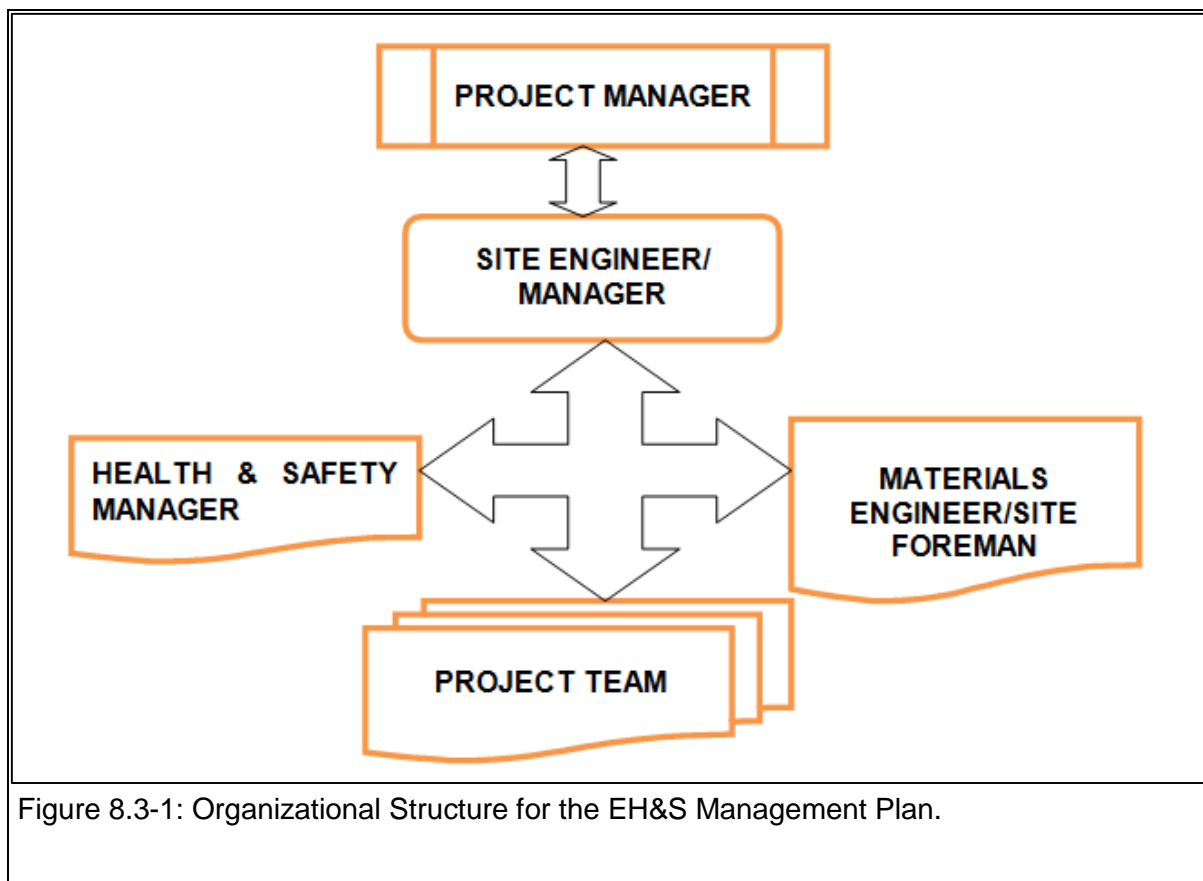
Specifically, the objectives of this HSMP are to:

- Provide specific mitigation measures and controls that can be applied on-site to avoid or minimize environmental health and safety risk.
- Describe health and safety management related roles and responsibilities of key personnel in implementing the identified safety measures and corrective actions.
- Outline monitoring regime to check the adequacy of safety measures during construction phase.
- Provide emergency preparedness and response mechanism to during construction phase.

8.3 Organizational Structure and Responsibilities

The organizational structure for implementation of HSMP is provided in **Figure 8.3-1**. The organization structure indicates there will be a forward and back flow of information among the key personnel and site construction team during implementation of HSMP. The responsibilities of key personnel and site construction team are provided in **APPENDIX 5**. The key personnel may include the Project Manager; Site Manager; Health and Safety Manager; Materials Engineer; and Site Foreman.

⁴⁰ https://en.wikipedia.org/wiki/Environment,_health_and_safety



8.4 Health and Safety Management System

The health and safety management system entails implementation of safety training and promotion of health and safety awareness, on the job-training, and toolbox talks

8.4.1 Safety Training and Promotion

The aims of safety training and promotion programs are:

- To update the safety awareness and technical skills of persons in the field of application.
- To orient new employees to working environment.
- To identify and rectify hazards and convey the same to the workforce.
- To prepare the persons to select appropriate safety measure to overcome any unforeseen hazards/emergency situations.

To achieve the above aims, the following types of training shall be conducted at the site level:

(a) Induction training on health and safety: New or re-assigned employees shall be given health & safety introduction training pertaining to health & safety management and general safety rules and procedure, site specific health & safety rules and their responsibility and accountability in safety performance. Health & safety introduction shall be given to all categories of personnel at site by health & safety Manager.

(b) On the Job Training - Based on the trade, individuals are given on the Job training. These trainings shall be focused on the safe ways of working in a particular trade including hazards involved. This shall be conducted by the foremen / supervisors in collaboration with Safety personnel. Trainer's performance after the programme shall be assessed to evaluate the

effectiveness of the training. All the Employees shall be explained clearly the procedure to be followed after an accident happens.

(c) Tool Box Talks - In addition to the formal training mentioned above, toolbox talks shall be conducted every day before the commencement of the job. TBT shall be designed to highlight relevant safety and individual health issue to the workforce to raise their level of awareness. Such meeting shall recall the risk assessment report and defects reported on previous performance. These shall be prepared and presented by the Supervisor/Foremen.

(d) Safety Promotion

Safety Promotion schemes shall be developed and implemented at site to promote safety awareness amongst the workforce. Individuals with best safety performance shall be recognized and rewarded. A safety suggestion scheme shall be implemented at site to encourage the workforce to come up with good safety practices and suggestions for improving working condition. The best suggestion shall be selected and the person shall be rewarded.

Health & Safety posters and banners including HIV/AIDS shall be displayed around the worksite to raise the awareness among the workforce. The posters shall be prepared in English and Kiswahili languages, which are commonly being used at site.

It is important that all persons involved in the project possess adequate safety knowledge and have a high degree of safety awareness so that they are able to:

- recognize the importance of safety and assign sufficient resources to handle it;
- give proper consideration to safety during planning and design stages to eliminate/reduce safety problems during later stages of the projects;
- take into account potential safety problems during preparation/vetting of method statements;
- avoid performing unsafe acts;
- avoid creating unsafe conditions;
- identify unsafe acts/conditions and ask for rectification

Training and promotion notes, in the form of posters, booklets or similar may be developed and distributed to engineers, leading hands, foreman and others with a responsibility for managing specific work locations or activities. Notes may also be distributed to the broader workforce at daily pre-start meetings or made available in worker gathering facilities.

The Environmental Health and Safety Representative from the Consultant will review and endorse the training program and monitor its implementation. Various training programs will be carried out as detailed in **Table 8.4-1**.

Table 8.4-1: List of Training Programs

S/n	Name of Programme	Resources
1.	Induction training on Health and Safety	Safeguard Expert and OSHA representative
2.	On the job training	Project Manager, Site Engineers/ Managers, and Site Foremen
3.	Tool Box Talks	Project Manager, Safeguard Expert Site Engineers/ Managers, and Site Foremen
4.	Safety Promotion	Project Manager, Safeguard Expert, Site Engineers / Managers, and Site Foremen

8.4.2 Safety Inspection and Follow up Actions

The duty for inspection and follow-up actions is vested to Contractor's Health and Safety Manager in collaboration with Resident Engineer's Environmental Expert. Contractor's Health and Safety Manager shall inspect all project components using a Site Safety Inspection Checklist.

8.4.3 Reporting of Accidents, Incidents and Investigation

Any accident or incident that will occur at site shall be recorded using Incident Reporting Data Sheet and the same information will be communicated to Chief Inspector of Occupational Safety and Health Authority (OSHA) within 24 hours from the time of incident. The Contractor shall notify the Engineer and Employer as soon as reasonably possible after the occurrence of any accident which has resulted in damage or loss of property, disability or loss of human life.

The types of reported accidents include death; major injuries⁴¹; over 3-day injuries⁴²; work related disease; and dangerous occurrences⁴³. The majority of construction accidents or serious near misses must be reported to the Health and Safety Manager so they can be recorded officially and acted upon.

All the incidents shall be investigated to find out the root causes and to prevent the recurrences of the same kind. The methodology for the incident investigation shall be "Find out the facts, not the faults".

A monthly safety performance report of the project shall be included in the Monthly Progress Report after the end of each month. Man-hours are defined as man-hours worked by all persons employed on site (including site supervisory staff, managerial staff and sub-contractors).

8.5 Hazard Identification and Risk Assessment

The purpose of the hazard identification and risk assessment is to identify all potential hazards and associated risks during construction. The contractor shall take relevant measures to control all critical, high and moderate hazards. Low potential hazards will be eliminated.

Prior to the commencement of any activity, detailed hazard identification shall be done by the site supervisory staff with the assistance of Health & Safety Manager and the hazards shall be communicated to the whole team deemed to execute the task.

8.5.1 Risk assessment

Assessing the risk includes considering things like:

- the severity of any injury or illness that could occur, for example is it a small isolated hazard that could result in a very minor injury or is it a significant hazard that could have wide ranging and severe affects, and
- the likelihood or chance that someone will suffer an illness or injury, for example, consider the number of people exposed to the hazard.

Severity and likelihood are combined to develop Risk Rating Matrix as shown in **Table 8.5-1**.

⁴¹ It could be worker injuries or public member injuries.

⁴² Employee fails to perform normal duties work for 3 consecutive days.

⁴³ These are near-miss happenings that are reportable.

Table 8.5-1: Risk Rating Matrix

Consequences (C)	Likelihood (L)				
	Rare	Unlikely	Possible	Very Likely	Certain
Catastrophic	Moderate	Moderate	High	Critical	Critical
Major	Low	Moderate	Moderate	High	Critical
Moderate	Low	Moderate	Moderate	Moderate	High
Minor	Very Low	Low	Moderate	Moderate	Moderate
Insignificant	Very Low	Very Low	Low	Low	Moderate
Consequences (C)	How Severely Could Someone be Hurt?				
Catastrophic	Death or permanent disability				
Major	Serious Injury, hospital treatment required				
Moderate	Injury requiring medical treatment and some lost time				
Minor	Minor injury, first aid only required				
Insignificant	Injury requiring no treatment or first aid				
Likelihood (L)	How Likely Are the Consequences?				
Certain	Expected to occur in most circumstance				
Very Likely	Will probably occur in most circumstance				
Possible	Will occur occasionally				
Unlikely	Could happen some time				
Rare	May happen only in exceptional circumstances				

8.5.2 Control the risks

The Contractor shall apply the hierarchy of risk control, whereby risks are ranked from the highest level of protection and reliability to the lowest. The first step is to eliminate a hazard, which is the most effective control. If this is not reasonably practicable, then risk will be minimized by substitution, isolation, and engineering controls.

If risk remains, it must be minimized by implementing *administrative controls*, and by using suitable *personal protective equipment*. However, administrative control measures and personal protective equipment rely on human behaviour and supervision, and when used on their own, tend to be least effective in minimizing risks. Therefore, review control measures shall be used to be more effective.

8.5.3 Review control measures

Control measures must be reviewed regularly to make sure they remain effective. Controls can be checked by using the same methods as the initial hazard identification process. Common methods include workplace inspection, consultation, testing and analyzing records and data. The entire process of risk identification, assessment and control will be done by contractor's Health and Safety Manager in collaboration with entire construction team.

8.6 Industrial health and hygiene

8.6.1 Potential health hazards

Potential hazards to health in a construction industry can arise from the use of materials, substances and process if they are not properly controlled. Some risks are caused by the inhalation of dust, toxic fumes, exposure to high temperature, noise, vibration, radioactive substances, etc.

Contractor shall be responsible for maintaining healthy working conditions for all employees and sub-contractors. If it is not possible to remove the cause of harm then suitable and sufficient Personal Protective Equipment (PPE) shall be provided to those who could be affected.

8.6.2 Sanitary Facilities

Adequate sanitary conveniences will be provided in strategic point of the workplace. Such conveniences are lavatories and washbasins. Such facilities shall be kept clean and in good working condition at all times.

Domestic wastes shall be collected per environmental management plan and Environmental Guidelines.

8.6.3 Food, Drinking Water, and Canteen for Workers

Proper clean and free food (lunch) shall be provided by the Contractor to all construction workers. The food shall be prepared by local food vendors. During Construction, the provision of food shall also be considered during the evening for construction workers if the construction works will continue beyond 18:00 hours.

The Contractor shall provide a proper cooking and eating place (Canteen) for construction workers with a clean drinking water supply and sanitary facility. The Canteen shall be of sufficient size and built up of cement floor with timber and corrugated iron sheets. The Canteen shall have benches and tables and well ventilated to allow fresh air circulation.

8.6.4 Personal Protective Equipment

Personal Protective Equipment (PPE) will be provided to construction workers. Construction workers will be trained on the proper use of PPE. Individuals shall not be allowed to work if they are not equipped with the appropriate PPE. Visible signboards shall be posted at work area indicating potential hazards and PPE that is required to be worn in that area / for that activity, in both English and Kiswahili languages.

8.6.5 First Aid Facilities

All accidents, which involve personal injury, shall be given medical treatment and reported to the concerned Supervisor. A first aid station shall be set up at the Contractor's Camp area and experienced medical personnel will be in charge of the station.

All injury cases, except minor injuries shall be sent to medical centre for treatment. In case of an accident with personal injury, doctors will attend such person in a prescribed hospital sent by Contractor's proper transport immediately after accident. Adequate number of first Aid boxes shall be available at work sites and offices. First aid boxes shall be frequently inspected and updated.

8.6.6 Fire Prevention and Fighting Facilities

Construction sites, offices and camp premises are very prone to fire hazards because of different kind of combustible material used in all the above places. The components of a fire are fuel (combustible substance), heat and oxygen.

Fire hazard evaluation shall be conducted at all the project sites and camp to identify the fire risk at each location. Depending upon the risk factors, fire prevention and fighting system shall be provided and maintained.

8.7 Emergency Preparedness and Response Plan

This section provides general guidance for handling emergency situation on the project site. An emergency is an unplanned event when a project operation loses control, or could lose control, of a situation that may result in risks to human health, property, or the environment, either within the project site or in the local community. Emergencies do not normally include safe work practices for frequent upsets or events that are covered by occupational health and safety. Proper emergency planning and response are important elements of the site.

8.7.1 Responsibilities

- **Project Management:** The management must be committed to the principle of the safe working and ensure that no any person shall ever put himself/.herself to risk.
- **Site Management:** It is the responsibility of the site management to review and ensure awareness of emergency procedure among all the site personnel.
- **Employees:** It is also the responsibility of all employees to continually familiarize themselves with the assembly procedures for their relevant areas of work.
- **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.

8.7.2 Emergency Plan

All actions will be coordinated with the overall emergency plan operated by the Engineer. The Project Manager has the overall responsibility of coordinating all emergency procedures along with the Health & Safety Manager.

All emergency telephone numbers and contact names shall be posted at strategic points on site. The following subsequent actions listed below shall be taken during emergency:

- Close all plant and equipment, if safe.
- Stop all work and report to the nearest evacuation area / assembly area and await further instructions.
- Stop all equipment and vehicles safely.
- Contact the Health & Safety Manager and relay message to Engineer / Employer
- Ensure all personnel are aware of the emergency.

(a) Emergency alarms

A combination of red warning lights and siren as appropriate will be used in case of:

- Major fire or an Explosion.
- Major transport accident/spill of flammable liquid.
- Major equipment accident.
- Entrapment of personnel

Emergency alarms shall be placed in all areas with gathering of employees including, camp sites, site offices, borrow pits, crushers and at specific work stations such as bridge sites.

The alarm shall be capable of being perceived above ambient noise or light levels by all employees in the affected portions of the workplace. Tactile devices may be used to alert those employees who would not otherwise be able to recognize the audible or visual alarm.

(b) Assembly Point

In an emergency all personnel are to proceed in an orderly manner to the nearest safe assembly point. Adequate assembly points shall be provided in all areas where indoor works are done to provide a common meeting point in case of emergency. These assembly point shall all have the signs written "*Assembly Point*" and be easily accessed.

(c) Head Count

After all the peoples have gathered at assembly point, supervisors shall take a head count and check all employees are at the assembly point. He / she shall also inform the Engineer/ Employer of the result of the head count.

The Evacuation Supervisor will use Evacuation Headcount Checklist to identify present and missing people and identify action to be taken.

(d) 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.

(e) Fire Fighting

In case of a fire, after the alarm has been sounded, all efforts will be made to put off the fire by the proper use of fire extinguishers, fire hydrants, hoses etc. until more professional help come by. Fire extinguishers will be available on site at strategic locations, such workshop/garage; offices; laboratories; and accommodations areas.

Employees shall be aware of the standards for fire safety:

- smoke alarm signals and locations
- how to use fire extinguishers and fire blankets, etc.
- where emergency exits are located
- where fire extinguishers and other fire equipment are located in their work areas
- the purpose of each type of fire extinguisher

(f) All Clear

Normal work will be resumed only after all clear signal is received from the Engineer. As such the supervisors shall make all arrangements to meet the concerned authorities.

CHAPTER NINE

9.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

9.1 The Objective and Scope of ESMP

9.1.1 The Objectives of ESMP

The purpose of this Environmental and Social Management Plan (ESMP) is to ensure that the project is being implemented with minimum adverse environmental and social impacts. The ESMP focuses on avoiding, where practical, unacceptable adverse environmental, social and/or economic impacts. In the event that an impact cannot be avoided, then appropriate compensatory and/or mitigation measures have to be implemented.

The objectives of this ESMP are to:

- Describe the measures required to implement construction related management and mitigation commitments made in the ESIA Report;
- Describe specific additional measures required to implement construction related good practice, approval conditions stipulated by Tanzania National Policies/Legislations and World Bank Safeguard Policies;
- Identify the roles and responsibilities of the environmental and social management organisation of the project; and
- Communicate environmental and social expectations and requirements to various stakeholders and relevant institutions, and regulatory agencies.

The measures and procedures outlined in this ESMP are commitments made by project proponent and therefore remain responsible for their implementation. It is recognised that practical implementation of many of the measures may rest with Contractors and Subcontractors and consequently, the project proponent will require the implementation of a robust review/audit programme, as described in this ESMP, to measure and ensure that it is properly executed by the Contractor. All Contractors and Subcontractors shall comply with implementation of ESMP requirements as applicable to the tasks they are employed to undertake.

9.1.2 The Scope of ESMP

This Environmental and Social Management Plan (ESMP) has been developed to identify the environmental and social management and mitigation actions required to implement the project in accordance with the requirements of the World Bank Safeguard Policies and applicable Tanzania national policies and legislation.

The ESMP will be used by the Contractor for preparation of Contractors' ESMP (C-ESMP) which will address site specific environmental and social issues. In addition, the Contractor will be required to prepare issues specific management plans, which provide details on the environmental and social management procedures, processes and mitigation and monitoring measures required to complete actions identified in the ESIA Report.

9.2 Institutional Roles and Responsibilities

The important stakeholders / agencies identified in this ESMP include the University of Dar Es Salaam (UDSM); World Bank; Dar es Salaam Region and Kinondoni District; Kinondoni Municipal Council; Fire and Rescue Force, Occupation health and Safety Authority (OSHA); Ward and Mtaa Development Committees, and Non-Governmental Organisations (NGOs) / Community Based Organisations (CBOs) dealing with project related environmental and social aspects in the project area.

The responsible institutions for ESMP implantation include the University of Dar Es Salaam (UDSM) on behalf of the Government of the United Republic of Tanzania; the World Bank (WB); Supervision Consultant; Contractor; Division of Environment in the Vice President's

Office (VPO); National Environment Management Council (NEMC) and Local Government Authority (LGA). The organisational structure for implementation of ESMP is provided in **Figure 9.3-1**.

The effective implementation of ESMP also requires that all persons working for the project are aware of the importance of environmental requirements of the project; their roles and responsibilities in the implementation of the ESMP. They should also be aware of the significant actual or potential environmental impacts of their work activities; the benefits of improved performance and the consequence of not complying with environmental requirements.

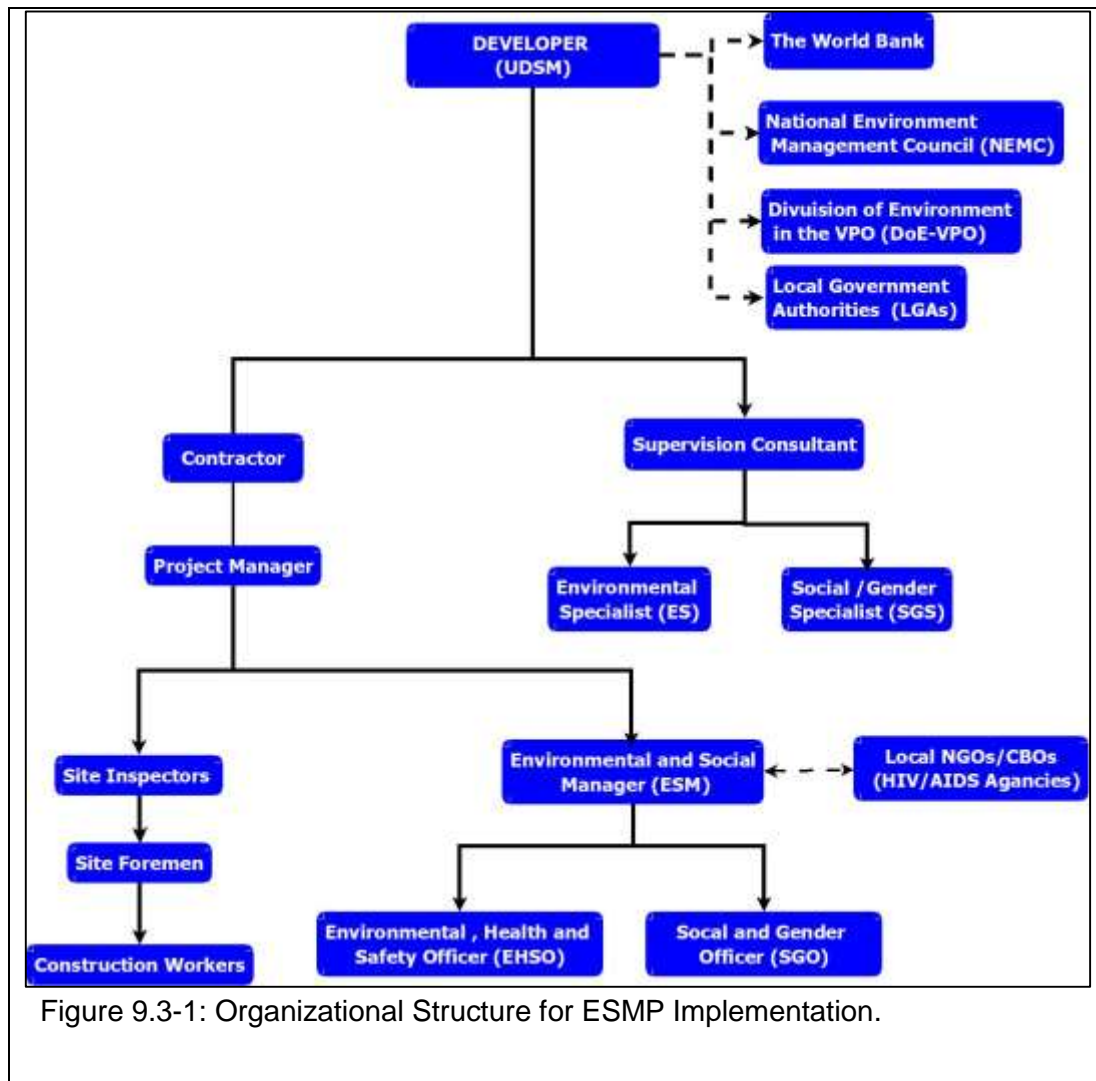


Figure 9.3-1: Organizational Structure for ESMP Implementation.

9.2.1 Financing agency

The project is being financed by University of Dar Es Salaam (UDSM) on behalf of the Government of the United Republic of Tanzania in collaboration with the World Bank (WB). UDSM and the WB shall be responsible for review and approval of Contractor’s ESMP (C-ESMP), subsequent Monthly Progress Reports and Monthly Environmental, Social, Health, and Safety (ESHS) Compliance Reports submitted by the Supervision Consultant and Contractor, respectively. The land valuation and compensation payment to the farmers will be done by the Kinondoni Municipal Council.

9.2.2 Implementing Agency

The project is being implemented by UDSM on behalf of the Government of the United Republic of Tanzania. In this regard, UDSM also holds final responsibility for environmental performance of the project.

UDSM is responsible for the environmental and social management of the proposed establishment of SoAF University Campus. Specifically, the responsibility for environmental and social management in UDSM rests with the Safety and Environment Unit (SEU) under HEET Programme. Therefore, the DSM shall be responsible for overseeing implementation of mitigation measures and compliance monitoring through its Safety and Environment Unit (SEU).

9.2.3 Supervision Consultant

The Supervision Consultant will be appointed by the implementing agency and will be responsible for monitoring and supervision of the construction works including implementation of ESMP. The Supervision Consultant will appoint a Resident Engineer to oversee the construction works and monitor the works undertaken by the Contractor and implementation of ESMP to ensure compliance with contract specification and contractual requirements.

The Supervision Consultant will also appoint Environmental Specialist (ES) and Social/Gender Specialist (SGS) to assist the Resident Engineer. The Environmental Specialist shall be responsible for Environmental, Health, Safety and Security (EHSS) Issues and Social/Gender Specialist (SGS) shall be responsible for Worker's Welfare, Resettlement / Compensations Issues, Grievances Redress Mechanism (GRM), Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH).

9.2.4 Contractor

The Contractor shall be responsible for the implementation of construction works and ensure compliance with environmental and social requirements, including implementation of outlined mitigation measures in the ESMP. Therefore, the Contractor will be responsible for preparation and implementation of Contractor's ESMP (C-ESMP) based on this ESMP or Project ESMP (P-ESMP). The Contractor will ensure that the implementation of C-ESMP conforms to the requirements of all local laws, regulations, and contract clauses.

The Contractor shall appoint the Project Manager who will be assisted by ESH&S Team, which will be comprised of Environmental Manager assisted by Environmental, Health and Safety Officer (EHSO) and Social/Gender Officer (SGO).

The Environmental Manager shall be an overall in-charge responsible for overseeing implementation of Environmental, Social, Health, Safety and Security (ESHSS) Issues. However, for effective implementation of the ESMP, the Contractor will be required to appoint an Environmental, Health, and Safety Officer (EHSO) and a Social/Gender Specialist (SGO).

The responsibilities of other experts shall be as follows:

S/n	Title/Position	Responsibility
1.	Environmental Health and Safety Officer (EHSO)	Environmental, Health, Safety and Security Issues
2.	Social/Gender Specialist (SGO)	Social, Gender and Resettlement Issues, including GRM, GBV/SEA and SH.

In order to ensure enforcement of ESHSS issues, the Site Inspectors and Site Foremen, apart from undertaking supervision of construction works, shall also be responsible for overseeing the implementation of outlined mitigation measures in the ESMP, including ESHSS issues.

9.2.5 Local Government Authorities (LGAs)

The SoAF University Campus is located within the jurisdictional boundaries of Kinondoni Municipal Council, Kunduchi ward Governments. Kinondoni Municipal Council and the respective Ward and Mtaa Governments are considered as the Local Government Authorities (LGAs).

The involvement of the Local Government Authorities (LGAs) is crucial for successful implementation of ESMP because some of the mitigation measures are better undertaken by local communities with the support of the LGAs. It is therefore important that Kinondoni Municipal Council as should be involved in the implementation of this ESMP.

In order to make the LGAs to be well informed on the contents of the Scoping Report, one copy of this report has been submitted to Kinondoni District Council. This is to ensure that the LGAs through their Environmental Management Officers are aware of the environmental and social issues regarding this project and therefore shall be able to monitor the Contractor's compliance with mitigation measures.

9.3 Contractor's Environmental Specification

The *Contractor's Environmental Specification* will be incorporated into the Contract Document to provide to ensure the environment is free from the impacts of the Contractor's activities. The Contractor shall follow the guidelines determined in the Contract Document. General environmental problems related to the Contractor's activities include:

- Site management;
- Storage and treatment of fuel and material;
- Dust and noise hazard control;
- Solid Waste Management; and
- Wastewater Management.

9.3.1 Contractor's Environmental Protection Plan

The Contractor shall hold the copy of *Environmental and Social Management Plan (ESMP)*, which shall be included in the bidding documents. Before commencement of construction works, the Contractor shall submit an *Environmental Protection Plan* for the construction site to the Supervision Consultant's Resident and PIU for review and approval.

The Plan shall include the general mitigation measures for environmental impacts and the specific mitigation measures for response to emergency accidents, and the general measures shall include the followings, but not be limited to the followings:

- General Rehabilitation Plan, indicating operation area, fuel storage area, fuel supply area, parking area, equipment maintenance area, material storage area and campsite;
- Waste Management Plan;
- Dust Control Plan; and
- Noise Control Plan.

9.3.2 Site Facility

The Contractor's Office and Materials Storage Yard will be secured near the construction site. The Contractor will be required to prepare site plan for review and approval by the Resident Engineer. This will include drawings showing the layout of the Contractor's Office and Materials Storage Yard.

9.3.3 Recruitment of Construction Workers

The Contractor will always give employment priority to the local people. The Contractor shall publish the required positions for employment in the local media and all signboards. The

construction workers and other personnel shall be employed in accordance with the Employment and Labour Relations Act No.6 of 2004. The Contractor shall provide training for the construction workers on environmental protection, GBV / SEA, and occupational health and safety issues.

9.3.4 Requirements for Contractor's Office

Since all construction workers to be recruited will be from the within the urban areas, there will not be any requirements for accommodation for the construction workers. However, the Contractor must provide cloth changing rooms, resting areas and sanitary facilities for the construction workers.

There shall be independent and sound bath facilities (toilets, bathroom) and cloth changing rooms) for male and female workers. The toilets shall have sufficient water and be equipped with soap and toilet paper, etc. All facilities shall be clean and available. The toilet shall be marked indicating separate toilets, bathrooms and cloth changing rooms for "Male" and "Female".

Other facilities shall include:

- Kitchen supplied with clean water, and in favorable sanitary condition.
- Septic Tank-Soak Pit System for treatment of domestic sewage before discharge into the seawater.
- First Aid Kit complete with medicine shall be available at the Contractor's Office managed by a qualified nurse. The nurse shall receive complete emergency rescue training and be capable of properly transferring the injured or patients to local referral hospital on time.

9.3.5 Code of Ethical Conduct

The *Code of Ethical Conduct* shall be established for the construction workers and emphasize appropriate conduct, strict prohibition of drug and alcohol and conformance to relevant laws and regulations to reduce the social impacts. All workers shall be familiar with the *Code of Ethical Conduct*. The local community shall also know the *Code of Ethical Conduct* for construction workers. The workers who fail to follow the *Code of Ethical Conduct* shall be punished. The *Code of Ethical Conduct* shall include, but not be limited to the following measures:

- All workers shall abide by national laws and regulations.
- Dangerous goods and weapon are strictly forbidden at the construction site.
- Obscene goods and gambling are strictly forbidden at the construction site.
- Fighting is strictly forbidden at the construction site.
- Life and production of the surrounding area and the local people shall not be interfered.
- Local traditional culture, customs and traditional activities shall be respected.
- Smoking is only allowed in designated area.
- Dressing and personnel hygiene shall be appropriate.
- Sanitary conditions of accommodation shall be proper.

The *Code of Ethical Conduct* shall be followed even outside the project site in their residential areas during interaction with local community members.

The followings are strictly forbidden at the construction site and the surrounding area:

- Impacting or damaging the structure with historical or architectural value;
- Burning of solid wastes into the surroundings without permission from resident engineers.
- Drinking during working time.
- Mechanical maintenance (engine oil and lubricant addition) of vehicles outside the designated area.

- Dumping of solid wastes outside the designated area.
- Dangerous driving in the surrounding area and local roads.
- Failure to PPE (safety shoes, reflective vests, face masks, and helmet) at the construction site.
- Causing any health and safety impact to the surrounding people.
- Leakage of any pollutant leakage, like waste oil; and
- Dumping of solid waste into the surrounding environment (e.g., plastic bottles, plastic bags, food cans, etc.).

All Contractors, office workers or other personnel who violate the above regulations shall be subject to punishment of verbal warning or termination of employment contract depending on the severity.

9.3.6 Health and Safety

The Contractor shall ensure the project conforms to all national and local safety regulations and other damage avoidance measures. Before construction, the Contractor shall execute safety training for the workers. Other measures include:

- Provision of sufficient sunlight during the day time and light during the night time.
- Provision of enclosure made up of corrugated iron sheet around the construction site, and shall be regularly inspected and maintained during construction. This will be reinforced by provision of written warning signboard in Kiswahili and English Language to prevent trespass by unauthorized persons into the construction site without the approval of the Contractor's personnel.
- Provision of Fire-fighting equipment, like fire extinguisher at the Contractor's Office.
- Provision of sufficient PPE such as eye goggles, protective gloves, face shield, dust cover, helmet, ear plugs, steel helmet, etc.) to the construction workers.
- Safety regulations, contingency plans and emergency contact information shall be indicated in the bulletin board at the construction site.
- Conducting medical examination for the construction workers annually;
- Provision of training on personal basic hygiene and epidemic prevention, including respiratory disease and communicable disease.
- Conducting HIV/AIDS prevention and control campaigns for construction workers and local community members, including publicity at the construction site and the surrounding areas in the form of bulletin and training course.
- Provision of basic emergency rescue service and emergency measures for the construction workers.
- Including to comply with the advice provided by OSHA and fire and rescue force

9.3.7 Storage of Fuel, Oil/Grease, and Other Hazardous or Toxic Material

All fuel shall be stored in a concrete paved the storage yard with bund walls and shall be 110% of the fuel storage container. Fuel storage sites shall not to be located near any water sources (i.e., within 100 m from the water source). Dangerous goods shall be stored in a designated storage device. Temporary storage regulations shall be prepared for fuel, oil and paint, etc. Only authorized personnel are allowed to enter the storage area. The storage area shall be free from vehicle damage, and shall be subject to periodic inspection for leakage, damage and pollution condition.

Equipment maintenance can only be made at the workshop / garage. The operation surface (concrete floor within the rail area) must be properly designed to ensure collection of oil and fuel in the appropriate container. In case of oil/fuel leakage, the soil polluted must be removed and transported to the approved area. Relevant preventive measures must be taken to prevent the grease, oil, fuel, solvent and chemicals from polluting soil and water.

9.3.8 Solid Waste Management

During construction, the Contractor must take proper measure to timely remove the waste at the construction site to the approved waste treatment equipment. Construction material accumulation shall be reduced by any possibility.

Household garbage produced during the Contractor's activities at the campsite must be placed in the can (210 L steel or plastic buckets) or garbage truck. The Contractor must ensure to empty the garbage container weekly or as required.

All garbage must be immediately put into the garbage can or truck. The garbage shall not be thrown about in operation area or Contractor's campsite.

The construction waste must be temporarily stored within the construction site and transported to the approved dumping site. Incineration or burning of any kind of solid wastes is strictly forbidden at the construction site.

9.3.9 Wastewater and Storm Water Management

Wastewater from the construction site and the campsite shall not be directly discharged to the surface waters. Domestic sewage must be discharged after proper treatment by using onsite sanitation system.

Storm water must be discharged to the sea through concrete lined storm water drainages to prevent sedimentation of the marine environment. Storm runoff discharged from the construction site (temporary drainage facility) shall be through concrete lined storm water drainages.

9.3.10 Noise Control

Construction works shall be confined to the day time only and construction near the sensitive receptors be noise-free.

Personnel, visitor and construction worker at the site must wear proper hearing protection device to avoid hearing injury by noise.

The Environmental Specialist must check the site periodically to ensure the site comply with *Occupation Health and Safety*.

9.4 Grievances Redress Mechanism

The Contractor will be required to formulate Grievances Redress Mechanism (GRM). The purpose of the GRM is to outline a process for dealing with or resolving project-level grievances raised by Aggrieved Person (AP) regarding specific activities, and/or unanticipated social impacts resulting from Project implementation. The GRM applies to the construction workers, local community members, and other stakeholders who are directly or indirectly affected by the project. The grievance process outlined hereunder provides procedures for handling complaints/claims internally in a transparent manner, to avoid conflict and therefore maintain good relationships with various stakeholders.

The PIU will oversee implementation of GRM during execution of the Project, to ensure the protection of the rights of APs and beneficiaries during Project implementation. The requirements for the GRM are as follows:

- The grievance process must not impose any cost to those raising the grievances (i.e., the complainants).
- Concerns arising from Project implementation must be adequately addressed promptly.
- Participation in the grievance process must not preclude the pursuit of legal remedies under the laws of Tanzania.

The issues covered by the GRM, among others, include complaints related to employment, sexual harassment, and gender-based violence. Specifically for employment issues may include:

- Failure by the Contractor to serve the employment contract.
- Failure by the Contractor to pay minimum wage following the labour laws.
- Failure by the Contractor to remit monthly national social security contributions.
- Failure by the Contractor to provide medical treatment for a sick employee.
- Unlawful termination of a worker,
- General workers' welfare such as annual leave, and sick, maternity and family leave,
- Failure to provide Project workers with adequate periods of rest per week, as required by the labour laws.

In case of GBV/SEA and SH a proper reception channel will be in place by appointing an NGO (or CBO) to handle all kind of complains related to GBV/SEA and SH), including providing appropriate counselling to the victims.

9.4.1 Formation of Grievances Redress Committee

To address grievances, a Grievance Redress Committee (GRC) will be formed for dealing with grievances as they arise. The GRC will be comprised of the following:

- ESU's Safeguard Officer.
- Supervision Consultant's Environmental Specialist and Social/Gender Specialist
- Contractor's Human Resource Officer.
- Municipal Environmental Management Officer (MEMO) and Municipal Community Development Officer (MCDO).
- Ward Executive Officers (WEO) from the Ward where project is located.
- Street ("Mtaa") Executive Officers from Streets located in the project site.

Note that the presence of the local government authorities is important because some of the grievances may originate outside the project boundaries. The involvement of NGO / CBO will also be necessary. For example, if a project worker is involved in sexual harassment of a local community member, the matter will be handled by a qualified NGO / CBO.

The construction workers and local community members will be informed of the existence of the GRM as soon as it is in place, as well as of the following:

- Members of the Grievances Redress Committee (GRC)
- How to access the GRC.
- How to lodge a formal complaint.
- The timeframes for each stage of the process.
- Characteristics of the GRC: confidentiality, responsiveness, and transparency.
- Alternative avenues of grievance resolution in case of conflicts of interest.

9.4.2 Role and Responsibility of Grievances Redress Committee

The Gender Redress Committee (GRC) will be chaired by SEU's Safeguard Officer who shall be responsible for receiving and registering grievances. The Supervision Consultant's Social/Gender Specialist shall be the Secretary of the GRC and shall be responsible for assisting the Chairperson in documenting, registering, communicating, and reporting issues related to grievances management.

The grievance management procedure will be simple and will be administered as far as possible by the GRC at the Project Level. The GRC will prepare monthly reports showing how received grievances were handled summary and submit to UDSM and WB for record purposes. To ensure transparency, the Grievance Redress Procedure will be printed in A3 Size Paper and posted at all strategic locations within the project site to be read by construction workers and local community members.

The GRC shall disseminate detailed procedures to redress grievances and appeal process among the construction workers and local community members through their local government offices (E.g., Ward Officers and Mtaa Officers).

9.4.3 Grievance Redress Procedures

The formal, detailed GRM to be developed will contain specific grievance procedures, including both informal and formal grievance mechanisms. The grievance redress mechanism for dealing with complaints is summarized in **Figure 9.5-1**.

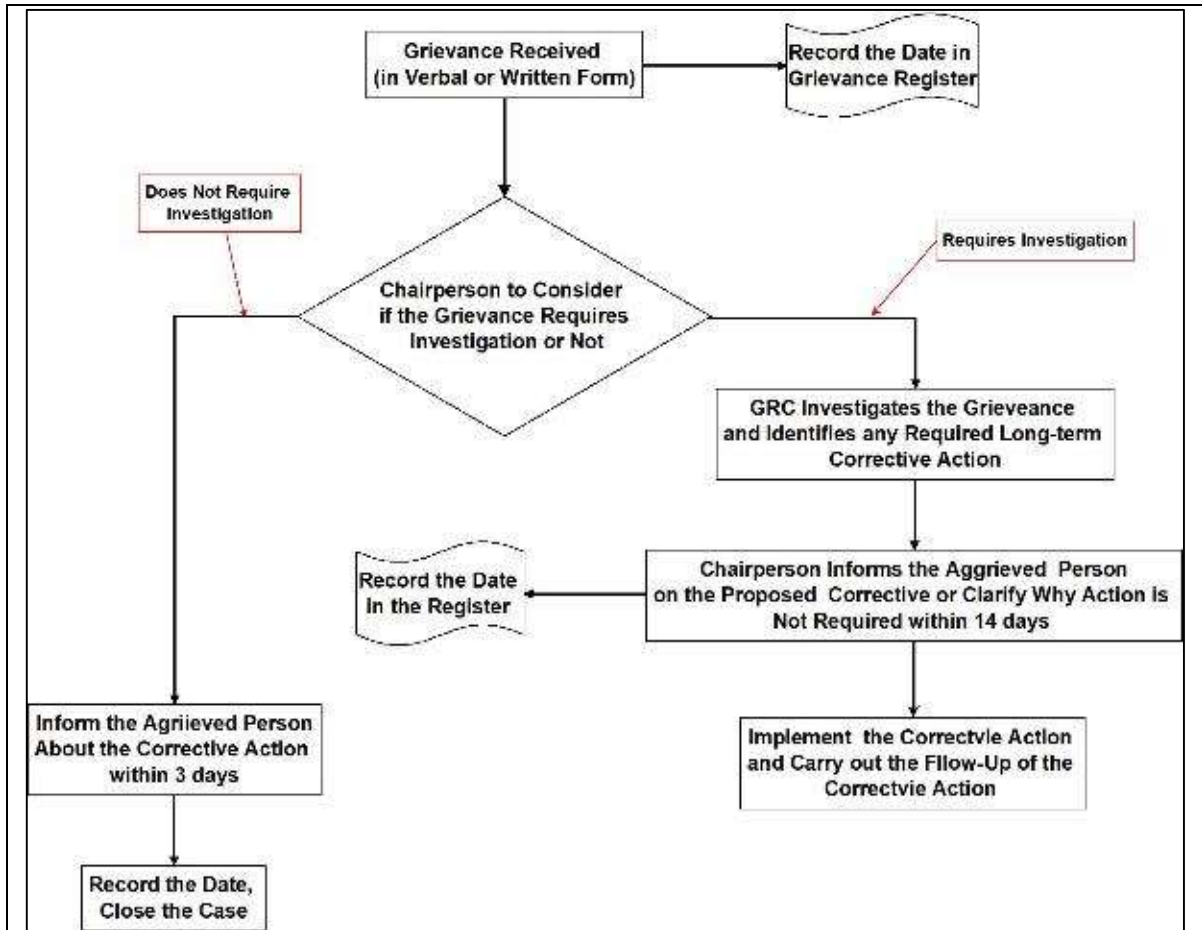


Figure 9.6-1: Grievances Redress Mechanism.

In general, complaints and disputes should be resolved at the project level. Each grievance will be treated confidentially.

The grievance resolution process is comprised of four stages:

- Reception
- Investigation and inquiry.
- Response
- Follow up and closeout.

The access to the GRM will be easy and quick, in particular to APs, who are the people most likely to need it. The formal grievance will be:

- (i) documented in a written Grievance Form and recorded in a logbook:
- (ii) assessed on its level of urgency/severity; and
- (iii) assigned to GRC, which will then inform the complainant within seven (7) days that it has received the grievance and that it is under review.

The Aggrieved Person (AP) will report his/her grievance to the GRC through its Chairperson. If a grievance is received face to face or over the phone and the aggrieved wishes to address the grievance formally, it is the responsibility of the Chairperson who receives the grievance to complete a Grievance Registration Form.

In general, grievances should be resolved within 30 days. The Chairperson will communicate the findings of the investigation and resolution and seek approval from the AP, who will either accept or appeal the outcome. If the AP is satisfied with the outcome, then the grievance is closed out and will provide his/her signature (or fingerprint) on the Grievance Form as confirmation.

If an agreement is unable to be reached between the AP and the GRC, the grievance will be submitted to UDSM as a lead Project Implementation Agency for review and a final decision through its HEET Team. If necessary, further action will be taken to resolve the issue. The national courts are the last avenue for addressing grievances. In case the AP reaches the judicial system, there should be no cost to the claimant.

A grievance is closed out when no further action can be or needs to be taken. Closure status will be entered into the Grievance database as follows:

- Resolved: the resolution of the complaint was reached and implemented and signed documentary evidence exists.
- Unresolved: the agreed resolution of the complaint was not reached and the case has been authorized for closeout by the Grievance Redress Committee (GRC).
- Abandoned: complaints in which efforts to contact a given complainant were unsuccessful for two months after receipt of the formal grievance.

Specifically, depending on the issues that may arise during project implementation the following stages will be observed in the grievances redress process:

Stage 1: Reception

The Aggrieved Persons (AP) is documented in the appropriate form to be provided by Chairperson. If during the process it appears that the AP does not understand the procedures, this will be explained. The Chairperson should not discourage the filing of a grievance form. The grievance will also be documented in the Grievance/Issues Register.

The Grievance Registration Form should be signed and dated by the aggrieved person. Where the aggrieved person is unable to write, he shall obtain assistance from the Chairperson to fill the form and emboss the form with his/her thumbprint.

Step 2: Investigation

If the issue is easily resolvable and it does not require investigation the Chairperson will refer to the GRC, which will carry out the hearing of the grievances and provide the answer within 3 days, after the date of hearing the grievances.

If the grievance is a more complex project-related issue, it will be investigated further, and then arrange the hearing within 7 days after the date of registration.

The Chairperson will arrange the hearing day within 7, which shall be attended by the AP and the party causing the grievances. The Chairperson will notify both parties within 3 days after the date of hearing the grievance.

Step 3: Response

It is assumed that all cases shall be solved at the GRC level. However, some cases may remain unresolved. For such cases, the AP shall have the option to refer his/her case to the

District Commissioner for final amicable solution. The Chairperson will prepare a preliminary report containing the details of the grievance and hearing date, and decision of GRC and submit to the District Commissioner.

Step 4: Follow Up and Close-Out

If no amicable solution is reached in Step 3 the AP will have recourse to the court of law as a last resort. This can be a labour court, criminal court, or civil court depending on the type of grievance.

This is a stage that although should always be open and available, it will be discouraged by all positive means such as timely communication and open negotiations. The institutional arrangement has been designed to allow for the process to detect and deal with problems in a timely and satisfactory manner for all parties concerned. Therefore, the GRC shall take necessary measures to ensure that solutions are reached by consensus based on negotiation and agreement.

9.5 Stakeholder Consultations

Stakeholder consultations has been carried out in during the execution of scoping exercise also will be carried out during preparation of this ESIA Report and its associated Environmental and Social management Plan (ESMP) and relevant stakeholders will be given the opportunity to raise issues and their concerns regarding the project. All the raised issues /concerns will be taken into consideration during the project design and preparation of ESIA Report, ESMP. However, in order to properly address environmental and social issues, further stakeholder consultation will be necessary during the project implementation.

The stakeholder consultations are aimed at providing a two-way communication or information exchange between the Contractor and the PAPs and the public. This is to ensure that information on the impact of the project is timely delivered by the Contractor and Project Proponent to the PAPs and the public. The Contractor shall disclose relevant content of the Project, potential environmental and social impacts and mitigation measures; GBV /SEA issues and EH&S issues.

The following actions will be taken by the Contractor during construction phase:

- During construction, the Contractor shall keep open communication with local government, and the surrounding local community members.
- Before construction, the Contractor shall disseminate the project information to the PAPs and surrounding local community members and the public in general in the form of brochures written in both Kiswahili and English Languages.
- Relevant project information to be published in the brochures shall include, but not be limited to:
 - Project Overview;
 - Construction Plan;
 - Main Construction Activities;
 - Main Environmental Problems and Mitigation Measures; and
 - Name and phone number of the Contractor's Project Manager, the Consultant's Resident Engineer and PIU Safeguard Officer.

The Contractor shall regularly communicate with the Supervision Consultant's Environmental Specialist and Social/Gender Specialist on the main sensitive subjects and to mitigate any unfavorable environmental and social impacts.

The Contractor shall provide training to the workers before commencement of construction works on Grievances Redress Mechanism, Contractor's Code of Ethical Conduct and Code

of Conduct on EH&S and GBV/SEA, and thereafter regularly (monthly) throughout the project implementation period.

Relevant information on Grievances Redress Mechanism, Ethical Code of Conduct, and Code of Conduct on GBV/SEA will be posted at strategic locations for easy access by construction workers in Kiswahili and English Languages.

Complaint recording shall be placed at the Contractor's Office, whereby all submitted complaints problems and other matters shall be included in the Monthly Progress Reports and submitted to the Resident Engineer and ESU for review and approval.

9.6 Institutional Capacity Building

To ensure the sustainability of this project there is a need for institutional capacity building. The purpose of institutional capacity building is to ensure the sustainability of the benefits obtained after the construction of UDSM SoAF Kunduchi Campus infrastructure and effective implementation of the outlined enhancement / mitigation measures in the ESMP during operation phase.

Therefore, institutional capacity building will involve:

- Training of the EHSO and SGO on the environmental, social, gender, health and safety issues during construction phase; and environmental and social monitoring issues during operation phase.
- Training of Contractor's Staff and Construction Workers.

9.6.1 Training of ESU Staff and Technicians

The objective of organizing training for Environmental and Social Unit (ESU) Staff is to strengthen environmental management during construction and operation phase, and to ensure the quality of environmental monitoring and effective environmental management, thus improving the quality of the construction works. At the end of the training the ESU Staff will be able to understand the main environmental and social issues during the construction and operation phase, and have a better understanding of existing problems and deficiencies on environmental management; and take necessary preventive and control measures as soon as possible.

The training shall be conducted by Supervision Consultant's Environmental Specialist in collaboration with Social/Gender Specialist. In addition, the ESU's Environmental Health and Safety Officer (EHSO) and Social/Gender Officer (SGO) will be involved on on-the job training by participating in the environmental and social monitoring during construction phase. They will be submitting their environmental and social monitoring reports for assessment by the Supervision Consultant's Environmental Specialist in collaboration with Social/Gender Specialist.

9.6.2 Training of Contractor's Staff and Construction Workers

Before commencement of construction works training will be organized for the responsible personnel and construction workers, in order to avoid environmental damages due to project implementation during construction. The training objective is to define the environmental protection responsibilities of the contractor; and for construction workers, the objective is to ensure the proper construction practice during the construction period in order to avoid some construction behaviours, which have adverse impacts on the environment.

The training will be helpful for the project responsible personnel to understand their obligations in environmental protection needed to be assumed and possible consequences of the environmental damage. The construction workers will have a better understanding of the protection level and methods for environmental sensitive areas. Based on the actual situation of the Project, the training period for construction workers will not be more than one week.

9.7 Cost Estimates for Mitigation Measures

The cost estimate for mitigation measures takes into consideration those costs to be incurred due to affected resources as a result of rehabilitation works/ activities and costs to be incurred as a result of the Contractor's adherence to good engineering practice.

Those costs resulting from implementation of mitigation measures for negative environmental and social impacts are considered as extra costs outside the Project Budget. However, the project will not be responsible for costs that arise out of normal responsibility of the project proponent or implementing agency. Therefore, for that reason, recurrent costs during operation and maintenance are excluded.

The cost estimates for the implementation of ESMP mitigation measures are cost due to the implementation of specific mitigation measures. These include:

- Tree Planting and Landscaping
- Air Pollution Control
- Abatement of Noise Nuisance
- Solid and Liquid Waste Management
- HIV/AIDS Prevention and Control Programme
- Prevention and Control of COVID-19
- Fencing of Construction Site to Prevent Risk of Accidents
- Health and Safety Management Plan
- GBV/SEA Awareness Programme
- Provision of Water Supply and Shelters (Enhancement measure)
- Traffic Management Plan

In this regard, the following cost estimates for mitigation measures have been considered for protection of environmental and social resources; and as such for implementation of ESMP:

S/n	Particulars of Cost Items	Amount (TZS)
1.	Tree Planting and Landscaping	2,000,000.00
2.	Air Pollution Control	2,000,000.00
3.	Abatement of Noise Nuisance	2,000,000.00
4.	Solid and Liquid Waste Management	7,000,000.00
5.	HIV/AIDS Prevention and Control Programme	47,000,000.00
6.	Prevention and Control of COVID-19	2,000,000.00
7.	Fencing of Construction Site to Prevent Risk of Accidents	2,000,000.00
8.	Health and Safety Management Plan	49,000,000.00
8.	GBV/SEA Awareness Programme	12,000,000.00
10.	Provision of Water Supply and Shelters (Enhancement measure)	2,000,000.00
11.	Traffic Management Plan	7,000,000.00
	Total 1:	134,000,000.00
	Add 10% Contingency:	13,400,000.00
	Total 2:	147,400,000.00

This makes the total cost for implementation of mitigation measures has been estimated to be about Tanzania Shillings **(TZS) 147,400,000.00**. These costs will be included in the Bill of Quantities during the preparation of the Bidding Document. The cost estimates have been based on the Consultant's experience on projects of similar nature.

9.8 ESMP Schedule

The role of ESMP is to outline environmental requirements for the project and provide guidance for the Contractor to follow and properly manage environmental impacts during

construction. It specifies mitigation, monitoring and institutional measures to be taken during construction and operation phases to eliminate any adverse environmental and social impacts, offset them or reduce them to acceptable levels.

Specifically, ESMP schedule as shown in **Table 9.8-1** summarizes all anticipated significant adverse environmental impacts and provides specific description of institutional arrangement for carrying out mitigation measures. In order to have effective ESMP there must be an integration of efforts among various institutions/stakeholders. This ESMP therefore specifies roles and responsibilities of various institutions/stakeholders during implementation. However, it is important that all responsible institutions /stakeholders should appreciate that they are united and should interact and work towards a common purpose.

Table 9.8-1: ESMP Implementation Schedule.

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates (TZS)
A. Mobilization Phase			
Loss of ecological functions and landscape quality of the surrounding environment due to removal of existing vegetation/trees.	<ul style="list-style-type: none"> ▪ Proper landscaping by planting grass and trees in open areas around the buildings after construction. ▪ However, precaution must be taken to avoid trees species that can cause damage to the building foundations⁴⁴. 	Contractor monitored by Supervision Consultant’s Environmental Expert	2,000,000.00
B. Construction Phase			
Creation of air pollution due to dust emission from construction activities.	<ul style="list-style-type: none"> ▪ Application of water on dusty areas. ▪ Minimize stockpiling of excavated soils within the construction site by immediate removal and transportation to dumping site. ▪ Trucks hauling excavated soil materials and dusty construction materials must be covered with tarpaulins. 	Contractor monitored by Supervision Consultant’s Environmental Expert	2,000,000.00
Creation of noise nuisance to the adjacent receptors (office /classroom buildings and hostel buildings.	<ul style="list-style-type: none"> • Limiting noisy construction activities only to day time hours. • Fencing of the construction site with corrugated irons sheets to minimize transmission of noise to the sensitive receptors. 	Contractor monitored by Supervision Consultant’s Environmental Expert	2,000,000.00
Landscape degradation and loss of aesthetic value of the surrounding environment due to accumulation of construction / demolition solid wastes.	<ul style="list-style-type: none"> ▪ All stockpiled soil materials and demolition solid wastes must be immediately removed and transported to the permitted dumping site. 	Contractor monitored by Supervision Consultant’s Environmental Expert	8,000,000.00

⁴⁴ This effect has already been noted during the site investigation at CoET Site.

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates (TZS)
	<ul style="list-style-type: none"> Useful soil materials can be retained for landscaping purpose, but must be properly stockpiled. 		
Increased transmission of HIV/AIDS and STIs	<ul style="list-style-type: none"> Formulation and implementation of HIV/AIDS prevention and control programme. Giving employment priority to local people to minimize the number of new comers, hence minimizing the likelihood of new HIV transmission. Collaboration with local NGOs/CBOs dealing with HIV/AIDS to promote awareness and education campaigns. 	Contractor monitored by Supervision Consultant's Environmental Expert	47,000.000.00
Increased risk of Covid-19 transmission due increased population at the project sites.	<ul style="list-style-type: none"> The Contractor will take necessary precautions as stipulated in the ESF/Safeguards Interim Note: Covid-19 Consideration in Construction/Civil Works Projects. 	Contractor monitored by Supervision Consultant's Environmental Expert	2,000,000.00
Increased risk of construction related accidents	<ul style="list-style-type: none"> Fitting all mobile construction equipment / machinery and trucks with sounding alarm and signal device to warn people, especially during backward movement. Putting a written warning sign boards in Kiswahili and English languages at strategic locations to prohibit or prevent entrance of unauthorized persons into the construction site. Restrict operation of mobile construction machinery / equipment to trained personnel only. 	Contractor monitored by Supervision Consultant's Environmental Expert	2,000,000.00

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates (TZS)
	<ul style="list-style-type: none"> ▪ Fencing the construction site to prevent people from entering the construction site. This will include putting a written warning in both English and Kiswahili at a strategic location to prevent unauthorized people from entering the construction site. 		
Creation of occupational health and safety risks.	<ul style="list-style-type: none"> ▪ Formulation and implementation of Health and Safety Management Plan (HSMP), including provision of Personal Protective Equipment (PPE). ▪ Avoid prolonged use of hand-held equipment by workers beyond the prescribed 8 hours in accordance with Tanzania Standards⁴⁵. 	Contractor monitored by Supervision Consultant's Environmental Expert	49,000,000.00
Increased employment opportunities for local people due to recruitment of construction workers.	<ul style="list-style-type: none"> ▪ The contractor will give employment priority to the local people and avoid any kind of discrimination based on gender, race, or religion. ▪ The Contractor will ensure compliance with the World Bank ESS 2: Labour and Working Conditions and national legislations regarding employment and workers' social welfare. These include The Employment and Labour Relations Act No. 6 of 2004; The Employment and Labour Relations (General) Regulations (2017); The Labour Institutions Act No. 7 of 2004; Labour Institutions Wage Order (2013) (Labour Institutions Act (Cap 300).; The Workers' Compensation Act (Cap. 	Contractor monitored by Supervision Consultant's Environmental Expert	Not Applicable

⁴⁵The United Republic of Tanzania. The Environmental Management (Standards for Control of Noise and Vibration Pollution) Regulations (2010). THIRD SCHEDULE (Made Under Regulation 15(1)).

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates (TZS)
	263 R.E. 2015); The National Social Security Fund Act [CAP. 50. R. E. 2018)		
Risk of emergence of GBV/SEA and SH due to interpersonal relationships and social interactions.	<ul style="list-style-type: none"> ▪ The Contractor will ensure there are codes of conduct on prevention of Gender-Based Violence (GBV)/ Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH). ▪ Disseminating information that raises awareness on the prohibition of GBV/SEA and SH among the workers, local community members and general public and disseminate information that promotes good and respectful relationships between workers and the local community members. ▪ Provision of cultural sensitization training for foreign workers regarding interaction with local community members ▪ Grievances Redress Mechanism will be in place to deal with GBV/SEA and SH issues involving construction workers, project staff and the local community members. 	Contractor monitored by Supervision Consultant's Environmental Expert	12,000,000.00
Increased income generation opportunities for local people due increased demand for food from construction workers.	<ul style="list-style-type: none"> ▪ Provide enabling environment for food vendors to sell their food in a clean and hygienic environment by providing shelter and water supply. 	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	2,000,000.00
Disruption of traffic flow along the adjacent local roads.	<ul style="list-style-type: none"> ▪ Formulation of traffic management plan. This includes deployment of flag persons to guide movement of vehicles. 	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	7,000,000.00
C. Demobilization Phase			

Effects/Impacts	Mitigation/Enhancement Measures	Responsibility	Cost Estimates (TZS)
Loss of temporary employment opportunities by local people due to retrenchment of construction workers after project completion.	<ul style="list-style-type: none"> ▪ Give employment priority to local people, because after project closure they will easily revert back to their normal economic activities. ▪ Ensure that all construction workers are registered with social security funds and are paid their terminal benefits immediately before retrenchment from jobs. 	Contractor monitored by Supervision Consultant's Environmental Expert and Social/Gender Expert	To be provided in the BOQ for Other Items
D. Operation Phase			
Increased enrolment of students and revenue for the institute.	<ul style="list-style-type: none"> ▪ The UDSM-SoAF Campus will promote marketing of the institute at national and international levels. 	The Management of UDSM-SoAF Campus.	NA
Increased revenue for infrastructure/ utility service providers.	<ul style="list-style-type: none"> ▪ UDSM will make consultation with infrastructure/utility service providers. 	UDSM-SoAF Campus in collaboration with infrastructure/ utility service providers.	NA
Overloading of wetland ecosystem due to discharge of raw sewage wastewater from sanitary facilities.	<ul style="list-style-type: none"> ▪ Prohibit discharge of raw sewage wastewater into the wetland area. ▪ Ensure the quality of discharged wastewater meets the domestic effluent quality in accordance with Tanzania Standards⁴⁶. 	Project Proponent.	Not Applicable (NA)

⁴⁶ The Environmental Management Act (Cap. 191). Regulations (Made under Section 143, 144 and 230 (2) (s)). The Environmental Management (Water Quality Standards) Regulations (2007).

CHAPTER TEN

10.0 ENVIRONMENTAL AND SOCIAL MONITORING PLAN

10.1 Implementation of Monitoring Plan

The information collected during monitoring exercise helps to improve ESMP by adapting measures to ensure that the anticipated impacts are mitigated. For example, in case environmental monitoring identifies some environmental concerns during construction or operation phase then construction or operation works has to be modified or stopped, whenever necessary.

Thus, the objectives of environmental monitoring programme are:

- To ensure that mitigation and benefit enhancement measures have been adopted and are effective.
- To identify any unforeseen negative impacts during EIA stage and propose appropriate mitigation measures.
- To provide information on the actual nature and extent of key impacts and effectiveness of mitigation and benefit enhancement measures, which through feedback mechanism can improve the planning and execution of future, similar projects.

The ESMP monitoring during construction phase will be comprised of two activities:

- Review of Contractor's plans, methods statement, and temporary works design and arrangements to ensure that environmental protection measures specified in the contract documents are adopted and Contractor's proposals provide acceptable levels of impact control.
- Systematic observation of all site activities and the Contractor's offsite facilities, including borrow pits and quarry sites areas. To ensure that the contract requirements relating to environmental matters are being complied with and that mitigation measures for those unforeseen impacts are formulated and implemented by the contractor.

The monitoring activities will be comprised of visual observation during site inspection and will be carried out at the same time as the engineering supervision activities. Site inspections will take place with emphasis on early identification of any environmental problems and the initiation of suitable remedial action. Where remedial actions have been required on the part of the Contractor, further checks will need to be made to ensure that these are actually being implemented to the agreed schedule and in the required form.

All sites where construction is taking place will be formally inspected from an environmental view point on a regular basis. However, in addition to visual observation there shall be informal questioning of members of the local communities and their leaders who live near the project. This is because they may be aware of matters which are unsatisfactory but may not be readily apparent or recognized during normal site inspection visits.

The monitoring plan will also be integrated with other construction supervision and carried out by the Resident Engineer. The Resident Engineer will decide on the appropriate course of action to be taken in cases where unsatisfactory reports are received from the field staff regarding environmental matters. In case of relatively minor matters, advice to the Contractor on the need for remedial action may suffice, but in all serious cases, the Resident Engineer will issue a formal instruction to the Contractor to take remedial action, depending on the extent of delegated powers.

10.2 Monitoring and Reporting Responsibilities

10.2.1 Supervision Consultant

The Supervision Consultant will appoint an Environmental Specialist and Social /Gender Specialist who shall be responsible for Environmental and Social Compliance Monitoring. The Supervision Consultant's Environmental Specialist and Social / Gender Specialist shall be making a daily site inspection and shall be attending Engineer's Site Meetings.

The participation of Environmental Specialist and Social /Gender Specialist in the Engineer's Site Meetings shall enable the Environmental Specialist and Social /Gender Specialist to:

- Review the status of any problem addressed in the previous meeting; propose additional mitigation measures, if the problem has not been resolved.
- Review the main construction activities and any environmental problem that occurred since the last meeting.
- Review the construction activities and general environmental performance as listed in the ESMP.

The Environmental Specialist and Social/Gender Specialist shall be preparing Monthly Environmental and Social Monitoring Reports which will highlight:

- The extent to which the Contractor is complying with the environmental and social specifications and contract conditions (compliance monitoring).
- Any unforeseen environmental and social impacts (i.e., the failure or inadequacy of the mitigation measures) and recommendations on how to manage unforeseen impacts.

In addition, the Vice councillor of UDSM shall deploy an Environmental Officer and Social/Gender Officer who shall be collaborating with the Supervision Consultant's Environmental Specialist and Social /Gender Specialist to oversee implementation of ESMP. The Environmental Officer and Social/Gender Officer apart from making a close follow-up on engineering issues shall be responsible for environmental and social monitoring on monthly basis.

There must be feedback from monitoring to ensure that failure to implement an approved measure incurs a penalty to the Contractor. The Resident Engineer's responsibility will include enforcement of mitigation measures. In case an approved measure turns out to be ineffective or results into unforeseen adverse impacts it should be reported to the Vice councillor of UDSM through the Campus Manager, which would be capable of finding out why, and of commissioning appropriate further measures.

10.2.2 Contractor

The Contractor will be responsible for implementation of environmental and social mitigation measures under the supervision of Resident Engineer. This is to ensure that technical and environmental clauses are followed and well implemented by the Contractor.

The Contractor shall assign an Environmental Manager who shall be responsible for carrying out monitoring on daily basis and overseeing compliance with environmental and social mitigation measures. The Contractor's Environmental Manager will be assisted by EHSO and Social/Gender Specialist.

The Contractor's Environmental Manager shall submit a Monthly Environmental, Social, Health, and Safety (ESH&S) Compliance report to the Resident Engineer specifying that:

- All previously notified failures to comply with the mitigation measures have been rectified.

- All newly notified requirements have been fulfilled and all standard requirements (as specified in this report) have been put into effect.

The Resident Engineer shall countersign the report and make it available to the UDSM and World Bank. UDSM in turn should pass a copy to Kinondoni Municipal Council within a reasonable period not exceeding 30 days from receipt.

10.3 Monitoring Methods

The purpose of monitoring is to ensure that the Contractor implements the outlined mitigation measures in the ESMP. Therefore, monitoring methods will be based mainly on visual inspection and will be carried out by the Supervision Consultant's Environmental Specialist and Social/Gender Specialists in collaboration with Contractor's Environmental Manager assisted by Environmental, Health and Safety Officer (EHSO) and Social/Gender Specialist on daily basis.

To verify environmental effects predictions, and to evaluate the effectiveness of mitigation measures committed during the ESMP preparation, it is necessary to collect baseline data before the commencement of the construction works that may result in changes to the environment. The purpose of baseline data collection is to update the baseline information and establish the existing conditions at the construction site.

Establishing baseline conditions allows for a comparison with conditions before and after construction works to determine the extent of any project-related environmental effects, the need for additional mitigation measures, and/or to confirm the effectiveness of mitigation measures that have been or are being implemented.

In case any environmentally and socially sensitive issues have been identified during baseline monitoring and not covered during the ESMP preparation, adaptive measures and additional monitoring or mitigation will be developed and implemented as may be necessary.

10.4 Environmental and Social Monitoring Costs

The cost of environmental and social monitoring will be included in the cost of Construction Supervision. The Supervision Consultant will be responsible for the cost of environmental and social monitoring. These costs include payment of professional fees for Environmental Specialist and Social/Gender Specialist. However, these costs will be included in the overall costs of commissioning the Supervision Consultant.

10.5 ESMP Monitoring Schedule

The ESMP monitoring schedule as summarized in **Table 10.5-1** addresses the following questions:

- WHAT parameter to be monitored? (Monitoring Parameters)
- WHY is the parameter being monitored? (Monitoring Objective)
- WHAT indicator to be used in monitoring? (Monitoring Indicators)
- WHERE to be monitored? (Monitoring Location).
- HOW is to be monitored? (Monitoring Methods).
- HOW frequent is to be monitored? (Monitoring Frequency)
- WHAT is the monitoring targets or standards? (Performance Standards)
- WHO is responsible for monitoring? (Monitoring Responsibility)

Table 10.5-1: ESMP Monitoring Schedule.

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Standards	Monitoring Responsibility
Pre-construction Phase							
A1. Submission of Contractor's Site Plan	To ensure compatibility of the site plan with local land use plan.	Submitted Contractor's Site Plan	Contractor Office/ Camp Site	Visual inspection.	Once before construction works.	Site Plan is compatible with local land use plan. Office / camp site is equipped with all support facilities.	Developer's Site Engineer.
A2. Access of local people to employment in the project area	To ensure employment priority is given to local people. To ensure equal employment opportunity without gender and/or racial discrimination. To ensure Contractor is providing employment contracts in accordance with the labour laws.	Number of local people employed in the project by gender.	Contractor's Office	Contractor's Monthly ESH&S Compliance Report. Sample of Employment Contract.	Continues throughout construction period.	Employment priority is being given to the local people. Number of reported cases of gender or racial discrimination. Employment contracts are in accordance with labour laws.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer
A3. Submission of C-ESMP, HSMP and	To ensure compliance with	Submitted C-ESMP, HSMP,	Based on submission of the documents	Review of C-ESMP and	Once, before construction works.	C-ESMP, HSMP and HIV/AIDs Programme has	Independent Environmental and Social Consultant

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Standards	Monitoring Responsibility
HIV/AIDS Programme.	EH&S issues by Contractor.	HIV/AIDS programme.	to the Engineer.	HSMP documents.		been approved and being implemented.	(IESC) in collaboration with Site Engineer
Construction Phase							
B1. Dust and smoke emission around the project site.	To minimize impacts from dust and exhaust emission.	Intensity of visible dust and smoke emission.	Construction sites.	Visual inspection.	Continuous	No visible dust and smoke emission around the construction sites. Dust and smoke emission control measures are being implemented.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer
B3. Noise nuisance and vibration effects.	To minimize noise and vibration impacts from construction activities	Noise and Vibration Levels	At the boundaries of construction sites.	Audible noise.	Continuous	No complaints regarding noise nuisance and vibration effects.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer.
B4. Discharge of sanitary wastewater into wetland area	To prevent overloading of wetland ecosystem	Presence algal blooms.	Wetland area	Visual inspection Laboratory analysis	Quarterly	Effluent quality in accordance with Tanzania Standards.	Project Proponent.
B5. Accumulation of construction / demolition solid wastes.	To prevent or minimize landscape degradation.	Presence of excavated soil materials and construction solid wastes.	At the construction sites.	Visual inspection.	Continuous	No accumulation of excavated soil materials and construction solid wastes.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer.

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Standards	Monitoring Responsibility
B6. Implementation of HIV/AIDs Prevention and Control Programme.	To minimize risk of HIV transmission.	Number of HIV/AIDs campaigns and training sessions. Number of participants by gender.	Based on submission of HIV/AIDs Campaign reports	Monthly ESH&S Compliance Reports.	Monthly	Number of Voluntary Clinical Testes (VCTs) HIV//AIDs program is in place and being implemented on a regular basis.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer.
B7. Implementation of Covid-19 prevention and control programme.	To prevent or minimize risk of Covid-19 transmission.	Number Covid-19 campaigns and training sessions. Number of participants by gender.	Based on submission of Covid-19 reports	Monthly ESH&S Compliance Reports.	Monthly	Precautions being taken as stipulated in the ESF/ Safeguards Interim Note: Covid-19 Consideration in Construction/Civil Works Projects.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer.
B2. Health and Safety of Construction workers.	To prevent or minimize occupational health and safety risks.	Number of toolbox sessions. Number of workers provided with and using appropriate PPE.	Construction sites	Visual inspection. An informal interview with workers. Monthly ESH&S Compliance Reports.	Continuous	Number of reported occupational diseases and accidents.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer.

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Standards	Monitoring Responsibility
		Presence of approved Health & Safety Management Plan (HSMP).”					
B8. Construction related risk of accidents.	To prevent or minimize construction related accidents.	Presence of fence around the around the construction site. Presence of written warning signboard in Kiswahili and English. Presence of trained mobile equipment /machine operators.	Construction sites.	Visual inspection.	Continuous.	Number of reported constructions related accidents.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer.
B9. Incidence of traffic accidents due to movement of heavy trucks to and from the construction site.	To prevent or minimize risk of traffic accidents,	Presence of traffic management plan. Presence of flag persons at strategic locations.	At the junction of access road and main road.	Visual inspection	Continuous	Number of reported cases of traffic accidents.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer.

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Standards	Monitoring Responsibility
B10. Incidence of Gender-Based Violence (GBV)/ Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH).	To prevent incidence of GBV/SEA and SH.	Number of awareness sessions.	Office/Camp Site and Construction sites.	Verification of awareness sessions organized with workers Verification of consultations with and involvement of local communities	After every 15 days	Number of workers who participated in awareness sessions by gender. Consistent and regular involvement of local community members	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer.
B11. Workers Welfare ⁴⁷ and Child labour.	To ensure compliance with labour laws.	Monthly Salary Slips; NSSF Monthly Payment Receipts. WCF Monthly Payment Receipts	Based on submission of Monthly Compliance Reports.	Monthly ESH&S Compliance Reports	Monthly	Number of reported complaints regarding minimum wages. Reported cases of non-payment of Monthly NSSF and WCF contributions.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer.
B12. Income generation opportunities for local people.	To facilitate income generation	Provision of clean and hygienic environment.	Food vending areas around the project ate.	Visual inspection.	Continuous	Food vendors are selling food in a clean and	Independent Environmental and Social Consultant

⁴⁷ (1) Payment of Minimum Wage (2) NSSF and WCF Contributions by the Contractor (3/ Deductions from payment of wages to be made as allowed by national law (project workers to be informed of the conditions under which such deductions will be made). (4) Project workers to be provided with adequate periods of rest per week, annual holiday, and sick, maternity and family leave, as required by national law.

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Standards	Monitoring Responsibility
	opportunities for local residents.					hygienic environment.	(IESC) in collaboration with Site Engineer.
Demobilization Phase							
C1. Retrenchment of workers during project completion.	To ensure NSSF contributions and terminal benefits have been paid to all retrenched workers.	Number of retrenched workers	Contractor's and Engineer's Office	Monthly Compliance Site Closure Report	Once, during project completion.	All retrenched workers have been paid their terminal benefits and NSSF contributions.	Independent Environmental and Social Consultant (IESC) in collaboration with Site Engineer.
Operation Phase							
D1. Enrolment of students and revenue generation for the institute.	To ensure the Increased enrolment of students and revenue for the institute.	Number of enrolled students Amount of fee paid to the institute.	Annual Enrolment Report.	Visual Inspection.	Annually	There is an increased enrolment of local and foreign student.	Developer in collaboration with tenants and vehicle owners.
D2. Revenue collected by infrastructure/ utility service providers.	To ensure there is increased revenue for infrastructure/ utility service providers.	Amount of monthly bill paid by the institute to service providers.	Monthly electricity and water bills.	Visual Inspection.	Monthly	There is increased revenue collected by infrastructure/ utility service providers.	Developer
D3. Wastewater Quality from Constructed Wetland	To ensure the wastewater from the constructed wetland does not exceed	Monitoring Report	Mixing Zone between sea water and discharged	Collection of water samples for laboratory analysis.	Every six months.	The MPC-2 is not exceeded.	Developer in collaboration with NEMC.

Monitoring Parameters	Monitoring Objective	Monitoring Indicators	Monitoring Locations	Monitoring Methods	Monitoring Frequency	Performance Standards	Monitoring Responsibility
	Maximum Permissible Concentration for Category 2 (MPC-2)		water effluents.				

CHAPTER ELEVEN

11.0 RESOURCE EVALUATION OR COST BENEFIT ANALYSIS

11.1 Project Costs and Benefits

11.1.1 Project Costs

The total construction cost of the proposed building is estimated to be Tanzania Shillings (TZS), 1,231,405,000.00.

11.1.2 Project Benefits

The project is expected to have both short-term and long-term socio-economic benefits to the local community and the nation.

11.1.3 Short-term Benefits

The short-term socio-economic benefits include creation of temporary employment and increased income generation opportunities to the local people. It is expected that during construction employment priority will be given to the local people.

During construction some local people, especially women will get opportunity to increase their income by selling food items to the construction workers. This benefit will be enhanced by providing water supply and sanitary facilities to enable them sell their food in clean and hygienic environment, hence preventing transmission of hygiene related diseases like cholera and diarrhoea to the construction workers.

11.1.4 Long-term Benefits

The long term socio-economic benefits include increased revenue due to increased students' enrolment, and increased productivity due to operation of Lecture Theatres and Laboratory Facilities; and increased revenue for infrastructure / utility providers due to increased demand for power, water supply and telecommunication services.

11.2 Environmental Costs

The cost of environmental mitigation measures, which is mentioned in section 10.9 is considered to be the environmental⁴⁸ cost to be incurred due to implementation of mitigation measures for this project, which is estimated to be TZS 147,400,000.00.

11.3 Determination of Benefit/Cost Ratio

The resource evaluation or cost benefits analysis focuses on comparing the project costs and environmental costs. The environmental costs for this project to be TZS 147,400,000.00, and the total project costs is estimated to be TZS 1,378,805,000, after including the environmental costs.

When compared with total project costs (TZS 1,378,805,000), the overall environmental cost is about 10.69% of the total project costs. It can be concluded that the environmental costs are significantly small and can be tolerated for this project.

The benefit/cost ratio is a good indicator of project viability from economic, environmental, and social point of view. However, due to lack of economic analysis the benefit/cost ratio cannot be determined for this project.

Nevertheless, it is anticipated that there will not be any significant difference in Benefit/Cost Ratio before and after incorporating environmental costs, because the environmental costs have been found to be significantly small and do not have any significant effects on the project costs. Ultimately, the Benefit/Ratio is expected to be greater than 1, hence making the project to be economically viable, and therefore it should be implemented without delay.

⁴⁸The term "environmental" in this report also means "social" and "cultural", unless otherwise specified.

CHAPTER TWELVE

12.0 DEMOBILIZATION PLAN

12.1 Implementation of Demobilization Plan

The demobilization and site reclamation process are one of the required project management activities during the project completion or closure of the projects. The demobilization activities will involve removal of all mobilized items and cleaning up of the construction site. It will include the removal of all temporary safety signs, temporary fencing, construction debris including crushed stone aggregates, pieces of wood, construction stakes, and other construction-related refuse, and temporary facilities or works. The restoration of surfaces to an equal or better than existing condition shall also be included as part of demobilization. Site reclamation includes reclamation of areas disturbed during construction, other than access and staging areas, to pre-project conditions or better.

In order to ensure that all demobilization and site reclamation works are done in a comprehensive way right from the beginning, it is important to have a demobilization checklist which shows all items that need to be completed during implementation of demobilization plan. Environmental and Social Demobilization Checklist groups the different items that need to be completed and inspected. The checklist covers the following issues and areas to be considered during implementation of demobilization plan:

- Workers Welfare Management
- Camp Sites and Office Facilities; Solid Waste Management; Soil Erosion and Sedimentation Control; Groundwater and Dewatering Control.
- Workshops/Garages, Vehicle Washing and Refueling Areas.
- Fuel and Chemical Storage Area
- Sanitary and Wastewater Disposal Facilities.
- Landscape Management and Run-off Control
- Borrow pits/Quarry Sites Rehabilitation.

The demobilization checklist will be used by Supervision Consultant's Environmental Specialist. For each inspection item, the form has a column for the work completion status (Yes, No or Not Applicable), observation comments made by the inspector for non-compliance works that need to be rectified by the Contractor and the target completion date for completing the non-conformant works. The Environmental Inspector will be taking some photographs during the site inspection for recording purpose. The photographs will be attached to the Environmental Demobilization Checklist and submitted to the Resident Engineer for action.

12.2 Retrenchment of Employees

Three (3) months before completion of the project, the Contractor through Human Resource Officer (HRO) will make sure NSSF contributions for all construction workers have been paid to the NSSF. This will involve posting of the names of all employees on the notice board indicating their Names, NSSF numbers and Monthly NSSF contributions. This is to ensure that the monthly NSSF deductions have been paid by the Contractor and allow rectification for any identified shortcomings before retrenchment of employees.

12.3 Exit Medical Examination for Employees

The Contractor will carry out an exit medical examination for all employees before retrenchment. This is the requirements of Sub-section 24(2) of the Occupational Health and Safety Act No. 5 of 2003. The legislation requires the Contractor shall carry out an exit medical examination through a qualified occupational health physician. According to Sub-section 24(3), the Contractor shall be responsible for the prescribed fee and all other medical expenses.

12.4 Restoration of Utilities and Landscape

During demobilization phase all work areas, offices, workshops /garages, and other temporary installations will be cleaned up and the site will be restored. These includes removal of temporary buildings, surplus materials, pieces of wood, pieces of bricks or any other material that is not in the area before construction works.

Damaged trees will be chopped / lopped and crosscut and removed from the construction sites. The site will be cleared of equipment, solid wastes, debris, and overburden resulting from construction works.

12.5 Restoration of Workshops / Garages and Materials Storage Areas

The workshop and other materials storage areas will be cleaned to remove petroleum products like oils and grease. The petroleum products should be handled in accordance with the provisions given in the Standard Specification for Road Works (2000).

All blocks, cements, stockpiled gravels, and any other surplus materials will be removed from the Materials storage yard. The useable materials should be taken away and stored in a safe place far from the abandoned site. The spilled materials must be removed and the site must be properly cleaned and restored to its original state. If possible, the site must be prepared and planted with vegetation to the unpaved areas as approved by Engineer.

12.6 Restoration of Solid Wastes and Spoil Materials Dumping Sites

All unwanted soil/spoil materials will be removed from temporary dumping sites and transported to permitted disposal site. The remaining useful soil materials will be mixed with surrounding topsoil, properly levelled, and graded to allow vegetation growth.

The solid waste dump site will be cleared, levelled, and returned to a regular form. All non-toxic wastes in the dump site will be thoroughly covered with topsoil. The Contractor will ensure that no wastes are visible.

The eliminated dry materials should form a stable slope and must be in harmony with the surrounding landscape. The wastes will be covered with 1 m of topsoil. The soils will be compacted thoroughly, the slope flattened and spread a layer of additional cover material and cover with topsoil to allow growth of natural vegetation.

CHAPTER THIRTEEN

13.0 CONCLUSION

The findings indicate the project is not located within environmentally sensitive area and has complied with the requirements of EMA Cap 191, whereby no development is permitted within a distance of 60 m from the shorelines. Again, the project is not likely to affect any important natural habitat or any unique, rare, threatened or endangered flora and fauna. However, the presence of marshland or wetland area needs to be taken into consideration. The marshland area provides an important ecosystem function as a natural waste treatment system if properly managed. Currently the wetland is being used for direct discharge of raw sewage wastewater from sanitary facilities, hence overloading the wetland ecosystem. It is therefore recommended that the wetland area should be protected by prohibiting discharge of raw sewage. All wastewater must be directed into the septic tank and soak pit treatment system before discharge into the wetland area. The treated wastewater must be periodically monitored to make sure it meets the prescribed standards⁴⁹. The wetland area should be protected against sedimentation from surface run-off by planting grass on bare areas. All foot paths and car parking areas must be paved by using porous interlocking concrete blocks to minimize surface run-off.

Although there is no any important natural habitat the removal of existing vegetation/trees will result into loss of intrinsic ecological functions and landscape quality. There are several ecological functions being provided by existing vegetation / trees. Apart from being important natural habitats for birds, insects, reptiles, etc., they help to minimize soil erosion and sedimentation of storm water drainages, control wind speed, provide shade, and refresh air by absorbing carbon dioxide and releasing oxygen into the atmosphere.

It is therefore recommended that some of the trees should be retained by carefully selecting the location of lecture theatre and laboratory building. Trees and grass should be planted around the building to prevent soil erosion and sedimentation of storm water drainages. However, trees species to be planted must be carefully selected to avoid trees species which may damage building foundation.

⁴⁹ ⁴⁹ The Environmental Management Act (Cap. 191). Regulations (Made under Section 143, 144 and 230 (2) (s)). The Environmental Management (Water Quality Standards) Regulations (2007).

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APPENDICES


APPENDIX 1: CERTIFICATE OF LAND OCCUPANCY FOR SoAF -KUNDUCHI CAMPUS

THE UNITED REPUBLIC OF TANZANIA
CERTIFICATE OF OCCUPANCY
 THE LAND ACT, Cap 113
 (Under Section 29)



M. Kunduchi

Title Number: **DSMT1034690** Date of Registration: **11-Dec-2022 [15:35]**



REGISTRAR OF TITLES
 (20-Dec-2022)
 Registered under section 27 of the Land Registration Act (Cap 334).

I. REGISTERED OCCUPYER AND TENURE

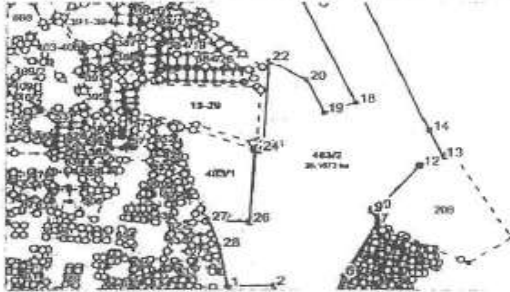
THIS IS TO CERTIFY that **UNIVERSITY OF DAR ES SALAAM** of P.O. BOX 35091, Kinondoni, Dar es Salaam (hereinafter called "the Occupier") is entitled to the Right of Occupancy (herein called "the Right") in and over the land described herein (hereinafter called "the land") for a term of **ninety nine (99) years** from the **first day of October two thousand and twenty two** according to the true intent and meaning of the Land Act and subject to the provisions thereof and to any regulations made thereunder and to any enactment in substitution thereof amendment thereof and to special conditions.

II. DESCRIPTION OF THE PROPERTY

District: Kinondoni
 Location: KUNDUCHI BEACH
 Block: -
 Plot No.: 483/2
 Area: 351,673.00 Square Metres
 Reg. Plan No.: 38149

Plot Reference Points (Part of):
 TAREFI1 / UTM ZONE 37S

	X	Y
1	523565.30	9262854.47
2	523692.17	9262857.91
3	523754.34	9262729.19
4	523826.31	9262758.29
5	523850.12	9262778.72
6	523886.77	9262892.57



III. CONDITIONS OF THE RIGHT

- The Occupier having accepted the terms and conditions of the Right as prescribed by the Land Act and the regulations made thereto, shall thereafter pay annual rent in advance on the first day of July in every year of the term without deduction PROVIDED that the amount of rent payable may be revised by the Commissioner.
- The land is general land and shall be used for **Institutional** purposes only. Use Group(s) and Use Class(es) **K (d)**; as defined in Urban Planning (Use Groups and Classes) Regulation, 2018.
- The President may revoke the Right for good cause or in public interest.
- Any other conditions prescribed under the Land Act and any other written law or regulations.


IV. DISCLAIMER

The contents of this Certificate of Occupancy do not disclose information related to encumbrances attached to the Certificate. Any person intending to acquire estate or interest in the land shall enquire to the Registrar of Titles for an Official Search so as to satisfy as to the existence of any encumbrances.

GIVEN under my hand and my official seal the day and year first above written.

[Signature]

COMMISSIONER FOR LANDS
 (11-Dec-2022)



GP-000

APPENDIX 2: ANALYSIS OF ISSUES/CONCERNS RAISED BY STAKEHOLDER REPS.

Number of Issues/Concerns	Affected VECs								
	Atmospheric Environment	Acoustic Environment	Transportation	Terrestrial Environment	Public Health, Safety and Security	Public and Community Services Infrastructure / Utilities	Labor and Economy	Historical and Cultural Heritage Resources	Current Land and Resources Use
<p>Since TAWA and SoAF share the same entrance and access road, we propose the entrance and the access road to TAWA to be improved to allow easy access by workers and Tourists who visit old graves of different nations. The area is the only place where Swahili civilization is portrayed</p> <p>During construction the contractor must be cautioned not to use/utilize water from the old wells found in the antiquity area because it is one of the historic and heritage assets.</p>			✓						
<p>During construction the Contractor must be cautioned not to use/utilize water from the old wells found in the antiquity area because is one of the historic and heritage assets.</p>								✓	
<p>During construction, Contractor's workers and school community in general must be educated on the spread of HIV/AIDS and STDs.</p>					✓				
<p>The project is very useful because it will increase number of students taking fisheries courses and these students are potential employees in our research industry.</p>							✓		
<p>The project will give more rooms for exchanging and improving research results for both TAFIRI and SoAF</p>							✓		

Number of Issues/Concerns	Affected VECs								
	Atmospheric Environment	Acoustic Environment	Transportation	Terrestrial Environment	Public Health, Safety and Security	Public and Community Services Infrastructure / Utilities	Labor and Economy	Historical and Cultural Heritage Resources	Current Land and Resources Use
In a near future, we will develop an MoU of utilizing lecture theatres and conferences for training and meetings (local and international) on Fisheries related issues.							✓		
We also invite the potential students for field attachment in our institute as young or senior researchers.							✓		
As a negative impact is on one of our supporting staff who is engaged as office security, resides in SoAF staff quarters and now because of the project the houses will be demolished so our employee has to reside away from the office and security obligations will be difficult.					✓				
The project is very valid and our office will collaborate with SoAF in research and particularly in laboratory testing.							✓		
During construction we urge the Contractor to use our laboratory for material testing because we believe we have best laboratory equipment for material testing.					✓				
If possible, some of our employees can study in SoAF especially in rocks and soils.					✓				
The Master Plan of SoAF does not include residential quarters.									✓
The proposed building is close to the Wet and Wild Hotel and we expect the hotel owners to use contemporary devices to minimize sound which may disturb students during lecture sessions.		✓							

Number of Issues/Concerns	Affected VECs								
	Atmospheric Environment	Acoustic Environment	Transportation	Terrestrial Environment	Public Health, Safety and Security	Public and Community Services Infrastructure / Utilities	Labor and Economy	Historical and Cultural Heritage Resources	Current Land and Resources Use
On liquid waste the design must provide appropriate means of collecting liquid waste because number of students will increase and the current sewerage system cannot accommodate much liquid waste.				✓					
The Contractor must cross-check the architectural drawings to observe the power load.						✓			
The Contractor must apply for temporary power for construction and during completion application must be submitted for operational stage.						✓			
The project is good in terms of increasing the number of employees in fisheries sector.							✓		
During construction, the Contractor must observe the underground cables, antennas, sewerage system (if any), and other utilities. It is ideal to contact TTCL if there are underground cables.						✓			
During construction spread of dust and noises must be minimized so that our customers will not be embarrassed.	✓	✓							
During lecture sessions the music sounds will be minimized through sound proof devices not to disturb the students and college staff in general		✓							
The project is very important and we encourage the University to construct many hostels for girls. Girls studying at the university staying off campus face many challenges including unwanted pregnancies which results into single mothers, street children and other GBV in general.							✓		

Number of Issues/Concerns	Affected VECs								
	Atmospheric Environment	Acoustic Environment	Transportation	Terrestrial Environment	Public Health, Safety and Security	Public and Community Services Infrastructure / Utilities	Labor and Economy	Historical and Cultural Heritage Resources	Current Land and Resources Use
During construction respective Municipal Authorities to take lead in HIV/AIDS awareness campaign and GBV. When budgeting for HIV programmes, the same should be done to GBV					✓				
Total Number of Issues/Concerns	1	3	1	1	4	3	7	1	3

Conclusion:

The consulted stakeholder representatives were more concerned on Labour and Economy (7 Issues) followed by Public Health, Safety and Security (4 Issues); Acoustic Environment, Public Services Infrastructure/Utilities, and Current and Resources Use (3 Issues@); and lastly Atmospheric Environment, Transportation, Terrestrial Environment, and Historical/Cultural Resources (1 Issue@).

APPENDIX 3: ANALYSIS OF ISSUES/CONCERNS RAISED BY LOCAL COMMUNITY MEMBERS.

Number of Issues/Concerns	Affected VECs								
	Atmospheric Environment	Acoustic Environment	Transportation	Terrestrial Environment	Public Health, Safety and Security	Public and Community Services Infrastructure / Utilities	Labour and Economy	Historical and Cultural Heritage Resources	Current Land and Resources Use
Employment Opportunities: The contractor should give the priority of employment to the people hailing along the project site during the construction. The residents (youth & women) may be involved in the some activities as labourers during the construction phase. Furthermore, carpenters and masonry in the community should get first priority in getting skilled labour in the construction.							✓		
There will be spread of HIV/AIDS and other sexually transmitted infections because of labour influx.					✓				
UDSM must ensure the entire workforce at the construction site is well covered by appropriate insurance policies. Also, first aid should be provided at work as per requirement of CRB.					✓				
Security and increase of crime. During construction many people will come as employment speculators and the security of the properties and people may be at stake. Moreover, the rate of crime may increase as a result of influx of people.					✓				
There is increase of Gender Based Violence (GBV) in our community where women are forced in sexual relations when selling goods to construction workers and sometimes abusive language and touching without the consent of women.							✓		

Number of Issues/Concerns	Affected VECs								
	Atmospheric Environment	Acoustic Environment	Transportation	Terrestrial Environment	Public Health, Safety and Security	Public and Community Services Infrastructure / Utilities	Labour and Economy	Historical and Cultural Heritage Resources	Current Land and Resources Use
Labour influx and shortage of drugs: Our experience shows that the influx of people or job speculators poses a threat on supply of medicine including drugs in our dispensary. We would like to encourage the Contractor to supplement medical facilities/equipment and drugs to meet the demand of new comers and local communities					✓				
Corporate Social Responsibility: We expect the project will assist the TPDC Community in construction of pit latrines in our schools.							✓		
Noise, dust and vibration: The Contractor should minimize noises, dust and vibration caused by heavy machines during construction.	✓	✓							
Total Number of Issues/Concerns	1	1	0	0	4	0	3	0	0

Conclusion:

The consulted local community members were more concerned on Public Health, Safety and Security (4 Issues) followed by Labour and Economy (3 Issues); and Atmospheric and Acoustic Environment (1 Issue@).

APPENDIX 4: ENVIRONMENTAL IMPACT ASSESSMENT MATRIX

Affected Valued Environmental Components (VECs)	Project Related Activities	Potential Environmental Effects/Impacts	Importance (A1)	Magnitude (A2)	Persistence (B1)	Reversibility (B2)	Cumulativity (B3)	$\alpha \times A2 = \alpha T$	$\beta 1 + \beta 2 + \beta 3 = \beta T$	$\alpha T \times \beta T = E S$	Significance	Ranking	Mobilization Phase	Construction Phase	Demobilization Phase	Operation Phase
1. Atmospheric Environment	Soil excavations and transportation of dry soil materials and dusty construction materials	Creation of air pollution due to dust emission	1	-2	2	3	3	-2	8	-16	Low	-2	0	✓	✓	0
2. Acoustic Environment	Operation of construction equipment / machinery	Creation of noise nuisance to the adjacent sensitive receptors .	2	-2	2	3	3	-4	8	-32	Medium	-3	0	✓	0	0
4. Wetland Environment	Discharge of raw sewage wastewater from sanitary facilities .	Overloading of wetland ecosystem due to accumulation of nutrients .	1	-3	3	2	2	-3	7	-21	Medium	-3	0	✓	0	0
3. Terrestrial Environment	Accumulation of construction and domestic solid wastes into the surrounding environment.	Creation of landscape degradation and loss of aesthetic value of the surrounding environment.	1	-3	2	2	1	-3	5	-15	Low	-2	0	✓	0	0
	Removal of vegetation cover/trees .	Loss of ecological and landscape value of the surrounding environment.	2	-2	3	3	2	-4	8	-32	Medium	-3	0	✓	0	0
4. Public Health and Safety	Social interaction between construction workers and local community	Increased prevalence of HIV/AIDS and STIs .	3	-2	2	3	3	-6	8	-48	High	-4	✓	✓	0	0
	Handling and operation of hazardous construction materials and equipment.	Creation of occupational health and safety risks .	1	-3	2	2	1	-3	5	-15	Low	-2	✓	✓	0	0
	Induced influx of people into the project sites.	Increased risk of exposure to Covid-19 transmission.	3	-2	2	3	3	-6	8	-48	High	-4	✓	✓	0	0
	Trespassing by unauthorized persons into the construction site.	Increased risk of construction related accidents .	1	-2	2	3	2	-2	7	-14	Low	-2	✓	✓	0	0
	Movement of heavy trucks to and from the construction site.	Increased risk of traffic accidents .	1	-2	2	3	2	-2	7	-14	Low	-2	✓	✓	0	0
5. Labour and Economy	Recruitment of construction workers	Creation of employment opportunity for local people.	2	3	2	1	2	+6	5	+30	Medium	+3	✓	✓	0	0
	Increased demand for food and other items from construction workers	Creation of income generation opportunities for local people	2	2	2	1	2	+4	5	+20	Medium	+3	✓	✓	0	0

	Interaction among the project employees with differences in gender and socio-economic status.	Risk of Emergence of Gender Based Violence, Sexual Exploitation and Sexual Harassment	3	-2	2	3	3	-6	8	-48	High	-4	0	✓	0	0
	Retrenchment of construction workers after project completion.	Loss of temporary employment by local people.	2	-1	3	3	3	-2	9	-18	Low	-2	0	0	✓	0
	Operation of lecture theaters and laboratory facilities after construction.	Increased enrolment of students.	4	3	3	1	1	12	5	60	High	+4	0	0	0	✓
6. Community and Public Service Infrastructure/Utilities.	Increased demand for infrastrucure/utlity services.	Increased revenue for infrastructure and utility service providers.	2	3	3	1	3	+6	7	+42	High	+4	0	0	0	✓

APPENDIX 5: RESPONSIBILITIES OF KEY PERSONNEL

S/n	Key Personnel	Responsibilities
1.	Project Manager	<ul style="list-style-type: none"> ▪ To ensure all works comply with relevant regulatory and Project requirements. ▪ To ensure the requirements of EH&S Management Plan is fully implemented. ▪ To endorse and support the Project environmental health and safety policy. ▪ To liaise with consultant, the health and safety Representative and other government authorities as required. ▪ To participate and provide guidance in the regular review of this EH&S Management plan and supporting documentation. ▪ To provide adequate resources (personnel, financial and technological) to ensure effective development, implementation and maintenance of this plan. ▪ To ensure that all personnel receive appropriate induction training, including details of the environmental health and safety requirements. ▪ To ensure that complaints are investigated and issues raised resolved. ▪ To stop work immediately where there is an actual or potential risk on health and safety.
2.	Site Engineer / Manager	<ul style="list-style-type: none"> ▪ To plan construction works in a manner that avoids or minimizes health risk. ▪ To ensure the requirements of EH&S Management Plan is fully implemented. ▪ To ensure construction personnel manage construction works in accordance with statutory and approval requirements. ▪ • Ensure environmental health and safety management procedures and risk protection measures are implemented. ▪ • Ensure all Project personnel attend an induction prior to commencing works. ▪ • Liaise with consultant, Health and Safety Representative and other government authorities as required. ▪ • Stop work immediately where there is an actual or potential risk on health and safety.
3.	Health and Safety Manager	<ul style="list-style-type: none"> ▪ Overall management of health and safety aspects of the Project. ▪ Development, implementation, monitoring and updating of the Contractor's EH&S Management Plan and Sub plans. ▪ Report to Project Manager on the performance and implementation of the EH&S Management Plan. ▪ Ensure management reviews of the EH&S Management Plan are undertaken annually, documented and actions implemented. ▪ Ensure environmental health and safety risks of the Project are identified and appropriate mitigation measures implemented. ▪ Identify where health and safety measures are not meeting the set targets and where improvement can be achieved. ▪ Ensure health and safety protocols are in place and managed. ▪ Ensure health and safety compliance. ▪ Obtain and update all safety licenses, approvals and permits as required. ▪ Lead liaison with health and safety Representative and approval authorities. ▪ Manage health and safety document control, reporting, inductions and training. ▪ Manage health and safety reporting within the Project team and to the UDSM and regulatory authorities.

S/n	Key Personnel	Responsibilities
		<ul style="list-style-type: none"> ▪ Prepare reports on a monthly basis outlining the Project Works undertaken, achievements and areas where improvements were made. ▪ Oversee site health and safety monitoring, inspections and internal audits. ▪ Manage all subcontractors and consultants with regards to health and safety matters, including assessing their safety capabilities and environmental documents. ▪ Develop and facilitate induction, toolbox talks and other training programs regarding health and safety requirements for all site personnel. ▪ Notify UDSM and relevant authorities in the event of a health and safety incident. ▪ Stop activities where there is actual or potential health risk of harm to prevent health and safety non-conformance and advise the Project Manager, Site Manager and Site Foremen. ▪ Assists the Communication Manager to resolve health and safety- related complaints.
4.	Materials Engineer / Site Foremen	<ul style="list-style-type: none"> ▪ Provide input into the preparation of environmental health and safety planning documents as required. ▪ Ensure instructions and information relating to project health and safety risks are provided to staff. ▪ Ensure that the works are carried out in accordance with the requirements of the plan and supporting documentation, including the implementation of all environmental health and safety controls. ▪ Identify health and safety risks. ▪ Identify resource needs for implementation of the plan requirements and related documents. ▪ Ensure that health and safety related complaints are investigated to ensure effective resolution. ▪ Take action in the event of a health and safety incident and allocate the required resources to minimize environmental health and safety risk. ▪ Report any activity that has resulted, or has the potential to result in health and safety incident immediately to Health and Safety Manager
5.	Site Construction Team	<ul style="list-style-type: none"> ▪ Comply with the relevant requirements of the plan and other health and safety documentation. ▪ Participate in the Project/site induction program. ▪ Report any health and safety incidents to the foreman immediately or as soon as practicable if reasonable steps can be adopted to control the incident. ▪ Undertake remedial action as required to ensure health and safety controls are maintained in good working order. ▪ Stop activities where there is actual or potential health risk of harm to the environment or to prevent health and safety non-conformance and advise the Project Manager, Site Manager and Site Foremen.

APPENDIX 6: AIR QUALITY, NOISE AND VIBRATIONS DATA**Appendix 5a: Ambient Particulate Matter measured at SoAF Kunduchi Site**

Code	Location		Particulate Matter		
	GPS Readings		TSP	PM ₁₀	PM _{2.5}
	Latitudes	Longitudes	mg/m ³	mg/m ³	mg/m ³
AQMS1	-6.770894	39.240672	0.012	0.009	0.004
Environmental Management (Air Quality Standards) Regulations, 2007			0.5	0.15	0.075
WHO/IFC (2007) and WB AQG 2006			0.23	0.05	0.025

Source: Measurements on February 2024

Appendix 5b: Average values of measured ambient pollutant gases

Code	Location		Ambient Pollutant Gases				
	GPS Readings		CO	NO ₂	SO ₂	H ₂ S	VOCs
	Latitudes	Longitudes	mg/m ³	mg/m ³	mg/m ³	mg/m ³	mg/m ³
AQMS1	-6.664789	39.216975	0.25	0.058	0.09	0.11	4.5
TBS Limits			15	0.12	0.5	-	6.0
WHO/IFC Guidelines			30	0.2	0.5	-	--

Source: Field Measurements on February 2024

Appendix 5c: Average ambient Noise Levels measured at established station

Station Code	Location		Noise Levels in dBA	
	GPS Readings		Daytime	Night-time
	Latitudes	Longitudes	dBA	dBA
AQMS1	-6.664789	39.216975	46.8	43.7
TBS Limits			<55	<35
WHO/IFC/WB Guidelines			<60	<45

Source: Field Measurements on February 2024

Appendix 5d: Average vibrations levels at measured station.

Station Code	Location		Vibration Levels
	GPS Readings		
	Latitudes	Longitudes	(mm/s PPV)
AQMS1	-6.664789	39.216975	0.004
Human detection level			<0.15
TBS Limit			5
British Limit			0.3

Source: Field Measurements on February 2024