

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED CARDIAC TEACHING AND RESEARCH HOSPITAL, LOCATED ON PLOT 3, MLOGANZILA MTA, KWEMBE WARD, UBUNGO MUNICIPALITY IN DAR ES SALAAM REGION

ESIA REPORT



Proponent:



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Submitted to:

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Submission Date: 28th June 2024

PROJECT TITLE:

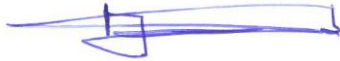
Environmental And Social Impact Assessment for The Proposed Cardiac Teaching and Research Hospital, Located on Plot 3, Mloganzila Mtaa, Kwembe Ward, Ubungo Municipality in Dar Es Salaam Region

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Declaration Statements:

I, Prof. Appolinary A. R. Kamuhabwa hereby confirm that I have reviewed and accept the findings and recommendations presented in this ESIA report.

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Declaration Statements:

I, Kamariya Mikidadi Mohamed hereby confirm that this ESIA report has been prepared in accordance with applicable regulations and guidelines.

Signature:**Date:** 02nd July, 2024

EXECUTIVE SUMMARY

Project Overview

Globally, cardiovascular diseases account for 17 million deaths annually. According to the WHO 2022 report, approximately 37% of premature deaths in East Africa are caused by cardiovascular diseases. Most of these deaths could have been averted by primary prevention or instituting lifesaving procedures that are not necessarily expensive provided skilled human resource and the required facilities are in place. However, Africa has the lowest cardiac centres at 1 to 33 million population compared to Asia: 1 to 16 million, Europe: 1 to 1 million and USA: 1 to 12 hundred thousand people. East Africa has 12 cardiac units/centres in a population of approximately 200 million. Tanzania, the partner state hosting the East African Centre of Excellence for Cardiovascular Sciences, has only 2 cardiac centres in a population of 60 million. In terms of human resource, Africa has a severe shortage of cardiac specialists, for example a cardiac surgeon (for adults): population ratio is 1:25 million population in Sub Saharan Africa, while the global ratio for the same is 1.6 (range 0-181) per 1 million population.

The East African Community (EAC) urgently requires a dedicated cardiovascular hospital for learning and research in Tanzania due to the rising prevalence of cardiovascular diseases (CVDs) in the region. According to the World Health Organization (WHO), non-communicable diseases, including CVDs, account for nearly 27% of all deaths in East Africa, with hypertension and heart disease being leading contributors. In Tanzania alone, the prevalence of hypertension has surged to over 25%, significantly contributing to the burden of heart diseases (Ministry of Health, 2016). Establishing a specialized cardiovascular hospital will provide the necessary infrastructure to manage and mitigate the growing CVD epidemic, ensuring that the region can address this critical public health challenge effectively.

Furthermore, the lack of advanced training and research facilities in cardiovascular health within the EAC hampers the development of local expertise and innovation. Currently, most medical professionals in East Africa have limited access to specialized training in cardiovascular medicine, often necessitating expensive and logistically challenging overseas education. A cardiovascular hospital dedicated to learning and research in Tanzania will bridge this gap by offering state-of-the-art training programs, fostering a new generation of highly skilled cardiologists and healthcare professionals. Additionally, local research initiatives can be accelerated, leading to context-specific solutions and advancements in cardiovascular care that are tailored to the unique health challenges faced by the EAC population.

The socioeconomic impact of cardiovascular diseases on the EAC underscores the need for such a facility. CVDs not only result in significant healthcare costs but also lead to loss of productivity due to disability and premature mortality. The World Bank estimates that the economic burden of non-communicable diseases, including CVDs, could reduce the GDP of low- and middle-income countries by up to 7% over the next two decades. By establishing a cardiovascular hospital in Tanzania, the EAC can proactively address these economic challenges through improved healthcare outcomes and reduced long-term costs. This investment in healthcare infrastructure will not only save lives but also bolster the region's economic stability and development.

The project will be executed by the Ministry of Education Science and Technology and implemented by MUHAS. MUHAS plans to build a 600-bed Cardiac Teaching Hospital which aims to complete the Centre of Excellence by offering an accessible, well-equipped teaching hospital situated near the Centre's Multipurpose building to enhance the synergy between teaching and learning.

The objectives of the project include; Improve access to quality and affordable specialized tertiary education in biomedical sciences in the EAC; Improve access to evidence based, timely, affordable and quality specialized biomedical services in the EAC for Cardiovascular disease prevention, treatment and rehabilitation.

Project description

The proposed project is located within the premises of MUHAS campus in Mloganzila area. The area is located in Mloganzila Mtaa, Kwembe Ward, Ubungo Municipality in Dar es Salaam Region. The premises owned by MUHAS, is located about 5km from the Morogoro road and it has the total area of 1,286.17Ha, at Latitude 6.491400 South and Longitude 39.033200 East. The proposed site is bordered with the Mloganzila road to the West, Mloganzila Hospital to the North, undeveloped area on East and East Africa centre of Excellence for cardiovascular sciences (EACECS) on the South. The proposed site can be accessed through Mloganzila Road when coming from Morogoro Road which is about 4km. The Key benchmark is Muhimbili Mloganzila Hospital which is near the project site.

The proposed cardiac teaching and research hospital will be a nine-story building with four wings to allow thorough ventilation and will have the following functional areas: Emergency area sufficient to handle 10 emergency cases at a time, ambulance bay, Outpatient services sufficient to handle 60 patients at a time, Cardiac Diagnostic Services – Echo, X-ray, CT Scan, MRI, a comprehensive cardiac laboratory, blood bank, Cardiac Angiography Services, Coronary care Unit, four (4) Cath lab Hybrid theatres, and provision for another six (6) cardiothoracic theatres making a total of 10 operating theatres. Cardiac High Dependency area/Cardiac Intensive care services and patient wards (ordinary, private and IPPM and VIP). Other units will include: Hospitality services i.e. genetic counselling, nutritional counselling, Physiotherapy and Rehabilitation services, pharmacy and compounding, therapeutic drug monitoring unit, quality assurance unit, centralized sterilization unit, minor workshop/biomedical engineering unit for addressing immediate faults in equipment, (a larger workshop within campus will be available from other projects). The administrative wing will have administrative offices, finance, logistics and supply chain management, procurement and social welfare offices, legal unit and public relations unit. Heads of Departments and Heads of Firm offices as well as seminar rooms will be available to facilitate teaching and learning.

Research will be an integral part of the hospital functions, and hence facilities for data collection (including sample collection), data archiving, and all the main aspects of data science will be made available. The data bases will be the cornerstone of developing AI algorithms for risk stratification and aiding diagnostics. The CTH will have facilities for next generation sequencing, gene and cell therapy. Equipment for other research approaches, will be made available at both the hospital and laboratories at the Multipurpose building. Long

term storage of research biological samples will be done at the University Biorepository at the Multipurpose Building of the EACECS.

The project investment cost is approximately USD 75 Million which includes all costs for engineering, procurement of construction equipment and materials acquisition as well as the actual construction process. The envisaged life span of the project construction implementation is about 24 months and more and the operation plus or minus 50 years depending on proper maintenance and rehabilitation of project infrastructure.

The main source of electricity at the site will be electricity from TANESCO, all construction works employing the use of electricity will be conducted by the use of electricity for construction sites. The proposed project will use TANESCO as source of energy for lighting during operational phase, but will also explore other options such as solar panels and stand by generator.

The main water source at the proposed site will be from DAWASA. However, consultations from the stakeholders revealed that water is not sufficient in the area. Establishment of the cardiac teaching and research hospital will further increase stress of water. Therefore, the proposed project should consider conservation of water through rain water harvesting during operational phase. The contractor should take note of this and find alternative source of water during construction phase.

The ESIA study is conducted in accordance with the Environmental Impact Assessment and Audit regulations (2005); and, formulated after the Environmental Management Act (EMA) No. 20 of 2004. The Regulations give mandate to NEMC to oversee the ESIA process, which culminates with an award of the ESIA Certificate by the Ministry responsible for Environment. The ESIA Certificate is among the prerequisite approvals required before the project takes off. This project will need this approval before it is implemented. In addition, ESIA study will adhere to the AFDB Policies and Legal Framework and Environmental and Social Operating Safeguards (E&S OSs).

Policy, Legal and Institutional Framework

Tanzania is committed to attaining sustainable development goal. A few policies that have a close bearing to education sector and construction industry are; National Environmental Policy (NEP) of 1997; Construction Industry Policy (2003); National Land Policy (1995); National Human Settlements Development Policy (2000); National Gender Policy (2002); Energy Policy (1992); The National Water Policy (URT, 2002); The National Health Policy (URT, 2003); The Tanzania Development Vision 2025; The Women, Gender and Development Policy (2000); and The National Strategy for Gender and Development (2005).

Relevant legislation includes; Environmental Management Act No. 20 of (2004), Cap. 191; EAC Medicine and Health Technologies Policy of 2018; The Medical Act, Dental and Allied Health Professionals Act, CAP.152; The Pharmacy Act of 2011, CAP 311; The Water Supply and Sanitation Act No. 12 of 2009; The Land Act, 1999; The Urban Planning Act (2007); Occupation Health and Safety (2003); Employment and Labour Relations Act No. 6 Of 2004; Engineers Registration Act and its Amendments 1997 and 2007; The Contractors Registration Act (1997); The Architects and Quantity Surveyors Act (1997); The Local Government Laws (Urban

Authorities) Act (1999); Public Health Act 2009; Sexual Offences (Special Provisions) Act (1998); The Child Act, 2009, Fire and Rescue Act (2007); Environmental Impact Assessment and Auditing Regulations (2005); The Environmental Regulations (Standards for control of noise and Vibrations, 2014; The Environmental Management (Air Quality Standards) Regulations, 2007; Environmental Management (Solid waste Management) Regulation, 2009 GN. NO. 263. Other provisions include EAC Treaty of 2007; EAC Regional Health Investments Framework (2018-2028); EAC Health Protocol of 2016.

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

- i. AFDB Integrated safeguards systems (ISS)
- ii. AFDB relevant Environmental and Social Operational Safeguards (E&S OSs)

This ESIA has applied 5 relevant standards out of 10 ESSs, which are:

- E&S OS 1: Assessment and Management of Environmental and Social Risks and Impacts;
- E&S OS 2: Labour and Working Conditions;
- E&S OS 3: Resource Efficiency and Pollution Prevention and Management;
- E&S OS 4: Community Health and Safety
- E&S OS 10: Stakeholder Engagement and Information Disclosure

Institutional and legal framework for implementation of the project

The project will be executed by the Ministry of Education Science and Technology and implemented by MUHAS. The following explains the public institution responsible for implementing and capacity they have for implementation of the project ESMP.

1. NEMC Zonal Office (Ubungo):

- **Role:** Will directly oversee the ESIA process for cardiac teaching and research hospital, including the review and approval of ESIA reports, and periodic monitoring.
- **Capacity:** Typically staffed with environmental officers and specialists who have experience in handling large-scale projects.

2. Regional Secretariat (Project Implementation Region):

- **Role:** Coordinates with NEMC to ensure all environmental regulations are followed and facilitates interdepartmental cooperation.
- **Capacity:** Equipped to handle coordination and oversight but may require technical support from NEMC for complex issues.

3. Municipal Environmental Management Committee (Project Implementation Municipality):

- **Role:** Monitors and enforces ESIA compliance on the ground, working closely with local authorities and NEMC.
- **Capacity:** Staffed by Five Municipal environmental officers and supported by other Municipal departments such as health, Town planners and Land officers, and Solid waste Management.

4. Ward Development Committees and Village/Mtaa Environmental Committees:

- **Role:** Act as local liaisons, ensuring community involvement and addressing grassroots environmental concerns.

- **Capacity:** They have limited but growing capacity in terms of environmental management and often rely on Municipal support. They are primarily engaged in monitoring and reporting rather than enforcement.

Organization responsibilities for implementation of ESMP

The institutional arrangement for environmental management in Tanzania is well spelt out in the Environment Management Act (EMA) (2004). As stipulated in the Act, the Vice President's Office (VPO) is responsible for overall policy guidance and advice on the development of strategic environmental vision, including formulation, analysis and appraisal of broad environmental policy, as well as formulation and review of broad environmental goals, in conformity with such vision. The VPO's office provides a basis for a broad political legitimacy for the administration of strategic policy decisions on a routine and continuous basis for coordinated environmental management. Similarly, Committees and Environmental Management Officers at Wards (WEMO) and Mtaa as directed by EMA 2004 are empowered to coordinate all activities geared towards the protection of environment within their local areas. The participation of the local authorities in stakeholder's meetings opens the door for their environmental management systems to be key players in the implementation of the project and serves the purpose of their being stakeholders.

PIE-MUHAS

The proponent responsibility is to ensure that the implementation process of the ESMP and Mitigation measures are in line with the relevant national policies and legislations and AFDB Environmental and Social Operational Safeguards (E&S OS1). MUHAS has the Project implementation Entity (PIE) responsible for supervision and monitoring the implementation of the project construction activities. The management of all project activities during operation is under the PIU, in collaboration with other departments and units depending on the nature of the activity. In general, the PIE falls under the management of MUHAS executing day-to-day activities in the project. The PIE is guided by management meetings that are chaired by the Deputy Vice Chancellor. The management meetings provide support, guidance and oversight of the progress of the PIE. Further, the PIE has designated the Environmental and Social Safeguard Specialists responsible for supervision and monitoring the implementation of the project. The responsibilities of the PIE member are as highlighted hereunder.

Environmental Specialist:

Environmental Specialists should have a minimum bachelor's degree in environmental sciences/environmental engineering, forestry, or related fields with experience in the construction industry. The said is responsible for the following functions:

- Monitor compliance with environmental regulations and ensure proper waste management and pollution control practices.
- Responsible for overseeing the implementation of mitigation measures.
- Monitor environmental impacts and coordinate with consultants and contractors.
- Play a crucial role in managing and minimizing the environmental impact of construction projects.
- Assess and address potential environmental risks and develop strategies for environmental management.

Social and Community Engagement Specialist:

The social specialists have a minimum bachelor's degree in social sciences and experience in building and construction projects. The social specialist is responsible for;

- The social aspects of the construction project. She ensures compliance with social performance standards.
- Overseeing the implementation of mitigation measures, monitoring social impacts, and coordinating with stakeholders.
- Involved in stakeholder engagement activities and reporting on social performance.
- Building positive relationships with the local community and stakeholders affected by the construction project.
- Engagement with community members, address concerns and facilitate communication between the project team and the community.

Health and Safety Specialist:

The health and safety specialist is a holder of a bachelor's degree in environmental health and safety or a relevant discipline. The social specialist is responsible for the following;

- To work with the site health officer to implement health and safety measures on the construction site.
- Collectively, they develop and enforce safety protocols, conduct risk assessments, and monitor compliance with health and safety regulations in all project stages.

Site Engineer:

The site engineer shall be a registered engineer with the Engineers Registration Board (ERB) and experienced in supervising construction sites. The site engineer is responsible for;

- Responsible for the technical aspects of the construction project.
- Overseeing the construction activities, coordinating with contractors and subcontractors, and ensuring the design and construction aligns with the ESIA/ESMP requirements.
- Working closely with the environmental and social specialist to address any technical issues related to environmental and social aspects.
- To work closely with the consultant in ensuring the construction follows the required quality standards and available laws and regulations.

Other key institutions for implementation of the project are as indicated in the Table below:

| Level | Institution | Role and Responsibility |
|----------------|--|--|
| National level | Vice President's Office (Division of Environment,) | <ul style="list-style-type: none"> • Coordinate various environment management activities in Tanzania • Advise the Government on legislative and other measures for the management of the environment • Advise the Government on international environmental agreements • Monitor and assess activities, being carried out by relevant agencies in order to ensure that the environment is not degraded • Prepare and issue a report on the state of the environment in Tanzania; • Coordinate the implementation of the National Environmental Policy |
| | Vice President's Office - NEMC | <ul style="list-style-type: none"> • Carry on environmental audit and environmental monitoring • Carry out surveys which will assist in the proper management and conservation of the environment • Undertake and co-ordinate research, investigation and surveys in conservation and management • Review and recommend for approval of environment impact statements • Enforce and ensure compliance of the national environmental quality standards • Initiate and evolve procedures and safeguards for the prevention of accidents which may cause environmental degradation and evolve remedial measures where accidents occur; • Undertake in co-operation with relevant key stakeholders' environmental education and public awareness; |
| | Ministry of Education, Science and Technology | <ul style="list-style-type: none"> • Issuing policy guidance • Providing legal frameworks • Issuing licenses, provisions of certificates of compliances • Enforcement of laws and regulations • Project monitoring. |

| Level | Institution | Role and Responsibility |
|------------------------------|---|---|
| | Ministry of Health | Provision Of: <ul style="list-style-type: none"> • Hospital Services • Preventive Services • Chemical Management Services • Forensic Science Services • Food and Drug Quality Services • Promotion of Traditional Medicine. • Inspection of Health Services. • Participating in International Health and Medical Organizations. • Developing Human Resource Under the Ministry. • Overseeing Extra Ministerial Development Parastatal and Projects Under the Ministry. • Supervising Government Agencies Under the Ministry |
| | Occupation Safety and Health Authority OSHA | <ul style="list-style-type: none"> • Approval of building plans for the proposed project • Monitoring Health and Safety of workers in working premises |
| Project Funding Institutions | AFDB | <ul style="list-style-type: none"> • Project financing • Ensure the project is carried out to the highest environmental standards strictly in accordance with the ESIA and the mitigation measures set out in the ESMF. • Provide second line of monitoring compliance and commitments made in the ESMPs through supervision. |
| Project Proponent | MUHAS | <ul style="list-style-type: none"> • Project implementation including mitigation measures • Ensure environmental compliance by the Sector Ministry • Review and approve the contractor's site-specific ESMP (C-ESMP) • Ensure contractor's compliance of the C-ESMP • Regular monitoring and reporting on the progress on the implementation of the ESMP. • Liaise with the DoE and the NEMC on matters involving the environment and all matters with respect to which cooperation or shared responsibility is desirable or required. • Oversee the preparation of and implementation of all ESIA's required for investments. |

| Level | Institution | Role and Responsibility |
|------------------------------|---|---|
| Regional level | Dar es salaam Regional Secretariat Office | <ul style="list-style-type: none"> Responsible for environmental coordination of all advice on environmental management in the region and liaises with the Director and the Director General on implementation and enforcement of the Environment Act. A Regional Environment Management Expert appointed by the Minister responsible for Regional Administration heads the secretariat. The Regional Environment Management Expert is responsible for advising the local authorities on matters relating to the implementation and enforcement of the Environment Act. The Expert links the region with the Director of Environment and Director General. Advice on implementation of development projects and activities at Regional level. |
| Municipal level | Ubungo Municipal Council | <ul style="list-style-type: none"> Oversee and advice on implementation of national policies at district level Oversee enforcement of laws & regulations Advice on implementation of development projects and activities at district level |
| Ward Level | Kwembe | <ul style="list-style-type: none"> Oversee general development plans for the Ward. Provide information on local situation and Extension services Technical support & advice Project Monitoring |
| Street (<i>mtaa</i>) level | Mloganzila | <ul style="list-style-type: none"> Information on local social, economic and environmental situation View on socio-economic and cultural value of the sites and on proposed plant operations Rendering assistance and advice on the implementation of the project Project Monitoring (watchdog for the environment, ensure wellbeing of residents and participate in project activities. |

Baseline Environment

The Proposed project site is located in Dar es salaam region, Ubungo Municipal Council Kwembe ward in Mloganzila Mtaa, which experiences a tropical savanna climate characterized by distinct wet and dry seasons.

It is crucial to recognize that the proposed site is located within Dar es Salaam region. Therefore, the subsequent description and data provided for the proposed site are reflective of the conditions and circumstances specific to Dar es salaam region. Most of information provided in this section were gathered through observation and measurements during field survey. Some of the data were obtained through literature review.

The climatic condition of the project site is coastal tropical climate characterized by high temperature, low wind speed, high humidity, and the absence of cold season. The wet or heavy rain season lasts from March to May and the dry season from June to October. Also, there is a short rainy season from November to December followed by a short dry hot season from January to February. The proposed site exhibits a slightly sloped topography, providing natural drainage and reducing the risk of waterlogging. The soil is predominantly sandy, characterized by good drainage properties. Physical observation and literature review confirmed that the type of the soil is sand soil.

The project site is bare, where large part of the site is covered by mixed vegetation of grass, bushes and trees. Apart from birds, no any fauna of ecological importance was observed at proposed project site.

The main source of water for the proposed project is DAWASA. The existing projects i.e., EACECS and Mloganzila Hospital and residents at Mloganzila mtaa also uses water from DAWASA. However, consultations from the stakeholders revealed that water is not sufficient in the area. Establishment of the cardiac teaching and research hospital will further increase stress of water. Therefore, the proposed project should consider conservation of water through rain water harvesting during operational phase. The contractor should take note of this and find alternative source of water during construction phase. Ubungo Municipality is supplied with electricity by TANESCO through the National Grid. Electricity is mainly used for lighting for commercial and domestic purposes. Gas stoves, Firewood and charcoal are the main sources of energy for cooking in the municipality and they account for 77.8% of the total energy use. The proposed project will use TANESCO as source of energy for lighting during operational phase, but will also explore other options such as solar panels

Stakeholder Engagement and Public Consultation

Stakeholders' identification and engagement process was conducted based on EIA and Audit Regulations, 2005 and its amendment of 2018, AFDB Environmental and Social Operating Safeguards (E&S OS10- "Stakeholders Engagement and Information Disclosure"). The project involved various stakeholders that include Ministries, beneficiaries of the project as well as other key stakeholders such as the local authorities where the proposed project will be located. These stakeholders were consulted to obtain their views and concerns of the project.

Key stakeholders consulted during this ESIA study, include the following; Ubungo Municipal Council (Environmental Officer, Town Planner and Community development Officer), Occupational Safety and Health (OSHA), Tanzania Electric Supply Company Limited (TANESCO), Fire and Rescue Forces (Kinondoni), Kwembe Ward Office (WEO); and Mloganzila, and Kwembe Development Committees. Others include Ministry of Education, Science and Technology (MoEST), Ministry of Health and Tanzania Electric Supply Company Limited (TANESCO), East Africa Community (EAC), Tanzania Atomic Energy Commission (TAEC), Cardiovascular Specialists, to seek for comments/issues. The main issues and concerns identified include the following:

- Stakeholders anticipate that the hospital will significantly enhance the quality of cardiac care available in the region, and EAC providing advanced treatment options and better patient outcomes
- The facility's teaching component is expected to offer valuable educational

opportunities for medical students, residents, and healthcare professionals, fostering a new generation of skilled cardiologists and researcher

- The research component of the hospital has the potential to drive advancements in cardiac care, leading to innovative treatments and improved health outcomes on a broader scale
- The establishment of a cutting-edge cardiac hospital can enhance the region's reputation as a center for medical excellence, attracting top talent and further investment in healthcare
- Collaborating with international experts will facilitate the exchange of resources, including state-of-the-art medical equipment, advanced technologies, and specialized medical supplies

Assessment of Environmental and Socio-Economic Impacts

(a) The assessed environmental risks and impacts were based on:

- i. AFDB Environmental Health and Safety Guidelines (EHSGs);
- ii. Effects related to climate change;
- iii. Effects of any material threat to the protection, conservation, maintenance and restoration of natural habitats and biodiversity;
- iv. Effects related to ecosystem services and the use of living natural resources; and those related to the design of the physical facilities.

(b) The assessed socio-economic risks and impacts were based on:

- i. Threats to human security through crime or violence; and

Risks that project impacts fall disproportionately on individuals and groups who because of their particular circumstances, may be disadvantaged or vulnerable

Identified Environmental and Social Impacts

The development of the Cardiac Hospital shall cause a wide range of environmental and social impacts on a number of receptors. The impacts are of both positive and negative nature. The table below presents the identified significant environmental and social impacts for all phases of the project.

| Project Phases | Positive Impacts | Negative Impacts |
|------------------------------|--|--|
| Preliminary/ mobilization | <ol style="list-style-type: none"> i. Job creation ii. Local economic boost (increased income) iii. Creation of business opportunities | <ol style="list-style-type: none"> i. Increased noise levels due to the movement of trucks to and from the site. ii. Increased dust generation from moving vehicles during the transportation of construction materials. iii. Increased traffic from vehicles entering and exiting the site. |
| Construction | <ol style="list-style-type: none"> iv. Employment opportunities v. Economic Stimulus vi. Increase of government revenue vii. Skills development of local workforce | <ol style="list-style-type: none"> i. Increased dust generation. ii. Soil disturbance iii. Occupational safety and health risks. iv. Transmission of vector-borne and communicable diseases. v. Impacts associated with the transmission of sexually transmitted infections. vi. Noise due to the movement and operation of construction machines. vii. Visual intrusion. |

| | | |
|----------------|--|--|
| | | Environmental contamination from increased waste generation. Population Influx Gender based violence (GBV), equity, rape and sexual harassment |
| Demobilization | Environmental restoration | Loss of employment to some workers |
| Operation | <ul style="list-style-type: none"> i. Employment opportunities ii. Accessibility to Quality Cardiovascular Services iii.Reduces cost of treatment for cardiac cases iv.Reduces the cost of education for students pursuing cardiovascular studies. v. Development of Highly Skilled Human Resources vi.Decreased Morbidity and Mortality vii. Promoting medical tourism viii. Establishing the country as a regional medical hub ix.Creation of Business Opportunities x. Economic Stimulus xi.Increase of government revenue xii. Adding value to the neighborhood properties | <ul style="list-style-type: none"> i. Occupational Health and safety risks ii.Environmental contamination from increased waste generation. iii. Increased surface water run-off iv. Fire risks |

Consideration of Alternatives

Different alternatives were considered in this study, including the no-project alternative, alternative designs, energy alternatives, and wastewater treatment alternatives. The no-project alternative was disqualified because choosing that option would mean maintaining the status quo and forfeiting all the potential benefits of the project. The existing water sources provided by DAWASA were preferred over alternatives like rainwater harvesting; however, there is an emphasis on considering rainwater harvesting due to the unreliability of the DAWASA source. Electricity from the national grid was chosen as the primary energy source, though solar energy will be explored and utilized if feasible. This Environmental and Social Impact Assessment (ESIA) emphasizes that MUHAS should consider using solar energy for low-electricity-intensity equipment such as lighting. For wastewater management, an onsite sanitation system (centralized biodigester) was selected due to the absence of a sewer system.

It is important to note that site alternatives were not considered in the assessment because the proposed project will be implemented within the MUHAS Mloganzila premises. This is the second phase of the East African Center of Excellence for Cardiovascular Science, eliminating the need for alternative sites or land acquisition. Additionally, since the project is within the MUHAS Mloganzila premises and land is owned by the MUHAS with no any human activities on the proposed site, there is no requirement for a Resettlement Action Plan (RAP).

Environmental and Social Management Plan

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

mitigation measures recommended in this report. The associated environmental costs for carrying out the environmental management plan amount to TSH 286,000,000 (106,880 USD).

ESMP Implementation Indicators to Monitor

Key Environmental and Social Management Plan (ESMP) implementation indicators to monitor for the proposed cardiac teaching and research hospital project include:

- i. Compliance with Legal and Regulatory Requirements
 - Adherence to environmental laws and regulations.
 - Fulfilment of permit conditions.
- ii. Environmental Performance Indicators
 - Air quality levels (e.g., particulate matter, NO_x, SO_x).
 - Water quality parameters (e.g., pH, turbidity, chemical pollutants).
 - Noise levels.
 - Soil quality metrics (e.g., contamination levels).
- iii. Social Performance Indicators
 - Community health and safety statistics.
 - Employment and labour conditions (e.g., number of local hires, working conditions).
 - Stakeholder engagement activities (e.g., number of consultations, grievance redressal cases).
- iv. Waste Management:
 - Volume and type of waste generated.
 - Waste disposal methods and compliance with disposal regulations.
 - Recycling and reuse rates.
- v. Monitoring and Reporting
 - Frequency and accuracy of monitoring activities.
 - Timeliness and quality of reports.
 - Corrective actions taken based on monitoring results.

MUHAS shall regularly tracking these indicators to ensures the ESMP is effectively implemented, helps identify areas needing improvement, and ensures compliance with environmental and social safeguards.

Environmental and Social Impact Management Plan for the Proposed Cardiac Teaching and Research Hospital Project

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|--|---|--|---|--------------------------------------|-----------------------------------|---|-------------|-------|
| | | | | | | | TZS | USD |
| During project preliminary/mobilization (PM) phase | | | | | | | | |
| PM-01 | Increased noise levels due to the movement of trucks to and from The site. | <ul style="list-style-type: none"> The material mobilization and transportation process shall be well scheduled to be done during night hours. Mobilization works will not be permitted during peak activity hours at the Mloganzila Hospital and other project neighbours. All vehicles and machinery used at the project site during material and labour mobilization will be subject to regular maintenance. The vehicles and machines that are excessively noisy due to poor engine adjustment or damage noise control devices shall be used upon maintenance. The Mloganzila community shall be informed of the planned works and the noise levels and periods during which they will occur. The location of noisy equipment will be chosen as far as possible from sensitive receptors including the Mloganzila Hospital, East African centre for cardiovascular sciences. Good management practice will be used to properly muff and distribute noise at the undeveloped plots near the project site. | Mobilization phase | Noise levels within regulatory limit | MUHAS/ Contractor | Project Manager/ Environmental Specialist | 5,000,000 | 1,910 |
| PM-02 | Increased Dust Generation from Moving Vehicles During the Transportation of Construction Materials. | <ul style="list-style-type: none"> Trucks transporting building materials such as cement, sands from source to the site should be covered so as to reduce dust pollution, and proper housekeeping of the site such as regularly watering the site. Ground will be moistened during loading and unloading of aggregates in trucks; Truck dumpers carrying spoil or other dusty materials will be covered with tarps; Loaded trucks should be washed down prior to exit from the working site to ensure that loose material is not tracked onto the roads; | Mobilization phase-Continuous during transportation | Dust level within regulatory limits | MUHAS/ Contractor | Project Environmental Specialist | 5,000,000 | 1,910 |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
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| PM-03 | Increased Traffic | <ul style="list-style-type: none"> A comprehensive traffic management plan to control and manage traffic flow during the mobilization phase shall be prepared and adhered to. Whenever necessary, the material and equipment transporting vehicles shall take specifically designated routes to minimize disruption and interference of local traffic. All construction vehicles shall be well maintained and equipped with safety features including reflective strips for night driving. | Mobilization phase- | <p>Traffic flow maintained without incidents,</p> <p>No traffic jam</p> | MUHAS/ Contractor | MUHAS/ Traffic Management Specialist | 5,000,000 | 1,910 |
| During project construction (C) phase | | | | | | | | |
| C-01 | Increased Noise Level Due to The Movement and Operation Of Construction Machines. | <ul style="list-style-type: none"> Whenever possible, all construction equipment will comply with the requirements of the Tanzania Bureau of Standards (TBS) on noise emission for outdoor equipment. All equipment shall bear the TBS marking, indicate the guaranteed sound power level, and be accompanied by a TBS declaration of conformity. Construction work will not be permitted at night; operations on site shall be restricted to the period from 0700hrs to 1800hrs. All vehicles and machinery used at the construction sites will undergo regular maintenance. Vehicles and machines that are excessively noisy due to poor engine adjustment or damaged noise control devices shall not be operated until corrective measures have been taken. The Construction Traffic Management Plan (TMP) will establish speed limits for construction vehicles and machinery at the construction site and on haulage roads, and organize traffic to avoid populated areas as much as possible. The Mloganzila community, Mloganzila hospital patients and staff, and other project neighbors will be kept informed in a timely manner about planned works, noise levels, and the periods during which they will occur. | Throughout construction phase | <p>Noise level within regulatory limits</p> <ul style="list-style-type: none"> TZS 932:2006 of TBS, the acceptable noise levels for industrial activities are 85dB <p>Compliance with Environmental Management (Quality Standards for Control of Noise and Vibration Pollution) Regulations, 2015.</p> | MUHAS/ Contractor | Project Environmental Specialist | 25,000,000 | 9,310 |

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| | | <ul style="list-style-type: none"> • The location of noisy equipment will be chosen to be as far as possible from sensitive receptors (such as hostels and offices). When near sensitive receptors, construction works will be scheduled and resourced to minimize the time of exposure. • Good management practices will be used to distribute heavy noise equipment at the site to avoid cumulative noise effects. • Workers will be instructed to maintain moderate sound levels and tranquility at the project site. • Physical barriers or acoustic screens will be erected around construction sites to reduce noise propagation to nearby sensitive areas. • Regular maintenance of construction equipment will ensure they operate within acceptable noise levels and minimize vibration. • Noisy activities will be limited to daytime hours, and coordination with nearby facilities will be undertaken to avoid critical times of operation. • A noise monitoring program will be implemented to continuously assess noise levels and ensure compliance with regulatory standards. • Silencers and mufflers will be installed on equipment to reduce noise emissions. • Appropriate and adequate personal protective equipment (PPE), such as hearing protection devices, will be provided to workers exposed to high noise levels. • The local community and nearby facilities will be informed about the construction schedule and anticipated noise levels, and communication channels for feedback and complaints will be established. | | | | | | |
| C-02 | Increased Dust Generation and Gaseous Emissions | <ul style="list-style-type: none"> • Accesses and construction sites will be kept moist to reduce dust formation; water sprays should be implemented at all times. | Throughout construction phase | Dust level within regulatory limits | MUHAS/ Contractor | Project Environmental Specialist | 25,000,000 | 9,310 |

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| | | <ul style="list-style-type: none"> • During the dry season, hygroscopic additives will be used in water to increase its presence in the ground. • Dust-generating activities will be slowed down on days of strong wind. • The ground will be moistened during the loading and unloading of aggregates in trucks. • Truck dumpers carrying spoil or other dusty materials will be covered with tarps. • Loaded trucks will be washed down prior to exiting the working site to ensure that loose material is not tracked onto the roads. • Hoardings will be constructed around the construction sites to minimize the spread of dust. • Vehicles and construction machinery will be required to be properly maintained and comply with relevant emission standards. • Unnecessary idling of construction vehicles at the construction sites will not be allowed. • Construction truck traffic will be optimized to ensure a minimum number of trucks carry the maximum volume of materials, as addressed in the Construction Traffic Management Plan. • Truck routes will be planned to avoid peak traffic hours or routes with heavy traffic. | | Adherence to the Environmental Management (Air Quality Standards) Regulations G.N No. 237 of 2007 | | | | |
| C-03 | Environmental Contamination From Increased Waste Generation | <p>The main mitigation measures during the construction phase to minimize wastes and to manage wastes would be contained in the Waste Management Plan which shall contain among other things;</p> <ul style="list-style-type: none"> • Brick, concrete and masonry can be recycled on site as fill, subbase material or driveway bedding. • Identification and classification of the different waste types that could be generated at the construction site (due to the materials used and waste generated in different sections) according to the Environmental | Ongoing during construction | <p>Proper waste disposal records,</p> <p>Adherence to: Environmental Management (Solid waste Management) Regulation, 2009</p> | MUHAS/ Contractor | Project Environmental Specialist | 35,000,000 | 13,030 |

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| | | <p>Management Regulations (Hazardous Waste Control), 2009;</p> <ul style="list-style-type: none"> • Completely separate hazardous from non-hazardous waste streams at the construction site should be done; • Immediate removal of waste material (concrete, iron, rocks, etc.) waste from site. • Collection and disposal of municipal solid alike waste generated in the construction site and camps (food, beverages, packaging waste such as paper, bottles, glass, etc., glass bottles) according to national legislation (separation of recycling waste materials from the waste stream that will be disposed at the dumpsite). Recyclable waste shall be given to an authorized recycling company; • Signing a contract with the company for waste collection (registered by NEMC/VPO) and transportation of the hazardous waste generated at the construction site to the authorised dumpsite; • Ensuring that the contracts signed with the companies dealing with waste recycling and recovery will take delivery and acceptance of the waste streams is performed on a frequent basis so that the construction sites remain clean at any time; • Reusing excavated soil and construction waste as much as possible; • There should be separate collection of possible hazardous waste (motor oils, vehicle fuels, scrap metals etc) and sub-contracting an authorized collector and transporter to transport, recovery or finally dispose the hazardous waste; • Establishing the Temporary Hazardous Waste Storage Points according the national legislation on handling, labelling, storage and management with hazardous waste; • Establishing and following the hazardous waste management procedure; | | <p>as amended in 2016</p> <p>Environmental Management (Soil Quality Management) G. N. No. 239 of 2007</p> <p>Environmental Management (hazardous Waste Control and Management) Regulations, 2021</p> | | | | |

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| | | <ul style="list-style-type: none"> • Ensuring that the hazardous waste is packaged and labelled showing the R and S phrases (risk and safety statements of the hazardous waste) and it is temporary stored on safety storage facility equipped with adequate ventilation, fire resistant conditions; • Ensuring that the access to these temporary hazardous waste storage points be only allowed for trained and equipped staff, and entrance prohibited for untrained workers and public; • Promptly cleaning up All waste spills; • Making available for inspections full records of the type of waste stream generated, quantity composition, origin, disposal destination and method of transport for all different waste streams; • Contractor shall cooperate with local government offices for smooth collection of solid wastes from the project area; • Undertaking the selective removal and storage of top soil; • The reuse of topsoil to restore cuttings; • Burning and burying of wastes shall be strictly prohibited. | | | | | | |
| C-04 | Occupational Safety and Health Risks | <ul style="list-style-type: none"> • Implementation of comprehensive safety training programs for all personnel involved in construction activities. • Compliance with regulatory standards and ongoing assessment of workplace conditions are essential to safeguarding the health and well-being of all personnel involved in the construction activities. • Provision of proper personal protective equipment (PPE) for workers. • Regular assessment and mitigation of potential hazards through thorough risk assessments. • Establishment of emergency response plans and drills to effectively manage any accidents or incidents. | Throughout construction phase | Reduced accident rates, compliance with the Occupational Health and Safety Act, 2003 | MUHAS/ Contractor | Project Health and Safety Specialist | 40,000,000 | 14,890 |

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| | | <ul style="list-style-type: none"> • Health and Safety Management Plan shall be prepared by contractor and adhered during construction taking stock of HSMP in; <p>In addition, MUHAS shall develop and implement a Health and Safety Plan in order to eliminate and/or reduce impacts, plus measures related to the following five areas:</p> <p>(i) Code Of Practices at Work Place: Instate a work place code of practice to comply with relevant Tanzania (OSHA, 2003)/International Performance Standards on health and safety requirements. Code of practice includes procedures and guidelines for specific operations, as well as inspections and maintenance systems, include in-house health and safety manual /guidelines.</p> <p>(ii) Personal Protective Equipment (PPE) and Working Conditions: Equipment and working condition shall be monitored and maintained through provision of adequate an appropriate equipment and enforcement of use of PPE should be done.</p> <p>(iii) Faulty Equipment and Risky Practices: The contractor shall Set and follow standards for operation and equipment use, such as for control devices, monitors, electrical isolation, manual handling, fitness for work, hand tools, housekeeping, vessel and navigation, hazardous substances etc. Engagement of human resource only of trained/qualified and competent personnel as operators and mechanics, with supervisors and specialists on site at all times during the operation shall be done.</p> <p>(iv) Water and Sanitation: MUHAS and the contractor shall conduct a thorough assessment of water needs prior to the commencement of operations. Additionally, they must ensure adequate water storage capacity is established where necessary to meet both operational and emergency requirements systems, to</p> | | | | | | |

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| | | <p>minimize water usage.</p> <ul style="list-style-type: none"> • Emergency Response Plan (ERP): MUHAS and the contractor shall establish a comprehensive First Aid and Emergency Response (ER) facility on-site. Prior to the commencement of construction activities, they must conduct a detailed Risk Assessment and develop a robust Emergency Response Plan (ERP) to address potential hazards and ensure prompt response to emergencies. • Safety and Security: MUHAS and the contractor shall ensure that project personnel are accommodated in a dedicated camp/place. They shall implement strict policies to discourage the use of alcohol during construction activities. Furthermore, they must conduct thorough screening of all security personnel to maintain a safe and secure work environment. | | | | | | |
| C-05 | Soil Disturbance | <ul style="list-style-type: none"> • Ensure the uses of less invasive machinery and techniques so as to reduce the impact on soil structure. • Carefully removing and storing topsoil during excavation to be replaced afterward to preserve soil fertility. • Planting trees or vegetation so as to protect soil from possible erosion and improve its structure and fertility. • Ensure the movement of heavy construction machineries and equipment are limited to designated paths so as to reduce compaction over a broader area. • Ensure proper waste management both solid and liquid | Ongoing during construction | <p>Stabilized soil, vegetation growth</p> <p>Compliance with Environmental Management (Soil Quality Management) G. N. No. 239 of 2007</p> | MUHAS/ Contractor | Project Environmental Specialist | 15,000,000 | 5,590 |
| C-06 | Population Influx | <ul style="list-style-type: none"> • Local employment: Prioritize hiring local labour to reduce the need for external workers, supporting the local economy and minimizing social tensions. • Business opportunities: Encourage local businesses to supply goods and services to the construction project, fostering economic growth and creating jobs. • Fair wages and working conditions: Ensure all workers receive fair wages and are provided with safe working | Throughout construction phase | Social harmony, employment record | MUHAS/ Contractor | Project Sociologist/ community development officer | 15,000,000 | 5,590 |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
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| | | conditions, preventing exploitation and promoting social stability. | | | | | | |
| C-07 | Impacts Associated with Transmission of Vector Borne and Communicable Diseases | <p>In order to minimize negative impacts from communicable diseases, a Worker Health and Safety Management Plan will be developed and will include the following general vector management plan:</p> <ul style="list-style-type: none"> • Develop and implement pre-employment screening measures for workers, which will cover applicable diseases. Individuals found to be suffering from communicable diseases will need to seek treatment prior to mobilization to site. However, no one should be denied employment because of their health status as long as they are able to undertake the required duties (following treatment if relevant). • Workers should receive training as part of their induction and then at least every 6 months on potential high risk communicable and vector borne diseases, symptoms, preventative measures and transmission routes as well as treatment options. This will be particularly important for diseases with which non-local workers are unfamiliar and in case of any emerging disease outbreaks. • A Worker Code of Conduct should be developed providing a site code of behaviour including worker-worker interactions, worker-community interactions and development of personal relationships with members of the Community. This would apply to all Project workers and visitors to the construction sites within MUHAS. • In the event of a new disease, increased transmission or outbreak compared to the baseline, the Project should interact with local health care facilities and workers to ensure there is an appropriate response in place. This involves community education and awareness, training of health care workers etc | Ongoing during construction | Reduced incidence of diseases | MUHAS/ Contractor | Health department | 25,000,000 | 9310 |

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| | | <ul style="list-style-type: none"> • For all contractors and sub-contractors, at worker sites the following will be implemented at a minimum in order to minimize disease transmission: <ul style="list-style-type: none"> ○ Providing workers with appropriate sanitary facilities which are appropriately designed to prevent contamination. ○ Developing a robust waste handling system to avoid the creation of new vector breeding grounds or attracting rodents to the area. ○ Implementing measures to reduce the presence of standing water onsite through environmental controls and source reduction to avoid the creation of new breeding grounds. ○ Ensuring the construction site is kept clean and free from any accumulation of wastes as well as supplied with clean potable water. ○ Ensuring appropriate food preparation and monitoring measures are in place. ○ Monitoring to ensure that all standards are being met by the relevant departments. • The workforce will be provided with access to treatment at health facilities near the site. Access to health care should include direct employees, sub-contractors and employees of the supply chain working on based on site. • The Project should implement TB prevention measures including testing and referral for treatment for all personnel working on the Project. This approach should be explained clearly to the workforce along with making it clear that there are no consequences for their employment. • The Project should monitor the emergence of major pandemics through World Health Organization (WHO) alerts and in the event of a pandemic review mobilization and demobilization of ex-patriate Project personnel and/ | | | | | | |

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| | | <p>or implement appropriate control measures and Emergency Response Plans.</p> <p>In addition, MUHAS shall prepare and implement an inclusive Vector Borne Disease Management Plan focusing on prominent vector borne diseases including Malaria, which includes vector control, avoidance, diagnosis, treatment and training.</p> | | | | | | |
| C-08 | Impacts associated with Transmission of Sexually Transmitted Infections | <ul style="list-style-type: none"> • Development of a Code of Conduct / rules for worker-community interaction and on-site behaviour. • MUHAS/contractor should develop an STD Management Plan designed to minimize the spread of HIV infection and other STDs. The plan should be prepared with the assistance of a specialist in sexually transmitted diseases. A plan would include, among other things, the following measures: <ul style="list-style-type: none"> o An HIV/AIDS training course and on-going education on transmission of HIV/AIDS and STDs, to employees, through workshops, posters and informal information sessions; o Encouragement of employees to determine their HIV status; o Supply of condoms/ femidoms at the construction site(s) and Development of a comprehensive Construction Site Management Plan, including rules for on-site behaviour, entrance and exit policies and prohibition of sex workers on site. o As part of STD Management Plan, information should be provided to workers on STD prevalence rates in Tanzania as well as the expectations of local communities if a woman is made pregnant by a worker (e.g., marriage, financial implications etc.). o Workers should have access to confidential health care for the treatment of STDs through medical facilities/ health care at Project site. | Ongoing during construction | <p>Increased awareness, reduced infection rates,</p> <p>Adherence to the HIV and AIDS (Prevention and Control) Act, 2008</p> | MUHAS/ Contractor | Health department | 20,000,000 | 7,450 |

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| | | <p>o The Project should partner with other NGOs and CBOs to support the provision of information, education and communication campaigns around safe sexual practices and transmission of STDs.</p> <ul style="list-style-type: none"> • A Grievance Mechanism should be developed, whereby affected people can raise issues and concerns associated with social vices, prostitution and the behaviour of workers and drivers. • Respect for people affected by HIV/AIDS shall be promoted, gender stereotypes and discrimination/stigma against people with HIV/AIDS shall be actively opposed; • MUHAS shall ensure access to HIV/AIDS testing, treatment, and prevention services for workers and local Songo Songo communities. • MUHAS/contractor shall collaborate with local healthcare providers and organizations to implement targeted HIV/AIDS and STI prevention strategies. | | | | | | |
| C-09 | Visual Intrusion | <ul style="list-style-type: none"> • Erect temporary fences or barriers around the construction site to shield the view of construction activities from the surrounding areas. • Use informative hoardings and barriers that blend with the local environment or provide community information to improve the visual appeal. • Place construction materials and equipment in less visible areas to reduce visual clutter. • Keep the height of temporary structures and equipment as low as possible to minimize their visual impact. • Maintain a tidy and organized construction site by regularly clearing debris and arranging materials neatly. • Employ low-intensity lighting that is sufficient for safety and security but does not cause excessive glare. • Install informative signage around the construction site to keep the community informed about the project and its benefits, reducing negative perceptions. | Ongoing during construction | Improved visual impact | MUHAS/ Contractor | Project Environmental Specialist | 20,000,000 | 7,450 |

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| C-10 | Gender based violence (GBV), equity, rape and sexual harassment | <ul style="list-style-type: none"> Contractor and implementing agency to prepare and implement a GBV Action plan to include at minimum, in conformance with local laws and customs, equal opportunity for employment; Contractor to prepare and enforce a No Sexual Harassment Policy in accordance with national law where applicable All workers and Community and stakeholders will be educated on preventing and responding to sexual harassment and GBV ahead of any project related works. Workers shall be provided with identification cards and shall put on uniforms all the time while at the Hospital project site The community within the vicinity of the project site where construction will take place will also be educated on gender-based violence and sexual offences such as sexual harassment, rape and defilement in the context of labour influx and the prevention and response measures. Strategies such as male involvement will be employed in preventing and responding to GBV and sexual harassment Partnerships will be established with relevant government agencies and NGOs to ensure survivors of GBV and sexual offences access survivor centred services such as medical care, psychosocial support, legal redress, safety, etc as and when necessary Impose zero tolerance on sexual harassment, all forms of gender-based violence and discrimination at all phases of the project | Ongoing during construction | Increased awareness, reduced GBV incidence | MUHAS/ Contractor | Project GBV Specialist | 25,000,000 | 9310 |
| During project demobilization (D) phase | | | | | | | | |
| D-01 | Loss of employment to some workers | <ul style="list-style-type: none"> Provide workers with ample notice about the demobilization timeline and potential job loss. Transparency will help workers to be prepared for the transition. | End of construction phase | Reduced unemployment impact | MUHAS/ Contractor | Human Resources Department | | |

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| | | <ul style="list-style-type: none"> • Conduct information sessions to explain the demobilization process, available support services, and next steps for workers. • Providing relevant skills to workers through on job training to make them marketable after decommission. | | | | | | |
| During project operation (O) phase | | | | | | | | |
| O-1 | Occupational Health and Safety Risks | <ul style="list-style-type: none"> • Ensure that workstations are designed to reduce repetitive strain and musculoskeletal disorders. • Implement strict hand hygiene protocols, including the use of alcohol-based hand sanitizers. • Ensure the availability and use of appropriate PPE such as gloves, gowns, masks, medical scrubs and eye protection. • Provide vaccinations for staff against common infections like influenza and hepatitis B. • Maintain and provide access to MSDS for all chemicals used in the hospital. • Store chemicals safely according to regulatory guidelines and provide appropriate labelling. • Use lead aprons, shields, and other protective equipment to minimize exposure. • Regularly monitor radiation levels and exposure. • Provide specialized training on the safe use of the equipment. • Use puncture-resistant sharps containers and ensure proper disposal of needles and other sharp instruments. • Utilize needleless systems and safety-engineered devices to reduce the risk of needlestick injuries. • Conduct regular emergency drills, including fire drills and evacuation procedures. • Promote a healthy work-life balance with adequate rest breaks and reasonable working hours. • Provide ongoing training and education on safety protocols and new procedures. | Ongoing during operation | Reduced accident rate, Adherence to the Occupational Health and Safety Act, 2003 | MUHAS | Health and Safety (HS) Officer | Part of project cost | Part of project cost |

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| | | <ul style="list-style-type: none"> • Regularly assess staff competency in safety procedures and practices. • Train staff on the proper handling and disposal of hazardous and non-hazardous waste. • Develop and regularly review evacuation plans. • Conduct regular health screenings and surveillance to detect work-related health issues early. • Provide rehabilitation programs for staff recovering from work-related injuries or illnesses. • Stay up-to-date with local, national, and international regulations and standards related to occupational health and safety. • Conduct regular audits and inspections to ensure compliance with safety regulations. | | | | | | |
| O-02 | Environmental contamination from increased waste generation | <p>MUHAS shall implement a comprehensive waste management and environmental protection plan to ensure the sustainable operation of the proposed cardiac teaching and research hospital, mitigating potential environmental contamination from its operations. The plan shall include the following key elements:</p> <p>i. Daily Maintenance and General Waste Handling:</p> <ul style="list-style-type: none"> • Engage a cleaning company for daily maintenance of structures and surrounding areas. • Collect ordinary household waste, including paper, food scraps, and yard debris, at an on-site transfer station and transport it to an authorized dumpsite at least twice a week. <p>ii. Hazardous and Medical Waste Management: Prepare and adhere to a Medical Waste Management Plan that includes:</p> <ul style="list-style-type: none"> • Proper segregation and storage of waste using separate bins for infectious, hazardous, and radioactive wastes. • Regular training for hospital staff, patients, students, and project staff on proper waste handling, storage, and disposal. | Ongoing during operation | <p>Adherence to the: Environmental Management (hazardous Waste Control and Management) Regulations, 2021</p> <p>Environmental Management (Soil Quality Management) G. N. No. 239 of 2007</p> <p>Environmental Management (Solid waste Management) Regulation, 2009</p> | MUHAS | Environmental Officer | 20,000,000 | 7,620 |

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| | | <ul style="list-style-type: none"> • Use of personal protective equipment (PPE) during waste handling. • Safe transportation and disposal of medical waste from the hospital site to treatment points. • Regular monitoring and evaluation to track the types, amounts, sources, and final destinations of medical waste. • Prepare a detailed Hazardous Waste Management Plan accounting for special solid and medical wastes generated during the project's operational phase, including: <ul style="list-style-type: none"> • Proper segregation into categories: general, infectious, hazardous, and radioactive. • Use of leak-proof, labeled containers for hazardous and infectious waste. • On-site treatment of infectious and hazardous waste using autoclaves, incinerators, or chemical disinfection. • Guidelines for disposal of expired or unused medications to prevent them from entering the sewage system. • Disposal of chemicals according to regulatory standards, using licensed disposal companies. • Installation of an on-site wastewater treatment facility to treat hospital effluents, removing contaminants such as pharmaceuticals, pathogens, and hazardous chemicals. • Implementation of pre-treatment systems for specific contaminants before they enter the main treatment plant. • iii. Spill Prevention and Response: <ul style="list-style-type: none"> • Develop and implement spill prevention and response plans, including regular training for staff on spill containment and clean-up procedures. | | as amended in 2016 | | | | |

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| | | <ul style="list-style-type: none"> • Conduct regular groundwater quality monitoring around the hospital to detect any signs of contamination early. • Ensure wastewater discharge complies with local environmental regulations through regular testing and reporting. • Install containment systems for storage areas of chemicals and hazardous materials to capture any spills or leaks. <p>iv.Sustainable Practices and Environmental Compliance:</p> <ul style="list-style-type: none"> • Use environmentally friendly cleaning agents and disinfectants. • Implement sustainable practices to reduce the overall environmental impact. • Regularly inspect and maintain sewage and drainage systems to prevent leaks and blockages. • Ensure that all waste management and treatment facilities are well-maintained and functioning properly. • Work closely with environmental regulatory bodies to ensure compliance with all relevant laws and regulations. • Collaborate with local authorities for coordinated responses to significant spills or contamination events. • Invest in research and development of new technologies and methods for reducing and treating hospital waste. • Stay informed about and implement best practices from other healthcare institutions and industry standards. <p>v.Specialized Waste Handling:</p> <ul style="list-style-type: none"> • Designate specific areas for waste oil collection, ensuring they are well-paved with concrete, equipped with bund walls, and covered. • Place all hazardous material in a designated concreted and lined area. | | | | | | |

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| | | <ul style="list-style-type: none"> • Ensure generators are placed on concrete bases and enclosed by concrete bund walls. • Replace contaminated soil and store it for disposal with other hazardous waste. <p>vi.Contracting and Compliance:</p> <ul style="list-style-type: none"> • Engage a GCLA Certified and VPO Environment registered hazardous waste disposal contractor on a framework contract to ease hazardous waste removal. • Ensure regular monitoring, training of staff, and proactive maintenance of infrastructure to minimize environmental impact and ensure sustainable operation. | | | | | | |
| O-03 | Increased Surface Water Run-off | <ul style="list-style-type: none"> • Roofs of all project building and its facilities shall be installed with gutters and downward pipes to direct rain water to the designated storm water drains within the site • The paved area surrounding the buildings shall have a slope towards storm water channels that direct storm water to the large storm water channel along Mloganzila road. • Designs shall explore option for rain water harvesting and if found feasible it shall be implemented | Ongoing during operation | Controlled runoff, water quality standards met | MUHAS | Environmental Officer | 6,000,000 | 2,290 |
| O-04 | Fire Risks | <ul style="list-style-type: none"> • Strictly enforce predetermined measures and activities to timely prevent, curb, and avoid conditions that may result in fires. • Always ensure sufficient water is available for firefighting purposes. • Sensitize all personnel about responsible fire protection measures and good housekeeping, including the removal of flammable materials such as rubbish, dry vegetation, and hydrocarbon-soaked soil from the vicinity of port facilities. • Establish collaboration with the Fire and Rescue Force and neighbouring companies within the vicinity. | Ongoing during operation | <p>Reduced fire incidents</p> <p>Adhere to the Fire and Rescue Force Act No. 14 of 2007</p> <p>Adhere to the Fire and Rescue (Fire Precautions in</p> | MUHAS | Fire Safety Officer/ Health and Safety (HS) Officer | Part of project cost | Part of project cost |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|------------------------------|--------|--|-------------------------|------------------------------|-----------------------------------|----------------------|-------------|---------|
| | | | | | | | TZS | USD |
| | | <ul style="list-style-type: none"> • Ensure the dedicated firefighting team on-site is properly equipped. • Timely service portable fire extinguishers at the port facilities. • Regularly test and certify installed firefighting facilities by the appropriate authority. • Install fire detection and alarm systems in all hospital buildings and offices. • Conduct regular drills and simulations to train workers in fire prevention and rescue skills. • Communicate and sensitize staff, contractors, and other stakeholders on the hospital's emergency response plan for the entire site. • Install and maintain fire detection and alarm systems, including smoke detectors, heat detectors, and automatic sprinkler systems, to detect and suppress fires promptly. • Develop and regularly review emergency response plans, including fire evacuation procedures, training for staff on fire safety protocols, and conducting fire drills to ensure preparedness. • Properly store and secure flammable and combustible materials in designated areas with appropriate ventilation and fire suppression systems. • Regularly inspect and maintain electrical systems, medical equipment, and fire safety equipment to ensure they are in good working condition and compliant with safety standards. • Provide comprehensive training to hospital staff on fire prevention, evacuation procedures, the use of fire extinguishers, and handling emergencies involving fire hazards. | | Buildings) Regulations, 2015 | | | | |
| Total Management Cost | | | | | | | 280,000,000 | 106,880 |

RISK MANAGEMENT MATRIX

| Code | Event | Risk Nature/Description | Risk level | Prevention measure | Preparedness/management action | Alert notification Officer | Supervision |
|------|-----------------------------|---|------------|-------------------------------------|-------------------------------------|----------------------------|-------------------------|
| 001 | Equipment malfunction | Failure of critical medical equipment | High | Regular maintenance and inspections | Implement backup systems | Chief Medical Engineer | Head of Biomedical Dept |
| 002 | Patient data breach | Unauthorized access to sensitive patient data | Medium | Strong cybersecurity measures | Conduct regular security audits | IT Security Officer | IT Manager |
| 003 | Infectious disease outbreak | Spread of infectious diseases within the hospital | High | Strict infection control protocols | Quarantine and isolation procedures | Chief Medical Officer | Infection Control Dept |
| 004 | Power outage | Interruption of electrical supply | Medium | Install backup generators | Regular testing of backup systems | Facilities Manager | Head of Operations |
| 005 | Medication error | Incorrect administration of medication | High | Implement double-check procedures | Staff training and audits | Chief Pharmacist | Head of Nursing |

| Code | Event | Risk Nature/Description | Risk level | Prevention measure | Preparedness/management action | Alert notification Officer | Supervision |
|------|-----------------------------|---|------------|---|---------------------------------------|----------------------------|--------------------------|
| 006 | Fire hazard | Fire outbreak within hospital premises | High | Install fire detection systems | Regular fire drills and training | Safety Officer | Facilities Manager |
| 007 | Research data loss | Loss of critical research data | Medium | Regular data backups | Cloud storage and data recovery plans | Research Data Manager | Head of Research Dept |
| 008 | Staffing shortages | Insufficient medical staff to handle patient load | Medium | Hire additional staff and volunteers | Develop contingency staffing plans | HR Manager | Hospital Administrator |
| 009 | Health and safety incidents | Workplace injuries or illnesses | High | Implement safety protocols and training | Regular safety audits and drills | Health and Safety Officer | Occupational Health Dept |
| 010 | Solid waste management | Improper disposal of solid waste | Medium | Segregate and dispose of waste properly | Regular waste audits | Environmental Manager | Facilities Dept |
| 011 | Medical waste management | Improper disposal of medical waste | High | Use certified disposal methods | Staff training and audits | Medical Waste Officer | Infection Control Dept |

| Code | Event | Risk Nature/Description | Risk level | Prevention measure | Preparedness/management action | Alert notification Officer | Supervision |
|------|----------------------------|---|------------|--|---------------------------------|----------------------------|----------------------|
| 012 | Chemical spill | Spill of hazardous chemicals | High | Use proper storage and handling procedures | Spill response training | Safety Officer | Laboratory Manager |
| 013 | Liquid waste management | Improper disposal of liquid waste | Medium | Use proper disposal methods | Regular waste management audits | Environmental Manager | Facilities Dept |
| 014 | Building design issues | Structural flaws or safety hazards in the building | High | Ensure compliance with building codes | Regular building inspections | Architect | Head of Construction |
| 015 | Poor sanitation facilities | Inadequate or poorly maintained sanitation facilities | High | Regular cleaning and maintenance | Sanitation audits | Sanitation Officer | Facilities Manager |
| 016 | Public health emergency | Outbreak of public health crisis | High | Implement public health surveillance | Emergency response plan | Chief Medical Officer | Public Health Dept |

| Code | Event | Risk Nature/Description | Risk level | Prevention measure | Preparedness/management action | Alert notification Officer | Supervision |
|------|---------------------------|--|------------|---------------------------------------|--------------------------------------|----------------------------|---------------------------|
| 017 | Human error in procedures | Mistakes made by staff during procedures | High | Staff training and SOPs | Regular audits and feedback sessions | Quality Assurance Officer | Department Heads |
| 018 | Natural hazards | Earthquake, floods, or other natural disasters | High | Emergency preparedness plans | Regular drills and equipment checks | Emergency Coordinator | Disaster Management Team |
| 019 | Water supply issues | Interruption or contamination of water supply | High | Install filtration and backup systems | Regular testing and maintenance | Facilities Manager | Environmental Health Dept |
| 020 | Ergonomic bed issues | Faulty or uncomfortable hospital beds | Medium | Regular maintenance and replacement | Staff training on bed adjustments | Nursing Manager | Head of Nursing |

Environmental and Social Monitoring Plan (ESMoP)

Environmental and Social Monitoring Plan will be implemented in all project phases. The monitoring of environmental and social parameters during the construction phase shall be carried out by the Contractor's Environmental and Social Safeguard team, under the supervision of the UPIU's Environmental and Social Safeguard team. The estimated annual costs for carrying out the proposed environmental monitoring programme amount to TSH 41,300,000 as shown in table 9.1 chapter 9

Cost Benefit Analysis

This project is purely a service and therefore it is not possible to convert all the social benefits into monetary terms. Therefore, an indicative and elementary description of the environmental and social costs and benefits was presented and compared (qualitatively). The comparison of the positive and negative impacts of the project showed that the project has more benefits than costs.

Project Decommissioning

As decommissioning will take place in the remote future (approximately 50 years), the specific conditions for mitigation are generally inherently uncertain. In view of this, specific mitigation measures pertaining to environmental impacts of decommissioning works cannot be proposed at the moment with a reasonable degree of certainty.

A decommissioning plan that takes environmental issues into consideration shall be prepared by the developer prior to the decommissioning works. Should it be done, decommissioning may entail a change of use (functional changes) or demolition triggered by change of land use.

This ESIA has prepared brief outline of the works required to demolish the proposed project on the site in case it happens. This Plan will be used as a reference document that provides the framework to ensure that demolition activities on the site do not adversely affect the health, safety, traffic or the environment of the public and neighbouring properties. The identified significant environmental impacts during decommissioning phase include; air (dust) and noise pollution; waste generation and management; occupational safety and health risks; and vibration. Social impacts during construction are employment opportunities and community health and safety risks. The Contractor will be required to prepare a detailed demolition plan and construction management plan to the satisfaction of the developer and relevant authorities prior to the commencement of works on site.

Conclusion

The ESIA study results show that although there are some limited negative environmental implications of the project, the project will have high benefits to MUHAS, the Community and Tanzania as a whole. The associated negative impacts, to a large extent have been minimized through good engineering design and envisaged construction practices. Specific mitigation measures have been suggested in this report to offset some of the inherent adverse impacts. Implementing these mitigation measures would increase environmental soundness of the project.

It can therefore be concluded that, the proposed construction of Cardiac Hospital at Mloganzila area will entail no significant impacts provided that the recommended mitigation measures are adequately and timely implemented. The identified impacts will be managed through the proposed mitigation measures and implementation regime laid down in this ESIA. The developer is committed in implementing all the recommendations given in this ESIA and further carrying out the environmental auditing and monitoring schedules.

MUHTASARI WA UTENDAJI

Utangulizi

Magonjwa ya moyo yanachangia vifo vya watu milioni 17 kila mwaka duniani kote. Kwa mujibu wa ripoti ya Shirika la Afya Duniani (WHO) ya mwaka 2022, takriban asilimia 37 ya vifo vya mapema Mashariki mwa Afrika husababishwa na magonjwa ya moyo. Vifo vingi vingeweza kuepukika kupitia kinga ya awali au taratibu za kuokoa maisha ambazo si za gharama kubwa, ikiwa rasilimali watu wenye ujuzi na miundombinu inayohitajika itapatikana. Hata hivyo, Afrika ina vituo vya matibabu ya moyo vichache sana, kwa mfano, kituo kimoja kwa watu milioni 33 ikilinganishwa na Asia (kituo kimoja kwa watu milioni 16), Ulaya (kituo kimoja kwa watu milioni 1), na Marekani (kituo kimoja kwa watu elfu 12).

Jumuiya ya Afrika Mashariki (EAC) inahitaji hospitali maalum ya moyo kwa ajili ya elimu na utafiti nchini Tanzania kutokana na ongezeko la magonjwa ya moyo katika eneo hilo. Kuanzisha hospitali maalum ya moyo kutaimarisha miundombinu inayohitajika kushughulikia janga linalokua la magonjwa ya moyo kwa ufanisi.

Uhaba wa mafunzo ya juu na miundombinu ya utafiti katika afya ya moyo ndani ya EAC unazuia maendeleo ya wataalamu na ubunifu wa ndani. Kuanzisha hospitali maalum ya moyo nchini Tanzania kutapunguza pengo hili kwa kutoa programu za mafunzo ya hali ya juu na kukuza kizazi kipya cha wataalamu wa kadiolojia na wafanyakazi wa afya.

Athari za kiuchumi za magonjwa ya moyo katika EAC zinaonyesha umuhimu wa kituo kama hicho. Magonjwa ya moyo siyo tu yanagharimu sana katika huduma za afya bali pia yanapunguza uzalishaji kutokana na ulemavu na vifo vya mapema. Benki ya Dunia inakadiriya kuwa mzigo wa kiuchumi wa magonjwa yasiyoambukiza, ikiwemo magonjwa ya moyo, unaweza kupunguza Pato la Taifa la nchi za kipato cha chini na cha kati kwa asilimia 7 katika miaka ishirini ijayo.

Mradi huu utatekelezwa na Wizara ya Elimu, Sayansi na Teknolojia na kusimamiwa na Chuo Kikuu cha Afya na Sayansi Shirikishi cha Muhimbili (MUHAS), na utatoa hospitali ya 600-kitanda ya kufundishia ya moyo iliyoko karibu na jengo la kisasa la Kituo cha Ubora cha Sayansi ya Moyo na Mishipa cha Afrika mashariki (EACECS) ili kuimarisha ushirikiano kati ya mafunzo na ujifunzaji.

Lengo la mradi ni kuboresha upatikanaji wa elimu ya tatu bora na nafuu katika sayansi za biomedical katika EAC; Kuboresha upatikanaji wa huduma bora na nafuu za matibabu maalum ya biomedical katika EAC kwa ajili ya kinga, matibabu na urekebishaji wa magonjwa ya moyo.

Maelezo Ya Mradi

Mradi uliopendekezwa utakuwepo kwenye eneo la MUHAS Mloganzila Mtaa, Kata ya Kwembe, Manispaa ya Ubungo, Dar es Salaam. Eneo hili liko umbali wa takriban kilomita 5 kutoka barabara ya Morogoro na lina ukubwa wa jumla wa ekari 1,286.17, katika pointi za Kijiografia Latitudi 6.491400 Kusini na Longitudi 39.033200 Mashariki. Eneo la mradi limepakana na barabara ya Mloganzila upande wa Magharibi, Mloganzila upande wa Kaskazini, na viwanja vilivyoendelezwa

upande wa Mashariki na Kituo cha Mafunzo ya Uzamili cha EACECS upande wa Kusini. MUHAS inaweza kufikiwa kupitia Barabara ya Mloganzila ikielekea Barabara ya Morogoro ambayo iko umbali wa takriban kilomita 4. Kituo muhimu cha kipimo ni Hospitali ya Muhimbili Mloganzila ambayo iko karibu na eneo la mradi.

Mradi huu utakuwa na jengo lenye sakafu tisa na mabawa manne ili kuruhusu uingizaji hewa wa kutosha na itakuwa na maeneo ya kazi yafuatayo: Eneo la dharura la kushughulikia kesi 10 za dharura kwa wakati, maegesho ya gari la wagonjwa, Huduma za nje ya mgonjwa za kushughulikia wagonjwa 60 kwa wakati, Huduma za Uchunguzi wa Moyo - Echo, X-ray, CT Scan, MRI, maabara kamili ya moyo, benki ya damu, Huduma za Angiografia za Moyo, Kitengo cha Matunzo ya Mahututi cha Coronary, maabara nne za Cath na vyumba vya upasuaji vinavyochanganya, na uwezekano wa vyumba vingine sita vya upasuaji wa moyo-kifua kufanya jumla ya vyumba 10 vya upasuaji. Eneo la utunzaji wa juu wa moyo/ Huduma za Utunzaji Intensive wa Moyo na vyumba vya wagonjwa (kawaida, binafsi na IPPM na VIP). Vitengo vingine ni pamoja na: Huduma za ukarimu kama ushauri wa maumbile, ushauri wa lishe, huduma za physiotherapy na urekebishaji, duka la dawa na viungo, kitengo cha ufuatiliaji wa dawa za matibabu, kitengo cha uhakikisho wa ubora, kitengo cha kati cha kuuawa/kutengenezwa kwa vifaa vya uhandisi wa biomedical kwa ajili ya matatizo ya haraka katika vifaa, (kazi kubwa zaidi itapatikana kutoka miradi mingine). Bwalo la utawala litakuwa na ofisi za utawala, fedha, usimamizi wa vifaa na usambazaji, ununuzi na ofisi za ustawi wa jamii, kisheria na kitengo cha uhusiano wa umma. Vichwa vya Idara na vichwa vya kampuni pamoja na vyumba vya semina vitapatikana ili kurahisisha ufundishaji na ujifunzaji.

Utafiti utakuwa sehemu muhimu ya majukumu ya hospitali, na hivyo vifaa kwa ajili ya ukusanyaji wa data (ikiwa ni pamoja na ukusanyaji wa sampuli), kuhifadhi data, na vipengele vyote kuu vya sayansi ya data vitapatikana. Databases zitakuwa nguzo ya kukuza algorithms za AI kwa ajili ya upangaji wa hatari na kusaidia vipimo vya utambuzi. CTH itakuwa na vifaa vya kukutana kwa kizazi kipya, jeni na tiba ya seli. Vifaa vya mbinu nyingine za utafiti, vitapatikana katika hospitali na maabara katika jengo la kazi za EACECS. Uhifadhi wa muda mrefu wa sampuli za kibaolojia za utafiti utafanyika kwenye hifadhi ya biorepository ya Chuo Kikuu.

Gharama ya uwekezaji wa mradi ni takribani dola za Kimarekani milioni 75 (75 million USD) ambayo inajumuisha gharama zote kwa uhandisi, ununuzi wa vifaa vya ujenzi na vifaa, pamoja na mchakato halisi wa ujenzi. Muda uliotarajiwa wa utekelezaji wa ujenzi wa mradi ni kama miezi 12 na zaidi na uendeshaji plus au minus miaka 50 kutegemea matengenezo sahihi na marekebisho ya miundombinu ya mradi.

Chanzo kikuu cha umeme kwenye eneo la mradi kitakuwa umeme kutoka ahirika la umeme la Tanzania (TANESCO). Kazi zote za ujenzi zinazohitaji umeme zitatekelezwa kwa kutumia umeme kwa ajili ya maeneo ya ujenzi. Mradi uliopendekezwa utatumia TANESCO kama chanzo cha nishati kwa ajili ya mwangaza katika awamu ya uendeshaji, lakini pia utachunguza njia nyingine kama vile paneli za sola.

Chanzo kikuu cha maji katika eneo la mradi kitakuwa kutoka mamlaka yamaji safi na maji taka Dar es Salaam (DAWASA). Hata hivyo, mashauriano na wadau yalionyesha kuwa maji hayatoshelezi katika eneo hilo. Uanzishaji wa hospitali ya kufundishia na utafiti wa moyo utaongeza zaidi shinikizo la upatikanaji wa maji. Kwa hiyo, mradi uliopendekezwa unapaswa kuzingatia uhifadhi wa maji kupitia uvunaji wa maji ya mvua katika awamu ya uendeshaji. Mkandarasi anapaswa kuzingatia hili na kutafuta chanzo mbadala cha maji wakati wa awamu ya ujenzi.

Utafiti wa Tathmini ya Athari kwa Mazingira na Jamii (TAM) umefanyika kulingana na miongozo ya Tathmini ya Athari za Mazingira na Ukaguzi (2005); na umeshughulikia Sheria ya Usimamizi wa Mazingira (EMA) Na. 20 ya 2004. Kanuni hizi zinampa mamlaka Baraza la Usimamizi na uhifadhi Mazingira (NEMC) kusimamia mchakato wa TAM, ambao hupelekea kupewa cheti cha TAM na Wizara inayohusika na Mazingira. Cheti hiki cha TAM ni mojawapo ya idhini za awali zinazohitajika kabla ya kuanza kwa mradi. Mradi huu utahitaji idhini hii kabla ya kutekelezwa. Aidha, TAM itazingatia Sera na Mfumo wa Sheria wa Benki ya Maendeleo ya Afrika (AFDB) na Mipango ya Usalama wa Mazingira na Jamii (E&S OSs).

Sera, Mfumo Wa Sheria na Taasisi

Tanzania imejitolea kufikia malengo endelevu ya maendeleo. Baadhi ya sera zinazohusiana na sekta ya elimu na ujenzi ni; Sera ya Mazingira ya Taifa (NEP) ya 1997; Sera ya Sekta ya Ujenzi (2003); Sera ya Ardhi ya Taifa (1995); Sera ya Maendeleo ya Makazi ya Binadamu ya Kitaifa (2000); Sera ya Kitaifa ya Jinsia (2002); Sera ya Nishati (1992); Sera ya Maji ya Taifa (URT, 2002); Sera ya Afya ya Taifa (URT, 2003); Mwelekeo wa Maendeleo ya Tanzania 2025; Sera ya Wanawake, Jinsia na Maendeleo (2000); na Mkakati wa Kitaifa wa Jinsia na Maendeleo (2005).

Sheria muhimu ni pamoja na; Sheria ya Usimamizi wa Mazingira Na. 20 ya (2004), Cap. 191; Sheria ya Ugavi wa Maji na Usafi wa Mazingira Na. 12 ya 2009; Sheria ya Ardhi, 1999; Sheria ya Upangaji wa Miji (2007); Afya ya Kazi na Usalama (2003); Sheria ya Ajira na Mahusiano ya Kazi Na. 6 ya 2004; Sheria ya Usajili wa Wahandisi na marekebisho yake ya 1997 na 2007; Sheria ya Usajili wa Makandarasi (1997); Sheria ya Wasanifu na Wachanganuzi wa Kiasi (1997); Sheria za Serikali za Mitaa (Mamlaka ya Mijini) (1999); Sheria ya Afya ya Umma ya 2009; Sheria ya Makosa ya Kijinsia (Mipango Maalum) (1998); Sheria ya Mtoto, 2009, Sheria ya Moto na Uokoaji (2007); Kanuni za Tathmini ya Athari za Mazingira na Ukaguzi (2005); Kanuni za Mazingira (Viwango vya Kudhibiti kelele na Msongamano, 2014; Kanuni za Usimamizi wa Mazingira (Viwango vya Ubora wa Hewa) 2007; Usimamizi wa Mazingira (Usimamizi wa Taka za Maji taka) Kanuni, 2009 GN. HAPANA. 263.

Mradi utatekelezwa na Wizara ya Elimu Sayansi na Teknolojia na kusimamiwa na MUHAS na kuhakikisha kuwa miundombinu, vifaa na taratibu zote muhimu zinapatikana kama inavyotakiwa.

Mazingira/Hali ya Msingi

Eneo la mradi unaopendekezwa lipo katika mkoa wa Dar es Salaam, Halmashauri ya Manispaa ya Ubungo, kata ya Kwembe katika mtaa wa Mloganzila, ambalo lina hali ya hewa ya kitropiki ya savanna yenye misimu tofauti ya mvua na kiangazi.

Ni muhimu kutambua kuwa eneo lililopendekezwa lipo ndani ya mkoa wa Dar es Salaam. Kwa hivyo, maelezo na data zilizotolewa kwa ajili ya eneo lililopendekezwa zinaakisi hali na mazingira maalum ya mkoa wa Dar es Salaam. Taarifa nyingi zilizoelzwa katika sehemu hii zilikusanywa kupitia uchunguzi na vipimo wakati wa utafiti wa eneo husika. Baadhi ya data zilipatikana kupitia mapitio ya maandishi.

Hali ya hewa ya eneo la mradi ni ya kitropiki ya pwani yenye joto kali, kasi ya upepo wa chini, unyevunyevu wa juu, na ukosefu wa msimu wa baridi. Msimu wa mvua nzito ni kutoka Machi hadi Mei na msimu wa kiangazi ni kutoka Juni hadi Oktoba. Pia, kuna msimu mfupi wa mvua kutoka Novemba hadi Desemba ukifuatiwa na msimu mfupi wa joto kali kutoka Januari hadi Februari. Eneo lililopendekezwa lina topografia yenye mwinuko kidogo, ambayo hutoa mifereji ya asili na kupunguza hatari ya maji kutuama. Udongo ni wa mchanga, ambao una sifa nzuri za mifereji ya maji. Uchunguzi kwa kuuangalia na mapitio ya fasihi yalithibitisha kuwa aina ya udongo ni udongo wa mchanga.

Sehemu kubwa ya eneo la mradi limefunikwa na mimea mchanganyiko ya nyasi, vichaka na miti midogomidogo. Mbali na ndege, hakuna wanyama wa umuhimu wa kiikolojia walioonekana katika eneo la mradi unaopendekezwa.

Chanzo kikuu cha maji kwa mradi unaopendekezwa ni mamlaka yam aji safi ya dar es salaam (DAWASA), pia miradi iliyopo jirani nae neo la mradi tarajiwa mfano jengo la kisasa la Kituo cha Uboru cha Sayansi ya Moyo na Mishipa cha Afrika mashariki (EACECS) na Hospitali ya Mloganzila na wakazi wa mtaa wa Mloganzila pia wanatumia maji kutoka DAWASA. Hata hivyo, mashauriano na wadau yalibainisha kuwa maji yanayotoka DAWASA hayatoshi katika eneo hilo. Hivyo basi uanzishwaji wa hospitali ya kufundishia na utafiti wa moyo utaongeza uhitaji wa maji. Kwa hivyo, mradi unaopendekezwa unapaswa kuzingatia njia mbadala ya upatikanaji maji kama vile uvunaji wa maji ya mvua hasa wakati wa awamu ya uendeshaji. Pia mkandarasi wa mradi anapaswa kuzingatia hili na kutafuta chanzo mbadala cha maji wakati wa awamu ya ujenzi.

Manispaa ya Ubungo inapatiwa umeme na shirika la umeme Tanzania (TANESCO) kupitia Gridi ya Taifa. Umeme hutumika zaidi kwa ajili ya taa kwa shughuli za kibiashara na za nyumbani. Majiko ya gesi, kuni na mkaa ndiyo vyanzo vikuu vya nishati kwa kupikia katika manispaa na vinachangia 77.8% ya matumizi yote ya nishati. Mradi unaopendekezwa utatumia umeme kutoka TANESCO kama chanzo cha nishati kwa ajili ya matumizi ya mradi wakati wa awamu ya uendeshaji, lakini pia utachunguza chaguo zingine kama vile paneli za jua.

Ushirikishaji wa Wadau na Mashauriano ya Umma

Mchakato wa utambuzi na ushirikishwaji wa wadau ulifanyika kwa kuzingatia Kanuni za Tathmini ya Athari za Mazingira na Ukaguzi za mwaka 2005 na marekebisho yake ya mwaka 2018, pamoja na Vigezo vya Uendeshaji vya Kimazingira na Kijamii vya AFDB (E&S OS10-"Ushirikishwaji wa Wadau na Utoaji wa Taarifa"). Mradi huu ulihusisha wadau mbalimbali kwa kuzingatia jinsia, watu wasiojiweza na wenye mahitaji maalum. Wadau hawa walishauriwa ili kupata maoni yao katika hatua zote za mradi. Aidha, mfumo uliwekwa ili kushughulikia malalamiko, Ukatili wa Kijinsia (GBV), Unyonyaji na Udhalilishaji wa Kijinsia (SEA) na Unyanyasaji wa Kijinsia (SH).

Ili kupata maoni na masuala yanayohusiana na mradi, wadau muhimu walioshirikishwa wakati wa utafiti wa TAM ni pamoja na:

- i. Wizara ya Elimu, Sayansi na Teknolojia (MoEST),
- ii. Wizara ya Afya, Maendeleo ya Jamii, Jinsia, Wazee na Watoto (MoHCDGEC),
- iii. Jumuiya ya Afrika Mashariki (EAC),
- iv. Tume ya Nguvu za Atomiki Tanzania (TAEC),
- v. Madaktari wa magonjwa ya moyo na magonjwa yasiyoambikiza
- vi. Halmashauri ya Manispaa ya Ubungo (Afisa Mazingira, Mpangaji Miji na Afisa Maendeleo ya Jamii),
- vii. Usalama na Afya Mahali pa Kazi (OSHA),
- viii. Shirika la Umeme Tanzania (TANESCO),
- ix. Jeshi la Zimamoto na Uokoaji (Kinondoni),
- x. Ofisi ya Kata ya Kwembe (WEO); na Kamati za Maendeleo za Mloganzila na Kwembe.

➤ *Muhtasari Wa Masuala Yaliyoibuliwa Na Wadau*

Yafuatayo ni Maoni/masuala na ushauri muhimu yaliyoibuliwa wakati wa mashauriano na wadau mbalimbali wa mradi:

- **Kuboresha Huduma za Matibabu ya Moyo:** Wadau wanatarajia kwamba hospitali itaboresha kwa kiasi kikubwa ubora wa huduma za matibabu ya moyo zinazopatikana katika eneo hilo. Kwa kushirikiana na madaktari bingwa wa moyo, watafiti, na waalimu wanaotambulika kimataifa, hospitali inaweza kutumia maarifa na mbinu za kisasa katika huduma za moyo. Hii itaboresha ubora wa huduma za matibabu zinazotolewa na kuhakikisha hospitali inabaki mstari wa mbele katika maendeleo ya kardiolojia kwa nchi yetu na ukanda wa Afrika mashariki kwa ujumla.
- **Fursa za Elimu na Mafunzo:** Sehemu ya kufundishia ya kituo hiki inatarajiwa kutoa fursa muhimu za kielimu kwa wanafunzi wa udaktari, madaktari wanaojifunza, na wataalamu wa afya, hivyo kukuza kizazi kipya cha madaktari bingwa wa moyo na watafiti. Ushirikiano na taasisi na vyuo vikuu vya kimataifa unaweza kutoa fursa za mafunzo kwa wataalamu wa matibabu wa ndani. Wataalamu wageni wanaweza kuendesha warsha, semina, na programu za mafunzo, kusaidia kuinua viwango vya ujuzi wa wafanyakazi na wanafunzi wa hospitali.
- **Makazi ya Wafanyakazi:** kupitia mashauriano na wadau wa mradi, wadau walisisitiza uwepo wa makazi maalum kwa wafanyakazi na watafiti karibu na eneo la mradi unaopendekezwa wakati wa awamu ya uendeshaji ili kuhakikisha ufanisi wa hospitali na madaktari katika utoaji wa huduma zilizokusudiwa.
- **Wafanyakazi Wakujitegemea:** Wadau walipendekeza kwamba hospitali ya kufundishia na utafiti wa moyo inapaswa kuwa na wataalamu wa matibabu wakwao wenyewe, badala ya kutegemea wale kutoka Hospitali ya Muhimbili il kusudia kuhakikisha uendeshaji mzuri wa mradi na kufanikisha malengo yake, kama vile kutoa huduma za ubora wa juu za moyo.
- **Vifaa Maalumu kwa Hospitali:** wadau wengi wamesisitiza kuwa uongozi uhakikishe uwepo wa rasilimali sahihi kwa hospitali hii, ikiwa ni pamoja na vifaa vya matibabu vya hali ya juu, teknolojia za kisasa, na vifaa maalum vya matibabu. Hii itaboresha uwezo wa hospitali na

kuboresha huduma kwa wagonjwa. Kuwa na wataalamu kutoka nje ya umoja wan chi za afrika mashariki (EAC) kutaiweka hospitali kwenye mbinu bora za kimataifa za usimamizi wa huduma za afya, protokali za huduma kwa wagonjwa, na ufanisi wa uendeshaji. Kutekeleza mbinu hizi kunaweza kuleta utendaji bora wa hospitali na matokeo bora kwa wagonjwa.

- **Uhifadhi wa Mazingira:** Wadau waliofanyiwa mashauriano kuhusu huu mradi wameukubali mradi lakini walisisitiza umuhimu wa kuhifadhi mazingira. Mwekezaji anashauriwa kutumia mbinu endelevu na salama wakati wa wote wa ujenzi na uendeshaji wa mradi.

Tathmini ya Athari Za Mazingira ya Kiuchumi-Kijamii

a) Hatari na athari za mazingira zilizotathminiwa zilizingatia:

- Miongozo ya Afya na Usalama wa Mazingira ya AFDB (EHSs);
- Athari zinazohusiana na mabadiliko ya hali ya hewa;
- Athari za tishio lolote la kulinda, kuhifadhi, kutunza na kurejesha makazi asilia na bioanuwai;
- Athari zinazohusiana na huduma za mfumo wa ikolojia na matumizi ya rasilimali asilia za kuishi; na zile zinazohusiana na muundo wa miundombinu ya kimwili.

b) Hatari na athari za kiuchumi-kijamii zilizotathminiwa zilizingatia:

- Vitisho kwa usalama wa binadamu kupitia uhalifu au vurugu; na
- Hatari kwamba athari za mradi zitaangukia kwa usawa kwa watu binafsi na makundi ambayo kutokana na hali zao maalum, yanaweza kuwa katika hali ya kudhulumiwa au kuathirika.

➤ *Athari Zilizobainishwa Kwa Mazingira Na Jamii*

Ujenzi and Uendeshwaji wa mradi huu unatarajiwa kusababisha athari mbalimbali za kimazingira na kijamii kwa wadau mbalimbali, zinaweza kuwa hasi au chanya. Japokuwa mradi unaathari nyingi chana zitakazo tokana na mradi huu kama zilivyoainisha hapo chini:

Athari chanya za mradi kwa mazingira na jamii

- i. Fursa za ajira
- ii. Upatikanaji wa Huduma Bora za Moyo
- iii. Kupunguza gharama za matibabu kwa wagonjwa wa moyo
- iv. Kupunguza gharama za elimu kwa wanafunzi wanaosomea masomo ya moyo
- v. Kuendeleza Rasilimali Watu Wenye Ujuzi wa Juu
- vi. Kupungua kwa wa magonjwa moyo na magonjwa yasiyo ambukizwa na Vifo
- vii. Kuhamasisha utalii wa kitiba
- viii. Kuiweka nchi kama kituo cha kimatibabu cha afrika mashariki
- ix. Kuzalisha Fursa za Biashara
- x. Kichocheo cha Uchumi
- xi. Kuongeza mapato ya serikali
- xii. Kuongeza thamani ya mali za jirani

Athari hasi za mradi kwa mazingira na jamii

- i. Kuongezeka kwa uzalishaji wa vumbi.
- ii. Kusababisha usumbufu kwa ardhi\udongo.
- iii. Hatari za usalama na afya kazini.
- iv. Uambukizaji wa magonjwa yanayoenezwa na vijidudu na magonjwa ya kuambukiza.
- v. Athari zinazohusiana na uambukizaji wa magonjwa ya zinaa.
- vi. Kelele kutokana na harakati na uendeshaji wa mashine za ujenzi.
- vii. kubadilisha muonekano wa eneo husika kwa jamii inayozunguka
- viii. Uchafuzi wa mazingira kutokana na ongezeko la uzalishawaji taka hasa wakati wa ujenzi.
- ix. Kuongezeka kwa idadi ya watu.
- x. Hatari za moto.
- xi. kesi zinazohusiana na ukandamizaji wa kijinsia (GBV), usawa, ubakaji na unyanyasaji wa kijinsia.

Mpango Wa Usimamizi Wa Mazingira na Kijamii

Mpango wa Usimamizi wa Mazingira na Jamii (ESMP) ni muhimu sana katika miradi inayopendekezwa na umeelezewa vizuri katika ripoti ya TAM. Lengo lake ni kuhakikisha kuwa mradi unatekelezwa kwa njia endelevu na kudhibiti athari za mazingira na jamii. ESMP hutoa mwongozo wa kufuatilia na kupunguza athari hizo. Pia, inahakikisha kuwa sheria na kanuni za mazingira na jamii zinazingatiwa. Kwa kuongezea, ESMP inalenga kuongeza ufahamu na uwajibikaji kwa wadau wote wanaohusika katika mradi. Utekelezaji wa mpango huu unahitaji ushirikiano wa hali ya juu kutoka kwa wadau wote. Mpango huu huchapishwa na kutolewa kwa wadau wote husika ili waweze kuelewa na kushiriki kikamilifu katika utekelezaji wa ESMP.

Mpango wa Usimamizi wa Mazingira na Kijamii (ESMP) pia unaonyesha ratiba ya utekelezaji wa mikakati/hatua zilizopendekezwa za kupunguza athari kwa mazingira na kijamii, pamoja na mipango ya shughuli za ufuatiliaji wa muda mrefu. ESMP pia inajumuisha gharama za mazingira zinazohitajika kutekeleza hatua zilizopendekezwa za kupunguza athari.

Mpango Wa Ufuatiliaji Wa Mazingira na Kijamii (Esmop)

Mpango wa Ufuatiliaji wa Mazingira na Kijamii (ESMoP) utatekelezwa katika awamu zote za mradi. Ufuatiliaji wa vigezo vya mazingira na kijamii wakati wa awamu ya ujenzi utafanywa na timu ya uhifadhi na usimamiaji wa Mazingira na Kijamii ya Mkandarasi, chini ya usimamizi wa timu ya uhifadhi na usimamiaji wa Mazingira na Kijamii ya MUHAS.

Uchambuzi Wa Gharama na Manufaa

Uchambuzi wa Gharama na Manufaa (CBA) katika Tathmini ya Athari za Mazingira na Kijamii (TAM) kwa hospitali ya kufundishia na utafiti wa magonjwa ya moyo unalenga kutathmini uwezekano wa kiuchumi wa mradi kwa kulinganisha gharama zinazotarajiwa na manufaa yanayotarajiwa. Uchambuzi huu husaidia wadau kuelewa athari za kifedha na mchango wa thamani wa mradi kwa jamii na eneo kwa ujumla.

CBA inaonyesha kuwa manufaa ya kuanzisha hospitali ya kufundishia na utafiti wa magonjwa ya moyo yanazidi gharama. Ingawa matumizi ya awali ya mtaji na uendeshaji ni makubwa, faida za



muda mrefu katika ubora wa huduma za afya, maendeleo ya elimu, ukuaji wa kiuchumi, na ustawi wa kijamii zinatoa hoja nzito kwa utekelezaji wa mradi. Mchakato wa TAM unahakikisha kuwa manufaa haya yanathaminiwa wakati wa kupunguza athari hasi kwa mazingira na jamii.

Hitimisho Na Mapendekezo ya Mradi

Matokeo ya utafiti wa TAM yanaonyesha kwamba ingawa kuna athari chache hasi za mazingira za mradi, mradi utakuwa na manufaa makubwa kwa MUHAS, jamii, Tanzania na Afrika mashariki kwa ujumla. Athari hasi zinazohusiana, kwa kiasi kikubwa zimepunguzwa kupitia muundo mzuri wa uhandisi na taratibu za ujenzi zinazotarajiwa. Hatua maalum za kupunguza athari zimependekezewa katika ripoti ya TAM ili kufidia baadhi ya athari hasi. Kutekeleza hatua hizi za kupunguza athari kutaongeza utunzaji wa mazingira wa mradi.

Washauri waelekezi wa mradi huu wanapendekeza mwekezaji apatiwe cheti cha TAM kwa sharti la kutekeleza mkakati ya udhibiti wa athari za kimazingira ulioainishwa kwenye ripoti ya TAM. Pia mwekezaji anahimizwa kushirikiana kwa karibu na wataalam wa mazingira, Baraza la Taifa la Mazingira, pamoja na wadau mbali mbali ili kuhakikisha maswala yote yaliyoibuliwa na utafiti huu yamepewa uzito unaostahili

REGISTERED ENVIRONMENTAL EXPERTS STUDY TEAM

| Name | Position | Signature |
|----------------------|---|---|
| Ms. Kamariya Mohamed | Environmental Scientist/EIA & EA Expert-Team Leader |  |
| Ms. Regina Kilima | Environmental Scientist/EIA & EA Expert |  |

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TABLE OF CONTENTS

| | |
|---|-----------|
| EXECUTIVE SUMMARY | I |
| MUHTASARI WA UTENDAJI..... | XXXIV |
| REGISTERED ENVIRONMENTAL EXPERTS STUDY TEAM | XXXII |
| TABLE OF CONTENTS..... | XXXIII |
| LIST OF TABLES | XXXVIII |
| LIST OF FIGURES..... | XXXIX |
| ACRONYMS AND ABBREVIATIONS | XL |
| ACKNOWLEDGEMENT | XLI |
| CHAPTER ONE | 1 |
| INTRODUCTION..... | 1 |
| 1.1 BACKGROUND | 1 |
| 1.1.1 Developer..... | 1 |
| 1.1.2 The East Africa’s Centres of Excellence in Skills and Tertiary Education in Biomedical Sciences Project Phase II - 2022-2026..... | 1 |
| 1.1.3 Establishment of the Cardiac Teaching Hospital..... | 2 |
| 1.2 OBJECTIVE OF THE PROJECT..... | 4 |
| 1.3 PROJECT JUSTIFICATION | 4 |
| 1.4 PROJECT BENEFICIARIES | 5 |
| 1.5 OBJECTIVES OF THIS ESIA STUDY..... | 5 |
| 1.6 RATIONALE OF THE ESIA | 6 |
| 1.7 SCOPE OF WORK | 6 |
| 1.8 GENERAL METHODOLOGY | 6 |
| 1.8.1 Study Team | 6 |
| 1.8.2 Scoping Exercise..... | 7 |
| 1.8.3 Desk Work Study..... | 7 |
| 1.8.4 Field Survey..... | 8 |
| 1.8.5 Onsite Measurements..... | 8 |
| 1.8.6 Stakeholders consultations | 9 |
| 1.8.7 Project Impact Assessment | 10 |
| 1.9 ESIA REPORT STRUCTURE | 11 |
| CHAPTER TWO | 12 |
| PROJECT DESCRIPTION | 12 |
| 2.1 NATURE OF THE PROJECT | 12 |
| 2.1.1 Objective of the project..... | 12 |
| 2.2 LOCATION AND ACCESSIBILITY..... | 12 |
| 2.3 SITE DESCRIPTION AND ADJACENT DEVELOPMENT..... | 16 |
| 2.3.1 Land Use and Ownership | 16 |
| 2.3.2 Project Investment cost and funding | 16 |
| 2.3.3 Project Life Span | 16 |
| 2.4 PROJECT COMPONENTS & DESIGN | 16 |
| 2.4.1 Project Components..... | 16 |
| 2.4.2 Project Design | 18 |
| 2.5 PROJECT ACTIVITIES..... | 19 |
| 2.5.1 Pre-construction phase..... | 19 |

| | |
|---|-----------|
| 2.5.2 Construction phase..... | 20 |
| 2.5.3 Operation phase..... | 23 |
| 2.5.4 Decommissioning phase | 23 |
| 2.6 WASTE MANAGEMENT | 25 |
| 2.6.1 Mobilization/Construction Phase..... | 25 |
| 2.6.2 Operational phase | 28 |
| 2.6.4 Demobilization phase..... | 35 |
| 2.7 PROJECT UTILITIES | 35 |
| 2.7.1 Energy and fuel sources | 35 |
| 2.7.2 Water Demand | 36 |
| 2.8 HEALTH, SAFETY, SECURITY AND ENVIRONMENT (HSSE) MEASURES | 36 |
| CHAPTER THREE..... | 37 |
| POLICY, ADMINISTRATIVE AND LEGAL FRAMEWORK..... | 37 |
| 3.1 ENVIRONMENTAL MANAGEMENT REGULATION IN TANZANIA..... | 37 |
| 3.2 NATIONAL POLICIES | 37 |
| 3.2.1 National Environmental Policy (NEP) of 2021..... | 37 |
| 3.2.2 EAC Medicine and Health Technologies Policy of 2018 | 37 |
| 3.2.3 Education and Training Policy of 2014..... | 38 |
| 3.2.4 The National Health Policy, 2017..... | 38 |
| 3.2.5 Construction Industry Policy (2003) | 39 |
| 3.2.6 National Land Policy (1995)..... | 39 |
| 3.2.7 The National Water Policy (URT, 2002) | 39 |
| 3.2.8 The National Employment Policy (NEP) 2008 | 40 |
| 3.2.9 The Community Development Policy (CDP), 1996..... | 40 |
| 3.2.10 The Women, Gender and Development Policy (2000) | 40 |
| 3.2.11 The National Strategy for Gender and Development (2005)..... | 41 |
| 3.2.12 National Policy on HIV/AIDS (2001) | 41 |
| 3.2.13 Energy Policy (2015)..... | 41 |
| 3.3 LEGAL FRAMEWORK | 41 |
| 3.3.1 Environmental Management Act No. 20 of (2004), Cap. 191..... | 41 |
| 3.3.2 Public Health Act (2009) | 42 |
| 3.3.3 The Medical Act, Dental and Allied Health Professionals Act, CAP.152..... | 43 |
| 3.3.4 The Pharmacy Act of 2011, CAP 311..... | 43 |
| 3.3.5 The Water Supply and Sanitation Act No. 12 of 2019..... | 43 |
| 3.3.6 Occupational Health and Safety Act (2003)..... | 44 |
| 3.3.7 Engineers Registration Act and its Amendments 1997 and 2007 | 44 |
| 3.3.8 The Contractors Registration Act (1997)..... | 44 |
| 3.3.9 The Local Government Laws (Urban Authorities) Act (1999)..... | 44 |
| 3.3.11 Fire and Rescue Act (2007)..... | 45 |
| 3.3.12 The Workers Compensation Act no 20 of 2008..... | 45 |
| 3.3.13 The HIV and AIDS (Prevention and Control) Act of 2008 | 45 |
| 3.3.14 The Child Act, 2009..... | 46 |
| 3.3.15 Sexual Offences (Special Provisions) Act (1998) | 46 |
| 3.3.16 The Prevention and Combating of Corruption Act (2007) | 46 |
| 3.3.17 National Social Security Fund Act No.153 of 2005 Cap. 50 R.E. 2015 | 46 |
| 3.3.18 The Land Act, CAP 113 R.E 2019..... | 47 |
| 3.3.19 The Urban Planning Act (2007) | 47 |
| 3.3.20 Employment and Labour Relations Act Cap 366 R.E 2020 GNNO 140 | 47 |
| 3.4 RELEVANT REGULATIONS AND GUIDELINES | 47 |
| 3.4.1 EAC Treaty of 2007..... | 47 |
| 3.4.2 EAC Regional Health Investments Framework (2018-2028) | 48 |

| | | |
|---|---|-----------|
| 3.4.3 | <i>EAC Health Protocol of 2016</i> | 48 |
| 3.4.4 | <i>Environmental Impact Assessment and Auditing Regulations, 2005 (as amended in 2018)</i> | 48 |
| 3.4.5 | <i>The Environmental Management (Solid waste Management) Regulation, 2009 as amended in 2016</i> 49 | |
| 3.4.6 | <i>The Environmental Management (Air Quality Standards) Regulations, 2007</i> | 49 |
| 3.4.7 | <i>The Environmental Management (Standards for Control of Noise and Vibration Pollution) Regulations, 2015</i> | 49 |
| 3.4.8 | <i>The Environmental Management (Soil Quality Standards) Regulations, 2007</i> | 50 |
| 3.4.9 | <i>Environmental Management (Water Quality Standards) Regulations, 2019</i> | 51 |
| 3.4.10 | <i>Environmental Management (Hazardous Waste Control and Management) Regulations, 2021</i> .. | 51 |
| 3.4.11 | <i>Urban Planning (Planning and Space Standards) Regulations, 2018</i> | 52 |
| 3.4.12 | <i>The Environmental Management (Fees and Charges) Regulations, 2021</i> | 52 |
| 3.4.13 | <i>The Environmental Management (Registration and Practice of Experts) Regulations, 2021 G.N 267</i> 52 | |
| | <i>These Regulations apply to registration, categorization, practicing and conduct of environmental experts and firms of environmental experts registered and certified under these Regulations to conduct-</i> | 52 |
| | a) <i>environmental impact assessment;</i> | 52 |
| | b) <i>environmental audit; or</i> | 52 |
| | c) <i>any other environmental study that may be required to be undertaken under the Act or its Regulations.</i> 52 | |
| 3.5 | THE BANK'S INTEGRATED SAFEGUARDS SYSTEMS (ISS)..... | 53 |
| 3.5.1 | <i>AFDB Environmental and Social Operating Safeguards (E&S OS)</i> | 53 |
| 3.5.2 | <i>AFDB Environmental and Social Operational Safeguards Applicable to the project</i> | 54 |
| 3.6 | INSTITUTIONAL FRAMEWORK FOR THE MANAGEMENT OF ENVIRONMENT..... | 59 |
| 3.6.1 | <i>Overall Management Responsibility at National Level</i> | 59 |
| 3.6.2 | <i>Capacity Assessment of public Entities to ESIA enforcement and oversight</i> | 62 |
| 3.7 | OVERALL MANAGEMENT RESPONSIBILITY AT PROJECT LEVEL..... | 62 |
| 3.7.1 | <i>Funding Institutions (GoT and AFDB)</i> | 62 |
| 3.7.2 | <i>PIE-MUHAS</i> | 63 |
| 3.7.3 | <i>The Contractor</i> | 64 |
| 3.7.4 | <i>The Consultant</i> | 65 |
| 3.8 | INSTITUTIONAL CAPACITY IN IMPLEMENTING ESIA..... | 65 |
| CHAPTER FOUR | | 67 |
| BASELINE ENVIRONMENT AND SOCIAL CONDITIONS | | 67 |
| 4.1 | GEOPHYSICAL ENVIRONMENT..... | 67 |
| 4.1.1 | <i>Climate</i> | 67 |
| 4.1.2 | <i>Topography and Soil</i> | 68 |
| 4.1.3 | <i>Ambient Air Quality</i> | 68 |
| 4.1.4 | <i>Dust</i> | 70 |
| 4.1.5 | <i>Noise levels</i> | 71 |
| 4.2 | BIOLOGICAL FEATURES..... | 72 |
| 4.3 | SOCIO-ECONOMIC ENVIRONMENT..... | 73 |
| 4.3.1 | <i>Administrative Division</i> | 73 |
| 4.3.2 | <i>Population</i> | 73 |
| 4.3.3 | <i>Education Services</i> | 74 |
| 4.3.4 | <i>Health Services</i> | 74 |
| 4.3.5 | <i>Safe and Clean Water Services</i> | 74 |
| 4.3.6 | <i>Energy</i> | 74 |
| 4.3.7 | <i>Culture and Ethnicity</i> | 75 |
| 4.3.8 | <i>Waste Management</i> | 75 |
| 4.4 | GENDER ISSUES..... | 76 |

| | |
|---|------------|
| CHAPTER FIVE | 77 |
| 5.0 STAKEHOLDER CONSULTATIONS AND PUBLIC INVOLVEMENT | 77 |
| 5.1 INTRODUCTION | 77 |
| 5.2 STAKEHOLDERS CONSULTED | 77 |
| 5.3 SUMMARY OF ISSUES RAISED BY STAKEHOLDERS | 78 |
| CHAPTER SIX | 87 |
| 6.0 ASSESSMENT OF IMPACTS AND IDENTIFICATION OF ALTERNATIVES | 87 |
| 6.1 IMPACT IDENTIFICATION | 87 |
| 6.1.1 <i>Sources of Impacts</i> | 87 |
| 6.1.2 <i>Impacts associated with preliminary/mobilization phase</i> | 87 |
| 6.1.3 <i>Impacts associated with construction phase</i> | 88 |
| 6.1.4 <i>Impacts associated with Demobilization Phase</i> | 88 |
| 6.1.5 <i>Impacts Associated with Operation Phase</i> | 88 |
| 6.2 IMPACT EVALUTION | 89 |
| 6.2.1 <i>Impact Prediction</i> | 89 |
| 6.3 DETAILED ASSESSMENT OF THE IDENTIFIED POTENTIAL POSITIVE AND NEGATIVE ENVIRONMENTAL AND SOCIAL IMPACTS | 95 |
| 6.3.1 <i>Potential Impacts During Preliminary/Mobilization Phase</i> | 95 |
| 6.3.2 <i>Potential Impacts During Construction Phase</i> | 96 |
| 6.3.3 <i>Potential Impacts During Demobilization Phase</i> | 103 |
| 6.3.4 <i>Potential Impacts During Operational Phase</i> | 103 |
| 6.4 CUMULATIVE IMPACTS | 111 |
| 6.5 SUMMARY OF SIGNIFICANCE IMPACTS BEFORE APPLICATION OF MITIGATION MEASURES | 112 |
| 6.6 PROJECT ALTERNATIVES | 115 |
| 6.6.1 <i>No project alternative</i> | 115 |
| 6.6.2 <i>Energy Alternative</i> | 115 |
| 6.6.3 <i>Technology and Building Materials Alternatives</i> | 116 |
| 6.6.4 <i>Collection, Treatment, and Disposal of Sewage</i> | 116 |
| 6.6.5 <i>Design Alternative</i> | 117 |
| CHAPTER SEVEN | 118 |
| 7.0 ENHANCEMENT AND MITIGATION MEASURES | 118 |
| 7.2 ENHANCEMENT MEASURES FOR POSITIVE IMPACTS | 118 |
| 7.3 MITIGATION MEASURES FOR NEGATIVE IMPACTS | 120 |
| 7.3.1 <i>During Preliminary/Mobilization Phase</i> | 120 |
| 7.3.2 <i>During Construction Phase</i> | 121 |
| 7.3.3 <i>During Demobilization Phase</i> | 128 |
| 7.3.4 <i>During Operation Phase</i> | 128 |
| 7.4 PROJECT GRIEVANCES REDRESS MECHANISM (GRM) | 132 |
| CHAPTER EIGHT | 133 |
| 8.0 ENVIRONMENTAL AND SOCIAL IMPACT MANAGEMENT PLAN | 133 |
| 8.1 IMPACT MANAGEMENT PLAN | 133 |
| 8.2 IMPLEMENTATION OF THE MANAGEMENT PLAN | 133 |
| 8.3 ENVIRONMENTAL AND SOCIAL COST | 133 |
| 8.4 ESMP IMPLEMENTATION INDICATORS TO MONITOR | 133 |

| | |
|---|------------|
| CHAPTER NINE | 154 |
| 9.0 ENVIRONMENTAL AND SOCIAL MONITORING PLAN | 154 |
| CHAPTER TEN | 158 |
| 10.0 COST BENEFIT ANALYSIS | 158 |
| 10.1 INTRODUCTION | 158 |
| 10.2 SOCIO-ECONOMIC AND ENVIRONMENTAL COST BENEFIT ANALYSIS | 158 |
| 10.3 BENEFITS..... | 159 |
| 10.3.1 <i>Socio-Economic Benefits</i> | 159 |
| 10.3.2 <i>Environmental Benefits</i> | 159 |
| 10.3.3 <i>Summary of Benefits</i> | 159 |
| 10.4 COSTS..... | 159 |
| 10.4.1 <i>Socio-Economic and Environmental Costs</i> | 159 |
| CHAPTER ELEVEN | 161 |
| 11.0 DECOMMISSIONING PLAN | 161 |
| 11.1 INTRODUCTION | 161 |
| 11.2 PRELIMINARY DECOMMISSIONING PLAN | 161 |
| 11.2.1 <i>Type of buildings to be demolished</i> | 161 |
| 11.2.2 <i>Demolition Methods</i> | 161 |
| 11.2.3 <i>Materials Handling</i> | 162 |
| 11.2.4 <i>Proposed Sequence</i> | 162 |
| 11.2.5 <i>Protective Measures</i> | 162 |
| 11.2.6 <i>Traffic Management</i> | 163 |
| 11.2.7 <i>Occupational Health and Safety</i> | 163 |
| 11.2.8 <i>Environmental Management Plan</i> | 163 |
| 11.2.9 <i>Potential Impacts and Mitigation Measures</i> | 163 |
| CHAPTER TWELVE | 164 |
| 12.0 CONCLUSIONS AND RECOMMENDATIONS | 164 |
| 12.1 SUMMARY | 164 |
| 12.2 CONCLUSIONS | 167 |
| BIBLIOGRAPHY | 168 |
| APPENDICES | 170 |
| APPENDIX I: TERMS OF REFERENCE | 171 |
| APPENDIX II: TITLE DEED | 178 |
| APPENDIX III: LIST OF CONSULTED STAKEHOLDERS | 182 |
| APPENDIX IV: MEETING MINUTES | 190 |
| APPENDIX V: ARCHITECTURAL DRAWINGS | 193 |
| APPENDIX VI: NEMC’S LETTER APPROVING TOR | 213 |

LIST OF TABLES

| | |
|---|-----|
| Table 1. 1: Study Team..... | 7 |
| Table 2. 1: The Project design and its illustration..... | 17 |
| Table 2. 2: Description of project activities and issues during Construction phase..... | 20 |
| Table 2. 3: Types and sources of project requirements during the construction phase..... | 22 |
| Table 2. 4: Types and sources of project requirements during the operation phase | 23 |
| Table 2. 5: Description of project activities and issues during decommission phase | 24 |
| Table 2. 6: Types, amounts and sources of project requirements during demobilization phase | 24 |
| Table 2. 7: Types, amounts and treatment/disposal of wastes during the construction phase.. | 26 |
| Table 2. 8: Colour coding for different HCW categories..... | 31 |
| Table 2. 9: Types, amounts and treatment/disposal of wastes during the operation phase | 33 |
| Table 2. 10: Types, amounts and treatment/disposal of wastes during the demobilization phase | 35 |
| Table 3. 1: Maximum Permissible Noise Levels for General Environment..... | 50 |
| Table 3. 2: The AFDB Environmental and Social Operating Safeguards (E&S OS) Applicable to the Project..... | 55 |
| Table 3. 3: Lists key Institutions relevant to the ESIA Process..... | 59 |
| Table 4. 1: Sampling points..... | 69 |
| Table 4. 2: Average ambient pollutant gases recorded points..... | 69 |
| Table 4. 3: Average ambient particulate matter values measured onsite..... | 70 |
| Table 4. 4: Noise levels recorded at the project site | 71 |
| Table 5. 1: Stakeholders Identified and Consultation Programme..... | 78 |
| Table 5. 2: Issues Response Table..... | 81 |
| Table 6. 1: Impact Characteristic Terminology | 90 |
| Table 6. 2: Designation Definitions | 91 |
| Table 6. 3: Definitions for Likelihood Designations (only used for unplanned events)..... | 92 |
| Table 6. 4: Impact Significances | 94 |
| Table 6. 5: Operations and/or hazards and potential OH&S effects | 99 |
| Table 6. 6: Summary Significance of impacts before application of Mitigation Measures | 112 |
| Table 6. 7: Impact Correlation Matrix for the Proposed Cardiac Teaching and Research Hospital Project..... | 114 |
| Table 8. 1: Environmental and Social Impact Management Plan for the Proposed Cardiac Teaching and Research Hospital Project..... | 135 |
| Table 9. 1: Social and Environmental Monitoring Plan for the Proposed Cardiac Teaching and Research Hospital Project | 155 |

LIST OF FIGURES

Figure 2. 1:Map of Tanzania and Dar es Salaam showing project area (Source: NBS, 2018)..... 13

Figure 2. 2: Map of Dar es salaam and Ubungo Municipality showing Project areaSource: NBS, 2018 14

Figure 2. 3: Map of Dar es Salaam Region , Kwembe Ward, Mloganzila Mtaa and Project area. 15

Figure 5. 1: Stakeholders Consultation Meetings..... 80

ACRONYMS AND ABBREVIATIONS

| | |
|---------|---|
| AFDB | African Development Bank |
| CTH | Cardiac Teaching Hospital |
| DAWASA | Dar es salaam Water and Sewerage Authority |
| EAC | East Africa Community |
| EACECS | East Africa Centre of Excellence for Cardiovascular Science |
| GBV | Gender Based Violence |
| HCW | Health Care Waste |
| HVAC | Heating, Ventilation and Air conditioning |
| MEO | Mtaa Executive Officer |
| MSDS | Material Safety Data Sheet |
| MUHAS | Muhimbili University of Health and Allied Sciences |
| NEMC | National Environmental Management Council |
| OSHA | Occupational Safety and Health Authority |
| PCU | Project Coordination Unit |
| PEA | Preliminary Environmental Assessment |
| PPA | Project Preparation Advance |
| PPE | Personal Protective Equipment |
| SEA | Strategic Environmental Assessment |
| TAC | Technical Advisory Committee |
| TACAIDS | Tanzania Commission for AIDS |
| TANESCO | Tanzania Electricity Supply Company Limited |
| TANROAD | Tanzania National Roads Agency |
| TARURA | Tanzania Rural and Urban Roads |
| TGNP | Tanzania Gender Network Program |
| TMA | Tanzania Meteorological Authority |
| ToR | Terms of Reference |
| TPO | Town Planning Officer |
| UDSM | University of Dar Es Salaam |
| URT | United Republic of Tanzania |
| VAT | Value Added Tax |
| WEO | Ward Executive Officer |

ACKNOWLEDGEMENT

The Proponent Muhimbili University of Health and Allied Science (MUHAS) and consultants are indebted to all those who were met and devoted their time to have discussions or meetings with them. Since the number is quite big it will be difficult to mentioned all of them. Moreover, we are grateful to Ubungo Municipal Council, Occupational Safety and Health (OSHA), Fire and Rescue Forces, Dar es Salaam Water Supply and Sanitation Authority (DAWASA), Tanzania Electric Supply Company Limited (TANESCO) during the consultation period, they were instrumental in providing valuable information. We also take the opportunity to thank the Kwembe Ward Office, Mloganzila Kwembe Mtaa Development Committees who devoted their time to answer a good number of questions and provide precious data and information. We sincerely dedicate our appreciation to all of them and say thank you very much.

God bless you!

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

1.1.1 Developer

Muhimbili University of Health and Allied Sciences (MUHAS) came into being University by His Excellence the President of the United Republic of Tanzania in 2007. MUHAS was conceived in 1963 when the then Dar es Salaam College of Medicine was established. In 1968 the school became a Faculty of Medicine and was upgraded to a Muhimbili University College of Health Sciences (MUCHS), a constituent college of the University of Dar es Salaam in 1991 with the aim of nurturing it to a full-fledged university and was later merged with the Muhimbili hospital to create the Muhimbili Medical Centre (MMC). Over the years MUCHS made significant achievements in terms of increased student enrollment and development of several new academic programs. The Parliament Act No 9 of 1991 that established MUCHS was repealed in 2005 through the universities Act no 7 of 2005. Subsequently, in 2007 Article 1 of the Charter of Incorporation established MUHAS; in line with the Universities act no 7 of 2005.

MUHAS has grown from a small Unit with an enrolment of 10 students and a single program, Doctor of Medicine (MD) to an institution with an enrolment of 4,200 students with a total of 91 accredited academic programs, which includes 10 diploma programs, 14 undergraduate programs and 67 postgraduate programs. It has developed from a Faculty of Medicine, which housed all current academic units as departments to an institution with 5 Schools, 2 Institutes and 12 Directorates.

1.1.2 The East Africa's Centres of Excellence in Skills and Tertiary Education in Biomedical Sciences Project Phase II - 2022-2026

The East Africa's Centres of Excellence in Skills and Tertiary Education in Biomedical Sciences Project Phase II comes after the completion of phase I (2014-2023) which involved establishment of the Centre's support facilities to address critical skill gaps and deficiencies in the biomedical sciences sector across the East African region. The primary problems leading to the project's initiation included a significant shortage of adequately trained healthcare professionals, which hindered the region's ability to provide quality healthcare services, especially in specialized fields such as biomedical sciences. Existing educational institutions lacked the capacity, infrastructure, and resources to deliver high-quality tertiary education and specialized training, resulting in a mismatch between the skills of graduates and the healthcare sector's needs. Additionally, the overall health outcomes in East Africa were suboptimal, with high prevalence rates of infectious diseases, non-communicable diseases, and other health challenges exacerbated by the lack of a robust healthcare workforce. The region also faced limited capacity for research and innovation in biomedical sciences, hindering its ability to develop and implement effective health interventions and treatments. EAC member Countries have no any Educational institute or Hospital which is specialized in cardiac diseases.

In response to the aforementioned burden and challenges, the East African Community (EAC) partner states put forth initiatives to combat non-communicable diseases by establishing six East Africa centres of excellence for Skills and Tertiary Education in biomedical sciences across the region way back in 2014/2015 primarily known as Phase I. The main aim of the project is to contribute to the development of highly skilled workforce in biomedical sciences to meet the East African Community immediate labor market needs in various specialties. The project has two phases: Phase One focused on the establishment of a network of Centres of Excellence (CoEs) in Nephrology and Urology in Kenya; Oncology in Uganda; Cardiovascular Sciences (CVS) in Tanzania; Biomedical Engineering and eHealth in Rwanda and Nutrition in Burundi. South Sudan and Democratic Republic of Congo are expected to join in Phase Two of the project.

Four centres were funded by a soft loan from the African Development Bank (AfDB). One of these centres is the East Africa Centre of Excellence for Cardiovascular Sciences (EACoECVS) in Tanzania. However, due to insufficient funding at the beginning, a fully-fledged centre could not be established and therefore implementation Phase I of the project was limited by the available funds with a hope that what was not attained in Phase I will be addressed in Phase II.

Therefore, Phase II is planned to enable full function of the Centre by addressing the gaps that were observed during implementation of phase I or omissions due to budgetary constraints, including establishment of a state-of-the-art cardiac teaching hospital. The proposed budget for phase II is 75 million US dollars and it is a five-year project from 2025 to 2030.

The main aim of the project is to contribute to the development of highly skilled workforce in biomedical sciences to meet the East African Community immediate labor market needs in various specialties. The project outcomes include Improved access to quality and affordable specialized tertiary education in biomedical sciences in the EAC and improved access to timely, affordable and quality specialized biomedical services in the EAC at various levels of prevention that will eventually lead to improved health outcomes and promote medical tourism within the region and hence contribute to the improvement of the economy

1.1.3 Establishment of the Cardiac Teaching Hospital

Globally, cardiovascular diseases account for 17 million deaths annually. According to the WHO 2022 report, approximately 37% of premature deaths in East Africa are caused by cardiovascular diseases. Most of these deaths could have been averted by primary prevention or instituting lifesaving procedures that are not necessarily expensive provided skilled human resource and the required facilities are in place. However, Africa has the lowest cardiac centres at 1 to 33 million population compared to Asia: 1 to 16 million, Europe: 1 to 1 million and USA: 1 to 12 hundred thousand people. East Africa has 12 cardiac units/centres in a population of approximately 200 million. Tanzania, the partner state hosting the East African Centre of Excellence for Cardiovascular Sciences, has only 2 cardiac centres in a population of 60 million.

In terms of human resource, Africa has a severe shortage of cardiac specialists, for example a cardiac surgeon (for adults): population ratio is 1:25 million population in Sub Saharan Africa, while the global ratio for the same is 1.6 (range 0-181) per 1 million population.

The Ministry of Health through MUHAS intends to construct a teaching Cardiac Hospital in Tanzania to; Improve access to quality and affordable specialized tertiary education in biomedical sciences in the EAC; Improve access to evidence based, timely, affordable and quality specialized biomedical services in the EAC for Cardiovascular disease prevention, treatment and rehabilitation.

1.1.3.1 Proposal

The project will be executed by the Ministry of Education Science and Technology and implemented by MUHAS with all the necessary organs, logistics and processes in place as required. MUHAS plans to build a 600-bed Cardiac Teaching Hospital which aims to complete the Centre of Excellence by offering an accessible, well-equipped teaching hospital situated near the Centre's Multipurpose building to enhance the synergy between teaching and learning.

The hospital will be a nine-story building with four wings to allow thorough ventilation and will have the following functional areas: Emergency area sufficient to handle 10 emergency cases at a time, ambulance bay, Outpatient services sufficient to handle 60 patients at a time, Cardiac Diagnostic Services – Echo, X-ray, CT Scan, MRI, a comprehensive cardiac laboratory, blood bank, Cardiac Angiography Services, Coronary care Unit, four (4) Cath lab Hybrid theatres, and provision for another six (6) cardiothoracic theatres making a total of 10 operating theatres. Cardiac High Dependency area/Cardiac Intensive care services and patient wards (ordinary, private and IPPM and VIP). Other units will include: Hospitality services i.e., genetic counselling, nutritional counselling, Physiotherapy and Rehabilitation services, pharmacy and compounding, therapeutic drug monitoring unit, quality assurance unit, centralized sterilization unit, minor workshop/biomedical engineering unit for addressing immediate faults in equipment, (a larger workshop within campus will be available from other projects). The administrative wing will have administrative offices, finance, logistics and supply chain management, procurement and social welfare offices, legal unit and public relations unit. Heads of Departments and Heads of Firm offices as well as seminar rooms will be available to facilitate teaching and learning.

Research will be an integral part of the hospital functions, and hence facilities for data collection (including sample collection), data archiving, and all the main aspects of data science will be made available. The data bases will be the cornerstone of developing AI algorithms for risk stratification and aiding diagnostics. The CTH will have facilities for next generation sequencing, gene and cell therapy. Equipment for other research approaches, will be made available at both the hospital and laboratories at the Multipurpose building. Long term storage of research biological samples will be done at the University Biorepository at the Multipurpose Building of the EACECS.

The proposed project is located in Mloganzila Mtaa, Kwembe Ward, Ubungo Municipality in Dar es Salaam Region. The area is located about 5km from the Morogoro road and it has the total area of 1,286.17Ha, at Latitude 6.491400 South and Longitude 39.033200 East. In five years', time, MUHAS targets; to have a state-of-the-art Cardiac Teaching Hospital; to train 120 students; conduct up to 10 open heart surgeries; and train approximately 100 staff using a team approach, that is a team able to accomplish a particular task or training.

1.1.3.2 The Need for ESIA Study

The ESIA study is conducted in accordance with the Environmental Impact Assessment and Audit regulations (2005); and, formulated after the Environmental Management Act (EMA) No. 20 of 2004. The Regulations give mandate to NEMC to oversee the ESIA process, which culminates with an award of the ESIA Certificate by the Ministry responsible for Environment. The ESIA Certificate is among the prerequisite approvals required before the project takes off. This project will need this approval before it is implemented. In addition, ESIA study will adhere to the AFDB Policies and Legal Framework and Environmental and Social Operating Safeguards (E&S OSs).

To comply with the legal requirements governing construction industry and Environmental safeguards in Tanzania, MUHAS has awarded the contract for the provision of consultancy services to undertake Environmental and Social Impact Assessment for the proposed Project.

1.2 OBJECTIVE OF THE PROJECT

The objective of the project is to train highly skilled human resource in the areas of Primary (Prevention), secondary (Treatment) and tertiary (rehabilitation) prevention of cardiovascular diseases (CVD). Concurrently, provide highly specialized services to patients and clients while conducting relevant research to mitigate and control CVS diseases. This will be achieved through attaining the following strategic objectives:

- i. To establish a state-of-the-art cardiac teaching hospital including all the necessary equipment and needed supplies
- ii. To continue training academic staff who will teach students at the centre in the areas of primary, secondary and tertiary prevention of CVD
- iii. To train the highly specialized human resource in the identified demand driven areas utilizing the trained human resource (faculty) and others through collaboration with world class local and international institutions
- iv. Treat and manage patients suffering from cardiovascular conditions including conducting basic CVS operations that include: coronary artery bypass, balloon angioplasty, valve repair and replacement, heart transplantation and artificial heart operations. Others will include use of medical devices such as pacemakers, prosthetic valves, and patches as maybe indicated. These will cut referrals abroad and promote medical tourism.
- v. Institute, coordinate and run evidence-based interventions against cardiovascular diseases with the main aim of reducing morbidity and mortality from CVS conditions in the region.

1.3 PROJECT JUSTIFICATION

The East African Community (EAC) urgently requires a dedicated cardiovascular hospital for learning and research in Tanzania due to the rising prevalence of cardiovascular diseases (CVDs) in the region. According to the World Health Organization (WHO), non-communicable diseases, including CVDs, account for nearly 27% of all deaths in East Africa, with hypertension and heart disease being leading contributors. In Tanzania alone, the prevalence of hypertension has surged to over 25%, significantly contributing to the burden of heart diseases (Ministry of Health, 2016). Establishing a specialized cardiovascular hospital will provide the necessary infrastructure to

manage and mitigate the growing CVD epidemic, ensuring that the region can address this critical public health challenge effectively.

Furthermore, the lack of advanced training and research facilities in cardiovascular health within the EAC hampers the development of local expertise and innovation. Currently, most medical professionals in East Africa have limited access to specialized training in cardiovascular medicine, often necessitating expensive and logistically challenging overseas education. A cardiovascular hospital dedicated to learning and research in Tanzania will bridge this gap by offering state-of-the-art training programs, fostering a new generation of highly skilled cardiologists and healthcare professionals. Additionally, local research initiatives can be accelerated, leading to context-specific solutions and advancements in cardiovascular care that are tailored to the unique health challenges faced by the EAC population.

The socioeconomic impact of cardiovascular diseases on the EAC underscores the need for such a facility. CVDs not only result in significant healthcare costs but also lead to loss of productivity due to disability and premature mortality. The World Bank estimates that the economic burden of non-communicable diseases, including CVDs, could reduce the GDP of low- and middle-income countries by up to 7% over the next two decades. By establishing a cardiovascular hospital in Tanzania, the EAC can proactively address these economic challenges through improved healthcare outcomes and reduced long-term costs. This investment in healthcare infrastructure will not only save lives but also bolster the region's economic stability and development.

1.4 PROJECT BENEFICIARIES

The cardiac hospital will serve Tanzania and the whole of the East African Community (EAC) including patients suffering from cardiovascular diseases who will gain access to specialized, high-quality cardiac care, reducing the need for costly overseas treatments. Medical professionals across the EAC will benefit from advanced training and research opportunities, enhancing their skills and knowledge in cardiology. The local and regional healthcare systems will experience improved efficiency and reduced burden from cardiovascular disease-related morbidity and mortality. Additionally, the hospital will stimulate economic growth by creating jobs, attracting medical tourism, and fostering collaborations with international health organizations. The overall community will benefit from improved health outcomes, increased awareness and prevention of heart diseases, and a strengthened healthcare infrastructure.

1.5 OBJECTIVES OF THIS ESIA STUDY

The objective of ESIA is to assess the environmental and social impacts of the Hospital construction and operations and recommend mitigation measures to address the negative and positive impacts. This is in line with the Environmental Management (EIA and Audit) (Amendment) Regulations of 2018 and AFDB Environmental and Social Operating Safeguards (E&S OS1). Specifically, this ESIA study foresees all environmental, social and economic effects of the proposed project design before the project comes into the actual implementation. This study therefore, addressed the social, economic, and environmental issues associated with the project and provided relevant mitigation plans to prevent or minimize adverse impacts and enhance the positive ones.

1.6 RATIONALE OF THE ESIA

To ensure that no segment of the population is adversely affected and the physical cultural resources are given the due attention. Therefore, this ESIA study was carried out to identify constraints, risks and mitigation measures on the project affected community by adhering to new Integrated Safeguards System (ISS) while applying the relevant AFDB Environmental and Social Operating Safeguards (E&S OS) which are E&S OS1, E&S OS2, E&S OS3, E&S OS4, and E&S OS10. The ESIA provides input to the design proposal of the project. The ESIA findings and recommendations contained in this report will be incorporated in the overall project design, specifically assist in the development of mitigation and enhancement measures of the identified risks, opportunities and impacts.

1.7 SCOPE OF WORK

This study entailed the following: -

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

The ToR (See appendix I) formed the basis for the study, and for that matter, this report.

1.8 GENERAL METHODOLOGY

This ESIA was conducted in accordance with the EIA and Audit Regulations (2005) and its amendments of 2018, AFDB's Integrated Safeguards System (ISS) while applying the relevant AFDB Environmental and Social Operating Safeguards (E&S OS). The approach and methodology that was used to acquire data and information for compilation of ESIA is provided in subsequent sub sections.

1.8.1 Study Team

The ESIA being a multidisciplinary field involved a team of experts. Table 1.1 below presents the team members who participated in the scoping exercise.

Table 1. 1: Study Team

| NAME | PROFESSION | |
|------------------------------|--|---|
| Kamariya Mikidadi Mohamed | Team Leader, Environmental Scientist | General Coordination of the Team and provide link between the developer and team Site visits, Stakeholders engagement, baseline data collection, preparation of the project brief and Terms of Reference (ToR) for the project registration, preparation of ESIA and coordinating NEMC's site verification visit, attending to technical advisory committee meeting at NEMC. |
| Regina Kilima | Environmental Scientist | Documents review, Field survey for social data Collection, Stakeholder's consultations, Gender and GBV data Collection, Preparation of Scoping report and ESIA Report |
| Neema Mwakagamba | Environmental Engineer | Documents review, Field survey for Biophysical data Collection, Preparation of Scoping and ESIA Report |
| Edgar Remen Mwash | Mechanical Engineer | Oversee the preparation of the ESIA and Perform Quality Assurance of the work performed by the ESIA team write Environmental Impact Statement |

1.8.2 Scoping Exercise

Scoping exercise was used to identify the key issues of concern at an early stage in the ESIA process in accordance with the EMA of 2004 and its ESIA and Audit Regulations, 2005 and the 2018 amendment as part of the ESIA processes. There are project benefits accrued from the process of scoping early, such as appropriate site selection and identification of possible alternatives. Scoping also identifies and initiates involvement of all interested and affected parties (IAPS) such as the proponent and planning and members of the public. The results of scoping study determine the scope, depth of the terms of reference (TOR) to be addressed within the Environmental Statement (ES). Scoping exercise was conducted in May 2024 and the TOR is waiting for approval from NEMC.

1.8.3 Desk Work Study

Desk work study involved identification and review of both local and international policies and laws relevant to the project; collection and review of previous study reports as well as literal collection and review of information and data on the physical, social, economic, cultural scope. The consultant noted that the important issues reflected in the ToR deserve special reference to the existing official information particularly in the following documents:

- AFDB's Integrated Safeguards system (ISS)
- Country Policies and legislation relevant to the project
- AFDB Environmental and Social Operating Safeguards (E&S OS)
- Project Design Drawings

- MUHAS Master plan 2018/2019- 2022/2023

1.8.4 Field Survey

The field visits were essential to fully realize the scope of the project, the biophysical environment specific to the location and the socio-economic conditions in the project area. Three visits to the project area were made during scoping stage and four visits during detailed ESIA stage. All visits were made between May and June 2024. The team used the fieldwork to conduct interview with stakeholders and collection of information on the state of the environment. Information collected includes site land use, water supply, wastewater collection, solid waste management, traffic issues, and other indicators related to environmental and socio-economic trends of MUHAS and surrounding. Other information was appraised through key informant interviews and experts' observations.

1.8.5 Onsite Measurements

The onsite measurements conducted for this study includes dust (particulate matter) measurements (ppm), ambient air measurements (respective units), noise levels measurements (dBA) and vibrations measurements (vibrations per Second) to establish baseline environment at the project area. Measurements was done by consultant for two days including weekday and weekend from 15th and 18th May 2024 respectively. For noise measurements was performed during day and night. Results of the measurements are presented in chapter 4 of this report.

1.8.5.1 Selection and description of measured sampling stations

The monitoring stations were established as per Environmental Management (Air Quality) regulations of 2007. The criteria followed included: predominant wind direction (leeward and windward) at the area during the study, workers'/operators' positions and nearest local communities as possible receptors, size of the area to be covered, the areas where pollution was expected, as well as areas that pollutants from the project activities are likely to disperse to. Other criteria include areas that are easily definable and with easy future access in case of need for comparison measurements or another monitoring study. Moreover, the selection criteria for sampling stations considered point source emissions and nearby receptors (i.e., workers or operators at their working locations) that is likely to be affected by the proposed project.

1.8.5.2 Dust (Particulate matter) concentrations in terms of PM₁₀

Dust levels in terms of PM₁₀ were measured using Casella Micro dust Pro that complies with the EMC Directive 89/336/EEC of the European Union in accordance to manufacturer procedure and applicable local standards and/or international environmental guidelines. The device has been tested according to the standard delivery schedule and complies with the EN 50081-1:1992 and EN 50081-2:1993 standards. On taking measurements, the device was placed at breath height of about 1.5 meter from the ground to monitor dust concentrations at each identified station. This position is assumed to be a relatively the breathing zone of the people at their respective locality or working environment. The recorded average values were compared with prescribed available limit to check their compliance with both TBS standards, WHO standards.

1.8.5.3 Ambient Pollutant Gases Emission

Levels of ambient pollutant gases were measured using Portable Multi Gas Detector-71-0028RK, in accordance with manufacturer's procedure that meet ISO 9001:2008 protocol. The measuring device undergoes automatic calibration once it is switched ON by pumping in fresh air into the sensors to allow toxic sensors to be set to zero. Three measurements were recorded periodically at each station and used to calculate the average value of each pollutant in each station. The average values were then compared with TBS-NES limits and World Health Organization (WHO) guidelines to check their level of compliance.

1.8.5.4 Noise Levels

Noise measurements were carried out using sound level meter (model CEM DT-8852 data logger), with reference to the international standards namely IEC 61672:1999, IEC 61260:1995 and IEC 60651, as well as ISO 19961:2003 and ISO 3095:2001. During testing, the digital sound level meter was set to A-weighting scale to enable the meter to respond in the same manner as the human ear. The "A" scale is applicable for workplace compliance testing, environmental measurement, and workplace design. At each station, at least eight measurements were performed and used to calculate the average levels.

1.8.5.5 Ground Vibration

Ground vibrations were measured by using an XTECH SDL-800 vibration meter data logger to quantify the ground vibration at the study area. A meter has an accuracy of $\pm 5\%$, acceleration of 200 m/s², a wide frequency range of 10 Hz to 1 kHz for capturing almost all possible vibrations for workplace assessments. The XTECH vibration meter data logger is designed to measure vibration at the workplace according to European standard EN 14253:2003. At each identified station, vibration readings were recorded after every 5 seconds three times and their mean value was used to represent the vibration level at that particular station.

1.8.6 Stakeholders consultations

A consultation map/plan was prepared in accordance with the stakeholder's Engagement Plan (SEP) and the recommendations in the AFDB E&S OS10. The consultation programme maps out the stakeholder engagement process in each phase of the ESIA study. The programme is adaptive and subject to change based on stakeholder responses/requirements. A combination of various types of consultation techniques was used like face to face meetings, interviews and serving of scoping report and request for issues. The overall consultation process was designed to comply with the requirements for public consultation as prescribed in Tanzania's ESIA and Audit regulations for stakeholder engagement, and AFDB guidelines for stakeholder's engagement.

Issues raised by stakeholders are presented in chapter 5 of this report while the list of names, addresses and signatures of stakeholders consulted are found in appendix III and IV.

1.8.7 Project Impact Assessment

Superimposing project elements onto the existing social and environmental natural conditions made it possible to identify the potential impacts of the proposed construction of cardiac Hospital.

1.8.7.1 Identifying Environmental Impacts

The checklist method was used to identify the impacts and mitigation measures. The banks ISS was also used as a framework in identification of impacts. A key guiding assumption in this study is that the project will be designed, constructed and operated with due care for safety and environmental matters using current and practical engineering practices and/or Best Available Technology Not Entailing Excess Cost (BATNEEC). The implementation schedule of the mitigation measures is summarized in the ESMP.

Several project alternatives were considered including that of not implementing the project. The fundamental environmental protection strategy and environmental considerations influencing engineering design were incorporated. However, reasonable regard to technological feasibility and economic capability were considered. The assessment entailed the following:

1.8.7.2 Collection of Baseline Data

The collection of baseline data was conducted subsequent to defining the scope of the ESIA. These data allow 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. Both primary and secondary data were collected. Primary data were collected by direct measurement, observations and using semi-structured interviews with respective and targeted parties (as explained in the previous section). Secondary data were obtained from various relevant sources of information such as education and health reports and many other official and non-official documents and the Internet.

1.8.7.3 Review of Policies, Laws and Legal Frameworks of the Project

The study also reviewed country policies, laws and regulations and AFDB safeguards relevant to the project. This allowed the study team to update and enhance their understanding of National policies, legislation and institutional arrangements for environmental management in Tanzania and relevant international procedures to ascertain the optimal management of impacts.

1.8.7.4 Predicting Environmental Impacts

This was done by using “best estimate” professional judgment of the experts and case studies as analogous or references. The environmental and social impacts were identified and their potential size and nature were predicted. The prediction of impacts specified the impact’s causes and effects and its secondary and tertiary consequences for the environment and the social aspects.

1.8.7.5 Identifying Mitigation and Management Options

The options for dealing with identified and predicted impacts were considered. This enabled the study team to analyze proposed mitigation measures. A wide range of measures have been proposed to prevent, reduce, remedy or compensate for each of the adverse impacts evaluated as being significant. Analysis of the implications of adopting different alternatives was done to assist in clear decision-making.

1.8.7.6 Determining the Significance of Impacts

The key activity was to evaluate the significance of impacts, the major criteria used was

- The level of public concern
- Scientific and Professional Evidence concerning
 - a) Resource loss, ecological damage
 - b) Negative Social Impacts
 - c) Resource use options etc.

1.9 ESIA REPORT STRUCTURE

- **Chapter one** presents the introduction on the background information of the proposed project, its development objectives and the proposed project implementation arrangements.
- **Chapter two** presents the project description, in which there is a description of the location and relevant components of the project and their activities.
- **Chapter three** illustrates policy, legal and administrative framework, which are the relevant National policies, acts and AFDB standards applicable to construction projects.
- **Chapter four** presents the baseline information relevant to environmental characteristics, which gives details concerning the Bio-physical environment, socio-economic and Gender equality and Gender Based Violence issues at the project area.
- **Chapter five** presents the consultation exercise at the project area detailing the list of stakeholders consulted and the issues raised.
- **Chapter six** describes the positive and negative environmental impact of the project that are likely to be generated from the different phases (the planning and designing, construction, operation and maintenance and the demobilization phases).
- **Chapter seven** presents the mitigation measure for the potential negative impact of the project.
- **Chapter eight** presents the Environmental and Social Management Plan (ESMP).
- **Chapter nine** presents the Environmental Monitoring Plan that contains the proposed institutions to carry out the monitoring activities, the monitoring indicators, time frame and the proposed budget for monitoring.
- **Chapter ten** presents the cost benefit analysis of the project.
- **Chapter eleven** provides the decommissioning plan for the proposed project.
- **Chapter twelve** presents the summary and conclusions of the study.

Appendices, this section presents some key primary information collected during the study as attached at the end of this report.

CHAPTER TWO

PROJECT DESCRIPTION

2.1 NATURE OF THE PROJECT

A teaching and research hospital combine clinical care with education and research, providing hands-on training for medical students and conducting cutting-edge research. It integrates patient treatment with academic instruction, fostering an environment of continuous learning and innovation. This dual focus enhances medical education and advances healthcare practices. MUHAS' plan to construct a cardiac teaching and research hospital is essential to provide students with hands-on experience and advanced training in cardiology, enhancing their practical skills and clinical knowledge. It will also address the growing demand for specialized healthcare professionals and improve the overall health outcomes in the region.

2.1.1 Objective of the project

The objective of a teaching and research Hospital is to provide a comprehensive learning environment for medical students and professionals, integrating practical training with academic knowledge. It aims to foster innovative medical research, advancing healthcare practices and treatments. The hospital serves to improve patient care through cutting-edge medical procedures and technologies. Additionally, it seeks to address public health needs by offering specialized and high-quality healthcare services. Lastly, it aims to develop skilled healthcare professionals who can contribute to the medical field and improve community health outcomes.

2.2 LOCATION AND ACCESSIBILITY

The project is located in Mloganzila Mtaa, Kwembe ward, Ubungo Municipal, Dar es Salaam Region. Dar es Salaam is located in the eastern part of the Tanzanian mainland at 6°51'S latitude and 39°18'E longitude. With an area of 1,350 square kilometres (km²), it occupies 0.19 percent of the Tanzanian mainland, stretching about 100 km between the Mpiji River to the north and beyond the Mzingu River in the south. The Indian Ocean borders it to the East.

Ubungo Municipal Council is one of the five (5) Councils in Dar-Es- Salaam Region. Other Councils are Dar-Es Salaam City, Temeke Municipal, Kinondoni Municipal and Kigamboni Municipal. The Ubungo Municipal Council was officially established through the Government Notes number 512 of year 2015 by the President's Office, Regional Administration and Local Government as an autonomous body. The Municipal is bordered by the Kibaha District to the West, Kinondoni Municipal to the East and North, Ilala Municipal and Kisarawe District to the South.

The proposed project is located about 5km from the Morogoro road and it has the total area of 1,286.17Ha, at Latitude 6.491400 South and Longitude 39.033200 East. It is bordered with Mloganzila road to the West and, Mloganzila to the North, undeveloped plots on East and East Africa centre of Excellence for cardiovascular sciences (EACECS) on the South. MUHAS can be accessed through Mloganzila Road when coming from Morogoro Road which is about 4km. The Key benchmark is Muhimbili Mloganzila Hospital which is near the project site (Figure 2.3).

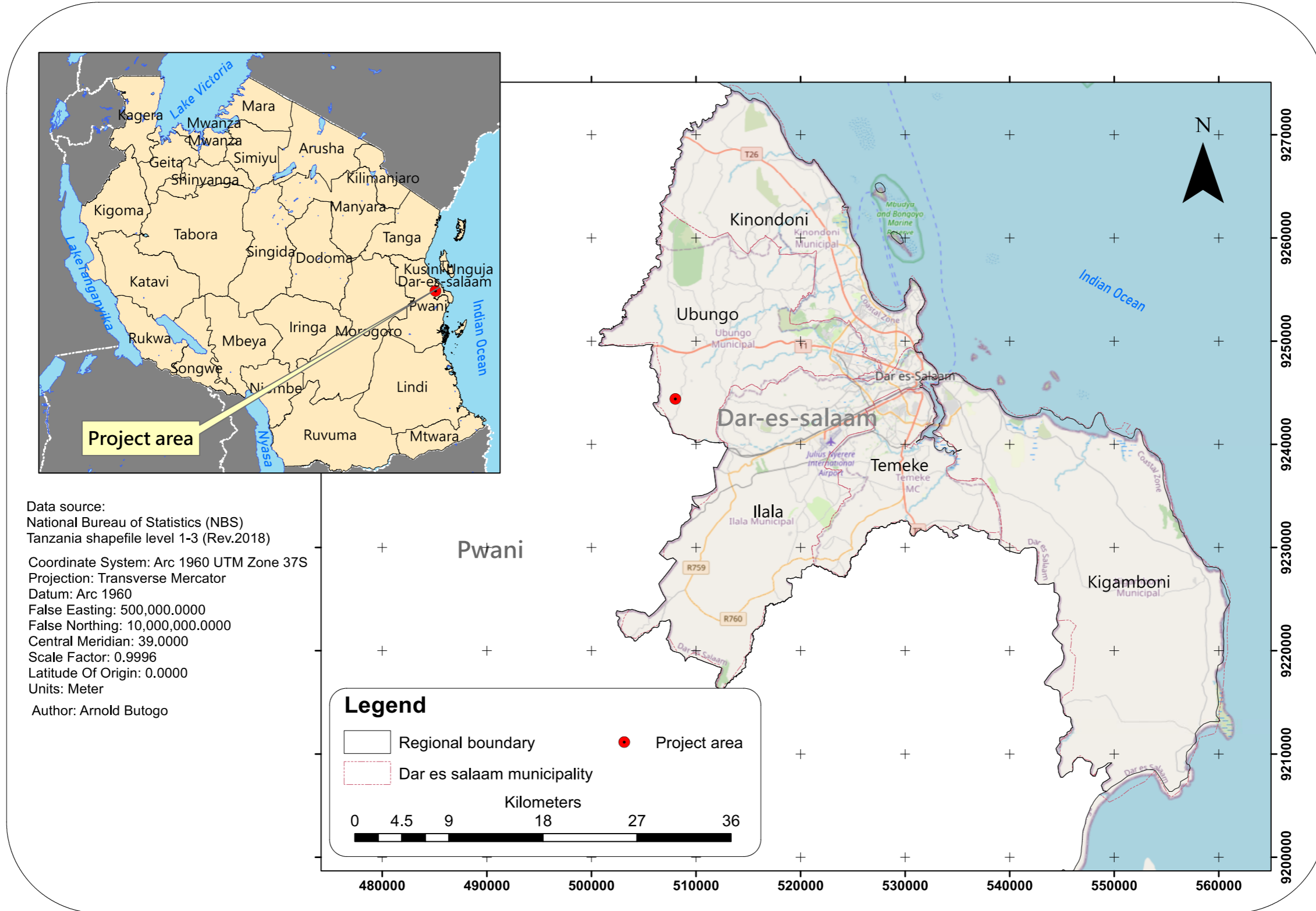


Figure 2. 1:Map of Tanzania and Dar es Salaam showing project area (Source: NBS, 2018)

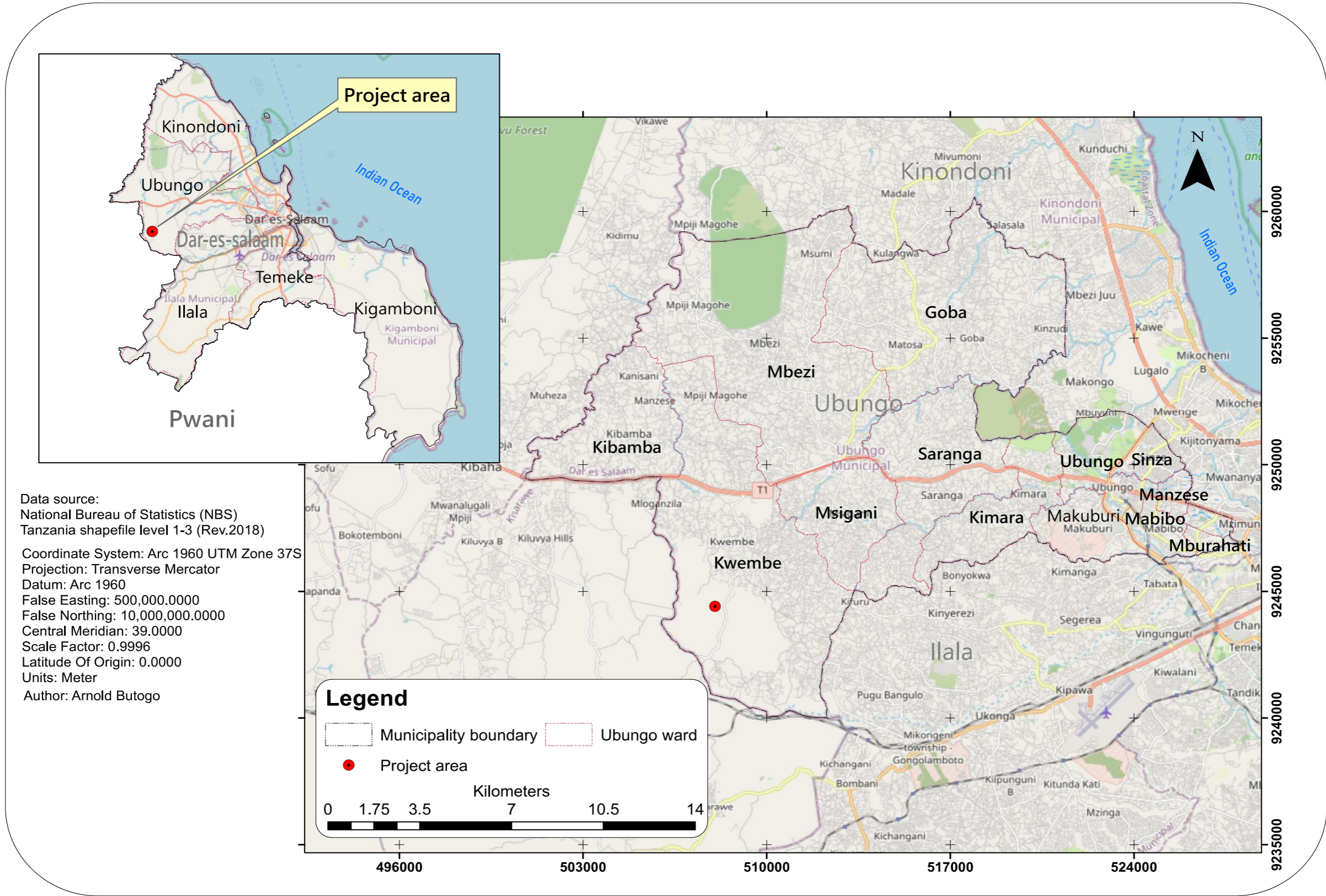


Figure 2. 2: Map of Dar es salaam and Ubungo Municipality showing Project areaSource: NBS, 2018

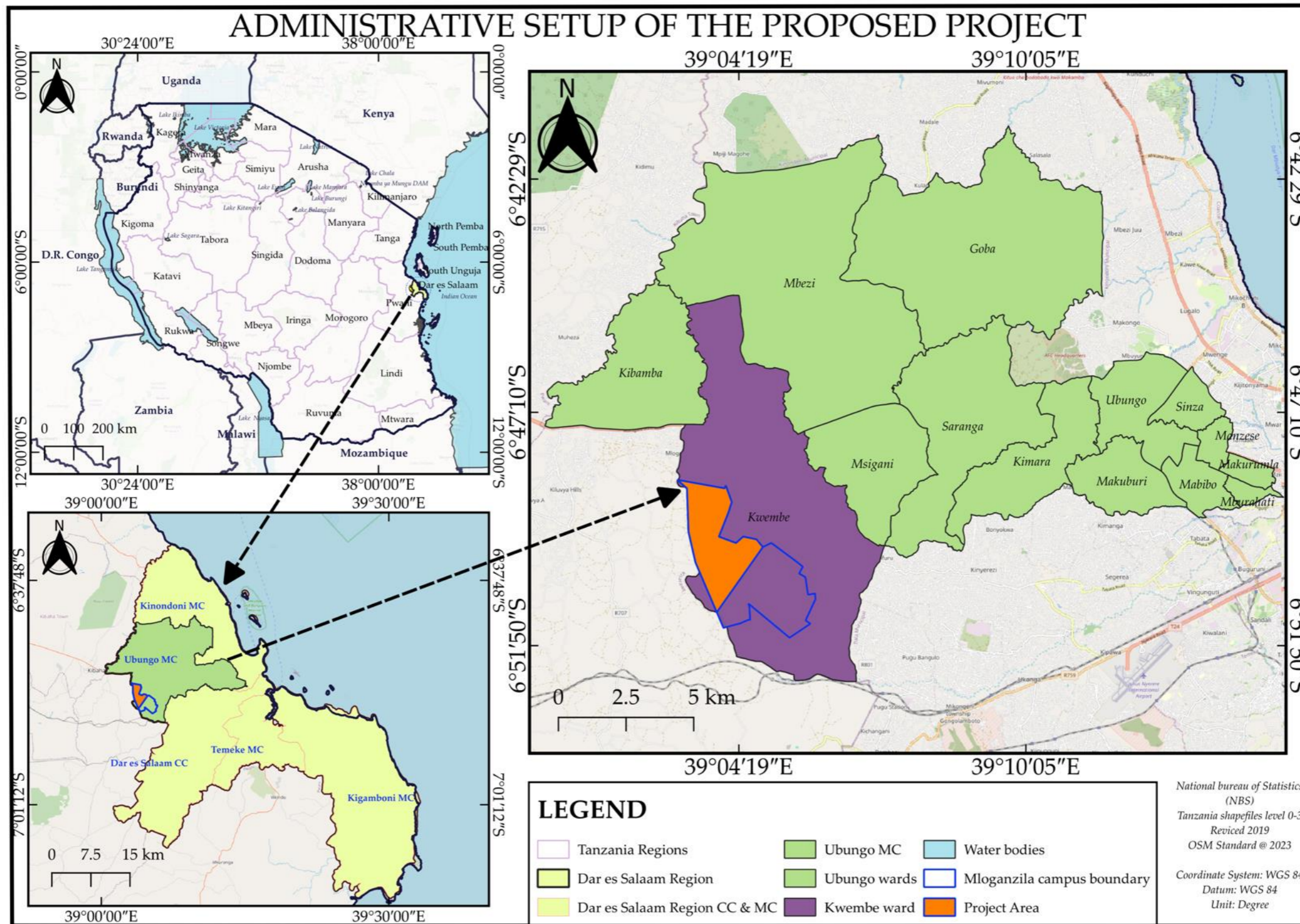


Figure 2. 3: Map of Dar es Salaam Region , Kwembe Ward, Mloganzila Mtaa and Project area
Source: NBS, 2023

2.3 SITE DESCRIPTION AND ADJACENT DEVELOPMENT

2.3.1 Land Use and Ownership

The certificates of occupancy show that the area should be used for Education Buildings purposes only, Use group “k” use classes (b) as defined in the Town and Country Planning Regulations, 1960 amended in 1993. Since the proposed project is part of the existing educational centre i.e. EACECS, the allocated land use in the title deed fit the activities of the proposed project.

The project is owned by Muhimbili University of Health and Allied Sciences (MUHAS) for the term of ninety-nine years (See certificates of occupancy in Appendix III). Therefore, no need of Resettlement Action plan since the proposed area is legally owned by MUHAS.

The whole campus has a total area of 1286.17Ha (equivalent to 12.8617sqkm) while this project shall be constructed on 10ha only, the remaining area shall be used for further expansion when the need arises. Within the project area there are is Mloganzila Hospital and East African Centre for Cardiovascular science.

2.3.2 Project Investment cost and funding

The project investment cost is approximately USD 75 Million which includes all costs for engineering, procurement of construction equipment and materials acquisition as well as the actual construction process.

2.3.3 Project Life Span

The envisaged life span of the project construction implementation is about 12 months and more and the operation plus or minus 50 years depending on proper maintenance and rehabilitation of project infrastructure.

2.4 PROJECT COMPONENTS & DESIGN

2.4.1 Project Components

A 600 bed Cardiac Teaching Hospital is proposed. This will be a nine-story building with four wings to allow through ventilation and will have the following functional areas: Emergency area sufficient to handle 10 emergency cases at a time, ambulance bay, Outpatient services sufficient to handle 60 patients at a time, Cardiac Diagnostic Services – Echo, X-ray, CT Scan, MRI, a comprehensive cardiac laboratory, blood bank, Cardiac Angiography Services, Coronary care Unit, four (4) Cathlab Hybrid theatres, and provision for another six (6) cardiothoracic theatres making a total of 10 operating theatres. Cardiac High Dependency area/Cardiac Intensive care services and patient wards (ordinary, private and IPPM and VIP). Other units will include: Hospitality services i.e., genetic counselling, nutritional counselling, Physiotherapy and Rehabilitation services, pharmacy and compounding, therapeutic drug monitoring unit, quality assurance unit, centralised sterilization unit, minor workshop/biomedical engineering unit for addressing immediate faults in equipment, (a larger workshop within campus will be available from other projects). The administrative wing will have administrative offices, finance, logistics and supply chain management, procurement and social welfare offices, legal unit and public relations unit. Heads of Departments and Heads of Firm offices as well as seminar rooms will be available to facilitate

teaching and learning. To avoid duplication and promote optimal use of available resources, the current mortuary.

Logistics and supply chain unit for medicines, consumables and other day to day commodities will be part of the necessary components. The CTH will have an ICT Unit responsible for all ICT solutions in the building including patient data systems, linkage with laboratory, pharmacy, finance and elsewhere where relevant, the unit's function will include enhancing data security. In summary, the ICT Unit, will make space for Artificial Intelligence use in data collection, storage, processing and archiving.

Research will be an integral part of the hospital functions, and hence facilities for data collection (including sample collection), data archiving, and all the main aspects of data science will be made available. The data bases will be the cornerstone of developing AI algorithms for risk stratification and aiding diagnostics. The CTH will have facilities for next generation sequencing, gene and cell therapy. Equipment for other research approaches, will be made available at both the hospital and laboratories at the Multipurpose building. Long term storage of research biological samples will be done at the University Biorepository at the Multipurpose Building of the EACECS.

In order to minimize time for consultation and securing services from outside the hospital, a few selected essential services other than cardiac will be available at the hospital. These include: A dialysis unit, oral health services for screening and management of patients as needed or before operations and diabetes unit.

Project components are presented in Table 2.1 (Description of each component in its respective floor is provided in appendix V)

Table 2. 1: The Project design and its illustration

| S/NO | FLOORS | COMPONENTS | AREA(SQM) |
|------|----------------|---|-----------|
| 1 | Basement Floor | <ul style="list-style-type: none"> • Laundry Department • Mortuary • Rail Yard • General Service Department • Biomedical Workshop • Genera Storage | 872 |
| 2 | Ground Floor | <ul style="list-style-type: none"> • Diagnostic Unit • Pharmacy • Open Plan Area • Outpatient Unit • General service Unit • Lobby • Emergency Unit | 3115 |
| 3 | First Floor | <ul style="list-style-type: none"> • Operation Rooms • Intensive care unit (ICU) • Surgical Centre Unite • Central Sterilization • CAT Lab • Recover Rooms | 2407 |

| | | | |
|---|--------------------|---|------|
| | | <ul style="list-style-type: none"> • Medical Rooms • Nurse Stations • Control Room • Patient wards | |
| 4 | Second Floor | <ul style="list-style-type: none"> • Administration offices • Clinical & Administrative staff offices • Open plan • Boardroom • Accounts, Human Resources and Facilities management Department | 2407 |
| 5 | Third -Ninth Floor | <ul style="list-style-type: none"> • General VVIP, VIP, Single and Double Occupants wards • Nurse stations • Visitors waiting Lounge • Doctor’s offices | 2407 |

Source: MUHAS, 2024

2.4.2 Project Design

The project design is currently in progress; however, the building rules and regulations will be in accordance with Urban planning (Space and standards) regulations of 2018. The following are the key design criteria that shall be followed during the design of the buildings;

- Functional space and relationship (Performance and adequacy).
- Coordination of Services network to ease installations and management.
- Effective security and Safety provisions in terms of escape, control and supervisions.
- Sufficient power and water supply with back-up facilities.
- Balanced indoor and outdoor spaces relationship to create conducive health environment.
- Design for future changes with adequate flexibility to allow for technological development.
- Flexible and adaptable infrastructure to meet unpredicted needs.
- Environmental responsiveness with considerations of renewable energy systems, solid waste management, waste water treatment and rainwater harvesting.

2.4.2.1 Climate Change risks mitigation and adaptation in the Project Design

To address the risks associated with climate change, including heat, drought, floods, and water scarcity, the proposed project design incorporates infrastructure elements focused on promoting low energy consumption, rainwater harvesting, effective storm water management, natural ventilation, and adequate lighting. The key features of the design include:

- **Open Spaces:** The central area of the site emphasizes open spaces with the use of native plants to facilitate storm water treatment and infiltration. These open spaces prioritize maximizing tree canopy cover, offering shade, and enhancing ecosystem services.
- **Greenery Walkways:** The design prioritizes pedestrian movement over motorized transport to minimize air emissions (greenhouse gases) and enhance carbon

sequestration. Walkways are strategically placed to control unrestricted movement that can lead to vegetation destruction, with trees planned along access roads and footpaths to improve the landscape and mitigate the effects of sun radiation.

- **Green Areas:** Every zone/block incorporates green areas to facilitate cross ventilation into buildings. Additionally, green belts and conservation zones are designated to preserve the ecosystem, prevent land degradation, and enhance the mountainous scenery. The use of native and artificial trees and grasses is proposed to reduce soil erosion in vulnerable areas.
- **Energy-Efficient Buildings:** The project emphasizes constructing buildings with low energy consumption, featuring provisions for cross ventilation through adequate openings, motion sensors in public areas for automatic light control, presence sensors in offices and classrooms, proper orientation to minimize indoor discomfort and harness natural air, and measures to reduce the impact of sunlight, such as fan installation and solar lights along pathways. The design also maximizes the use of renewable energy sources like solar and wind, and utilizes biogas from wastewater treatment for cooking.
- **Low-Footprint Buildings:** The project aims to minimize the environmental footprint by increasing green spaces, incorporating rainwater harvesting, storm water management, and waste management systems, and adopting water-efficient processes.

2.4.2.2. Disaster risk management

The planned project will include measures for fire prevention and firefighting facilities. The building itself will be equipped with systems for managing solid and liquid waste, aimed at preventing the spread of diseases. Furthermore, the campus will utilize two access roads (Morogoro and Mloganzila roads) to facilitate convenient pedestrian and vehicular movement to and from the site, with the intention of preventing traffic congestion and minimizing the risk of accidents. These roads will be securely linked to a sufficiently spacious parking area capable of accommodating cars. The project site will implement an emergency management plan, clearly delineating responsibilities for various emergency tasks, specifying who is responsible for what, when, and how.

2.5 PROJECT ACTIVITIES

The proposed undertaking involves various phases from the planning phase all the way to the construction and operational phases. Each specific phase has its own activities which are adequately elaborated in following sections;

2.5.1 Pre-construction phase

The duration of this phase will be one month and it will entail the following activities.

2.5.1.1 Feasibility Study, Procurement and Fund Mobilization

The project is currently at phase one whereas procurement of ESIA Consultant has been done and the ESIA is currently ongoing. The EPC (Engineering, Procurement and Construction) team together with Project Management Contract (PMC) firms will as well be procured at this stage. Environmental and Social Impact Assessment (ESIA) of the project has been contracted to Kamariya M Mohamed a registered Environmental (ESIA) Expert and the project designs have been prepared and open for any modifications where necessary.

2.5.1.2 Design Phase

This is an on-going phase embracing project appraisal and design activities most of which have been completed. The phase constitutes the following design activities.

- Topographical and geotechnical surveys to collect data which informed the assessment of the technical feasibility of the project site – completed
- Preliminary and detailed design of the proposed project – Ongoing
- Acquiring building permit and OSHA certificate – in progress
- Obtaining other required permits from national and local authorities including ESIA Certificate from NEMC and fire certificate - ongoing.

2.5.1.3 Material Mobilization

Large percent of the building materials such as sand, aggregates, masonry units, cement, paint, timber, roofing sheets, shall be sourced locally via contracted suppliers where quality and quantity availability shall dictate the material sources. Many of the construction projects in Dar es salaam obtain materials locally except for specialized building elements and installations. Building materials will be transported to the project site from approved extraction, manufacture, or storage sites using transport trucks compliant with the traffic regulations. The building materials to be used in the construction of the project will be sourced from approved dealers. Greater emphasis will be on procurement of building materials from within the local area, to make both economic and environmental sense as it will reduce negative impacts of transportation of the materials to the project site through reduced distance of travel by the materials transport vehicles.

2.5.2 Construction phase

During this phase the main activity will involve construction of the proposed 9 storey Hospital building and other associated infrastructures such as workers camp, erection of offices, storage facilities and services (water, wastewater and electricity). This phase is expected to take 12 months and more for its accomplishment. The following (in Table 2.2) are the main activities to be executed on the site during construction phase

Table 2. 2: Description of project activities and issues during Construction phase

| SN | Activity | Description | Environmental/ Social Issue |
|----|-----------------------|--|---|
| 1 | Site Clearance | This involves clearance of vegetation to pave way for construction activities. The contractor shall ensure that clearance is confined within the areas requiring permanent construction. | <ul style="list-style-type: none"> • Loss of vegetation • Noise • Dust • Vibrations • Emissions to air • Solid waste generation • Occupational safety and health • Community Health, Safety and security risk |
| 1 | Foundation excavation | This involves cutting of the land to a required depth that foundation shall lie. The excavation activities shall be limited to the required areas and the excavated soil shall be used for landscaping activities to match the surrounding | <ul style="list-style-type: none"> • Noise • Dust • Vibrations • Emissions to air waste generation (spoil soil) • Solid waste generation • Occupational safety and health |

| SN | Activity | Description | Environmental/ Social Issue |
|----|--|--|---|
| | | environment. Excavators shall be used. | <ul style="list-style-type: none"> • Mloganzila Mtaa area Health, Safety and security risk |
| 2 | Material transportation | Materials (fine and coarse aggregates) from quarries will be transported by trucks to the construction site. Water shall be supplied by DAWASA articulation system, other materials like cement, timber and reinforcement bars will be transported by trucks to the construction site. | <ul style="list-style-type: none"> • Noise • Dust • Vibrations • Emissions to air • Occupational safety and health • Mloganzila Mtaa area Health, Safety and security risk • Traffic interference at Morogoro highway road and Mloganzila road |
| 3 | Material Storage- | Materials like aggregates and sand will be stockpiled at the site ready for use. Cement and reinforcement bars will be stored in special storage rooms. Timber will directly be used at the required areas. | <ul style="list-style-type: none"> • Loss of amenity |
| 4 | Actual construction works | This involves masonry, concrete works and related activities. Generally masonry and related activities will include stone shaping, concrete mixing, plastering, slab construction, construction of foundations, and erection of building walls and curing of fresh concrete surfaces. These activities are known to be labour intensive and will be supplemented by machinery such as concrete mixers. | <ul style="list-style-type: none"> • Noise • Dust • Vibrations • Solid waste generation • Liquid waste (sewage) • Occupational safety and health • Mloganzila Mtaa area Health, Safety and security risk |
| 5 | Steel Structure works | The projects building components will be reinforced with structural steel for stability. Structural steel works will involve steel cutting, welding and erection. | <ul style="list-style-type: none"> • Noise • Solid waste generation (metal cuts) • Occupational safety and health • Mloganzila Mtaa Health, Safety and security risk |
| 6 | Installation of power, communications lines, water, foul water systems | This involves electrical work and plumbing activities. Electrical work during construction of the premises will include installation of electrical gadgets and appliances including electrical cables, lighting apparatus, sockets, weighbridge circuits, filling station pumps wiring etc. In addition, there will be other activities involving the use of electricity such as welding and metal cutting | <ul style="list-style-type: none"> • Solid waste generation (garbage) • Occupational safety and health risk • Mloganzila Mtaa Health, Safety and security risk |

| SN | Activity | Description | Environmental/ Social Issue |
|----|-------------|--|---|
| 7 | Landscaping | Landscaping shall be done to match with the surrounding environment to improve the aesthetic value or visual quality of the site once construction ceases, the proponent will carry out landscaping. | <ul style="list-style-type: none"> • Noise • Dust • Solid waste generation (rubbles) • Occupational safety and health • Mloganzila Mtaa Health, Safety and security risk |

Source: Consultant, May, 2024

2.5.2.1 Types and Sources of Project requirements

The construction project requirements from suppliers will be transported to the project site from areas in Dar es salaam. Types and sources of project requirements during the construction phase are shown in Table 2.3.

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

| Requirements | Type | Source | Quantity (Approx) |
|---------------|--------------------------|--|-------------------|
| Raw Materials | Aggregates | Dar es salaam (licenced suppliers shall be used) | To be determined |
| | Blocks | Dar es salaam (licenced suppliers shall be used) | To be determined |
| | Sand | Dar es salaam (licenced suppliers shall be used) | To be determined |
| | Cement | Cement Industries in Dar es salaam | To be determined |
| | Water | DAWASA | To be determined |
| | Reinforcement bars | Dar es salaam (licenced suppliers shall be used) | To be determined |
| | Timber | Dar es salaam (licenced suppliers shall be used) | To be determined |
| Manpower | Skilled | Contractor | 50 |
| | Unskilled | Local People | 100 |
| Equipment | Excavator | Contractor | 1 |
| | Dozer | Contractor | 2 |
| | Motor grader | Contractor | 2 |
| | Plate compactor | Contractor | 1 |
| | Water Boozer (Emergency) | Contractor | 1 |
| | Tippers/ Dampers | Contractor | 2 |
| | Concrete mixers | Contractor | 2 |
| | Generator | Contractor | 2 |

Source: Consultant, May 2024

2.5.2.2 Transportation of Construction Materials

Materials (fine and coarse aggregates) from quarries will be transported by trucks to the construction site. Water from DAWASA system will be available from the site. Other materials like cement, timber and reinforcement bars will be transported by trucks to the construction site. Trucks carrying construction materials shall use Morogoro road and then Mloganzila road before entering project area. These two roads do not have restrictions to trucks as long as

tonnage is within allowable range. Contractor shall prepare Traffic Management Plan (TMP) which shall be approved by MUHAS and the AFDB before the commencement construction starts.

2.5.2.3 Storage of Construction Materials

Materials like aggregates and sand will be stored within the project site for use. Cement and reinforcement bars will be stored in special storage rooms. The materials for storage shall be manageable not to cause nuisance to community. Timber will directly be used at the required areas and consequently there will be no stockpiling of timber at the construction site.

2.5.3 Operation phase

A teaching and research hospital will conduct a wide range of operational activities centered around patient care, medical education, and research. Patient care includes diagnostics, treatment, surgical procedures while utilizing advanced medical technologies and specialized departments. Medical education will be integral, involving the training of medical students, residents, and fellows through hands-on clinical practice, simulations, lectures, and seminars. The hospital will also engage in cutting-edge research, conducting clinical trials and laboratory experiments to advance medical knowledge and improve treatments. These activities are supported by robust administrative functions, ensuring efficient hospital operations and compliance with healthcare regulations. Additionally, continuous professional development for staff and collaboration with academic institutions and research organizations are pivotal components of the hospital's operations.

2.5.3.1 Types, Amounts and Sources of Project requirements

Types and sources of project requirements during the operational phase are shown in Table 2.4

Table 2. 4: Types and sources of project requirements during the operation phase

| Requirements | Type | Source | Quantity (Approx) |
|-------------------------|---|--|--|
| Water | For domestic use | DAWASA | Total Water demand per day under worst case scenario – (720x40L) =28,8000L/day (28.8m ³ /day) |
| Electricity | For machine and other use | <ul style="list-style-type: none"> MUHAS Standby generator at the building | <ul style="list-style-type: none"> To be determined |
| Fire-fighting equipment | Fire detection, Fire hydrants, safety and rescue procedures materials | <ul style="list-style-type: none"> Contractor and Fire Rescue forces | <ul style="list-style-type: none"> To be determined |

Source: Consultant, May 2024

2.5.4 Decommissioning phase

Decommissioning is not anticipated in the foreseeable future of this project. However, if it were to occur, it may entail changes in land use, including functional alterations or demolition prompted by changes in land use.

A decommissioning plan that considers environmental concerns should be prepared by the developer before commencing decommissioning activities. If decommissioning is carried out, it might involve alterations in land use, such as functional changes or demolition due to changes in land use. The main activities to be executed on the site during decommissioning phase if it were to occur are presented in Table 2.5 and this stage will last for a period of six (6) months.

Table 2. 5: Description of project activities and issues during decommission phase

| SN | Activity | Description | Environmental/ Social Issue |
|----|-------------------------|---|--|
| 1 | Rehabilitation of Site | Rehabilitation of the site building and infrastructure | <ul style="list-style-type: none"> Noise Dust Solid waste generation (rubbles) Liquid waste (sewage) Occupational safety and health |
| 2 | Solid waste collection | Clearance of all sorts of wastes including solid wastes (rubbles, plastics, wood, metal, papers, etc); | <ul style="list-style-type: none"> Noise Dust Solid waste generation Occupational safety and health |
| 3 | Transportation of waste | Construction rubbles from site will be transported by trucks away the construction site. All materials/rubbles which can be reused (iron, wood pieces) shall be taken to contractor's workshop for storage ready for reuse. All materials/waste which can be recycled shall be sold to authorized recyclers and all materials/wastes which can neither be reused nor recycled shall be disposed to the authorized dumpsites | <ul style="list-style-type: none"> Noise Air pollution due to dust and emissions Occupational safety and health Mloganzila Mtaa Community Health, Safety and security risk |

Source: Consultant, May 2024

2.5.4.1 Types and Sources of Project Requirements

Types and sources of project requirements during the demobilization phase are shown in Table 2.6.

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

| Requirements | Type | Source | Quantity |
|--------------|-----------------|--------------|----------|
| Manpower | Skilled | Contractor | 10 |
| | Unskilled | Local People | 50 |
| Equipment | Motor grader | Contractor | 1 |
| | Tippers | Contractor | 1 |
| | Plate compactor | Contractor | 1 |

Source: Consultant, May 2024

2.6 WASTE MANAGEMENT

Wastes generated will include solid wastes, liquid waste from sanitary facility, Healthcare Waste (Solid and liquid) and hazardous solid and liquid wastes. The proponent will provide facilities for handling solid waste generated within the facility. These will include waste bins for the sections, a central waste collection for temporarily holding waste within the premises before final collection for transportation. Hazardous solid waste such as oil contaminated materials, (chemicals, contaminated materials and chemicals will be separately collected and handled by a certified hazardous waste handling contractor. Sewage generated from the proposed site will be discharged into a centralized bio digester, storm water from the project area will be channeled into the storm water drainage that will be constructed on site.

The amount of waste generated and their respective management in all project phases is estimated in this section.

2.6.1 Mobilization/Construction Phase

2.6.1.1 Solid Waste

Source: Construction wastes will include top soil, rubbles, excavated materials (mud, sand and rocks) cement bags, and cut trees, shrubs and grass. Other wastes are expected to be generated are water plastic bottles. The amount of construction waste materials is estimated to be approximately 2% of the total amount of materials used in this phase.

Additionally, there is the generation of domestic solid waste during this phase, including food-related waste such as food remnants, used water bottles, and paper waste. This is inevitable due to the on-site provision of food and water for construction personnel. It is estimated that about 92kg of domestic solid waste will be generated daily from a workforce of approximately 100 workers during this phase.

Management: Domestic waste will be properly collected and segregated onsite and collected by a registered municipal contractor and send them to the designated Pugu Kinyamwezi dumpsite. While those recyclable wastes like plastic bottles will be properly collected and sold to recyclers. The developer is advised to provide proper and adequate labelled bins so as to make easy the segregation of waste e.g. there should be a bin for collecting decomposable wastes such as food remains/left overs and another bin for plastics or recyclable wastes.

Amount of domestic solid waste generated at the sites is based from the current solid waste generation rate in Tanzania which ranges from 0.50 to 0.92kg/cap/day (Robert Breeze Toronto, 2012).

Amount of solid waste generated is estimated as below. Given that;

- Expected number of workers=100 persons
- Generation rate is 0.92kg/person. Day (worst case scenario)
- Total waste generated per day= 100 persons*0.92kg/person. day
=92kg/day

The estimated amount of waste refuses to be generated will be About 92kg/day from the site during construction period.

2.6.1.2 Hazardous Wastes

Source: Hazardous waste expected for this project are metal scraps, Chemical solvents, paints and paints contaminated materials, adhesives and sealants, and electrical wire remains.

Management: Hazardous waste material that are produced through construction activities will be properly handled by certified contractors. The waste will be well managed to avoid its adverse effects over health and environment.

2.6.1.3 Liquid Waste

Sanitation system to be used at the site is onsite system that is Centralized Bio-digester. The wastewater treated was computed based on the assumption that:

- There will be about 100 workers;
- Water consumption =40L/capita/day; and
- 80% of the water consumed becomes wastewater.

Therefore, wastewater generation per day =100x40x0.8=3200 litres

800L per day of wastewater is expected to be produced during the construction period. The waste will be stored on temporary improved pit latrine constructed on site.

The types, estimated amount and disposal methods of solid wastes in this phase are as shown in Table 2.7.

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

| - Type of waste | - Source and Characteristics | - Estimated - quantity | - Management Measure |
|------------------|--|------------------------|---|
| Overburden | - Will emanate from earth moving works for soil excavation for - establishment of buildings foundations and site clearance. | | <ul style="list-style-type: none"> • Avoiding unnecessary excavation of land thereby confining earth works to effective areas; • Most of overburden produced will be stockpiled for backfilling and site rehabilitation; • The rest of overburden materials (if any) will be used for land reclamation activities in the locality. |
| Vegetative waste | - This include materials generated by site clearing activities and includes, but is not limited to, leaves, grass trimmings, woody wastes such as shrub and tree pruning, bark, limbs, roots, and stumps | | <ul style="list-style-type: none"> • Unnecessary removal of vegetation cover shall be avoided; • woody wastes will be provided to local community as fuel wood; • Wastes will be properly collected, transported for safe disposal at designated dumpsite in Pugu kinyamwezi |
| Solid waste | - These will be garbage and rubbish such food remains, papers, cardboards, plastic bottles, etc. This will be generated by about 100 | 92kg/day | <ul style="list-style-type: none"> • Awareness on waste management will be provide to all construction workers; • Appropriate waste management plan will be developed and implemented in order to prevent, minimize and control the disposal of |

| | | | |
|------------------------------|---|--|---|
| | - construction crew (laborer's) at generation rate of 0.92kg/day/person | | such waste; <ul style="list-style-type: none"> Wastes will be properly collected, segregated, transported for safe disposal at designated dumpsite in Pugu kinyamwezi |
| Wastewater | - This will include wastewater/sewage to be generated from sanitation facilities (washing basins and toilets). It will be generated based on - 100 people at site with estimated water consumption rate of - 40L/capita/day and wastewater discharge factor of 80%. | 3200 litres/day | <ul style="list-style-type: none"> Appropriate wastewater management plan will be developed and implemented; Onsite sanitation facilities preferably Centralized Bio-digester will be established; - |
| Waste oils/ Hazardous wastes | - Waste oil will include leaking fuels and lubricants from poorly maintained trucks, vehicles and equipment - Hazardous wastes will include scrap metals, paint containers, etc. | 3 litre/day | <ul style="list-style-type: none"> Secondary containment measures in areas where fuels, oils and lubricants are stored and loaded or unloaded shall be installed; All hazardous materials and chemicals will be handled in accordance with their Materials Safety Data Sheets held on site; Service and maintenance of vehicles will be done at designated garages |
| Construction wastes | - These are wastes generated as a result of construction works. It comprises surplus construction materials, woods, containers and - packaging materials | 2% of the total amount of materials used | <ul style="list-style-type: none"> Appropriate waste management plan will be developed and implemented at the site to minimize environmental damage from construction activities; Awareness on waste management will be provide to all construction workers; Appropriate waste collection bins will be put in places; Useful wastes will be used for land rehabilitation on and off site; Useless waste will be properly collected, stored and transported for safe disposal at official landfill Metal and plastic waste and will be sold/ provided to registered scrap metal and plastic dealers. |
| Emissions | - These will include emissions from combustion of fossil fuels from stationary or mobile sources such as construction vehicles and - machineries. | | <ul style="list-style-type: none"> Drivers and operator will be train on measures to minimize emissions (e.g. shut off engines when vehicles not in use, etc.). Efficient and well serviced vehicles and equipment will be used in order to minimize emissions. |

Source: Consultant, May 2024

This comprehensive waste management plan will ensure responsible handling, recycling, and disposal of various waste streams during the construction phase of the project.

2.6.2 Operational phase

2.6.2.1 General Waste

General waste (non-medical waste) from hospitals includes all waste materials that are not contaminated with hazardous substances or infectious agents. This category encompasses a wide range of materials typically found in administrative, kitchen, and maintenance areas. Common items include paper, cardboard, packaging materials, food scraps, and disposable items like gloves and masks that are not contaminated with bodily fluids. Proper segregation, recycling, and disposal practices are essential components of a hospital's waste management plan, ensuring that non-medical waste will be handled in an environmentally responsible manner.

Amount of domestic solid waste generated at the Cardiac Hospital will be based from the current solid waste generation rate in Tanzania which ranges from 0.50 to 0.92kg/cap/day (Robert Breeze Toronto, 2012). The estimated amount of waste refuses to be generated for 720 people at the site will be 662Kg/day.

Amount of solid waste generated is estimated as below. Given that;

- Expected number of people =720
- Generation rate is 0.92kg/person/day
- Total waste generated per day= 720 persons*0.92kg/person. day
=662kg/day

A solid waste collection point shall be designated to store domestic refuse before they are collected by the appointed contractor to the disposal facility. The proponent will provide facilities for handling solid waste generated within the facility.

Practically, the registered municipal contractors will be responsible for collection of solid wastes in area.

2.6.2.2 Health Care Waste

In practice the classifications of healthcare waste is based on the types of risks associated with waste which can be either hazardous or non-hazardous. Generally, 75-90% of healthcare waste in a health facility are regarded as non- hazardous and 10-25 % are regarded as potentially hazardous waste or waste that is associated with health and environmental. Classifications are useful for deciding treatment approaches, Waste minimization options and Recycling and re-use of valuable materials. (National Policy Guidelines for Health Care Waste Management in Tanzania, 2017)

Classification of Health Care Waste

Healthcare waste is classified mainly into two categories which are Hazardous and Nonhazardous waste.

A. Non-hazardous waste

Non-hazardous waste is waste that has not been in contact with infectious agents, hazardous chemicals or radioactive substances and does not pose a sharps hazard. A significant proportion (about 85%) of all waste from health-care facilities is non-hazardous waste and is usually similar in characteristics to municipal solid waste. More than half of all non-hazardous

waste from healthcare facility is paper, cardboard and plastics, while the rest comprises discarded food, metal, glass, textiles, plastics and wood.

B. Hazardous Health Care Waste

Hazardous waste is a waste that poses potential threat to public health and the environment. They can be in the form of solid, liquid or gaseous. Hazardous waste is classified into the following;

- i. **Infectious waste:** is any material suspected to contain pathogens (bacteria, viruses, parasites or fungi) in sufficient concentration or quantity to cause disease in susceptible hosts. This category includes: Waste contaminated with blood or other body fluids;
- ii. **highly infectious waste:** Means all waste materials containing, blood, fluids with **viable biological agents** from infected person or artificially cultivated in significant elevated numbers; Waste from infected patients in isolation wards, cultures and stocks; dishes, devices used to transfer, inoculate and mix cultures of infectious agents. In case of notifiable highly infectious diseases ie. Viral Hemorrhagic fever, such waste materials should follow extra treatment procedure.
- iii. **Sharps:** These are items that could cause cuts or puncture wounds and infections. Sharps include needles, hypodermic needles, scalpels and other blades, knives, infusion sets, saws, broken glass and pipettes. Whether or not they are infected, such items are usually considered hazardous health-care waste and should be treated as if they were potentially infected.
- iv. **Pathological waste;** These waste consists of tissues, organs, body parts, blood, body fluids and other waste from surgery and autopsies. It also includes human fetuses and infected animal carcasses.
- v. **Pharmaceutical waste;** These include expired, unused, spilt and contaminated pharmaceutical products, prescribed and proprietary drugs, vaccines and blood sera that are no longer required, and, due to their chemical or biological nature, need to be disposed of carefully. The category also includes discarded items heavily contaminated during the handling of pharmaceuticals, such as bottles, vials and boxes containing pharmaceutical residues, gloves, masks and connecting tubes.
- vi. **Genotoxic waste;** These include certain cytostatic drugs, vomit, urine or faeces from patients treated with cytostatic drugs, chemicals and radioactive material.
- vii. **Chemical waste:** These consist of discarded solid, liquid and gaseous chemicals; for example, from diagnostic and experimental work and from cleaning and disinfecting procedures. Chemical waste from health care is considered to be hazardous if it has at least one of the following properties: toxic (harmful); corrosive (e.g. acids of pH <2 and bases of pH >12); flammable; reactive (explosive, water reactive, shock sensitive) and oxidizing.

Wastes from materials with high heavy-metal contents represent a subcategory of hazardous chemical waste and are usually highly toxic. Mercury and cadmium are examples of highly toxic yet common substance in health-care facilities. Mercury wastes are typically generated by spillage from broken clinical equipment (thermometers and aneroid blood pressure equipments) and dental amalgam while cadmium waste comes mainly from discarded batteries

- viii. **Radioactive waste:** These are materials contaminated with radionuclides. They are produced as a result of procedures such as in vitro analysis of body tissue and fluid, in vivo organ imaging and tumor localization, and various investigative and therapeutic practices. includes liquids, gas and solids contaminated with radionuclides whose ionizing radiations have genotoxic effects. The ionizing radiations of interest in medicine include X-and y-rays as well as cx- and B- particles. An important difference between these types of radiations is that X-rays tubes only when generating equipment is switched on whereas y-rays, cx- and B- particles emit radiations continuously. The type of radioactive material used n HCFs results in low level radioactive waste and concerns mainly therapeutic and imaging investigation activities where Cobalt 60 Co, Technetium 99mTc, iodine 1311 and iridium 192Ir are most commonly used;

Management of Health Care Waste (HCW)

Minimization concept

For efficient and effective minimization, of Health Care Waste, MUHAS shall establish and practice strategies for HCW waste avoidance, reduction, re- use and recycling as follows;

- Minimization of HCW shall include source reduction, use of medical procedures that reduce the volume of waste generated.
- MUHAS should put in place mechanisms to restrict the purchase of supplies that produce a lot of HCW.

Recycling:

- MUHAS shall use separate color-coded containers placed at the source of waste generation for recyclable materials.
- MUHAS will practice effective waste segregation at the point of generation to facilitate recycling of recyclable materials.
- All recyclable healthcare waste must be properly treated before taken out of the healthcare facilities

Re-use


- Surgical equipment and other items which are designed for reuse and are sensitive to heat shall be sterilized by approved procedures.
- Operating and waste treatment costs should be reviewed periodically to evaluate any fluctuations. Data shall be collected to allow comparisons between HCF and to establish benchmarks.

Guidelines for Segregation of Healthcare Waste

- MUHAS shall segregate waste to protect personnel from injury and infection by preventing hazardous waste entering inappropriate waste streams.

- All standard operating procedures of HCW segregation, packaging and labeling shall be displayed in each department;
- Segregation of healthcare waste shall be done at the generation point and is the responsibility of the person/institution that generate it.
- Segregation receptacles must be placed close as possible to waste generator as this will avoid cross contamination.
- Standard color-coded receptacles for each category of waste shall be provided by MUHAS.
- Segregation of healthcare waste shall consist of separating different waste materials based on the type, treatment and disposal or recyclable options;
- The mixing of non-hazardous and hazardous waste is not permitted. If mixing occurs, all waste contained together in, shall be classified and treated as hazardous waste.
- Staff engaged in the segregation of HCW should wear appropriate personal protective equipment.
- SOPs or posters for healthcare waste segregation should be displayed at the point of healthcare generation.

Table 2. 8: Colour coding for different HCW categories

| Waste category | Type of waste | Colour of receptacles and liner |
|-------------------------|---|---|
| Non-infectious Waste | Paper, packaging materials, plastic bottles, food remains, boxes, cartons | Black or Blue or  |
| Infectious Waste | Used gloves, dressing materials, specimen containers, infusion packages, catheters, urinal bags | Yellow  |
| Highly infectious waste | Anatomical waste, blood, body fluids, pathological waste, culture materials, stocks, petri dishes, waste from isolation ward or camp. | Red  |
| Sharps waste | Used Syringes and needles, surgical blades, scalpels, , needles, scalpels, prickers, blades, broken glass (e.g., pipettes, ampoules, vials) | Yellow Safety Boxes  |

Guidelines for collection and onsite-transportation of Healthcare Waste

For efficient and effective collection and transportation of Health Care Waste, MUHAS shall;

- Provide standard equipment for collection and transportation of healthcare waste.
- Provide appropriate personal protective equipment
- Supervise staff to adhere on use of personal protective equipment.
- All infectious waste shall be collected on daily basis
- Hazardous HCW and non-hazardous HCW shall be collected on separate trolleys.
- The collection/transport route shall be the most direct and shortest one from the collection point to the central storage facility or disposal point, and should avoid where food preparation is done and the heavily populated areas.
- HCW should be transported using color coded/labeled transportation equipment that are not used for any other purpose;
- Collection times should be fixed and reliable

- The collected waste shall not be left even temporarily anywhere other than at the designated central storage facility;
- Health-care waste shall not be transported by hands to avoid the risk of accident or injury
- All bin liners and /or containers of waste must be marked to identify the unit/ward where the waste was generated
- Spare trolleys/wheeled bins shall be available in case of breakdowns and maintenance
- The trolleys/ wheeled bins shall be cleaned and disinfected after every use.
- All waste bag seals should be in place and intact at the end of transportation.
- There should be separate, secured, storage rooms to maintain segregation of:
 - – Radioactive waste
 - – Waste containing Mercury

Guidelines for Health Care Waste storage

For efficient and effective storage of Health Care Waste, MUHAS shall:

- Provide a secured and fenced HCW storage bay
- The bay should have an impermeable, hard-standing floor with good drainage system, easy to clean and disinfect in line with standards and procedures for HCWM
- Ensure separate labeled storage compartment for various types of HCW
- Provide a separate compartment for radioactive waste storage
- Infectious waste must be stored not more than 48 hours from the time of generation.

Guidelines on disposal methods

Non-hazardous waste

- Non – hazardous waste shall be disposed of in public designated disposal sites.
- In case there is no public disposal site the authority shall establish a designated disposal site for non-hazardous that meet public health and environmental requirement.
- Open burning is strictly not allowed for all types of waste
- The designated disposal site should be secured for unauthorised access and fenced.

Hazardous waste disposal options

Hazardous waste must be treated before final disposal. The following disposal are options for various types of hazardous waste: -

Pathological waste disposal:

- MUHAS will have a designated placenta pit within the facility premises.
- Other pathological waste will be incinerated.

Disposal of hazardous ash:

Fly ash and bottom ash from incineration is generally considered to be hazardous, because of the possibility of having heavy metal content and containing dioxins and furans.

- Hazardous ashes will be disposed in sites centralized designed for hazardous wastes,

Sharp waste disposal

Even after sterilization, sharp waste may still pose physical risks. MUHAS will do the following;

- Sterilized sharp waste will be disposed of in safe sharp pits or encapsulated by mixing waste with immobilizing material like cement before disposal.
- In case recycling opportunity existing sharp waste will be sterilized and taken for recycling with licensed companies.

According to (National Policy Guidelines for Health Care Waste Management in Tanzania, 2017), Healthcare waste in a health facility are regarded as only 10-25 % of the general waste. Amount of solid waste generated is estimated as below. Given that;

- Amount of General waste produced=662kg
- Generation rate is 10-25% of general waste (taking 20% as average)
- Total waste generated per day= 662kg *20%
=132kg/day

2.6.2.3 Liquid waste

Expected waste water will be emanating from the domestic activities and sanitation facilities which will be handled and treated by designed by the centralized system at the hospital.

Assume that:

- There will be about 720 people;
- Water consumption =40L/capita/day;
- 80% of the water consumed become wastewater; and
- Wastewater generation per day =720x40L/person/dayx0.8 =23,040L

About 23,040 litres of wastewater per day is expected to be produced from during operation period. Sewage generated from the proposed site will be discharged into a centralized system at the hospital.

Types, amounts and treatment/disposal of wastes during the operation phase are shown in Table 2.9

Table 2. 9: Types, amounts and treatment/disposal of wastes during the operation phase

| Type | Source and Characteristics | Management Measure |
|--------------------------|--|---|
| General waste | These will be garbage and rubbish such food remains, kitchen wastes, papers, cardboards, plastic bottles, and all general garbage generated from domestic activities. This will be generated by about 250 people including students and staffs at generation rate of 0.92kg/day/person | <ul style="list-style-type: none"> •Awareness on waste management will be provide; •Appropriate waste management plan will be developed and implemented in order to prevent, minimize and control the disposal of such waste; •Wastes will be properly collected, segregated, transported for safe disposal at designated dumpsite located at Pugu Kinyamwezi. |
| Medical (Clinical) waste | Needles, syringes, scalpels, human tissues, organs, body parts, fluids removed during surgery or autopsy. Items contaminated with blood or other bodily fluids, such as bandages, gloves, swabs, and surgical drapes. Expired, unused, | <p>Segregation of healthcare waste shall be done at the generation point and is the responsibility of the person/institution that generate it.</p> <p>Segregation receptacles must be placed close as possible to waste generator as this will avoid cross contamination.</p> |

| | | |
|---------------------------------|---|---|
| | or contaminated medications, including tablets, vials, and IV bags | Standard color-coded receptacles for each category of waste shall be provided by MUHAS. Waste will be treated in the Incinerator |
| Hazardous Waste | Disinfectants, laboratory reagents, solvents, and cleaning agents. Radioisotopes used in diagnostic imaging and therapeutic procedures. Chemotherapy drugs and related materials like IV bags, tubing, and gloves. | Segregation of healthcare waste shall be done at the generation point and is the responsibility of the person/institution that generate it. Segregation receptacles must be placed close as possible to waste generator as this will avoid cross contamination. Standard color-coded receptacles for each category of waste shall be provided by MUHAS. Waste will be collected by the respective hazardous waste contractor |
| Electronic waste | Outdated or broken electronic devices such as computers, monitors, medical equipment. | They will be contracted once desirable amount has been reached |
| Wastewater | This will include wastewater to be generated from domestic activities including cooking, washing and from sanitation facilities. It will be generated based on 250 people to with water consumption rate of 20L/capita/day and wastewater discharge factor of 80% | Appropriate wastewater management plan will be developed and implemented to prevent, minimize and control the discharges; Centralized Biodigester will be constructed for management of wastewater to be generated. When full the containments will be emptied and discharged to the |
| Waste oils/ Hazardous wastes | Waste oil shall include leaking fuels and lubricants from poorly maintained trucks, vehicles and equipment. | <ul style="list-style-type: none"> • Secondary containment measures in areas where fuels, oils and lubricants are stored and loaded or unloaded shall be installed; • All hazardous materials and chemicals will be handled in accordance with their Materials Safety Data Sheets held on site; • Service and maintenance of vehicles will be done at designated garages |
| Storm water runoff | This will be generated from the rainfall catchment areas in the core project area | <ul style="list-style-type: none"> • Appropriate storm water drainage systems will be established at core project site; • The design of the storm water system will make provision for erosion protection, as the transformed area, after construction will have a greater surface run-off that will contribute to higher flows • Rainwater harvesting will be used to minimise generation of surface runoff |
| Emissions | These will include emissions from combustion of fossil fuels from | <ul style="list-style-type: none"> • Drivers and operator will be train on measures to minimize emissions |

| | | |
|--|---|--|
| | stationary or mobile sources such as vehicles and machineries. Emission will also be generated from the training workshops. | (e.g. shut off engines when vehicles not in use, etc.). <ul style="list-style-type: none"> Efficient and well serviced vehicles and equipment will be used in order to minimize emissions. |
|--|---|--|

Source: Consultant, May 2024

2.6.4 Demobilization phase

Types, amounts and treatment/disposal of wastes during the demobilization phase are shown in Table 2.10:

Table 2. 10: Types, amounts and treatment/disposal of wastes during the demobilization phase

| Waste | Types | Amount | Treatment/ Disposal |
|------------------------------|---|---|--|
| Solid Waste (Degradable) | Remnants of timber. | 0.4-0.5tons | Taken to contractor workshop for reuse (away from site) |
| | General garbage (food remains, cardboards and papers) | 0.375tons/month (based on generation rate of 0.25kg/day/person and 50 people) | To be collected in a large skip bucket at each site and disposed at the authorized landfill at chidaya |
| Solid Waste (Non-Degradable) | Scrap metals (drums, paint cans, iron sheets etc) | 0.3-0.5tons | Given to companies authorised to collect hazardous wastes. |
| | Tins, glasses | 50-60kg | To be collected at waste collection point at site and disposed at the authorized dumpsite in Pugu Kinyamwezi |
| Liquid waste | Sewage | 48m ³ /Month (Based on 50 people, water consumption rate of 40L/capita/day and wastewater discharge factor of 80%) | Water is channeled to centralized systems |
| | Oils and greases | N/A | service and maintenance of vehicles will be done at designated garages |

Source: Consultant, May 2024

2.7 PROJECT UTILITIES

2.7.1 Energy and fuel sources

The main source of electricity at the site will be electricity from MUHAS, all construction works employing the use of electricity will be conducted by the use of generators that are standalone power sources for construction sites. With reflection to the project demand, this energy source will therefore provide flexibility and can be moved to different locations on the site as needed.

2.7.2 Water Demand

The main water source at the site will be from DAWASA. water used for construction and operational purposes will be obtained from DAWASA by the pre-existing water supply system in Mloganzila area.

During Mobilization Phase

Water consumption during mobilization is not expected although water will be available at the site.

During Construction Phase

About 4m³ (4000 litres) of water is expected to be used per day during construction period. There will be about 100 workers.

- There will be about 100 people
- Water consumption =40l/capita/day
=100 workers *40L/capita/day =4000l/day

During Operation Phase

Water consumption in this phase is expected to be minimal. Total water for operation is estimated at 28.8m³ (28,800l/day).

- There will be about 720 people
- Water consumption =40l/capita/day
=720 people *40L/capita/day
=28,800l/day

2.8 HEALTH, SAFETY, SECURITY AND ENVIRONMENT (HSSE) MEASURES

MUHAS is committed to protect health and safety of all employees and surrounding, to ensure this all activities will be conducted in a manner that protects the environment and people who might be impacted by its operations. MUHAS recognizes that safe working practices are fundamental to the long-term business success.

Great emphasis will be made on Health and Safety compliance so as to ensure safety of people, property and the environment against possible hazards. All workers will be provided with adequate and appropriate personal protective equipment (PPEs) such as safety helmets, safety shoes, safety goggles, overcoats, gloves, and masks whenever required. Wearing the right PPEs is a prerequisite before entering the working environment.

Safety signs and chemicals handling procedures will be displayed at strategic areas around the project site to remind the site occupants and visitors what to do and what not to do. All visitors, new staffs, contractors and nearby community will undergo HSE induction program conducted to raise awareness of the project HSSE procedures.

There will be good record keeping for the accidents, injuries and near misses. This helps the management to have a strategic plan to prevent what has happened not to happen again and also prepare the precautionary plan for the accident/injuries/loss not to happen and thus zero accidents. Security services during project implementation will be provided by a contracted company.

CHAPTER THREE

POLICY, ADMINISTRATIVE AND LEGAL FRAMEWORK

3.1 ENVIRONMENTAL MANAGEMENT REGULATION IN TANZANIA

A clean and safe environment is the constitutional right of every Tanzanian citizen. Regulation on environmental management in the country is mainly vested on two public institutions, the National Environment Management Council (NEMC) and the Division of Environment (DoE) in the office of the Vice President. NEMC undertakes enforcement, compliance, and review of environmental impact statements whereas the DoE provides the policy formulations and technical back-up and executes the overall mandate for environmental management in the country. The ESIA certificate is issued by the minister responsible for environment. There are many policies and pieces of legislation on environmental management in Tanzania, the relevant ones to this project briefly discussed below.

3.2 NATIONAL POLICIES

Environmental awareness in the country has significantly increased in recent years. The government has been developing and reviewing national policies to address Environmental management in various sectors. Among others, the objective of these policies is to regulate the development undertaken within respective sectors so that they are not undertaken at the expense of the environment. The national policies that address Environmental management as far as this project is concerned and which form the corner stone of the present study include the following:

3.2.1 National Environmental Policy (NEP) of 2021

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

The National Environmental Policy, 1997 stresses that for a framework law to be effective, environmental standards and procedures have to be in place. For example, Chapter 4 of the policy (Instruments for Environmental; Policy), Section 61, states that "*As part of the (National Environmental Policy) strategy in the implementation of the National Environmental Guidelines, specific criteria for ESIA conduct will be formulated*". This policy is relevant to the proposed project as it restates the need to protect the environment regardless of the importance of the proposed development. This policy provide framework for the EMA 2004 and EA and Audit regulations of 2005 and its amendment of 2018 which guided this ESIA Study.

3.2.2 EAC Medicine and Health Technologies Policy of 2018

The EAC Health Policy provides a comprehensive framework for health collaboration, aiming to enhance health service delivery, infrastructure, and capacity building across the region. One of the policy objectives is to "To improve the health infrastructure in the region by promoting the establishment of regional centers of excellence." Section 3.4 (Health

Infrastructure) emphasizes the need to develop and maintain health infrastructure across the EAC member states to ensure equitable access to health services and Focus on the development of human resources through training and capacity building to improve health service delivery. Establishing a cardiac teaching and research hospital directly supports this objective by creating a regional center of excellence in cardiology. This will not only improve health infrastructure but also enhance the region's capacity to handle complex cardiac conditions.

The cardiac teaching and research hospital will contribute significantly to health infrastructure development, fulfilling the policy's goal of equitable access to specialized health services. By incorporating training and research components, the hospital will aid in the development of human resources for health, as outlined in Section 3.4, by providing training for cardiac specialists and conducting research to improve cardiac care.

3.2.3 Education and Training Policy of 2014

Education and Training policy (2014) is the result of restoration and finally cancelled by the Education and Training Policy (1995), Vocational Education and Training Policy (1996), National Higher Education Policy (1999) and Information and Communication Technology for Basic Education Policy (2007). The Education and Training policy 2014 is designed to provide direction for education and training in considering changes in economic, social, scientific and technological challenges of education and training nationally, regionally and internationally, to increase opportunity, efficiency and quality of education and in training and human resources to meet the standards of a country with middle economy by 2025.

The specific objectives of the policy is to have:

- i. Framework, flexible structures and procedures to enable Tanzanians to develop in different ways in the currents of academic and professional;
- ii. Education and training with highly recognized quality standards nationally, regionally and internationally;
- iii. Access to a variety of opportunities in education and training
- iv. Increased human resources according to national priorities;
- v. Management and effective operation of education and training in the country;
- vi. Sustainable system of financing education and training in the country; and
- vii. Education and training system centred cross-cutting issues.

Regarding Environment, policy statement no 3.7.1 states that *The government will put in place a mechanism that will ensure that the content of the care for the environment is integrated into the curriculum of education and training at all levels.* The policy statement no 3.7.3 states that *The government will strengthen the partnership between the public and private sectors to facilitate availability of modern infrastructure and services at all levels of education and training.* This project is part of Government efforts to achieve the objectives of this policy.

3.2.4 The National Health Policy, 2017

This Policy is a revision of the 2003 Health Policy, which emphasized on the need for increasing community involvement in health development and improved access and equity in health and health services. One of the main objectives of this policy is to ensure that health services are available and accessible to all people wherever they are in the country, whether in urban and

rural areas. The policy encourages safe basic hygienic practices in workplaces, promote sound use of water, promotes construction of latrines and their use, encourage maintenance of clean environment; working environment which are conducive to satisfactory work performance.

The project involves construction of a Cardiac teaching and research Hospital. The proposed project will observe the objectives outlined in the policy and contribute to the broader goal of improving cardiovascular health across the population

3.2.5 Construction Industry Policy (2003)

The Construction Industry Policy intends to support sustainable construction sector by promoting application of costs effective and innovative technologies and practice to support socio-economic development activities such as road-works, water supply, sanitation, shelter delivery and income generating activities. It also ensures application of practices, technologies and products which are not harmful to both environment and human health. There is no room for this project contractors not to adhere to construction standards as required by the National Bureau of Standards (Item 8.2 of the Policy). The policy also requires contractors to promote sustainable building environmental practices as required by national laws (Item 8.2.2 of the policy).

The proposed project shall comply with the sustainable building practices.

3.2.6 National Land Policy (1995)

The policy recognizes the need for protecting the environment. It stresses protecting the environment and natural ecosystem from pollution; degradation and physical destruction. Important sections of the policy relevant to the proposed project are section 2.4 (on use of land to promote socio-economic development; section 2.8 (on the protection of land resources), section 3 (iii) and section 4 (on land tenure). This policy is relevant and guides the proponent in terms of occupancy, land use and land-use change at the project site.

MUHAS is a legal owner of the project area, having certificate of occupancy showing that the land use of the area is educational purposes.

3.2.7 The National Water Policy (URT, 2002)

The overall objective of this policy is to develop a comprehensive framework for the sustainable management of the water resources in the country. This framework promotes the optimal, sustainable and equitable development and use of water resources for the benefit of all Tanzanians, based on a clear set of guiding principles. The policy provides for beneficiaries' participation in water supply schemes and addresses cross-sectoral interests in water, watershed management and integrated and participatory approaches for water resources planning, development and management. The policy provides a shift of Government roles from service provider to that of coordination, policy and guidelines formulation, and regulation.

This policy is relevant to this project because it provides framework for sustainable management of water resources during project implementation. The proposed project will use

DAWASA as the main source of water and have storage water tanks. This ESIA suggests rainwater harvesting as another way of conserving water

3.2.8 The National Employment Policy (NEP) 2008

The NEP intends to promote employment and efficient utilization of human resources in achieving national development goals in Tanzania. It acknowledges the problem of unemployment in Tanzania but strives to create a good environment for employment (Items 2.4 & 2.5 of the NEP).

The construction sector is acknowledged as one of the rapidly growing sectors in employment creation due to public construction projects in both urban and rural areas (Item 1.2.2 of the NEP). The relevant issues to note include the following: -

- Creating enabling environment for promoting and encouraging the private sector and other stakeholders to allocate investment in labour and protect marginalized groups (Item 3.2 of the NEP).
- Rationalising of employment of foreigners in Tanzania (Item 3.13 of the NEP). This will include skills transfers; work permits and control of foreign workers without required skills.
- Reducing the impact of HIV/AIDS in work place (Item 3.14 of the NEP).
- Improving access employment opportunities and productive resources for disabled (Item 3.15 of the NEP).
- Mainstreaming environmental issues in employment creation as required under the National Environmental Policy and Laws (Item 3.16 of the NEP).
- Eliminating Child labour in work place (Item 3.22 of the NEP).
- Mainstreaming gender in employment (Item 3.24 of the NEP).
- Provision of rights to Workers' Organisations at place of work (Item 4.3 of the NEP).

Regarding gender, the policy also calls for affirmative actions aimed to facilitate access to productive employment opportunities among women both in wage and self-employment in public and private sectors. MUHAS shall implement this policy by providing equal opportunities for both genders, prohibiting child labour and providing conducive environment for workers during construction and operation of the project.

3.2.9 The Community Development Policy (CDP), 1996

The Policy envisages that community development is achieved when people are enabled to develop their capacity to identify their problems and plan ways of solving them. Therefore, members of the community are to be involved in planning, decision making and implementation of development initiatives. One of the emphasized areas in this policy is to expand and develop infrastructure and using local labour in works such as roads, water, schools, dispensaries and godowns. An increase in social services is considered an indicator of community development i.e. good housing, health, education, nutrition, clean environment and safe water (Items 10 & 11 of the CDP). Improvement of Education sector through this project is part of Government efforts to achieve the objectives of this policy.

3.2.10 The Women, Gender and Development Policy (2000)

The key objective of the women and gender and development policy is to provide guidelines to ensure that gender sensitive plans and strategies are developed in all sectors and institutions. Moreover, the policy emphasizes on gender quality and equal opportunity of both

men and women for them to participate equitably in development projects as it requires proper and effective project management to ensure that gender issues get the attention and priority they deserve.

Therefore, this project shall insure women's participation is incorporated in all levels of project planning and implementation

3.2.11 The National Strategy for Gender and Development (2005)

The strategy outlines the step for laying out the foundation for promoting gender equality and equity in the country's institutions. As the Beijing Platform for Action is vital in enforcing the rights of women, the Tanzania government has committed itself to supporting initiatives that focusing on alleviating gender inequality in economic, education, training and employment at all levels. One of the aim of this project is to alleviate students gender inequality at MUHAS.

3.2.12 National Policy on HIV/AIDS (2001)

The overall goal of the National HIV/AIDS policy is to provide a framework for leadership and coordination of the National multi-sectorial response to the HIV/AIDS epidemic. This includes formulation, by all sectors, of appropriate interventions which will be effective in preventing transmission of HIV/AIDS and other sexually transmitted infections, protecting and supporting vulnerable groups, mitigating the social and economic impact of HIV/AIDS. Emphasis is placed on women who work as food vendors and other small businesses who are at risk and vulnerable of contracting HIV/AIDS infection due to integration of seasonal contractual workers and vice versa.

Therefore, this policy is relevant in this respect since it provides the larger framework for intervention and production of HIV/AIDS for all people (Item 3 of the NPH).

3.2.13 Energy Policy (2015)

The policy guides sustainable development and utilization of energy resources to ensure optimal benefits to Tanzanians, contributing to economic transformation. The Policy document covers the following areas or subsectors: (i) Electricity generation, transmission, distribution, interconnection, power trading and rural electrification; (ii) Petroleum and gas upstream, midstream and downstream activities; (iii) Renewable energy, energy conservation and energy efficiency including Feed-in-tariff; and (iv) Cross-cutting issues including subsidies, institutional, legal, regulatory as well as monitoring and evaluation frameworks.

The proposed project will procure electricity from Tanzania Electric Supply Company Limited (TANESCO). The project also intends to install a standby generator in case of a power outage. The setup of the generator will consider environmentally friendly options to minimize pollution.

3.3 LEGAL FRAMEWORK

3.3.1 Environmental Management Act No. 20 of (2004), Cap. 191

The Environmental Management Act (EMA) is a piece of legislation that forms an umbrella law on environmental management in Tanzania. Its enactment has repealed the National

Environment Management Council Act. 19 of (1983) while providing for the continued existence of the National Environment Management Council (NEMC).

Among the major purposes of the EMA are to provide the legal and institutional framework for sustainable management of the environment in Tanzania; to outline principles for management, impact and risk assessment, the prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and enforcement; to provide the basis for implementation of international instruments on the environment; to provide for implementation of the National Environmental Policy; to provide for establishment of the National Environmental Fund and to provide for other related matters.

Part III, Section 15(a) states that *in matters pertaining to the environment, the Director of Environment shall coordinate various environment management activities being undertaken by other agencies to promote the integration of environment considerations into development policies, plans, programmes, strategies projects and undertake strategic environmental assessments with a view to ensuring the proper management and rational utilization of environmental resources on a sustainable basis for the improvement of the quality of human life in Tanzania.*

Part VI of the EMA deals with Environmental Impact Assessments (ESIA) and other Assessments and directs that an ESIA is mandatory for all development projects. Section 81(2) states that *An Environmental Impact Assessment study shall be carried out prior to the commencement or financing of a project or undertaking, while Section 81(3) states a permit or licence for the carrying out of any project or undertaking in accordance with any written law shall not entitle the Developer or developer to undertake or to cause to be undertaken a project or activity without an environmental impact assessment certificate issued under this Act.* This ESIA is conducted to respond to provisions of this act.

3.3.2 Public Health Act (2009)

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

Section 54 of this law states that *"A person shall not cause or suffer from nuisance, likely to be injurious or dangerous to health, existing on land, premises, air or water"*. The proposed project will adhere to the provisions of this act

3.3.3 The Medical Act, Dental and Allied Health Professionals Act, CAP.152

This is a legislative framework that regulates the practice of medicine, dentistry and all allied health professionals to ensure the competence and ethical behavior of practitioners in these fields. It establishes the Medical Practitioners and Dentists Board, which is responsible for licensing, regulating, and supervising medical and dental professionals. The Act outlines the qualifications required for registration, sets standards for professional conduct, and provides mechanisms for disciplinary action in cases of malpractice or unethical behavior. Additionally, it mandates continuous professional development to maintain high standards of care, thereby safeguarding public health and ensuring that medical and dental services are provided by qualified and accountable professionals.

The proposed project will adhere to the provision of this Act by ensuring all medical personnel employed at the hospital are qualified, with proper license. Furthermore, the proposed project will ensure all services provided are of high care and standard to safeguard the public health.

3.3.4 The Pharmacy Act of 2011, CAP 311

The Pharmacy Act Cap 311 is a legislative framework that regulates the practice of pharmacy to ensure the safe and effective distribution and use of pharmaceutical products. This Act establishes the Pharmacy and Poisons Board, which oversees the registration, licensing, and regulation of pharmacists and pharmaceutical establishments. The Act specifies the qualifications required for registration as a pharmacist and sets out the procedures for licensing pharmacies and drug manufacturing facilities. It also enforces standards for the storage, distribution, and dispensing of medicines, and controls the sale of poisons and restricted drugs. Additionally, the Act includes provisions for inspecting pharmacies, taking disciplinary action against those who violate professional standards, and ensuring ongoing professional education for pharmacists to maintain high standards of pharmaceutical care and public health safety.

3.3.5 The Water Supply and Sanitation Act No. 12 of 2019

This is a legislation that provides for sustainable management and adequate operation and transparent regulation of water supply and sanitation services; provides for establishment of water supply and sanitation authorities as well as community owned water supply organizations; and provides for appointment for service providers. The main aim of this law is to ensure the right of every Tanzanian to have access to efficient, effective and sustainable water supply and sanitation services for all purposes by considering among others protection and conservation of water resources and development and promotion of public health and sanitation; and protection of the interest of customers. Under this law, the Minister responsible for water affairs shall establish water authority and cluster water authorities in order to achieve commercial viabilities.

MUHAS shall comply to all provisions of this act. The proposed project shall use water supplied by DAWASA and explore other methods of water conservation such as Water harvesting..

3.3.6 Occupational Health and Safety Act (2003)

The law provides for safety, health and welfare of persons at work places; to provide for protection of persons other than persons at work against hazards to health and safety arising out of or connection with activities of persons at work; and to provide for connected matters. Section 62 of the law states that *where in a workplace, workers are employed in any process involving exposure to any offensive substance or environment, effective protective equipment shall be provided and maintained by employer for the use of the persons employed*. In this project the contractor (during construction) shall provide PPEs as per provision of this act including, overall dress, boots, helmets, ear plugs etc depending on the exposure.

Section 58 present the issue of first aid box and it states that *There shall be provided and maintained a first aid box or cupboard to the prescribed standard and the first aid box or cupboard shall be distinctively marked "FIRST AID" having only appliances or stocks of first aid equipment*. A well-stocked first aid kit shall be provided at the construction site.

Section 24 (1) states that *"a thorough pre-placement and periodic occupational medical examination for fitness for employment and for employees shall be carried out by a qualified occupational health physician or where necessary a qualified medical practitioner as may be authorized by the chief inspector*. Developer shall conduct medical examination to all those who require employment before employing them.

3.3.7 Engineers Registration Act and its Amendments 1997 and 2007

The Acts regulate the engineering practice in Tanzania by registering engineers and monitoring their conduct. It establishes the Engineering Registration Board (ERB) (Section 25 of the Act). Laws require any local and foreigner engineers to register with ERB before practicing in the country (Section 10 of the Act).

Engineers contracted for construction of the Cardiac teaching and research hospital project will be registered with ERB.

3.3.8 The Contractors Registration Act (1997)

The Contractors Registration Act requires contractors to be registered by the Contractors Board (CRB) before engaging in practise and entitled class in respect to the costs of the project (Section 7 of the Act). It also requires foreign contractors to be registered by the Board before gaining contracts in Tanzania. This Act requires contractors in any site to abide to labour laws and Occupational Health and Safety regulations in construction industries. Furthermore, in execution of the works, the contractors are obliged to supply materials for the work and exercise control over type, quality and materials used during construction.

The developer shall comply with the law requirement by recruiting certified contractors during project implementation.

3.3.9 The Local Government Laws (Urban Authorities) Act (1999)

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

Hospital will be located within Kwembe Ward, Ubungo Municipality and therefore its development and operation shall abide to all bylaws formulated by the mentioned local governments.

3.3.11 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 rescues 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; and*
- g) *Conduct fire tests on protection facilities, equipment and materials.*

In section 3(1) (g) it covers premises of facility used as a place for storage 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 such other escape and rescue modalities in the event of fire.

Developer shall comply of all the provisions of this Act during construction and operation of the project.

3.3.12 The Workers Compensation Act no 20 of 2008

The law provides for compensation to employees for disablement or death caused by or resulting from injuries or diseases sustained or contracted in the course of employment (Section 19 of the Act); to establish the Fund for administration and regulation of workers' compensation and to provide for related matter. This act is very relevant to this project as workers will be exposed to various hazards during construction and operation of the four colleges. This law is relevant to the project as workers will be exposed to various hazards during construction of the facilities. The proposed project will adhere to the provisions of the Act when dealing with issues pertaining to injuries of workers in the cause of performing their duties. The contractor of the proposed project must be register with Workers Compensation Fund and make monthly contribution.

3.3.13 The HIV and AIDS (Prevention and Control) Act of 2008

The Act requires every institution registered and operating in Tanzania to do the following (Sections 19 – 32 of the Act):-

- Promote public awareness on causes, transmission, consequences, prevention and control of HIV/AIDS;
- Reduce the spread and adverse effects of HIV/AIDS;
- Protect the rights of orphans;
- Discourage negative traditions and practices which enhance the spread of HIV/AIDS;
- Increase access care and support to persons living with HIV/AIDS.

The Act also requires every employer in consultation with the Ministry of Health to establish and coordinate a workplace programme on HIV/AIDS for employees. The contractors and developer in the proposed project will comply with the provisions of this Act.

3.3.14 The Child Act, 2009

Part II of the Act defines a child in Tanzania as a person below the age of 18 years. Part II, Section 78 of the Act, provides for prohibition of exploitive labour to children. Every child shall be protected from labour exploitation and any work that is likely to (a) deprive the child of his health or development; (b) exceeds six hours a day; (c) is inappropriate to his age, and (d) the child receives inadequate remuneration.

The developer during operational phase and Contractor during construction phase shall adhere to this act by strictly prohibiting of employment to children under 18years.

3.3.15 Sexual Offences (Special Provisions) Act (1998)

Also known as SOSPA amended several written laws to incorporate special provisions on sexual violence and other offences to enhance personal integrity, dignity, liberty and security of women and children. More significantly, SOSPA introduced severe punishments for sexual offences such as imprisonment of rape perpetrators for a minimum sentence of 30 years and compensation to a survivor of sexual violence.

The proposed project comply to provisions of this act during construction and operation phase of the project.

3.3.16 The Prevention and Combating of Corruption Act (2007)

This law has established the Prevention and Control of Corruption Bureau (PCCB), which is one of the government organs mandated with handling all types of corruption incidents including those related to gender and sexual violence such as demand or offer of sexual favours in exchange for official services. For instance, Section 125 of the PCCB states that “*any person being of position or authority, who in the exercise of his authority, demands or imposes sexual favours or any other favour on any person as a condition for giving employment, a promotion, a right, a privilege or any preferential treatment, commits an offence and shall be liable on conviction to a fine not exceeding five million shillings or to imprisonment for a term not exceeding three years or both*”. MUHAS shall comply to this act.

3.3.17 National Social Security Fund Act No.153 of 2005 Cap. 50 R.E. 2015

An Act to establish the National Social Security Fund and to provide for its constitution, administration and other matters related to the Fund. Section 6-(1) of the act states that “*This Act shall apply in Mainland Tanzania in relation to a person who is-*

- (a) employed in the formal or informal sector; and*
- (b) self-employed, other than a person who is registered or insured under any other written law.*

While section 6-(2) states that *Every insured person shall be issued with a registration number upon registration.* The proposed project will adhere to the given provisions of the Act.

3.3.18 The Land Act, CAP 113 R.E 2019

This law declares all land in Tanzania “Public land” to be held by the state for public purposes. The Acts empower the President of the United Republic of Tanzania, to revoke the “Right of Occupancy” of any landholder for the “public/national interest” should the need arise. The laws also declare the value attached to land. The law as amended in 2004 recognizes the role of land in economic and urban development. The law provides for technical procedures for preparing land use plans, detailed schemes and urban development conditions in conformity with land use plan and schemes. The LGA has the power to impose conditions on the development of any area according to the land-use planning approved by the Minister.

This project has been designed according to the requirements of this law.

3.3.19 The Urban Planning Act (2007)

The law provides for the orderly and sustainable development of land in urban areas, to preserve and improve amenities; to provide for the grant of consent to develop land and powers of control over the use of land and to provide for other related matters. Section 29-(1) of the law states that *Notwithstanding the provisions of any other written law to the contrary, no person shall develop any land within a planning area without planning consent granted by the planning authority or otherwise than in accordance with planning consent and any conditions specified therein.*

Building permit will be issued before construction and therefore the project will comply to the provisions of this act.

3.3.20 Employment and Labour Relations Act Cap 366 R.E 2020 GNNO 140

The Act makes provisions for core labour rights and procedures, establishes basic employment standards, provides a framework for collective bargaining and provides for the settlement of disputes. The proposed project must meet the minimum standards of labour laws in Tanzania provided under Sections 5 – 25 of the Act including prohibition on child and forced labour, discrimination and harassment, and so forth.

The proposed project shall comply to the provisions of this act.

3.4 RELEVANT REGULATIONS AND GUIDELINES

3.4.1 EAC Treaty of 2007

The Treaty for the Establishment of the East African Community (EAC) is the foundational document that guides regional integration and cooperation among member states. **Article 118: Cooperation in Health, Social and Cultural Activities** states "The Partner States shall cooperate in the development of specialized health training, health research, and health care services. "This article supports the creation of specialized health facilities like a cardiac teaching and research hospital, emphasizing regional cooperation in health service development. The hospital aligns with the treaty's goal by providing specialized cardiac care and advancing medical research and training in cardiology within the EAC.

The establishment of a cardiac teaching and research hospital aligns with the objectives of the treaty by improving specialized health services and infrastructure within the EAC region. It also

supports the treaty's aim of enhancing medical research and training, contributing to the overall health sector development.

3.4.2 EAC Regional Health Investments Framework (2018-2028)

This strategy outlines the EAC's plan to increase investments in health, focusing on infrastructure, human resources, and service delivery. One of the **Strategic Objective is "Increasing Investment in Health Infrastructure"** which focuses on encouraging the establishment of modern health facilities and support public-private partnerships in the health sector". Objective 1 (Enhancing Health Investments) Focuses on increasing investments in health infrastructure, medical equipment, and technology, while Objective 3 (Strengthening Health Systems) aims to strengthen health systems through better infrastructure, human resources, and service delivery. Constructing a cardiac teaching and research hospital directly supports Objective 1 by increasing investments in specialized health infrastructure. The hospital will also strengthen health systems (Objective 3) by improving cardiac care services, providing advanced medical equipment, and offering training programs for healthcare professionals.

The cardiac hospital project aligns with the strategy by modernizing health infrastructure and potentially leveraging public-private partnerships for funding and operational support. This can lead to improved healthcare services and innovation in the region.

3.4.3 EAC Health Protocol of 2016

The Health Protocol facilitates regional cooperation in health services, including policy harmonization, health training, and research. Article 4 of the Protocol elaborates about Harmonization of Health Policies where a Partner States shall harmonize their health policies and regulations to facilitate the provision of quality health services and health-related research. Article 6 (Harmonization of Health Policies) encourages member states to harmonize health policies and practices, while Article 9 (Health Services and Facilities) focuses on the establishment and upgrading of regional health services and facilities. The cardiac hospital will benefit from the harmonization of health policies and practices, ensuring that the hospital meets regional standards and can collaborate effectively with other health institutions in the EAC. Under Article 9, the hospital's establishment aligns with the protocol's goal of upgrading regional health services and facilities, providing specialized cardiac care accessible to all EAC citizens.

By establishing a cardiac teaching and research hospital, member states can harmonize their cardiac care policies and regulations. This ensures consistent quality and standards in cardiac care and research, promoting regional health integration.

3.4.4 Environmental Impact Assessment and Auditing Regulations, 2005 (as amended in 2018)

These regulations set procedures for conducting ESIA and environmental audit in the country. They are made from Section 82 and 230 of EMA 2004 and prescribe that the Minister responsible for environment shall formulate regulations and guidelines on how ESIA shall be conducted. ESIA and Audit are applicable to all projects contained in Third Schedule of the EMA 2004 and First Schedule of the EIA and Audit Regulations. A project of this nature is also

covered in both schedules. It is thus a legal binding requirement to undertake the ESIA of this project (Regulations 4 – 15).

These regulations also prescribe the stages and/or the ESIA process, which are in principal managed by NEMC. The procedure is as follows: -

- Project registration and Screening before approval is made;
- Conducting of ESIA under the approved Scope and Terms of Reference;
- Review of process of Environmental Impact Statement;
- Decision of the Minister & Issue of ESIA Certificate;
- Project Implementation;
- Environmental Audit; and Monitoring.

This ESIA is conducted in accordance to the provisions of these regulations.

3.4.5 The Environmental Management (Solid waste Management) Regulation, 2009 as amended in 2016

The regulation has been made under section 114, 115, 116, 117, 118, 119, 120, 121, 122 and 230 of Environmental Management Act, 2004. These regulations apply to all matter pertaining to solid waste management. They aimed among other things at setting standard for permit to dispose solid waste and license to own or operate solid waste disposal site. MUHAS shall abide to the regulations by ensuring that solid waste generated on site does not lead to pollution within the project area or around the neighbouring area.

3.4.6 The Environmental Management (Air Quality Standards) Regulations, 2007

These Regulations regulate the air pollution from human activities including construction. It requires any person or company to comply with minimum standards of air quality issued by the National Environmental Standards Committee (Regulations 4 & 7). It also prohibits emission of hazardous substances, chemicals and gas that create air pollution. The proposed project will have to comply with the limits of emissions (Regulation 9).

The objectives of these regulations are to set baseline parameters on air quality and emissions and enforce minimum air quality standards. These Regulations stipulate the role and powers of the National Environmental Standards Committee. According to the regulations, the approval of a permit for emission of air pollutants shall be guided by ambient, receptor, emission and specification standards approved by the Minister. Offences and penalties for contraveners are also provided for in the regulations.

Emission limits of sulphur and nitrogen dioxides, carbon monoxide, lead, ozone, black smoke and suspended particulate matter together with their test methods are specified. Tolerance limits and test methods for dust, sulphur dioxide and nitrogen oxides from cement factories into the air as well as from motor vehicles are also given. Even though the project operations shall not generate air emissions but during construction air pollution is expected. Developer shall monitor the air quality from the construction site with guidance from these regulations.

3.4.7 The Environmental Management (Standards for Control of Noise and Vibration Pollution) Regulations, 2015

These Regulations provides for control and standards of noise pollution and vibrations in any environment resulting from human activities (Regulation 5). They give permissible noise levels

and tolerance limits for environmental vibrations as provided by the National Environmental Standards Committee (Regulations 9 & 10).

Section 7.-(1) of the regulation states that *Except as otherwise provided in these Regulations, no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise that annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and that of the environment.*

The permissible limits are provided for in the Schedule 1 to the Regulations, for this project the standard are shown in Table 3.1 below.

Table 3. 1: Maximum Permissible Noise Levels for General Environment

| COLUMN 1 | | COLUMN 2 | |
|----------|--|------------------------|-------|
| FACILITY | | NOISE LIMITS dBA (Leq) | |
| | | DAY | NIGHT |
| A. | Any building used as hospital, convalescence home, home for the aged, sanatorium and institutes of higher learning, conference rooms, public library, environmental or recreational sites. | 45 | 35 |
| B. | Residential building | 50 | 35 |
| C. | Mixed residential (with some commercial and entertainment) | 55 | 45 |
| D. | Residential and industry small-scale production and commerce | 60 | 50 |
| E. | Industrial area | 70 | 60 |

Source: The Environmental Management (Standards for control of noise and Vibrations) Regulations, 2014

It is evident that construction of the project shall produce noise and vibrations owing to the use of heavy machinery therefore these regulations shall be used to monitor noise and vibrations.

3.4.8 The Environmental Management (Soil Quality Standards) Regulations, 2007

These regulations set limits for soil contaminants in agriculture and habitat, enforce minimum soil quality standards, prescribe measures designated to maintain, restore and enhance the sustainable productivity of the soil and prescribe minimum soil quality standards for sustaining ecological integrity and productivity of the soil. According to the regulations, among others, the National Environmental Standards Committee has the powers to set pollutant limits and specify procedures for determination of the quality of soil for protection of the soil from degradation as a result of anthropogenic activities such as agricultural and mining activities and waste disposal.

Owners and operators of a main polluting activity are required to voluntarily register with NEMC and obtain a soil pollutants discharge permit. Obligations of polluters are also given. According to the regulations, the NEMC plays a crucial role in soil quality compliance and enforcement. Recording and reporting requirements, Offences and penalties for non-compliance as well as how appeals against aggrieved decisions should be handled are stipulated. Contaminant limits for selected soil pollutants mainly halogenated hydrocarbons (example, trichloethylene, dichloromethane, tetrachloroethylene, carbon tetrachloride, etc.),

fuel hydrocarbons (benzene, ethylbenzene, total xylenes, toluene, etc.), organic and inorganic pesticides (lindane, Atrazine, DDT, sulphur, Hexachlorobenzene, Aldrin, etc.) and their respective test methods are specified. The Regulations also cover contaminant limits for some heavy metals (e.g., arsenic, cadmium, nickel, copper, zinc, etc.) together with their test methods.

Most of the pollutants covered in these regulations will not be produced from the project activities. However, there is a potential for soil pollution from petroleum hydrocarbons due to the use of fossil fuels for running machineries, plants and vehicles during the construction phase. Nonetheless, the developer is committed to abide to the provisions of these regulations should any of the project activity produce anyone of the pollutants covered in the regulations.

3.4.9 Environmental Management (Water Quality Standards) Regulations, 2019

The regulations provide for water pollution and water quality standards, in respect to compliance by polluters and enforce minimum water quality standards prescribed by the National Environmental Standards Committee. The established committee may prescribe classifications, criteria and procedure for measuring standards for water quality and enforcement of legal water resources management requirements and monitoring. In fulfilling the requirements of the regulations, the project proponent will have to undertake monitoring of both domestic water and wastewater and ensure compliance with the acceptable discharge standards. These Regulations provide procedures for the following: -

- Protection of human health and conservation of the environment through protection of water sources and ground water (Regulation 5)
- Enforcement of minimum water quality standards prescribed by the National Environmental Standards Committee (Regulation 8)
- Establishing water usages for purposes of establishing environmental quality standards and values for each usage (Regulation 7)
- Prohibition of illegal discharges and pollutions in view of avoiding contamination which is detrimental to water usages (Regulations 9 – 17).

Monitoring of water quality within MUHAS shall be done in accordance with these regulations.

3.4.10 Environmental Management (Hazardous Waste Control and Management) Regulations, 2021

These Regulations apply to all categories of hazardous waste and to the generation, collection, storage, transportation, treatment, recycling, reuse, recovery and disposal of hazardous waste and their movements in, into and out of Mainland Tanzania. The Act (EMA 2004) defines hazardous wastes as any solid, liquid, gaseous or sludge waste which by reason of its chemical reactivity, environmental or human hazardousness, its infectiousness, toxicity, explosiveness and corrosiveness is harmful to human health, life or environment. Section 16.-(1) of the regulation's states that *A person who intends to collect, store or transport hazardous waste shall apply for a permit to the Minister by filling Form No. 1 prescribed in the Fifth Schedule and submit it to the Council for consideration.* For this project, hazardous wastes are expected during construction phase only (i.e scrap metals, used oils), therefore MUHAS handling measures of hazardous wastes shall be done according to the provisions of

this Regulation, specifically by commissioning a person/firm that have a permit recognized by this regulation.

3.4.11 Urban Planning (Planning and Space Standards) Regulations, 2018

These regulations revoke the urban planning and space standards regulations of 1997 and that of 2011. Urban Planning and Space Standards includes standards for residential areas, building lines and setbacks, plot coverage and plot ratio, health and educational facilities, golf courses, passive and active recreation, public facilities by planning levels, public facilities by population size, parking agriculture show grounds, standards for electricity supply and its way leave, way leave for water supply, road width, communication pylons, sewerage treatment plants, ponds, transportation terminals, stream/river valley buffer zone, beaches and industrial plots and recommended colours for land uses.

3.4.12 The Environmental Management (Fees and Charges) Regulations, 2021

These regulations revoke The Environmental Management (Fees and Charges) Regulations, 2008. The Regulations apply in relation to an act or service in respect of which fees and charges are payable under the Act and Regulations made thereunder. Section 4-(1) of these regulations itemize all undertakings which fees and charges apply, it states that *A person shall not, upon payment of fees and charges prescribed in the Schedule to these Regulations, carry on any of the following:*

- a. Environmental Impact Assessment;*
- b. Environmental Compliance Monitoring and Audit;*
- c. registration of Environmental Experts; d) Environmental Quality Standards;*
- d. ozone Depleting Substances;*
- e. management of waste;*
- f. biosafety;*
- g. noise and Vibrations; or*
- h. other activities related to the environment.”*

For this project, the fees for Environmental Impact Assessment includes registration fees and ESIA review fees have been paid dully to NEMC. Therefore, MUHAS have fully complied to these regulations.

3.4.13 The Environmental Management (Registration and Practice of Experts) Regulations, 2021 G.N 267

These Regulations apply to registration, categorization, practicing and conduct of environmental experts and firms of environmental experts registered and certified under these Regulations to conduct-

- a) environmental impact assessment;
- b) environmental audit; or
- c) any other environmental study that may be required to be undertaken under the Act or its Regulations.

The objectives of these Regulations are to-

- a) establish a system of registration, categorization and practicing of environmental experts;*
- b) provide for qualifications for persons who may conduct environmental studies;*

- c) *provide for a system of nurturing competence, knowledge and consistence of environmental experts in the carrying out of environmental impact assessment and environmental audits; and*
- d) *provide for a code of conduct, discipline and control of environmental experts.*

The consultants who have conducted this ESIA have been registered by these Regulations. Also, developer shall use consultant registered by these regulations when conducting annual audits for the project.

3.5 THE BANK'S INTEGRATED SAFEGUARDS SYSTEMS (ISS)

The African Development Bank (AFDB) Integrated Safeguards System (ISS) is a framework designed to promote sustainable development and ensure that all projects funded by the AFDB adhere to the highest environmental and social standards. The ISS includes a comprehensive set of policies and procedures aimed at identifying, assessing, and managing potential environmental and social risks and impacts associated with development projects. The system is built around Ten operational safeguards. These safeguards ensure that projects not only comply with legal requirements but also contribute positively to the well-being of affected communities and the environment.

The primary objectives of the AFDB's ISS are to enhance the sustainability of development outcomes by integrating environmental and social considerations into the project cycle from inception to completion. By doing so, the ISS aims to prevent and mitigate undue harm to people and their environment in the development process. Additionally, the ISS promotes the informed participation of stakeholders in project design and implementation, ensuring that the voices of affected communities are heard and addressed. This inclusive approach helps to build local ownership, improve project outcomes, and foster long-term sustainability. By adhering to the ISS, the AFDB reinforces its commitment to responsible financing that supports inclusive growth and sustainable development across the African continent.

3.5.1 AFDB Environmental and Social Operating Safeguards (E&S OS)

The Environmental and Social Operating safeguards are set out the requirements for Borrowers relating to the identification and assessment of environmental and social risks and impacts and mitigation measures associated with projects supported by the Bank through Investment Project Financing. The E&S OS are expected to: (a) support Borrowers in achieving good international practice relating to environmental and social sustainability, (b) assist Borrowers in fulfilling their national and international environmental and social obligations; (c) enhance non-discrimination, transparency, participation, accountability and governance; and (d) enhance the sustainable development outcomes of projects through ongoing stakeholder engagement.

The ten OS as per the ISS are: E&S OS1: Assessment and Management of Environmental and Social Risks and Impacts; E&S OS2: Labour and Working Conditions; E&S OS3: Resource Efficiency and Pollution Prevention and Management; E&S OS4: Community Health and Safety; E&S OS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement; E&S OS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; E&S OS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities; E&S OS8: Cultural Heritage; E&S OS9: Financial

Intermediaries; and E&S OS10: Stakeholder Engagement and Information Disclosure. Given the nature of activities of this project, only five E&S OSs (E&S OS1, E&S OS2, E&S OS3, E&S OS4, and E&S OS10) are applicable to this project.

3.5.2 AFDB Environmental and Social Operational Safeguards Applicable to the project

The following Table 3.3 below summarises The AFDB Environmental and Social Operating safeguards applicable to the project:

Table 3. 2: The AFDB Environmental and Social Operating Safeguards (E&S OS) Applicable to the Project

| No | The Applicable Environmental and Social Standard (ESS) | Operational Safeguards Triggered by the Project (For the Moment) | Reason for its Application in the Project |
|----|---|--|--|
| 1 | E&S OS1: Assessment and Management of Environmental and Social Risks and Impacts | YES | The project will generate environmental and social risks and hence they will be screened, identified and prevention and mitigation measures implemented to prevent, reduce, mitigate and address E&S OS these impacts. Site-specific ESMP will be prepared by contractor during construction to recommend E&S measures to be incorporated into designs of the specific subprojects. |
| 2 | E&S OS2: Labour and Working Conditions | YES | The project will engage community and contracted workers. The standard will promote the health and safety of these workers and ensure fair working conditions. Further a project GRM that is attentive to GBV/SEA will be in place to manage project related grievances from project affected people and other stakeholders in order to address them appropriately. In line with E&S OS2, the project will establish and operate a worker grievance mechanism to enable project workers to raise workplace concerns, including work-related sexual harassment. |
| 3 | E&S OS3: Resource Efficiency and Pollution Prevention and Management | YES | Construction materials such as wood, sand, gravel and water are expected to be supplied by authorized vendors. Mitigation measures are put in place to ensure that methods of extraction of the materials and transportation do not lead to soil erosion, pollution of water bodies, air. Site specific environmental and social assessment will determine the significance of the likely impacts and risks and mitigation measures will be included in the ESMP. It is anticipated that e-waste will be collected |

| No | The Applicable Environmental and Social Standard (ESS) | Operational Safeguards Triggered by the Project (For the Moment) | Reason for its Application in the Project |
|----|--|--|---|
| | | | separately and later on taken to the designated registered vendor by the National Environmental Management Council (NEMC) for recycling and proper disposal. |
| 4 | E&S OS4: Community Health and Safety | YES | <p>Construction activities (excavation, vehicle operations, work at height, use of chemicals, use of crane or other heavy equipment etc.) may have irreversible effects of disability or fatality to community. Localized negative impacts (like dust emissions, accidents, etc.) to sensitive receptors such as schools, religious buildings and community centers will need to be managed. The Project will require Contractors to prepare appropriate plans for emergency preparedness and response, management and safety of hazardous materials, traffic and road safety, security personnel, etc. as per the requirement of E&S OS4.</p> <p>Implementation of the Project is likely to trigger influx of workers or job seekers and their followers into sub-project areas. If a significant labor influx does occur, the project will develop and implement a Labor Influx Management Plan in line with E&S OS2, and E&S OS4. The project workforce could facilitate an increase in the transmission of HIV and other communicable diseases to members of the local/host communities. Implementation of the sub-projects.</p> <p>As the situation permits and depending on the public health circumstances, the project will ensure compliance with national law, policies and protocol requirements as well as World Health Organization in relation to stakeholders' consultations, project worksites and related areas.</p> |
| 5 | E&S OS 5: Land Acquisition, | NO | This E&S OS is not relevant to the proposed project as |

| No | The Applicable Environmental and Social Standard (ESS) | Operational Safeguards Triggered by the Project (For the Moment) | Reason for its Application in the Project |
|----|---|--|---|
| | Restrictions on Land Use and Involuntary Resettlement | | the site is legally owned by MUHAS |
| 6 | E&S OS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources | NO | The project is situated at a distance from protected areas and delicate habitats. Should the project involve the procurement of natural resource commodities like timber, it becomes crucial to identify the origin and implement a mechanism to guarantee that Primary Suppliers do not cause substantial impact on sensitive ecosystems or degrade natural habitats." |
| 7 | E&S OS 7: Indigenous People/ Sub-Saharan African Historically Underserved Traditional Local Communities | NO | This standard is deemed irrelevant, given that the project will primarily be executed in regions where communities meeting the criteria of E&S OS7 are generally not present in the area. |
| 8 | E&S OS 8: Cultural Heritage | NO | This is applicable for projects with likelihood of "chance finds "of physical cultural resources during excavation activities for foundations, etc. |
| 9 | E&S OS 9: Financial Intermediaries | NO | The Project will adhere to all rules and conditions provided by the Bank |
| 10 | E&S OS10: Stakeholder Engagement and Information Disclosure | YES | A Stakeholders Engagement Plan (SEP) has been prepared to guide implementing agencies on how to provide stakeholders with timely, relevant, understandable and accessible information, and consult with them in a culturally appropriate manner, which is free of manipulation, interference, coercion, discrimination and intimidation. |

| No | The Environmental and Social Standard (ESS) | Applicable Operational Safeguards Triggered by the Project (For the Moment) | Reason for its Application in the Project |
|----|---|---|---|
| | | | In ensuring that the project complies to the E&S OS10, the ESIA has been prepared by consulting stakeholders that include local communities, etc. |

Source: AFDB ISS, 2024

3.6 INSTITUTIONAL FRAMEWORK FOR THE MANAGEMENT OF ENVIRONMENT

3.6.1 Overall Management Responsibility at National Level

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

Table 3. 3: Lists key Institutions relevant to the ESIA Process

| Level | Institution | Role and Responsibility |
|----------------|---|--|
| National level | Vice President's Office (Division of Environment) | <ul style="list-style-type: none"> • Coordinate various environment management activities in Tanzania • Advise the Government on legislative and other measures for the management of the environment • Advise the Government on international environmental agreements • Monitor and assess activities, being carried out by relevant agencies in order to ensure that the environment is not degraded • Prepare and issue a report on the state of the environment in Tanzania; • Coordinate the implementation of the National Environmental Policy |
| | Vice President's Office - NEMC | <ul style="list-style-type: none"> • Carry on environmental audit and environmental monitoring • Carry out surveys which will assist in the proper management and conservation of the environment • Undertake and co-ordinate research, investigation and surveys in conservation and management • Review and recommend for approval of environment impact statements • Enforce and ensure compliance of the national environmental quality standards • Initiate and evolve procedures and safeguards for the prevention of accidents which may cause environmental degradation and evolve remedial measures where accidents occur; • Undertake in co-operation with relevant key stakeholders' environmental education and public awareness; |

| | | |
|------------------------------|--|--|
| | Ministry of Education Science and Technology | <ul style="list-style-type: none"> • Issuing policy guidance • Providing legal frameworks • Issuing licenses, provisions of certificates of compliances • Enforcement of laws and regulations • Project monitoring. |
| | Ministry of Health | Provision Of: <ul style="list-style-type: none"> • Hospital Services • Preventive Services • Chemical Management Services • Forensic Science Services • Food and Drug Quality Services • Promotion of Traditional Medicine. • Inspection of Health Services. • Participating in International Health and Medical Organizations. • Developing Human Resource Under the Ministry. • Overseeing Extra Ministerial Development Parastatal and Projects Under the Ministry. • Supervising Government Agencies Under the Ministry |
| | Occupation Safety and Health Authority OSHA | <ul style="list-style-type: none"> • Approval of building plans for the proposed project • Monitoring Health and Safety of workers in working premises |
| Project Funding Institutions | AFDB | <ul style="list-style-type: none"> • Project financing • Ensure the project is carried out to the highest environmental standards strictly in accordance with the ESIA and the mitigation measures set out in the ESMF. • Provide second line of monitoring compliance and commitments made in the ESMPs through supervision. |

| | | |
|------------------------------|---|---|
| Project Proponent | MUHAS | <ul style="list-style-type: none"> • Project implementation including mitigation measures • Ensure environmental compliance by the Sector Ministry • Review and approve the contractor's site-specific ESMP (C-ESMP) • Ensure contractor's compliance of the C-ESMP • Regular monitoring and reporting on the progress on the implementation of the ESMP. • Liaise with the DoE and the NEMC on matters involving the environment and all matters with respect to which cooperation or shared responsibility is desirable or required. • Oversee the preparation of and implementation of all ESIA's required for investments. |
| Regional level | Dar es salaam Regional Secretariat Office | <ul style="list-style-type: none"> • Responsible for environmental coordination of all advice on environmental management in the region and liaises with the Director and the Director General on implementation and enforcement of the Environment Act. • A Regional Environment Management Expert appointed by the Minister responsible for Regional Administration heads the secretariat. • The Regional Environment Management Expert is responsible for advising the local authorities on matters relating to the implementation and enforcement of the Environment Act. The Expert links the region with the Director of Environment and Director General. • Advice on implementation of development projects and activities at Regional level. |
| Municipal level | Ubungo Municipal Council | <ul style="list-style-type: none"> • Oversee and advice on implementation of national policies at district level • Oversee enforcement of laws & regulations • Advice on implementation of development projects and activities at district level |
| Ward Level | Kwembe | <ul style="list-style-type: none"> • Oversee general development plans for the Ward. • Provide information on local situation and Extension services • Technical support & advice • Project Monitoring |
| Street (<i>mtaa</i>) level | Mloganzila | <ul style="list-style-type: none"> • Information on local social, economic and environmental situation • View on socio-economic and cultural value of the sites and on proposed plant operations • Rendering assistance and advice on the implementation of the project • Project Monitoring (watchdog for the environment, ensure wellbeing of residents and participate in project activities. |

3.6.2 Capacity Assessment of public Entities to ESIA enforcement and oversight Project Implementation in the Specific Region

1. NEMC Zonal Office (Ubungo):

- **Role:** Will directly oversee the ESIA process for cardiac teaching and research hospital, including the review and approval of ESIA reports, and periodic monitoring.
- **Capacity:** Typically staffed with Environmental experts and specialists in all fields who have experience in handling large-scale projects.

2. Regional Secretariat (Project Implementation Region):

- **Role:** Coordinates with NEMC to ensure all environmental regulations are followed and facilitates interdepartmental cooperation.
- **Capacity:** Equipped to handle coordination and oversight but may require technical support from NEMC for complex issues.

3. Municipal Environmental Management Committee (Project Implementation Municipality):

- **Role:** Monitors and enforces ESIA compliance on the ground, working closely with local authorities and NEMC.
- **Capacity:** Staffed by Five Municipal environmental officers and supported by other Municipal departments such as health, Town planners and Land officers, and Solid waste Management.

4. Ward Development Committees and Village/Mtaa Environmental Committees:

- **Role:** Act as local liaisons, ensuring community involvement and addressing grassroots environmental concerns.
- **Capacity:** They have limited but growing capacity in terms of environmental management and often rely on Municipal support. They are primarily engaged in monitoring and reporting rather than enforcement.

3.7 OVERALL MANAGEMENT RESPONSIBILITY AT PROJECT LEVEL

To ensure the sound development and effective implementation of the proposed project, it will be necessary to identify and define the responsibilities and authority of the various key project implementors. The following entities will be involved:

- i. Funding Institution
- ii. MUHAS PIE
- iii. Contractor; and
- iv. Consultant

3.7.1 Funding Institutions (GoT and AFDB)

The project funders will have an overarching responsibility to ensure that the project is carried out to the highest environmental standards strictly in accordance with the ISS, E&S OSs and EIS.

3.7.2 PIE-MUHAS

The proponent responsibility is to ensure that the implementation process of the ESMP and Mitigation measures are in line with the relevant national policies and legislations and AFDB Environmental and Social Operational Safeguards (E&S OS1). MUHAS has the Project implementation Unit (PIU) responsible for supervision and monitoring the implementation of the project construction activities. The management of all project activities during operation is under the PIU, in collaboration with other departments and units depending on the nature of the activity. In general, the PIU falls under the management of MUHAS executing day-to-day activities in the project. The PIU is guided by management meetings that are chaired by the Deputy Vice Chancellor. The management meetings provide support, guidance and oversight of the progress of the PIU. Further, the PIU has designated the Environmental and Social Safeguard Specialists responsible for supervision and monitoring the implementation of the project. The responsibilities of the PIU member are as highlighted hereunder.

Environmental Specialist:

Environmental Specialists should have a minimum bachelor's degree in environmental sciences/environmental engineering, forestry, or related fields with experience in the construction industry. The said is responsible for the following functions:

- Monitor compliance with environmental regulations and ensure proper waste management and pollution control practices.
- Responsible for overseeing the implementation of mitigation measures.
- Monitor environmental impacts and coordinate with consultants and contractors.
- Play a crucial role in managing and minimizing the environmental impact of construction projects.
- Assess and address potential environmental risks and develop strategies for environmental management.

Social and Community Engagement Specialist:

The social specialists have a minimum bachelor's degree in social sciences and experience in building and construction projects. The social specialist is responsible for;

- The social aspects of the construction project. She ensures compliance with social performance standards.
- Overseeing the implementation of mitigation measures, monitoring social impacts, and coordinating with stakeholders.
- Involved in stakeholder engagement activities and reporting on social performance.
- Building positive relationships with the local community and stakeholders affected by the construction project.
- Engagement with community members, address concerns and facilitate communication between the project team and the community.

Health and Safety Specialist:

The health and safety specialist is a holder of a bachelor's degree in environmental health and safety or a relevant discipline. The social specialist is responsible for the following;

- To work with the site health officer to implement health and safety measures on the construction site.

- Collectively, they develop and enforce safety protocols, conduct risk assessments, and monitor compliance with health and safety regulations in all project stages.

Site Engineer:

The site engineer shall be a registered engineer with the Engineers Registration Board (ERB) and experienced in supervising construction sites. The site engineer is responsible for;

- Responsible for the technical aspects of the construction project.
- Overseeing the construction activities, coordinating with contractors and subcontractors, and ensuring the design and construction aligns with the ESIA/ESMP requirements.
- Working closely with the environmental and social specialist to address any technical issues related to environmental and social aspects.
- To work closely with the consultant in ensuring the construction follows the required quality standards and available laws and regulations.

3.7.3 The Contractor

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

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

- i. Drafting environmental and social aspects during project implementation;
- ii. Managing environmental, social, health and safety aspects at the worksites;
- iii. Participating in the definition of the no working-areas;
- iv. Recommending solutions for specific environmental and social problems;
- v. Facilitating the creation of a liaison group with the stakeholders at the project site and shall monitor the compliance of C-ESMP;
- vi. Organizing consultations at critical stages of the project with the stakeholders and interested parties;
- vii. He/She will be required to liaise with MUHAS Safeguard specialists on the level of compliance with the ESMP including health and safety achieved by the contractor regular for the duration of the contract;
- viii. Controlling and supervising the implementation of the ESMP;

- ix. Preparing environmental and social health and safety progress or "audits" reports on the implementation status of measures and management of site works.

3.7.4 The Consultant

The project Consultant will be responsible for design review and supervision of the construction phase of the proposed project. The Consultant shall ensure compliance of EIS and C-ESMP. The Consultant shall have a Project Environmental, Health and Safety Site Officer (EHSSO) and Project Social Site Officer (SSO) who will be the focal point for all environmental, health and safety and social matters. The EHSSO and SSO will be routinely supervised on-site for the duration of the construction works. Both officers will have minimum of Bachelor degree in their respective specialization.

3.8 INSTITUTIONAL CAPACITY IN IMPLEMENTING ESIA

MUHAS structure comprises of Coordinator, Assistant Coordinator, Portfolio Leaders, Consultants, Contractors and the MUHAS-Mloganzila Community (See Figure 3.2). Coordinator will be responsible in coordinating and managing functions of the project at the institution level such as organising financial procurement, E&S and monitoring and evaluation (M&E). Similarly, will be providing support geared towards building capacity of the staff in the implementation of the project in order to observe issues of E&S as recommended by the MoEST

Environmental and Social Safeguards Specialist at MUHAS will ensure that different activities of the project meet the country legal and AFDB requirements in regard to Environment and Social Operational safeguards. The environmental and Social Safeguard Team will work closely with the consultants Contractors and the MUHAS community to implement E&S activities. The team will also work closely with consultants and contractors to ensure the implementation observes project E&S standards as indicated by ES OS1, ES OS2, ES OS3, ES OS4, and ES OS10. In addition, consultants and contractors will provide technical assistant to the institution on how to implement the project by observing the standards given by the government and the AFDB. In the implementation of the project the team will ensure that MUHAS community and the nearby surroundings understand the project, cooperate, and own it. The process of addressing issues of E&S standards in the project implementation will also involve other stake holders such as Ubungo Municipal Council, OSHA, Police Force, TANESCO, NEMC, and DAWASA.

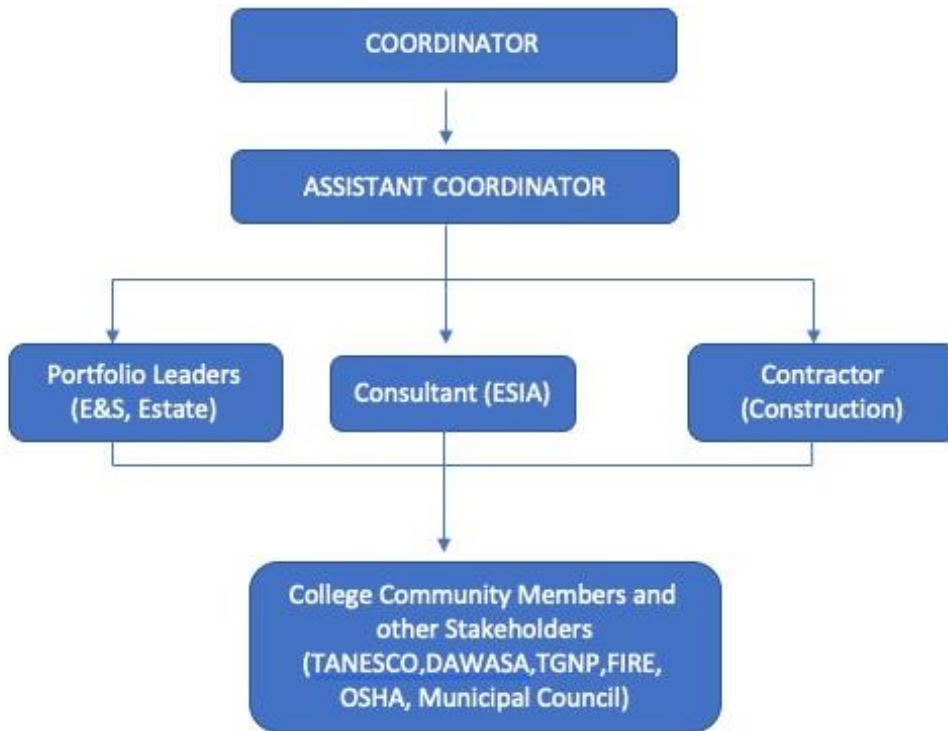


Figure 3.2: Institutional Project Implementing Entity (PIE)

CHAPTER FOUR

BASELINE ENVIRONMENT AND SOCIAL CONDITIONS

This part postulates the baseline environmental and social details of the proposed project prior to the project development. It describes the physical, biological and social environment that could be affected by the project development.

4.1 GEOPHYSICAL ENVIRONMENT

The Proposed project site experiences a tropical savanna climate characterized by distinct wet and dry seasons. Below, is a detailed explanation of the climatic conditions in the proposed area.

It is crucial to recognize that the proposed site is located within Dar es salaam region. Therefore, the subsequent description and data provided for the proposed site are reflective of the conditions and circumstances specific to Dar es salaam region. Most of information provided in this section were gathered through observation and measurements during field survey. Some of the data were obtained through literature review.

4.1.1 Climate

The climatic condition of the project site is coastal tropical climate characterized by high temperature, low wind speed, high humidity, and the absence of cold season. The wet or heavy rain season lasts from March to May and the dry season from June to October. Also, there is a short rainy season from November to December followed by a short dry hot season from January to February.

The annual rainfall average of the project site is 1100mm in its bimodal pattern. The short rainy season during November and December giving a maximum average rainfall of 800 mm per month and the long rainy season between March and May which gives a monthly rainfall average of up to 1300mm.

The proposed site, generally has warm temperatures throughout the year. The average daily temperature ranges from about 25°C (77°F) to 31°C (88°F). The hottest months are typically from November to March, where temperatures can sometimes reach up to 34°C (93°F). The cooler months are from June to August, with temperatures occasionally dropping to around 19°C (66°F) during the night.

The proposed site experiences high humidity levels throughout the year, often exceeding 80%. The humidity is particularly high during the rainy seasons. The area experiences moderate wind speeds, which help during warm temperatures. The winds are generally stronger during the dry season. (TMA, 2024).

Air emissions during construction and operation phase may be produced from the operation of diesel-powered generators, vehicle exhaust, incinerator, moving trucks, and other motorized equipment such as wheel loaders and forklifts, which emit carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (NO₂), which are the main contributors

of global warming, and contribute to climate change. The proposed project will adopt measures to minimize and mitigate air emissions as explained in chapter 7 of the report.

4.1.2 Topography and Soil

The proposed site exhibits a slightly sloped topography, providing natural drainage and reducing the risk of waterlogging. The soil is predominantly sandy, characterized by good drainage properties. Physical observation and literature review confirmed that the type of the soil is sand soil.

Construction process involves excavation which can disrupt the soil surface, making it more vulnerable to erosion by wind and water. Use of hazardous materials, such as chemicals, fuels, and lubricants, can contaminate soil if not handled and managed properly. Effective waste management systems are necessary to prevent soil contamination from medical waste during Operational phase. Proper disposal protocols and containment measures must be in place to protect the soil and surrounding environment.

4.1.3 Ambient Air Quality

The typical air pollutants from the project area are Carbon Monoxide (CO), Nitrogen Dioxide (NO₂), Sulphur Dioxide (SO₂) and volatile compounds; and particulate matters (dust).

During the site visit baseline data for air quality from various areas along the project were taken by a MultiRAE Lite gas monitor with Model Name: PGM-6208, Firmware: V1.31 and Serial number: M01C005071, the air quality data of the. The gas monitor detects the following parameters from air; LEL(%LEL), CO (mg/m³), SOX (µg /m³) and NOX (µg /m³).

The assessment of air emissions at the site (eight points) revealed that the emissions of carbon monoxide (CO) and nitrogen oxides (NO_x) were within acceptable values, below the threshold limit set in the Tanzania's Environmental Management (Air Quality Standards) Regulations (2007). The details presented in Table 4.1 shows that the average CO and NO_x emissions were below Tanzania Standards.

The sampling point were selected in consideration of sensitive receptors and area of concentration. However, the air quality is mostly affected by the wind direction as it carries air pollution away from its source.

Methodology

The measurements were done by gas diffusion sampling method where by the readings were read and recorded directly from the equipment placed on its stand with its sensors to a height that workers will be working.

The quality of air will slightly be affected during construction phase due to the construction activities such as uses of generator, moving machines and other construction equipment that may lead to slight increase in CO emission and NO_x while during operation phase, the level of CO and NO_x will be the same as the current level. Table 4.1 shows sampling points (GPS coordinates) where the environmental parameters were

taken, while Table 4.2 shows air quality measurements taken at the site. Measurements were done by consultant on May 2024

Table 4. 1: Sampling points

| | | |
|---------|-------------------------|---|
| Point 1 | 9241804.481, 510325.178 | Project site |
| Point 2 | 9243229.42, 505941.064 | Project site |
| Point 3 | 9243438.132, 505999.484 | Project site |
| Point 4 | 9247329.413, 505941.064 | East African center for cardiovascular research |
| Point 5 | 9242322.47, 510691.38 | Muhimbili -Mloganzila hospital |

Table 4. 2: Average ambient pollutant gases recorded points

| Site | Sampling Point | CO ₂ | CO | NO ₂ | SO ₂ | CH ₄ | H ₂ S |
|---|----------------|-----------------|-------------------|-----------------|-----------------|-------------------|-------------------|
| | | ppm | mg/m ³ | ppm | ppm | mg/m ³ | mg/m ³ |
| Project site | Point 1 | 198 | <1 | <1 | | | |
| | Point 2 | 201 | <1 | <1 | <1 | <1 | <1 |
| | Point 3 | 210 | <1 | <1 | <1 | <1 | <1 |
| East African center for cardiovascular research | Point 4 | 230 | 0.24 | 0.05 | 0.02 | <1 | <1 |
| Muhimbili – Mloganzila Hospital | Point 5 | 265 | 0.56 | 0.13 | 0.09 | <1 | <1 |
| AVERAGE | | 220 | 0.4 | 0.09 | 0.06 | <1 | <1 |
| TBS Limits | | - | 15 | 0.12 | 0.12 | - | 0.1 |
| WHO/IFC Guidelines | | 500 | 30 | 0.2 | 0.2 | - | 0.1 |
| Maximum standard for natural concentration of CO ₂ in fresh air or at the atmosphere | | 600 | - | - | - | - | - |

Source: site visit measurements, 2024

Instruments detected small amounts of CO (Carbon monoxide), NO₂ (Nitrogen dioxide), SO₂ (Sulfur dioxide), CH₄ (Methane gas) and H₂S (Hydrogen sulfide) concentration. Methane (CH₄) and Hydrogen sulfide (H₂S) levels were measured across the sampling stations as shown in Table 4.2, recorded levels for unlegislated CH₄ have no significant affects to the environment and human health. Levels of CO₂ (Carbon dioxide) were found to be within their corresponding limits prescribed by TBS and WB/IFC for ambient air quality as displayed in Table 4.2.

Based on the results, the following mitigation measures should be employed in order to reduce the emitted pollutant gases to an acceptable level:

- The use of good quality fuels for trucks and machinery

- Maintaining stable operating conditions i.e., minimize emission by maintaining proper air and fuel ratio
- Ensure appropriate uses of machineries as per manufactures guidelines

4.1.4 Dust

Dust levels from five (5) pre-determined points within the site compound were determined using Stark PM particulate counter of model HAT200S. The equipment is capable to sample dust of PM2.5 and PM10. The Stark Counter measures particulate concentrations using laser scattering technique. The following are instrument specification:

- Measuring principle: Laser scattering
- The range of PM2.5 detection: 0-999.9 $\mu\text{g}/\text{m}^3$
- The resolution of PM2.5: 0.1 $\mu\text{g}/\text{m}^3$
- The range of PM10 detection: 0-999.9 $\mu\text{g}/\text{m}^3$
- The resolution of PM10: 0.1 $\mu\text{g}/\text{m}^3$
- The minimum of particle diameter : 0.3 μm
- Relative Accuracy: $\pm 20\%$ or $\pm 15 \mu\text{g}/\text{m}^3$ MAX

Methodology

The measurements were taken at the exposure points, reading where taken in triplet at each point through placing an equipment with its sensors pointing to the direction where people will face when working, readings were recorded after one minute, three times in each point selected within the component under measurement.

Averaged measurements for the five points at the site show dust level are within Tanzania’s Environmental Management (Air Quality Standards) Regulations (2007). It is worthwhile to note that Tanzania Standards do not provide for PM2.5. Table 4.3 depicts dust measurements taken at the site. The level of dust may increase during construction phase due to activities such as, excavation, moving machines and equipment.

Table 4. 3: Average ambient particulate matter values measured onsite

| Site | Sampling Point | Average PM ₁₀ (mg/m ³) |
|---|----------------|---|
| Project site | Point 1 | 0.02 |
| | Point 2 | 0.01 |
| | Point 3 | 0.02 |
| East African center for cardiovascular research | Point 4 | 0.02 |
| Muhimbili – Mloganzila Hospital | Point 5 | 0.04 |
| AVERAGE | | 0.022 |
| TBS LIMITS [TZS845:2005] | | 0.06-0.09 |
| IFC (2007) and WHO AQG 2006 | | 0.05 |
| US OSHA Standard Limit for Inert or Nuisance Dust | | 15 |

Source: Site visit and measurement, 2024

The measured particulate matter (PM₁₀) concentrations associated with project site were within the detectable levels in the ambient air (Table 4.3). The average PM₁₀ concentrations recorded at five (5) sampling locations ranged from 0.01 to 0.04 mg/m³, with the maximum values been measured in the northern side which is mostly caused by wind movements and other human activities. PM₁₀ values measured some stations were **BELOW** corresponding limits prescribed by TBS and IFC/WHO for ambient air quality. Similarly, all stations were having PM₁₀ values satisfying the US OSHA standard limit of 15 mg/m³ recommended purposely for inert or nuisance dust.

4.1.5 Noise levels

Current noise levels are associated with moving cars and trucks and ongoing activities from EACECS and Mloganzila hospital within the area. other noise levels associated with the area are natural elements i.e. wind and birds.

Noise level measurement was done using a SOUNDTRACK LxT class 1 of model type LxT1, with measurement range of 30 to 130 dB(A). The following are technical specifications:

- Microphone: 1/2 polarization capacity microphone
- Range: A-weighting: 29dB ~ 140dB
- Measurement frequency range: 31.5Hz to 8kHz
- Calibration: 114dB
- Data recording; 10
- Display: High-contrast, monochrome, 1/8 VGA 160X240 LCD display graphics
- Bar graph: Scale range 50dB, 1dB resolution

Methodology

The measurements were done in different points of exposure at the points where people will spend a relatively long time when working near the noise sources by holding the sound level meter with its microphone pointing to the direction of the source of noise. The readings were taken after 5 minutes by pressing the hold button, read and record the results

The average noise level measured at five (5) different areas of the proposed sites was found to be **30db** for night time **and 32db** for daytime which is within both National and WHO standards. Table 4.4 shows the measured noise values. The noise level during construction may increase due to construction activities such as excavation, uses of generators, moving vehicle and operation of construction machines. At operation phase the level of noise may slightly increase.

Table 4. 4: Noise levels recorded at the project site

| Site | Sampling Point | Average Noise Levels Measured onsite in dBA | |
|--------------|----------------|---|----------------|
| | | Night time Noise | Day Time Noise |
| Project site | Point 1 | 30 | 32 |
| | Point 2 | 29 | 31 |

| Site | Sampling Point | Average Noise Levels Measured onsite in dBA | |
|---|----------------|---|----------------|
| | | Night time Noise | Day Time Noise |
| | Point 3 | 31 | 30 |
| East African center for cardiovascular research | Point 4 | 30 | 32 |
| Muhimbili -Mloganzila Hospital | Point 5 | 32 | 34 |
| Average | | 30 | 32 |
| TBS-NES Limits | | 45 | 35 |
| WB/IFC Guideline | | 55 | 45 |

Source: site visit measurements, 2024

Based on the measured noise levels, the following abatement and control strategies are recommended as mitigation measures for laborers and nearby locals in noisy zones to avoid sound level induced hearing damages:

- Check the performance of the major equipment periodically, make sure you fix the problem by lubricating, repairing and etc. These include regular servicing and proper lubrication and maintenance of noisy machines to reduce noise levels; maintenance should consider of the following:
 - replacement or adjustment of worn or loose parts;
 - balancing of unbalanced equipment;
 - lubrication of moving parts;
 - use of properly shaped and sharpened cutting tools.
- Use of machinery or equipment of superior technology as a noise minimization strategy;
- Reduce the noise exposure level of the laborers by employing part time operators or altering their activity zones between safe and unsafe acoustical zones;
- Installation of barriers between noise sources and receivers can be attenuating the noise levels
- Encourage the use of noise protectors i.e. earplugs where necessary however this should be done with carefully because workers if not done properly as workers would not be able to communicate

4.2 BIOLOGICAL FEATURES

Flora and Fauna

The project site is bare, where Large part of the site is covered by mixed vegetation of grass, bushes and trees. Apart from birds, no any fauna of ecological importance was observed at proposed project site. (source: Field visit, June 2024)

During construction natural vegetation is removed to make way for a new development. The area will slightly be impacted resulting in alteration or reduction in biodiversity. The proposed project will re-plant trees and maintain greenspaces during operation phase

4.3 SOCIO-ECONOMIC ENVIRONMENT

The socio-economic environment described here has been gathered from the area spanning in Dar es salaam region, Ubungo Municipality, Kwembe Ward to Mloganzila Mtaa, where the proposed project site is located. Consequently, this data serves as a representation of the activities and conditions in the vicinity that may be impacted by the proposed project. This information is crucial for understanding the potential effects of the project on the local community and ensuring that all relevant socio-economic factors are considered during the planning and implementation stages.

4.3.1 Administrative Division

Administratively, Dar es Salaam region has a regional administration headed by the Dar es Salaam Regional Commissioner. It also has a City Council administration headed by the Mayor of Dar es Salaam. The City has five (5) Municipal Councils and by their embedded administrative functions they form Municipals of the Dar-es Salaam Region. The 5 Municipals are: Temeke Municipal Council, Kinondoni Municipal Council, Ilala Municipal Council, Ubungo Municipal Council and Kigamboni Municipal Council (source: Ubungo Municipal Council Website). The proposed project is located within Ubungo Municipality

Ubungo Municipality, located in Dar es Salaam, Tanzania, is administratively divided into several wards. These include Kwembe, Kimara, Goba, Mbezi, Makuburi, Sinza, Ubungo, Mabibo, Manzese, and Makurumla. Each ward is further subdivided into mtaa (streets or neighborhoods), which are the smallest administrative units. This structure facilitates local governance and administration, allowing for more efficient management and provision of services to the residents of the municipality. The proposed project is located in Kwembe ward, Mloganzila mtaa.

4.3.2 Population

According to National Bureau of Statistics (NBS) 2022, the Region Dar es salaam has a population of 5,383,728 of which 2,600,018 (48.9%) are male and 2,783,710 (51.1%) are female. The region has 1,550,066 households with an average house size of 3.5 and a sex ratio of 93.

Ubungo Municipality has a population of 1,086,912 where 519,925 are male and 566,987 are female with a sex ratio of 95. Kwembe ward has a total population of 93,457 people where 48,773 are female and 44,684.

According to Mloganzila Mtaa office, at Mloganzila Mtaa where the project is found, the total population is 5650 people.

Population along the project area will slightly increase and may strain existing infrastructure and resources during construction phase and operation phase which may be caused by the project constructions workers as well as other service providers such as food vendors, casual laborers, building materials and tools suppliers, and so forth.

Presence of Cardiac Teaching and research Hospital at the project area is anticipated to stimulate more commercial, socioeconomic activities/projects as well as investment. Once operational, the hospital will attract students, medical professionals, patients, and

their families from surrounding regions, increasing demand for housing, transportation, and local businesses. This may therefore attract people to relocate their businesses or residences to the project area and hence contribute to raise in population. Ensuring adequate planning and community engagement is essential to mitigate adverse effects and maximize the hospital's benefits to the local population.

4.3.3 Education Services

Tanzania hosts a total of 49 general universities and university colleges, with 12 being government-owned and 37 privately owned. Among these institutions, only 10 universities are dedicated to health studies, and only two of them are in Dar es salaam region. Currently, there is no specialized university for cardiovascular studies in the country. Instead, a cardiac institute operates within Muhimbili Hospital, and existing universities only offer limited cardiac programs.

The proposed cardiac teaching and research hospital, along with the East African Cardiac Excellence Centre for Services (EACECS), aims to bridge this significant gap in cardiovascular care and education. By providing specialized training, research opportunities, and comprehensive cardiac services, the project will significantly enhance the capacity to manage and treat cardiovascular cases in Tanzania and the broader East African Community, ultimately improving health outcomes across the region.

4.3.4 Health Services

Tanzania has a total of five specialized hospitals, with only one dedicated to cardiac activities. The introduction of the proposed cardiac teaching and research hospital is therefore highly beneficial to both Tanzania and the East African Community (EAC). This project addresses a critical need for specialized cardiac care and expertise, which is currently lacking in the region. By providing advanced cardiac services, training healthcare professionals, and conducting vital research, the new hospital will enhance the capacity to diagnose, treat, and manage cardiovascular diseases. This not only improves health outcomes but also reduces the burden on the existing cardiac institute within Muhimbili Hospital and Jakaya Kikwete Cardiac Insitute, ultimately contributing to the overall well-being of the population in Tanzania and the EAC.

4.3.5 Safe and Clean Water Services

The main source of water for the proposed project is DAWASA . The existing projects i.e. EACECS and Mloganzila Hospital and residents at Mloganzila mtaa also uses water from DAWASA. However, consultations from the stakeholders revealed that water is not sufficient in the area. Establishment of the cardiac teaching and research hospital will further increase stress of water. Therefore, the proposed project should consider conservation of water through rain water harvesting during operational phase. The contractor should take note of this and find alternative source of water during construction phase.

4.3.6 Energy

Ubungu Municipality is supplied with electricity by TANESCO through the National Grid. Electricity is mainly used for lighting for commercial and domestic purposes. Gas stoves, Firewood and charcoal are the main sources of energy for cooking in the municipality and they account for 77.8% of the total energy use. The proposed project will use TANESCO

as source of energy for lighting during operational phase, but will also explore other options such as solar panels.

4.3.7 Culture and Ethnicity

Kwembe residents originated from different locations in Tanzania and other part of the world, the culture of the area is Mixed Culture but dominated by *Zaramo*. But nowadays, almost all tribes from Tanzania can be found in the area especially Chaga, Sukuma, Luguru, Ha, Pare, Nyakyusa, Wahaya, Kurya, Masai, etc. So, it is difficult to state clearly what is the culture of the area. The common language used is Kiswahili where by all people within the area can use in communication.

4.3.8 Waste Management

Solid Waste Management

Principally, waste management in Tanzania is liable directly to the local authority's responsibility. The Local Government (Urban authority) Act 1982 imposes under urban authorities the responsibility "to remove refuse and filth from any public or private place" (sect.55g) and to provide and maintain public refuse containers for the temporary deposit and collection of rubbish. The Municipal council plays an important role in the financing, planning and providing waste collection and disposal services. Under the Municipal council, waste management belongs to the structure of the waste management department, but other departments such as works, health and urban planning carry out part of its operation.

Solid waste management and collection is the responsibility of the municipal council. In Ubungu municipality, waste are collected by trucks from both collection points and door to door collection and are transported to the dumpsite in Pugu Kinyamwezi area. Recyclable waste like plastic are collected by registered private waste collectors. Waste are collected twice or three times per week. (Ubungu Environmental officer)

During the operation phase of the proposed cardiac teaching and research hospital, comprehensive waste management protocols will be implemented to ensure environmental and public health safety. General solid waste will be collected and disposed of by a registered contractor, ensuring proper handling and compliance with local regulations. Medical waste, which requires special attention due to its hazardous nature, will be managed through the use of an on-site incinerator, effectively neutralizing potential risks. Additionally, plastic bottles will be collected separately and sold to recyclers, promoting sustainable practices and contributing to the circular economy. These measures will ensure that the hospital operates efficiently while minimizing its environmental footprint

Liquid waste management

Due to the absence of a sewage system in the area, liquid waste from the proposed cardiac teaching and research hospital will be managed using an on-site system. This Environmental and Social Impact Assessment (ESIA) recommends the use of oxidation ponds as an effective measure for liquid waste management. Oxidation ponds will treat the wastewater through natural biological processes, ensuring that the liquid waste is

handled in an environmentally responsible manner. This approach not only addresses the immediate need for waste management infrastructure but also aligns with sustainable and eco-friendly practices.

4.4 GENDER ISSUES

MUHAS is devoted to gender equality and inclusion. The anti-sexual assault and prejudice policy as well as a gender unit, guidelines, and other measures were all formed by MUHAS to handle gender concerns. By admitting more female students and holding and attending awareness-raising seminars, MUHAS has essentially been putting the national strategy for gender mainstreaming into practice. However, in order to follow the national encouragement for gender equality, the institution needs to develop the gender program of activities to sustain, and support the efforts that have been established.

MUHAS is devoted to gender equality and inclusion. The University provides equal chances in employment of staffs, provision of expertise skills to both staff and students, students' enrolment, assessment and leadership and promotions for staff. Through a developed gender based violence and gender mainstreaming policy, MUHAS is committed in promoting gender equality and fairness. This gender strategy is the result of the Tanzanian government.

CHAPTER FIVE

5.0 STAKEHOLDER CONSULTATIONS AND PUBLIC INVOLVEMENT

5.1 INTRODUCTION

Public consultation as recommended by the AFDB Environmental and Social Operating Safeguards (E&S OS10-“Stakeholders Engagement and Information Disclosure”) recognizes the importance of open and transparent engagement between the borrower and project stakeholders as an essential element of good international practices which is an essential requirement of the ESIA process. This aim to ensure public participation and acceptance of the project as well as limiting adverse impacts that would be produced when the project is being implemented. Similarly, it helps to uncover issues that the preparation team may not have been identified nor addressed in the ESIA. If the community participates in the early stages of project preparation, then it should it be possible to develop a close relationship between the community and the project team thereby allowing the community to put forward valuable proposals before project implementation. The Objectives of public consultation are to:

- Share information about project components and proposed project activities with the community in the project areas, and also with relevant stakeholders
- Gather different viewpoints and opinions, and understand the concerns and sensitivities of local authorities and communities on environmental problems in the project areas, especially problems that were not identified by the ESIA team. Using this information, public concerns can be addressed in time, during project design and when the selection between alternative solutions is made
- Perform a thorough and comprehensive evaluation of all environmental impacts and propose the most effective mitigation measures that exactly address the expected adverse environmental impacts of the project

The Methodology for Stakeholders consultation has been presented in a Methodology section (See section 1.8.6)

5.2 STAKEHOLDERS CONSULTED

In line with E&S OS10, E&S OS1 and the ISS, stakeholder engagement will focus on broad inclusion and ensuring meaningful engagement with and participation of members affected directly by the project. The project stakeholders are individuals or groups who are affected or likely to be affected by the project affected parties (PAP) and who may have an interest in the project and/or the ability to influence its outcome, either positively or negatively (other interested parties OIPs). The identification of stakeholders under the project will be based on (a) their roles and responsibilities; (b) possible influence/interest on the project; and (c) their particular circumstances they may be disadvantaged or vulnerable in different ways from each other. Stakeholders’ consultation will also be done in the phases of construction and operation of the project.

A summary of the consultation programme which contains stakeholders identified for this project is presented in Table 5.1 below. The consultation program maps out the stakeholder engagement process in each phase of the ESIA study. The program is adaptive and subject to change based on stakeholder responses/requirements. A combination of

various types of consultation techniques was used like face-to-face meetings, interviews and serving of scoping report and requests for issues. The overall consultation process was designed to comply with the requirements for public consultation as prescribed in Tanzania’s ESIA and Audit regulations for stakeholder engagement, and AFDB guidelines for stakeholders’ engagement.

Table 5. 1: Stakeholders Identified and Consultation Programme

| ESIA Phase | Stakeholders Identified and Consultation Plan | Method of Consultation |
|--------------------------------------|---|---------------------------|
| Project Inception State (April 2024) | <ul style="list-style-type: none"> MUHAS (Project Coordinator, Estate manager, Procurement officer, Warden, Human Resources officer) | Face to face consultation |
| Scoping Phase (May 2024) | Consultation with Stakeholders including; <ul style="list-style-type: none"> Ubungu Municipal Council (Town Planner and Environmental management Officer) Occupational Safety and Health Authority (OSHA) Kwembe Ward Executive Officer (WEO) Government Chemistry Laboratory Authority (GCLA) Tanzania Medicine and Medical Device Authority (TMDA) | Face to face consultation |
| | <ul style="list-style-type: none"> Mloganzila Mtaa Development Committee | Meeting |
| Detailed ESIA Study (May-July2024) | <ul style="list-style-type: none"> Ministry of Education, Science and Technology (MoEST) Ministry of Health Fire and Rescue Forces (Kinondoni) Tanzania Electric Company limited (TANESCO), Dar es Salaam Water Supply and sanitation Authority (DAWASA) East Africa Community (EAC) MUHAS Gender Unit Officer (Dean of Students, Director of Postgraduate and undergraduate) Mloganzila Hospital Tanzania Atomic Energy Commission (TAEC) | Face to face consultation |

Source: Consultant, 2024

5.3 SUMMARY OF ISSUES RAISED BY STAKEHOLDERS

The following are the primary concerns raised during the ESIA process:

- **Improved Cardiac Healthcare Services:** Stakeholders anticipate that the hospital will significantly enhance the quality of cardiac care available in the region, and EAC providing advanced treatment options and better patient outcomes. By collaborating with internationally renowned cardiologists, researchers, and educators, the hospital can leverage cutting-edge knowledge and practices in cardiac care. This will enhance the quality of medical services provided and ensure that the hospital remains at the forefront of cardiology advancements.
- **Education and Training Opportunities:** The facility's teaching component is expected to offer valuable educational opportunities for medical students, residents, and healthcare professionals, fostering a new generation of skilled cardiologists and researchers. Partnerships with leading global medical institutions and universities can provide valuable training opportunities for local medical professionals. Visiting experts can conduct workshops, seminars, and training programs, helping to elevate the skill levels of the hospital's staff and students.
- **Research Advancements:** The research component of the hospital has the potential to drive advancements in cardiac care, leading to innovative treatments and improved health outcomes on a broader scale. international collaboration will open doors to joint research projects, allowing the hospital to participate in ground-breaking studies and clinical trials. This will not only contribute to the global body of knowledge in cardiology but also position the hospital as a significant player in cardiac research.
- **Staffs Accommodation:** Most consulted stakeholders insisted on the provision of dedicated accommodation for staff and researchers near the proposed project site during the operational phase to ensure efficiency and effectiveness in delivering the intended services.
- **Dedicated Staffs:** Stakeholders proposed that the cardiac teaching and research hospital should have its own dedicated medical professionals, rather than relying on those from MUHIMBILI Hospital. This approach is intended to ensure the smooth operation of the project and achieve its goals, such as providing high-quality cardiovascular services.
- **Reputation Enhancement:** The establishment of a cutting-edge cardiac hospital can enhance the region's reputation as a center for medical excellence, attracting top talent and further investment in healthcare.
- **Resource Sharing:** Collaborating with international experts will facilitate the exchange of resources, including state-of-the-art medical equipment, advanced technologies, and specialized medical supplies. This can enhance the hospital's capabilities and improve patient care. Engaging with experts from outside the EAC will expose the hospital to global best practices in healthcare management, patient care protocols, and operational efficiencies. Implementing these practices can lead to improved hospital performance and patient outcomes.
- **Environmental Conservation:** The stakeholders supported the project but emphasized conserving the environment. The proponent was advised to use sustainable and safe methods during construction and operation
- **Employment Opportunities-** The stakeholders advised the proponent to ensure that the employment opportunities are prioritized by the locals to improve the social well-being. It is their expectation that, during the construction and

operational phases, more of the youths will be employed depending on the skills they have.

- **Safety During Project Construction and Operation** was also one of the issues raised by the stakeholders. Ensuring the project neighbors and the surrounding environment do not get harmed by the construction process.
- **Good Community Relations:** The stakeholders desired that the proponent to assist in community development projects and engage the ward and village administrative at all project stages. Furthermore, the proponent should update the people through its local government leaders on the progress of the project.

Issues and comments raised by the stakeholders are summarized in Table 5.2. while Figure 5.1 shows some of the photos taken during stakeholders' meetings/engagements (consultations).



Figure 5. 1: Stakeholders Consultation Meetings
(Source: Field Work, May 2024)

Table 5. 2: Issues Response Table

| Date and Venue | Authority / institution | Name of Consulted Person | Position/Designation | Issues raised | Response |
|-------------------------------|---|--------------------------|---|---|--|
| 28/06/2024 Virtual Meeting | Jakaya Kikwete Cardiac Institute MUHAS | Dr. Deogratias Nkya | Pediatric Cardiologist Pediatric Cardiology Lecturer | <p>The number of pediatric cardiovascular disease cases is increasing recently due to several factors:</p> <ul style="list-style-type: none"> • Increased awareness among parents and patients. • Greater awareness among doctors about cardiovascular diseases. • Availability of services at the Jakaya Kikwete Cardiac Institute, which serves both Tanzanian and East African patients. However, the number of patients at the center is much higher than the available specialists and medical practitioners, with a ratio of one doctor to 12,000-20,000 patients. <p>In order to address this situation, the following should be considered:</p> <ul style="list-style-type: none"> • Establishment of more cardiac hospitals and centers. • Provision of additional training to doctors and specialists on cardiovascular diseases. • Ensure that the proposed project focuses on developing human resources and infrastructure dedicated to cardiovascular issues. • The proposed cardiac teaching and research hospital should offer more train of health consultants, including doctors, as part of the project. • Establishment of the proposed project will ensure availability of cardiovascular services and help meet the existing demand. • Inclusion of a research component in the project will help to overcome current challenges in cardiovascular issues. | This is well noted, MUHAS will do the needful |
| 28/06/2024 Virtual Meeting | Jakaya Kikwete Cardiac Institute MUHAS | Dr. Reuben Mtugaywa | Adult Cardiologist Senior Lecturer | <ul style="list-style-type: none"> • Cases of cardiovascular diseases have recently increased among both adults and children. • There is a growing need for more cardiovascular services, including hospitals and medical practitioners such as specialists, doctors, nurses, and other hospital staff. • The cost of treatment is high, and the expense of specializing in cardiovascular diseases is also significant. • There are only 50 cardiovascular specialists in Tanzania. • This project should ensure ample space is considered, particularly during the design stage, to accommodate: <ul style="list-style-type: none"> ➢ Patients waiting for rehabilitation ➢ Inpatients ➢ Clinics | <ul style="list-style-type: none"> • The proponent will do as advised |

| Date and Venue | Authority / institution | Name of Consulted Person | Position/Designation | Issues raised | Response |
|--------------------------------------|-----------------------------|----------------------------|-----------------------|--|---|
| | | | | <ul style="list-style-type: none"> • The design should include dedicated Intensive Care Unit (ICU) and High dependent Unit (HDU) units. • There should be dedicated ICU wards, operating rooms, coronary care units, and general wards. • Ensure the availability of all necessary equipment and machinery for treating cardiovascular diseases, such as MRI, CT scanners, and imaging devices. • Ensure the availability of a proper and well-equipped laboratory for cardiovascular diseases and other non-communicable diseases associated with cardiovascular health, such as lung and kidney diseases. • Consider the availability of services for dialysis and pulmonary function tests, as lung and kidney diseases are associated with cardiovascular diseases. • Ensure the availability of histology test services in the laboratory. • Ensure that the area proposed for the project is large enough to accommodate: <ul style="list-style-type: none"> ➢ A dedicated area with proper design for radiographic activities, such as X-rays ➢ A dedicated area for waste collection and onsite treatment. | |
| 21/06/2024 AICC offices in Arusha | East Africa Community (EAC) | Dr. Stanley Serser Sonoiya | EAC Health Department | <ul style="list-style-type: none"> • The proposed project will enhance cardiovascular services in the East Africa community since this will be the first Cardiac hospital to be constructed in EAC • Student mobility guidelines and labour mobility protocols are currently on process • EAC community is supportive of the proposed project and sees this as a great opportunity for EAC community • There should be a proper and efficient discharge system for patients, especially those from other countries. • Each East African country should have a dedicated hospital for cardiac clinical care and follow-ups after patients are discharged. • All countries should cooperate to facilitate the project implementation. • Competent individuals should be appointed for project supervision. • Dedicated specialists should be assigned to this project. • A strong and positive relationship on health service issues should be established between East African countries. | <ul style="list-style-type: none"> • Noted • The proponent will do as advised |

| Date and Venue | Authority / institution | Name of Consulted Person | Position/Designation | Issues raised | Response |
|--|---|--------------------------|--------------------------|---|---|
| | | | | <ul style="list-style-type: none"> Partnerships with international cardiac hospitals in countries such as South Africa, India, South Korea, China, and Japan should be formed for knowledge transfer, especially during project operations. Proper management of medical waste, both solid and liquid, should be ensured to prevent pollution. An incinerator should be considered for the management of pharmaceutical and medical waste. Beautification of the project site with trees should be undertaken. The use of solar energy should be considered. The use of electric cars and equipment should be considered to reduce emissions. Proper management of stormwater should be ensured. The planted trees should be equipped with chairs and tables so that patients, visitors, students, and workers can use them as resting areas. | |
| 20/06/2024 Mikocheni | Ministry of Health | Dr. Michael Kiremeji | MD Ministry of Health | <ul style="list-style-type: none"> Masterplan allocated for MUHAS Mloganzila campus should reflect 100 years to come The hospital should plan to include social services such as hotels, shopping malls Standard and Quality of the proposed project should be adhered Architectural designs should be unique to capture medical tourism The operational activities of the hospitals and teaching centre should be separated | The proponent will adhere to the given provisions |
| 19/06/2024 Government city, Mtumba. MOEST Offices | Ministry of Education, Science and Technology (MoEST) | Prof Peter Msoffe | DHE MoEST | <ul style="list-style-type: none"> The project provides opportunity for Tanzania to participate in cardiac health matters The project will help reduce cost of going abroad to get treatment for cardiovascular cases The proposed project will enhance opportunity for medical tourism The project should consider the following <ul style="list-style-type: none"> Mobility of staff and students within EAC should be adhered There should be opportunity for experts to visit the centre Provide practical learning to students from other universities Collaboration with experts from outside EAC should be done Dedicate staff and experts mainly for the hospitals | The proponent will do as advised |
| 19/06/2024 TAEC offices Dodoma | Tanzania Atomic Energy Commission | Machibya Matulanya | Ag. DRC TAEC | <ul style="list-style-type: none"> The proposed project should adhere to Atomic Energy Act 7 of 2003 The proposed hospital should adhere to protection from ionizing and non-ionizing radiation regulations of 2023 | All laws and regulations will be adhered to |

| Date and Venue | Authority / institution | Name of Consulted Person | Position/Designation | Issues raised | Response |
|---|---|---|--|---|---|
| | | | | <ul style="list-style-type: none"> The proposed project should adhere to fees and charges regulations of 2022 | |
| 23/05/2024 Municipality offices in Kwembe | Ubungo Municipal Council | Jesca Stanley | Environmental Management Officer (EMO) | <ul style="list-style-type: none"> Ensure consultation with all neighbours of the project site. Ensure land rehabilitation and vegetation replacement throughout the project phases. The project site should be fenced and apply necessary dust pollution preventive measures at the project site Observe the use of PPEs, and ensure site safety Observe proper solid waste management at the project site by preparing a collection point for construction waste as well as food remains, plastic bottles and cement sacks. All chemical liquid wastes should not be directed to open streams or bare land, instead, observe the preparation and use of a proper wastewater management system | <ul style="list-style-type: none"> All stakeholders including neighbours were consulted The proponent will do as advised Proper solid waste and liquid waste management shall be observed |
| 28/05/2024 Kwembe ward offices in Kwembe | Kwembe Ward | Allen Mjindo | Ag. WEO | <ul style="list-style-type: none"> All solid wastes including chemical and medical practical wastes should be disposed or destroyed in acceptable means The project should benefit the surrounding community by ensuring the recruitment of local personnel as casual workers/ unskilled labour | The proponent will prepare a waste management plan during operation phase |
| 23/05/2024 Mtaa offices in Mloganzila area | Mloganzila Mtaa | MEO Mtaa chairperson Mtaa representatives | Development Committee | <ul style="list-style-type: none"> During construction, unskilled labour should be obtained from the mtaa/ward Contractor and MUHAS should allow small business/ income generating activities to be done at the site by residents MUHAS should participate in rehabilitation of street roads | <ul style="list-style-type: none"> MUHAS shall give priority to residents Arrangement shall be made As part of CSR, MUHAS shall participate |
| 20/05/2024 OSHA offices in Kinondoni | Occupational Safety and Health Authority (OSHA) | Esther Juma Salum | OHS Inspector | <ul style="list-style-type: none"> The premises must be registered by OSHA as per section 16 and 17 of OSHA act 2003 During operation phase, MUHAS must apply and acquire OSHA Compliance certificate Personal Protective Equipment (PPE) must be provided to all employees during the construction and operation phase as per section 62 of OSHA act 2003 Conduct medical examination to all employees at least once a year as per Provide training for first aiders and safety health and Environment representatives Washrooms should consider both genders and should be labelled Warning signs should be placed where required | <ul style="list-style-type: none"> Premises is registered already Compliance certificate shall be acquired PPE shall be provided and enforced All examinations, check-ups and inspections examination shall be conducted once a year The proponent will do the needful |

| Date and Venue | Authority / institution | Name of Consulted Person | Position/Designation | Issues raised | Response |
|--|-------------------------|--------------------------|----------------------------------|---|---|
| | | | | <ul style="list-style-type: none"> • Prepare OHS policy and risk assessment report • Formulate OSH committee and minutes should be recorded • Allocate a first aid kit at the premises • The developer should train First Aid and Safety and Health representatives. • Inspections (General, Ergonomic, hygiene, Electrical, Building and construction and plant inspection) should be annually conducted. • Prepare OHS Policy and Risk assessment report. • Supply safe and clean drinking water to workers. • Prepare an emergency preparedness Plan and fire assembly point. • Ensure proper electrical installations with earthing system and labelling of all electrical areas. • All accidents should be reported to OSHA within 24 hours of occurrence | <ul style="list-style-type: none"> • Washrooms will be labelled • The policy shall be in place • OSH committee will be formulated • A first aid kit will be in place • Fire assembly point will be identified • All assessment reports and response plans will be prepared • Proponent will adhere to all concerns given |
| 06/06/2024 FIRE office in Kinondoni | Fire and Rescue forces | S.F Peter Mtui | Environmental Department Officer | <ul style="list-style-type: none"> • Site layout plan, floor plans, sections, elevations, and generally full set of architectural drawings should be submitted to allow suggestions of types, fixed or movable firefighting equipment to be used. • Standard occupancy load of structure/ buildings should be considered. • Before construction/ during the design stage design drawings should be assessed by fire and rescue forces as per regulations requirements (right before building permit issuing) • Consideration of fire and rescue forces consultation fees for all design drawings consultation. • Ensure MUHAS involves consultant on fire and safety throughout the project. • DO NOT start construction without site inspection by fire and rescue forces. The contractor should be issues a fire and safety certificate (compliance certificate that is issues annually depending on project construction phase duration) | <ul style="list-style-type: none"> • Design drawings shall be submitted to Fire and Rescue forces • Proponent shall adhere to all firefighting and safety issues addressed • Inspections by fire and rescue forces shall be conducted at project site |
| May 2024 MUHAS university in Upanga | MUHAS-Upanga campus | Tumaini Nyambanga | Director of student's services | <ul style="list-style-type: none"> • Proper estimations should be done to allow waste water and solid waste infrastructure to accommodate use by all students and staff involved in the project • MUHAS should engage transport service providers in ensuring proper transportation of students and all projects' personnel to and from the Mloganzila campus whenever necessary especially during the project operational phase | Proper waste management systems will be adhered to throughout the project |

| Date and Venue | Authority / institution | Name of Consulted Person | Position/Designation | Issues raised | Response |
|--|-------------------------|--------------------------|----------------------|--|---|
| 24/05/2024 MUHAS university in Upanga | | Dr. Hawa Mbawalla | Gender Focal person | <ul style="list-style-type: none"> • Seminars and sensitizations on should be done to all project workers and service providers • The contractor should have a social welfare representative and a proper GBV reporting system to all and enhance intensive ans extensive consideration for gender issues • The gender unit at MUHAS has been financially and administratively empowered to deal with gender issues and preparing online reporting systems to enhance GBV issues prevention and control. • MUHAS gender unit is included in the HEET project committee and shall therefore work to ensure that the project is gender inclusive and adheres to implementing the recently reviewed MUHAS gender policy | <ul style="list-style-type: none"> • All gender related issues shall be adhered to and implemented as advised during all project phases • MUHAS acknowledges the information provided |

Source: Fieldwork, 2024

CHAPTER SIX

6.0 ASSESSMENT OF IMPACTS AND IDENTIFICATION OF ALTERNATIVES

This chapter provides a comprehensive overview of the process involved in identifying and assessing potential impacts at each stage of the proposed **cardiac teaching and research hospital** project. The chapter details the methodologies used to evaluate the environmental, social, and economic consequences of the project activities. Additionally, this chapter explores various project alternatives, assessing their feasibility and potential to minimize adverse impacts **and** ensuring sustainable project development.

6.1 IMPACT IDENTIFICATION

The identification and assessment of environmental and social risks has been analyzed basing on the type of the proposed project, nature of works and limited to the construction and operation of the Cardiac Practical and training Hospital.

The proposed project can cause a wide range of environmental and social impacts on a number of receptors. This EIA identifies these impacts for the purposes of mitigating the adverse ones and/or enhancing the benefits. Impact *identification* is a process designed to ensure that all potentially significant impacts are identified and taken into account in the EIA process. A number of 'tools' are available to assist in impact identification. The simplest, and most frequently used, *checklists and matrix* of impacts method were used for this project. The following subsections present the impacts identified to associate with the project.

6.1.1 Sources of Impacts

The impacts associated with the proposed project will primarily stem from project inputs, activities, and outputs, related to the following activities:

- i. Vegetation clearance due to site preparation for construction.
- ii. Transportation of materials, construction equipment, and their corresponding accessories to the site.
- iii. Civil works.
- iv. Handling of construction waste.
- v. Excavation activities.
- vi. Demobilization activities.
- vii. Delivery of input materials, machinery, and equipment.
- viii. Hospital operational activities.
- ix. Decommissioning phase.

Therefore, the environmental impacts assessed are those directly or indirectly related to the project activities and the support services mentioned above. The likely both positive and negative impacts of the proposed project are elaborated in the following sections.

6.1.2 Impacts associated with preliminary/mobilization phase

Positive Impacts

- i. Job creation
 - ii. Local economic boost (increased income)
-

- iii. Creation of business opportunities

Negative Impacts

- i. Increased noise levels due to the movement of trucks to and from the site.
- ii. Increased dust generation from moving vehicles during the transportation of construction materials.
- iii. Increased traffic from vehicles entering and exiting the site.

6.1.3 Impacts associated with construction phase

Positive Impacts

- i. Employment opportunities
- ii. Economic Stimulus
- iii. Increase of government revenue
- iv. Skills development of local workforce

Negative Impacts

- i. Increased dust generation.
- ii. Soil disturbance
- iii. Occupational safety and health risks.
- iv. Transmission of vector-borne and communicable diseases.
- v. Impacts associated with the transmission of sexually transmitted infections.
- vi. Noise due to the movement and operation of construction machines.
- vii. Visual intrusion.
- viii. Environmental contamination from increased waste generation.
- ix. Population Influx
- x. Gender based violence (GBV), equity, rape and sexual harassment

6.1.4 Impacts associated with Demobilization Phase

Positive Impacts

- i. Environmental restoration

Negative Impacts

- i. Loss of employment to some workers

6.1.5 Impacts Associated with Operation Phase

Positive Impacts

- i. Employment opportunities
- ii. Accessibility to Quality Cardiovascular Services
- iii. Reduces cost of treatment for cardiac cases
- iv. Reduces the cost of education for students pursuing cardiovascular studies.
- v. Development of Highly Skilled Human Resources

- vi. Decreased Morbidity and Mortality
- vii. Promoting medical tourism
- viii. Establishing the country as a regional medical hub
- ix. Creation of Business Opportunities
- x. Economic Stimulus
- xi. Increase of government revenue
- xii. Adding value to the neighborhood properties

Negative Impacts

- i. Occupational Health and safety risks
- ii. Environmental contamination from increased waste generation.
- iii. Increased surface water run-off
- iv. Fire risks

6.2 IMPACT EVALUATION

Identification of impacts was followed by the prediction or estimation of their magnitude, extent, and duration, compared to the situation without the project. The impact assessment stage comprises several steps that collectively evaluate how the proposed project will interact with elements of the physical, biological, cultural, or human environment to produce impacts on resources and receptors. The impact evaluation relied on experts' knowledge and checklists. The steps involved in the impact assessment stage are described in greater detail below.

6.2.1 Impact Prediction

The impact assessment process predicts and describes impacts that are expected to occur for different phases of the Project at Mloganzila. Where possible, impacts are quantified to the extent practicable, which may include increase in noise or air pollution levels above acceptable standards; volume of waste or water discharged, etc. For each impact, its significance is evaluated by defining and evaluating two key aspects:

- The **magnitude** of the impact; and
- The **sensitivity** of the feature or receptor that will be impacted.

6.2.1.1 Impact Magnitude

Magnitude essentially describes the intensity of the change that is predicted to occur in the resource/receptor as a result of the impact. A magnitude rating tends to reflect a combination of the size of an area that may be affected, the duration over which the aspect may be altered, and the size, degree or scale of that change. In essence, magnitude is a descriptor for the degree of change that is predicted to occur in the resource or receptor.

For positive impacts (which are mostly socio-economic impacts) magnitude is generally categorized as 'Positive' unless sufficient information is available to support a more robust characterization and to assign the degree of magnitude as Small, Medium or Large. For instance, if the number of jobs to be assigned to local community members is confirmed or if the size or value of the contribution to the national, regional or district economy is known then a magnitude rating can be assigned. If not, then the significance rating is assigned based

on the sensitivity of the feature impacted by a specific activity or change. The term ‘**magnitude**’ therefore encompasses all the characteristics of the predicted impact including:

- Extent;
- Duration;
- Scale;
- Frequency; and
- Likelihood (only used for unplanned events).

The definitions for characteristics of magnitude used during the impact assessment are summarized in Table 6. 1.

Table 6. 1: Impact Characteristic Terminology

| Characteristic | Definition | Designations |
|-----------------------|---|---|
| Type | A descriptor indicating the relationship of the impact to the Project (in terms of cause and effect). | Direct Indirect Induced |
| Extent | The “reach” of the impact (e.g., confined to a small area around the Project Footprint, projected for several kilometers, etc.). | Local Regional International |
| Duration | The period over which a resource / receptor is affected. | Temporary Short-term Long-term Permanent |
| Scale | The size of the impact (e.g., the size of the area damaged or impacted, the fraction of a resource that is lost or affected, etc.). | [no fixed designations; intended to be a numerical value] |
| Frequency | A measure of the constancy or periodicity of the impact. | [no fixed designations; intended to be a numerical value] |

Source: UNEP, 2019

The evaluation of pre-mitigation impact significance takes into account control measures that are already part of, or embedded within, the Project design. This avoids the situation where an impact is assigned a magnitude based on a hypothetical version of the Project that considers none of the embedded controls that are defined as part of the Project description. Examples of embedded controls could include acoustic reduction measures around noisy equipment or servitude and buffer requirements the development is obliged to implement and is part of the layout. Additional mitigation measures aimed at further reducing the significance of impacts are proposed where necessary or appropriate and are assessed as part of the ‘residual’ impact significance rating.

In the case of **type**, the designations are defined universally (i.e., the same definitions apply to all resources/receptors and associated impacts). For these universally defined designations, the definitions are provided in Table 6.2.

Table 6. 2: Designation Definitions

| Designation | Definition |
|--------------------|--|
| Type | |
| Direct | Impacts that result from a direct interaction between the Project and a resource/receptor (e.g., between occupation of a plot of land and the habitats which are affected). |
| Indirect | Impacts that follow on from the direct interactions between the Project and its environment as a result of subsequent interactions within the environment (e.g., viability of a species population resulting from loss of part of a habitat as a result of the Project occupying a plot of land). |
| Induced | Impacts that result from other activities (which are not part of the Project) that happen as a consequence of the Project (e.g., influx of camp followers resulting from the importation of a large Project workforce). |
| Extent | |
| Local | Impacts that affect an area in proximity to the development area within an area defined on a resource/receptor-specific basis. |
| Regional | Impacts occurring at a regional scale as determined by administrative boundaries or which affect regionally important resources or ecosystems. |
| International | Impacts that extend across international boundaries or affect resources such as features, resources or areas protected by international conventions. |
| Duration | |
| Temporary | Impacts are predicted to be of short duration (in the order of days) and/or intermittent/occasional. |
| Short-term | Impacts that are predicted to last only for the duration of the construction period |
| Medium-term | Impacts that will continue for a period of 5 to 10 years following the completion of the construction phase e.g., where the impact may reverse or affected resources or receptors recover within this period of time. |
| Long-term | Impacts that will continue for the life of the Project, but will either cease when the Project stops operating or is decommissioned, or where the impact may reverse or the affected resource / receptor recovers or reverts to a near natural state after 10 or within 20 years following the completion of the construction phase. |
| Permanent | Impacts that cause a permanent change in the affected receptor or resource (e.g., removal or destruction of ecological habitat) that endures substantially beyond 20 years following the completion of the construction phase. |

In the case of **scale** and **frequency**, these characteristics are not assigned fixed designations, as they are typically numerical measurements (e.g., number of acres affected, number of times per day, etc.).

The terminology and designations are provided to ensure consistency when these characteristics are described in an impact assessment deliverable. However, it is not a requirement that each of these characteristics be discussed for every impact identified.

For unplanned events (e.g., accidental release of hazardous materials) the **likelihood** of the impact occurring is taken into consideration in deriving the magnitude rating. The likelihood of an impact occurring as a result of an unplanned event is expressed as a probability and is designated using a qualitative scale (or semi-quantitative, where appropriate data are available), according to the attributes described in Table 6.3.

Table 6. 3: Definitions for Likelihood Designations (only used for unplanned events)

| Likelihood | Definition |
|-------------------|---|
| Unlikely | The event is unlikely but may occur at some time during normal operating conditions. |
| Possible | The event is likely to occur at some time during normal operating conditions. |
| Likely | The event will occur during normal operating conditions (i.e., it is essentially inevitable). |

Likelihood is estimated on the basis of experience and/or evidence that such an outcome has previously occurred.

It is important to note that likelihood is a measure of the degree to which the unplanned event is expected to occur, not the degree to which an impact or effect is expected to occur as a result of the unplanned event. The latter concept is referred to as uncertainty, and this is typically dealt with in a contextual discussion in the impact assessment deliverable, rather than in the impact significance assignment process.

In the case of impacts resulting from unplanned events, the same resource/receptor-specific approach to concluding a magnitude designation is utilised, but the ‘likelihood’ factor is considered, together with the other impact characteristics, when assigning a magnitude designation. There is an inherent challenge in discussing impacts resulting from (planned) Project activities and those resulting from unplanned events. To avoid the need to fully elaborate on an impact resulting from an unplanned event prior to discussing what could be a very low likelihood of occurrence for the unplanned event, this methodology incorporates likelihood into the magnitude designation (i.e., in parallel with consideration of the other impact characteristics), so that the “likelihood factored” magnitude can then be considered with the resource/receptor sensitivity/vulnerability/importance in order to assign impact significance. Rather than taking a prescriptive (e.g., matrix) approach to factoring likelihood into the magnitude designation process, it is recommended that this be done based on professional judgment, and assisted by quantitative data (e.g., modelling, frequency charts) where available.

Once the impact characteristics are understood, these characteristics are used (in a manner specific to the resource/receptor in question) to assign each impact a magnitude. In summary, magnitude is a function of the following impact characteristics:

- Extent;
- Duration;
- Scale;
- Frequency; and
- Likelihood.

Magnitude essentially describes the degree of change that the impact is likely to impart upon the resource/receptor. As in the case of extent and duration, the magnitude designations themselves (i.e., negligible, small, medium, large) are universally used and across resources/receptors, but the definitions for these designations will vary on a resource/receptor basis, as is discussed further below. The universal magnitude designations are:

- Positive;
- Negligible;
- Small;
- Medium; and
- Large.

The magnitude of impacts takes into account all the various dimensions of a particular impact in order to make a determination as to where the impact falls on the spectrum (in the case of adverse impacts) from negligible to large. Some impacts will result in changes to the environment that may be immeasurable, undetectable or within the range of normal natural variation. Such changes can be regarded as essentially having no impact, and should be characterized as having a negligible magnitude.

6.2.1.2 Sensitivity

In addition to characterizing the magnitude of impact, the other principal step necessary to assign significance for a given impact is to define the sensitivity/vulnerability/importance of the impacted resource/receptor to the type of activity proposed (e.g., habitat clearance, topsoil removal, etc.) or the consequences of a Project activity (e.g., dust, noise, water pollution, or induced population influx). This requires a range of physical, biological, cultural or human factors to be taken into account and may also need to include other factors such as legal protection, government policy, stakeholder views and economic value.

Characterization of sensitivity for a physical or biological resource or receptor (e.g., a water feature or parameter, cliff, vegetation type) will take into account its conservation status and importance (on a local, national and international scale), its vulnerability to disturbance, and its resilience to recover or withstand a specific impact or type of impact. Where the receptor is human or cultural, the value of that social and cultural heritage receptor/s and its vulnerability to the impact is considered, taking into account the receptor's resilience, including ability to adapt to change or use alternatives where available.

As in the case of magnitude, the sensitivity/vulnerability/importance designations themselves are universally consistent, but the definitions for these designations will vary on a resource/receptor basis. The universal sensitivity/vulnerability/importance designations are:

- Low;
- Medium; and
- High.

6.2.1.3 Evaluating Significance

Once magnitude of impact and sensitivity/vulnerability/importance of resource/receptor have been characterized, the significance of the impact is assigned using the impact significance matrix shown in Table 6.4.

For impacts resulting from unplanned events (typically accidents, such as a major oil spill or other event that cannot be reasonably foreseen), the above methodology is applied but likelihood is also considered when assigning the magnitude designation, as classified in Table 6.2.

Table 6. 4: Impact Significances

| Evaluation of Significance | | Sensitivity/Vulnerability/Importance of Resource/Receptor | | |
|----------------------------|-------------------------|---|------------|----------|
| | | Low | Medium | High |
| Magnitude of Impact | Negative Impacts | | | |
| | Negligible | Negligible | Negligible | Minor |
| | Small | Negligible | Minor | Moderate |
| | Medium | Minor | Moderate | Major |
| | Large | Moderate | Major | Critical |
| | Positive Impacts | | | |
| | Positive | Minor | Moderate | High |

The matrix applies universally to all resources/receptors, and all impacts to these resources/receptors, as the resource/receptor- or impact-specific considerations are factored into the assignment of magnitude and sensitivity designations that enter into the matrix. The following are definitions of impact significance;

- An impact of **Negligible significance** is one where a resource/receptor (including people) will essentially not be affected in any way by a particular activity or the predicted effect is deemed to be ‘imperceptible’ or is indistinguishable from natural background variations.
- An impact of **Minor significance** is one where a resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small (with or without mitigation) and/or the resource/receptor is of low sensitivity/ vulnerability/ importance. In either case, the magnitude should be well within applicable standards.
- An impact of **Moderate significance** has an impact magnitude that is within applicable standards, but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly, to design an activity so that its effects only just avoid breaking a law and/or cause a major

impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that impacts of moderate significance have to be reduced to minor, but that moderate impacts are being managed effectively and efficiently.

- An impact of **Major significance** is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of IA is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). An example might be the visual impact of a facility. It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones, such as employment, in coming to a decision on the Project.
- An impact of **Critical significance** after all feasible mitigation measures have been identified and assessed warrants the highest level of attention and concern. As with residual impacts of major significance, the regulators and stakeholders will need to closely evaluate whether the positive impacts of the project outweigh residual negative impacts of critical significance. In many cases residual critical impacts can be considered as a potential fatal flaw of the project.

6.3 DETAILED ASSESSMENT OF THE IDENTIFIED POTENTIAL POSITIVE AND NEGATIVE ENVIRONMENTAL AND SOCIAL IMPACTS

This section provides a detailed elaboration of both the positive and negative impacts associated with the proposed cardiac teaching and research hospital across all project phases. It discusses how these phases could affect the surrounding community, our nation, and the broader East African region. It is noted that many of the potential negative impacts have already been mitigated during the project design phase. Overall, this project is expected to yield predominantly positive impacts for Tanzania and the East African Community.

6.3.1 Potential Impacts During Preliminary/Mobilization Phase

6.3.1.1 Positive Impacts

Impact No. 1: Job Creation

The main positive impact anticipated at this stage is the creation of job opportunities for architects, engineers, and other professionals, contributing to the local economy, as they will be employed to design the proposed project. During the mobilization of construction materials to the site and site preparation, approximately 30 local individuals will benefit from job opportunities. This opportunity is expected to benefit both the local community and the Ubungu Municipality, as well as the broader region. **“This impact is localized and short term.”**

Impact No. 2: Local Economic Boost (Increased Income)

The wages that will be paid to the local workers/labours will directly contribute to their household incomes. This disposable income can then be spent on goods and services within the local economy, thereby stimulating economic activities and facilitating increased money

circulation, hence support broader economic growth within the region. **“This impact is localized and short term.”**

Impact No. 3: Creation Of Business Opportunities

The proposed project will establish a robust supply chain encompassing materials, equipment, and services. This chain will involve manufacturers, suppliers, distributors, transportation providers, and other intermediaries, thereby creating business opportunities across these sectors. Increased demand for construction materials such as cement, steel, and aggregate, along with construction equipment and machinery, will stimulate sales and business growth in manufacturing and distribution. Moreover, logistics companies and transport operators will experience heightened activity, leading to additional employment opportunities. **This impact is regionally based and medium-term."**

6.3.1.2 Negative Impacts

Impact No. 1: Increased Noise Levels Due to The Movement Of Trucks To And From The Site.

The transportation of materials, equipment, and personnel during mobilization phases can result in elevated noise levels within the project area and its surrounding neighborhoods. This noise originates primarily from vehicle operations including trucks and forklifts, which may disturb the local environment. **“This impact is site-specific, short-term, and of low significant."**

Impact No. 2: Increased Dust Generation from Moving Vehicles During The Transportation of Construction Materials.

Transportation of materials, especially those that are loose or dry (e.g., sand, gravel, cement), can generate dust, when are loaded, unloaded, or transported without proper covering, particulate matter can become airborne, contributing to air pollution. This is particularly problematic in dry and windy conditions. **“This impact is localized, short-term, and of low significant."**

Impact No. 3: Increased Traffic

The mobilization and transportation of materials and equipment will necessitate the use of heavy trucks and machinery, potentially increasing traffic congestion. Given that the project site primarily accesses Mloganzila Road, which is currently utilized by Mloganzila Hospital, the East African Centre for Cardiovascular Research, and local residents, this could lead to **localized, short-term traffic congestion**. However, this impact is considered **low in significance."**

6.3.2 Potential Impacts During Construction Phase

6.3.2.1 Positive Impacts

Impact No. 1: Employment Opportunities

During the project construction phase, employment opportunities in Ubungo Municipality, as well as at the ward and street levels, will increase. About 70 people will be directly and indirectly employed as hired laborers during the construction of the proposed project. Additionally, other business opportunities will emerge, such as food vendors selling foodstuffs. The project will also require various support services such as security, catering,

waste management, cleaning, and maintenance. These services often generate employment opportunities for local businesses and service providers. Security firms will be engaged to safeguard the site, while catering services will be needed to provide meals for the workers. Waste management companies will be contracted to handle construction debris, and cleaning services will ensure the site remains operational. Maintenance crews will be necessary to keep equipment and facilities in good working order, all contributing to increased local employment. **This impact is regionally based and medium-term."**

Impact No. 2: Economic Stimulus

The construction of the proposed cardiac teaching and research hospital will require a wide range of materials, including cement, steel, wood, plumbing fixtures, electrical components, and more, as the project involves building a nine-story structure with associated facilities. Local material suppliers will benefit from increased demand during the construction phase, which can lead to expanded production, additional sales, and the potential hiring of more staff to manage increased orders and logistics. Additionally, the construction phase will inject money into the local economy as workers and contractors spend their earnings on housing, food, transportation, and other goods and services in the surrounding area. This increased consumer spending will stimulate local businesses, creating a multiplier effect that boosts overall economic activity in the project area and the region. **"This impact is regionally based and medium-term."**

Impact No. 3: Increase of Government Revenue

The proposed project construction activities will generate tax revenues for local governments through the issuance of permits, licensing fees, and property taxes associated with the project. Additionally, sales taxes from the purchase of construction materials (such as cement, bricks, sand, gravel, paint, toilet fixtures, wiring, plumbing materials, roofing sheets, etc.) and services will contribute to government revenue. This revenue can be allocated towards public infrastructure or community development initiatives. **"This impact is nationally based and medium-term."**

Impact No. 4: Skills development of local workforce

During the project construction phase, contractors will provide job-specific training to workers. This training will facilitate skill development for local workers, enhancing their future employability and expertise in construction and related fields. **This impact is regionally based and long term."**

6.3.2.2 Negative Impacts

Impact No. 1: Increased Noise Level Due To The Movement And Operation Of Construction Machines.

The project Construction activities are highly expected to generate significant amounts of detectable noise levels from vehicles and construction equipment. Noises will also arise from various construction machinery at site and transportation of materials. which might have a significant impact to the East African center for cardiovascular diseases research staff, as well as project neighbors. During construction noise levels are expected to reach 80dBA if not controlled, that is well beyond the TBS standards of 55dBA during the day and 45dBA during the night.

This impact is considered moderately significant in consideration that the project area shall be at a close proximity to the project neighbors but significantly separated by undeveloped plots that are expected to muffle noise pollution. Most of the deterrent noises shall be confined during the construction period only because operation phase is not associated with noise, which is rather a shorter period compared with the lifetime of the proposed buildings. **"This impact is localized, short-term, and of medium significant."**

Impact No. 2: Increased Dust Generation and Gaseous Emissions

Air pollution by dust and gaseous emissions from various sources is an issue of consideration during the project design and project execution stages particularly in the choice of technologies and practices to be used under the project. Dust will mainly be generated from earth movements (excavation, levelling, dumping), wheels of trucks and machinery moving/traveling along unpaved surfaces, handling and transport of soil, and wind erosion from exposed surfaces. At the construction site, the possible impacts are expected across (at a radial distance of ± 0.5 km). The dispersion area of exhaust and dust (up to standard levels of air quality) will depend on the concentration of machinery and equipment at the site and the capacity of their engines.

Additionally, reduction in air quality shall depend on equipment type, quantities, duration, distance from sensitive environments and prevailing atmospheric conditions, particularly wind and moisture of the air. The main source of emission of atmospheric pollutants emanates from the exhaust from engines (in construction equipment trucks/tipper, excavators, etc.). Various internal combustion engines will release greenhouse gases (GHGs), notably carbon-dioxide (CO₂), small quantities of noxious gases such as nitrogen oxides (NO_x), sulphur oxides (SO_x), and hydrocarbons. There will be truck journeys by vehicles mobilizing construction materials, land clearance etc. to the project sites followed by several truck journeys. Consequently, any reduction in air quality, although virtually certain will be moderate and localized.

Along the proposed project areas, the adjacent areas including the Mloganzila hospital, Mloganzila Road and East African Centre for cardiovascular sciences are relatively open, without impediment to air movement hence enhance dilution of air pollutants. Also, the leafy vegetation at undeveloped plots of the project site shall be able to filter out a considerable content of low-level airborne pollutants. Thus, ventilation and vegetation are anticipated to lessen the air pollution problem. This impact is slightly significant because the project areas are at a reasonable distance to the existing Mloganzila components. **"This impact is localized, short-term, and of medium significant."**

Impact No. 3: Environmental Contamination From Increased Waste Generation.

The project construction process will at some extent contribute to the increase in waste generation at the project site. Such wastes include:

- Excavated materials from the earth works;
- Timber from used formwork;
- Paints, lubricants and petroleum contaminated waste`;
- Cement paper bags and other packaging materials;
- Metal, glass, plastic containers and other unwanted materials;
- Dirty or Old Clothes and Shoes: Discarded personal items.

- Food remains; and
- Wastewater (Sewage)

If not properly managed, these wastes may have a direct impact on the neighbouring premises. Disposal of the project generated waste off-site could also be a social inconvenience if done in unauthorized premises. The offsite effects expected in the project site include un-aesthetics view, pest breeding, unhygienic conditions, and pollution of physical environment. With mismanagement of construction waste water, there is a potential of land and water contamination resulting to soil and ground water pollution, spread of diseases to the Mloganzila Community and surrounding areas.

Proper waste management will however be taken into consideration and proper solid waste disposal done according to the requirement and directions of the Ubungo Municipal Council. Estimation of waste quantities is provided in Section 2.3 of this report. This impact will be **“This impact is localized, short-term, and of medium significant.”**

Impact No. 4: Occupational Safety and Health Risks

Construction sites inherently pose a significant risk to workers due to the intensive engineering and construction activities involved. This project shall involve activities such as erecting and fastening materials, metal grinding and cutting, concrete work, steel erection, and welding, can lead to accidental injuries. Common hazards include falls from heights, injuries from hand tools and construction equipment, cuts from sharp metal edges, and collapses of building sections. In extreme cases, poor construction practices can result in fatalities, highlighting the importance of occupational health and safety concerns. Additionally, workers may be exposed to diseases from building materials during the construction phase.

Anticipated health risks include those posed by noise production from equipment transport and setup, as well as accidents and other factors outlined in Table 6.5, which provides examples of standard operations and their associated hazards, along with occupational health and safety (OH&S) effects on personnel.

“This impact is site-specific, medium-term, and of medium significant.”

Table 6. 5: Operations and/or hazards and potential OH&S effects

| Operation and/ or hazard | Potential direct OH&S effects |
|---|--|
| Lifting operations | Dropped/ falling objects |
| Sharp edged/ pointed objects | Cuts |
| Electricity | Electric shock or electrocution |
| Hot objects | Burn and fire risks |
| Working at heights | Fall from height |
| Working outdoors | Hear stress, sunburn |
| Manual handling | Sprains and strains |
| Housekeeping | Slips, trips and falls |
| Hazardous substances (handling and storage) | Chemical contact with a person |
| Fire | Injuries, equipment damage |

| Operation and/ or hazard | Potential direct OH&S effects |
|---|---|
| Hazardous fumes, noxious gases | Chemicals inhalation, asphyxiation |
| Noise | Nuisance, disturbances, hearing problem |
| Use of low-quality freshwater, poor sanitary conditions, and exposure to communicable diseases and disease vectors can pose significant health risks. | Sickness, absenteeism from work |

Impact No. 5: Soil Disturbance

Excavation activities involve the removal of topsoil and the reshaping of the land, which disturbs the soil structure. Excavated soil is often stockpiled on-site; if not properly managed, these stockpiles can become sources of sediment that may be washed away during rain events.

Activities such as laying foundations, pipelines, and other infrastructure require digging trenches and holes, which disturbs the soil. The use of chemicals such as fuels, lubricants, and concrete additives carries the risk of accidental spills or leaks. If not properly managed, these chemicals can contaminate the soil, altering its composition and potentially harming soil organisms. **“This impact is localized, medium-term, and of low significance.”**

Impact No. 6: Population Influx

The construction phase will attract an influx of personnel, resulting in an increase in the local population. Approximately 70 workers are expected to be employed for the project construction activities. In addition, service providers such as security personnel, food vendors and caterers, cleaning agents, casual laborers, and suppliers of building materials and tools, along with others seeking employment, are expected to be present throughout the construction phase.

This influx will have social implications, including significant pressure on local resources such as housing, transportation, and amenities, leading to potential disruptions and challenges for the local community. The increase in population is also expected to have a temporary influence on the Mloganzila community demography, including changes in population density, age distribution, and socioeconomic composition. These changes can have effects on the local community, such as changes in local services, and potential impacts on local culture and traditions. **“This impact is localized, medium-term, and of medium significance.”**

Impact No. 7: Impacts Associated with Transmission of Vector Borne and Communicable Diseases

Communicable diseases are caused by viral, bacterial, parasitic and fungal pathogens that are airborne or that are transmitted through an infected person, animal or environmental source. Communicable diseases include malaria, tuberculosis (TB), measles and bacterial infections such as colds, gastric infections (e.g. diarrhoea) and the like.

Communicable diseases expected to be experienced at the project site include Malaria, tuberculosis, gastroenteritis, pneumonia, acute respiratory infection, diarrhoea, etc. HIV/AIDS and other sexually transmitted diseases and Covid 19 impacts are presented separately in *the*

following sections. Some of these diseases are water borne and caused by poor sanitary conditions and poor-quality drinking water.

The presence of an external workforce working in construction sites at the project site where interaction with Mloganzila community is possible could lead to the increased transmission of communicable diseases within the area. If opportunistic workers (those hoping to find employment on the Project or from related activities) migrate to Mloganzila, this could also impact on the transmission of communicable diseases.

Finally, overcrowding, poor hygiene and sanitation at Construction sites and poor waste management can also facilitate the spread of communicable diseases. There is the potential for increased transmission between contractor's workers living and then onwards into workers' and the students through interactions.

During construction, modifications to the environment and immigration into the area are likely to increase the risk of transmission of malaria. Modifications to the environment can create small water pools (e.g., wheel ruts and footprints) offering new mosquito breeding grounds and leading to increased vector densities and human-vector interaction. Any influx of people into the area may play an indirect role in increasing the malaria burden. This may result from an increase in pressure on medical facilities and inadequate waste management. The highly endemic nature of malaria means that the proposed buildings are unlikely to significantly add to the already high disease burden of the community during the wet season. However, modifications to the environment may change the breeding patterns of mosquitoes extending the high-risk malaria season for transmission from its peak.

As above, poor hygiene, sanitation and waste management can all result in increased risk of transmission of water borne communicable diseases such as Hepatitis A and E and Typhoid through increased risk of contamination of water and food with faecal matter. In addition, these factors can also result in increased number of pests, such as rats, which can contribute to disease transmission.

Communicable diseases have the potential to impact Project workforce and the project neighbors. It is anticipated that during the construction period the workforce will comprise up to 100 employees, both skilled and unskilled. Local labour will (as far as possible) be sourced within the region. **"This impact is localized, medium-term, and of low significance."**

Impact No. 8: Impacts associated with Transmission of Sexually Transmitted Infections

The HIV/AIDS prevalence rate in Dar es Salaam is 4.7. It is anticipated that during the construction period, the necessary workforce will comprise up to 100 people, who shall enter the proposed project site daily. The Project could result in increased transmission of STDs including HIV/AIDS during construction due to:

- Population influx, resulting in the mixing of people with higher HIV/AIDS or STD prevalence rates than the host community, which may promote the transmission of the disease.
- Workers establishing casual relationships with Mloganzila community's young girls. This may result in transactional sex or circumstances where the women assume they are in a more serious relationship, which will end in marriage.

- Engagement in casual high-risk sexual activity by transport drivers at their end destination (the MUHAS research and training Hospital). Transport drivers typically have higher rates of STDs and HIV/AIDS than the general population.
- Increased numbers of CSWs, who may have higher infection rates of STDs and HIV, near construction sites.

While there is access to treatment for STIs including HIV/AIDS in the communities, it is limited in terms of quality. Furthermore, there are significant taboos around STDs, which may influence people's willingness to access treatment. Any lack of access to treatment could affect the long-term health of those who contract STDs other than HIV, including fertility, damage to internal organs and long-term disability or even death. Increased transmission of STDs including HIV/AIDS has the potential to affect Mloganzila community. The increase in risk of STDs including HIV/AIDS will be long-term, as it can take time for prevalence/ incident rates to return to baseline levels. Furthermore, those infected with HIV/AIDS will have health effects, which last beyond the duration of the construction activities. **“This impact is localized, long-term, and of low significance.”**

Impact No. 9: Visual Intrusion

The project construction phase can lead to visual intrusion of the project site due to several factors. The presence of construction equipment, machinery, and materials such as scaffolding, cranes, and stockpiles of soil or building materials can create visual clutter and detract from the aesthetic value of the site. Additionally, the installation of temporary structures, such as site offices, storage containers, and fencing, can contribute to the visual impact and may be considered unsightly by the local community. Increased movement of construction vehicles and workers further contributes to visual intrusion, as the dynamic nature of the site becomes more prominent and disrupts the usual visual environment. These factors collectively contribute to the visual intrusion of the proposed project site during the construction phase, potentially impacting the local. **“This impact is localized, medium-term, and of low significance.”**

Impact No. 10: Gender-Based Violence (GBV), Rape and Sexual Harassment

Due to labour influx to the Mloganzila community, on daily bases for this project, the acts of GBV, sexual harassment, and other sexual offenses such as rape are expected and shall therefore be accounted for. About 30 skilled and 70 unskilled workers are expected to be working for the project contractor during the construction phase. The following impacts/ risks have the potential to happen during the construction phase if proper mitigation measures are not going to be implemented;

- Women who seek employment may also face demands for sexual favours before being employed which amounts to sexual harassment. Even when employed, women may face continuous and unwanted demands for sex and risk losing their jobs if they do not give in.
- Construction workers may engage in sexual fraternization with Mloganzila residents, patients and staff. In addition to this being a driver of HIV infection, it will lead to domestic conflicts, GBV, and domestic violence.
- Community residents, patients and staff may also face the risk of being subjected to verbal harassment in the form of insults and demeaning comments in addition to unwanted gestures and touches by construction workers.

- Outright rape is also a risk at construction sites. As a result, domestic violence and gender-based violence might happen.
- Sexual harassment of women (workers) might also happen as a result of mixing of women and men at worksites.

“This impact is localized, medium-term, and of low significance.”

6.3.3 Potential Impacts During Demobilization Phase

6.3.3.1 Positive Impacts

Environmental Restoration

This project's demobilization phase will typically encompass comprehensive environmental cleanup and restoration activities to mitigate the environmental impacts incurred during the construction phases. The cleanup process at this stage will involve removing construction debris, remediating contaminated soils, restoring natural habitats, replanting vegetation, and rehabilitating landscapes to their original or improved conditions. Furthermore, the environmental restoration process will ensure the affected area is returned to a sustainable state, aligning with regulatory requirements and promoting ecological balance. **“This impact is site specific and medium-term.”**

6.3.3.2 Negative Impacts

Loss Of Employment to Some Workers

The demobilization phase of the proposed project can lead to the loss of employment for some workers, particularly unskilled workers, due to the completion of their specific tasks. Many workers are hired for specific tasks, and once these tasks are completed, their roles become redundant. Demobilization will involve dismantling equipment, clearing the site, and conducting minor restoration work, which requires fewer workers compared to the active construction phase. Additionally, most construction phase employees are often employed on temporary or project-based contracts, which end once the project reaches completion.

Apart from that the loss of employment is due to certain roles being highly specialized and only necessary during specific stages of construction, such as electrical wiring. Once their expertise is no longer needed, these workers are let go. **“This impact is regional, medium-term, and of medium significance.”**

6.3.4 Potential Impacts During Operational Phase

The operation of a cardiac teaching and research hospital can have several negative environmental and social impacts, despite its many benefits. Most of the environmental problems associated with project activities and actions has been addressed in the design stage of the project. Environmental and social impacts, which could arise during operations, may be due to inadequacies in the institutional, operational, maintenance, management and monitoring aspects of the project systems e.g., availability of resources such as water supply, energy etc; management of solid waste, wastewater and storm water drainage etc, inadequacies in maintaining high standards of hygiene, safety and security; and maintenance of good neighbourliness and relations with different stakeholders.

6.3.4.1 Positive Impacts

Impact No. 1: Accessibility to Quality Cardiovascular Services

The primary social benefit of the proposed cardiac teaching and research hospital is the improvement of health outcomes for patients with heart diseases, leading to a healthier population and reduced mortality rates. Africa currently has the lowest number of cardiac centers per capita at 1 per 33 million people compared to Europe and Asia. Moreover, East Africa lacks a dedicated hospital for cardiovascular diseases, making this project timely and essential.

This hospital will alleviate the demand for cardiovascular services not only within our country but also across the East African Community and the continent as a whole. By providing access to high-quality cardiovascular services to the majority of East Africans, the hospital will significantly enhance public health in the region. Specialized cardiovascular services offered by the hospital will improve the diagnosis, treatment, and management of heart diseases, thereby leading to better health outcomes. This includes reducing the incidence of heart attacks, strokes, and other cardiovascular conditions, ultimately enhancing both the quality of life and longevity of the population. **“This impact is high extends nationally and internationally, promising long-term benefits.”**

Impact No. 2: Decreased Morbidity and Mortality

The proposed project aims to reduce morbidity and mortality from cardiovascular conditions in the East African region, thereby enhancing well-being and fostering socioeconomic development. Currently, there is no dedicated hospital for cardiovascular diseases in Tanzania or elsewhere in East Africa. Consequently, cardiac patients from across East Africa must seek treatment abroad, often in countries such as South Africa, India, South Korea, China, and Japan. This situation imposes significant health burdens and financial costs on patients and their families.

Reducing these burdens will not only enhance productivity and quality of life but also contribute to the overall economic growth of East African communities. The establishment of advanced cardiac care facilities will directly decrease the prevalence and severity of cardiovascular conditions. Early detection and intervention will play a crucial role in preventing complications, reducing hospitalizations, and lowering mortality rates associated with heart diseases. **“This impact is high national and international in scope and is long-term.”**

Impact No. 3: Development of Highly Skilled Human Resources

The project aims to develop highly skilled human resources in cardiovascular sciences, addressing the immediate labor market needs of the East African Community (EAC) and supporting the implementation of the EAC’s common market protocols. As a teaching and research institution, the hospital will offer advanced training for medical professionals, nurturing a highly skilled workforce to meet regional healthcare demands. In five years of project operation, approximately 120 students and 100 cardiovascular staff are expected to undergo training.

The hospital's teaching and research programs will cultivate a cadre of highly trained cardiovascular specialists, including doctors, nurses, and technicians. This initiative will not only fulfill the immediate healthcare requirements of the region but also contribute to the long-term sustainability and self-sufficiency of the East African healthcare system. **"This impact is high extends nationally and internationally, promising long-term benefits."**

Impact No. 4: Reduces Cost of Treatment for Cardiac Cases

Currently, patients in Tanzania and the broader East African region often travel abroad for cardiovascular treatment, incurring substantial costs for travel, accommodation, and treatment in foreign hospitals. By providing specialized care locally, the hospital will eliminate these additional expenses, making treatment more affordable. **"This impact extends nationally and internationally, promising long-term benefits."**

Impact No. 5: Reduces the cost of education for students pursuing cardiovascular studies.

The operation of a cardiac teaching and research hospital in Tanzania will reduce the cost of education for Tanzanian and East African students pursuing cardiovascular studies in several ways:

By offering high-quality education locally, the proposed cardiac teaching and research hospital will eliminate the need for students to travel abroad, thereby reducing costs related to international travel, visas, accommodation, and living expenses, which are often significantly higher than domestic costs.

The proposed cardiac teaching and research hospital can collaborate with governmental bodies, non-governmental organizations (NGOs), and international donors to provide subsidized education programs. These subsidies can help lower tuition fees and offer scholarships, making cardiovascular education more affordable for students from Tanzania and East Africa. Additionally, the hospital can attract funding and support from the government and international donors focused on improving healthcare education in the region. This financial support can be used to subsidize education costs for students, further lowering their financial burden.

The hospital will provide integrated clinical training within the same institution where theoretical education is delivered, reducing costs associated with external internships and clinical placements. This integration ensures that students do not have to seek costly placements elsewhere.

Training and retaining local experts to serve as faculty will reduce the need to hire expensive foreign educators. This can lower the operational costs of the educational programs, which can be passed on to students in the form of reduced tuition fees. The hospital can also attract funding and support from the government and international donors focused on improving healthcare education in the region. This financial support can be used to subsidize education costs for students, further lowering their financial burden.

The proposed cardiac teaching and research hospital in Tanzania will reduce the cost of education for Tanzanian and East African students by offering local training opportunities, subsidized programs, integrated clinical training, access to advanced resources, local faculty,

economies of scale, government and donor support, research opportunities, community-based training, and regional collaborations. These measures collectively will lower the overall cost of cardiovascular education, making it more accessible and affordable for students in Tanzania and the broader East African region. **“This impact extends nationally and internationally, promising long-term benefits.”**

Impact No. 6: Establishing The Country as a Regional Medical Hub

The operation of a cardiac teaching and research hospital in Tanzania will position the country as a regional medical hub through the presence of advanced medical infrastructure. Establishing a state-of-the-art cardiac teaching and research hospital will provide advanced medical infrastructure that is currently lacking not only in Tanzania but also in the East African region. The proposed hospital will be the only facility dedicated to cardiovascular care in Tanzania and East Africa. This hospital will be equipped with the latest technology and facilities for cardiovascular care, setting a high standard for medical services in East Africa.

Additionally, the hospital will serve as a center for specialized medical training, attracting students and professionals from across the region, and will produce a cadre of skilled healthcare professionals. This will not only improve the local workforce but also attract international students, positioning Tanzania as a leader in medical education.

As a research institution, the hospital will foster medical research and innovation. Collaborative research projects with international institutions and the publication of significant findings in cardiovascular medicine will enhance Tanzania's reputation as a center for medical excellence. This will attract researchers and funding from around the world, further strengthening the country's position as a regional medical hub.

The availability of advanced cardiac care will significantly improve healthcare services in Tanzania and the region. The hospital will provide comprehensive cardiovascular care, from prevention and early diagnosis to advanced treatment and rehabilitation. High-quality healthcare services will attract patients from neighboring countries, reducing their need to seek treatment abroad. **“This impact extends nationally and internationally, promising long-term benefits.”**

Impact No. 7: Promoting Medical Tourism

The proposed project will focus on cardiovascular care, hence will employ highly skilled medical professionals, including cardiologists, surgeons, nurses, and technicians. The presence of such specialized expertise will draw patients from across the region and beyond, looking for advanced treatments and procedures. The proposed cardiac teaching and research hospital will offer a full spectrum of cardiovascular services, from preventive care and early diagnosis to advanced treatment and rehabilitation. This comprehensive approach will ensure that patients receive all necessary care in one location, making it an attractive option for medical tourists who prefer a single, coordinated care experience.

The cardiovascular treatments in the country are likely to be more affordable compared to those in developed countries, even with the high standards of care provided. This cost-effective treatment, without compromising quality, will be a significant draw for international

patients seeking affordable healthcare solutions. **“This impact is nationally based, promising long-term benefits.”**

Impact No. 8: Employment Opportunities

The operation of a cardiac teaching and research hospital in Tanzania will create significant employment opportunities for Tanzanians and individuals within the broader East African Community.

The proposed cardiac teaching and research hospital will directly employ a wide range of healthcare professionals, including cardiologists, cardiac surgeons, nurses, technicians, radiologists, pharmacists, and administrative staff. These positions will cater to both entry-level roles and specialized positions requiring advanced training and experience.

As a teaching hospital, there will be opportunities for educators and trainers across various disciplines related to cardiovascular care, including academic faculty members, clinical instructors, and researchers who will contribute to both undergraduate and postgraduate medical education programs.

Given the advanced medical infrastructure of the hospital, there will be demand for skilled technicians and technologists within Tanzania and the East African region who can operate and maintain specialized medical equipment and technology. This includes roles in biomedical engineering, medical imaging, and laboratory sciences.

The hospital will also require support staff in areas such as maintenance, cleaning, security, catering, and transport services. These roles provide employment opportunities for individuals with diverse skill sets and educational backgrounds. Apart from that, administrative and managerial roles will be crucial for the efficient operation of the hospital. These positions include hospital administrators, finance managers, human resources specialists, and IT professionals who support the day-to-day functioning and strategic development of the institution.

By directly employing healthcare professionals, educators, support staff, and technical experts, this project will contribute significantly to job creation within Tanzania and the broader East African Community. **“This impact is nationally based, promising long-term benefits.”**

Impact No. 9: Creation of Business Opportunities

The establishment of the proposed cardiac teaching and research hospital goes beyond enhancing healthcare provision; it will serve as a catalyst for economic diversification and growth. By attracting pharmaceutical companies, medical equipment suppliers, ancillary health services, research entities, and educational institutions to the area, the hospital will create a vibrant ecosystem of innovation, collaboration, and economic opportunity. This ecosystem not only supports local businesses and job creation but also strengthens the region's healthcare infrastructure and attractiveness as a hub for medical excellence. As a result, the proposed project is poised to significantly boost the local economy and contribute to long-term socio-economic development. **“This impact is nationally based, promising long-term benefits.”**

Impact No. 10: Economic Stimulus:

The operation of the cardiac teaching and research hospital in Tanzania serves as a significant economic stimulus through its direct and indirect contributions to the local economy. Directly, the hospital creates employment opportunities across various sectors, including healthcare professionals such as cardiologists, cardiac surgeons, nurses, technicians, and administrative staff. These positions not only provide stable employment but also stimulate local consumption and demand for goods and services, ranging from housing and groceries to leisure activities and transportation.

Indirectly, the hospital boosts economic activity by supporting a network of suppliers and service providers. This includes companies that supply medical equipment, pharmaceuticals, and IT services, as well as local businesses that cater to the needs of hospital staff and patients. The increased economic activity generates multiplier effects, leading to further job creation and income generation throughout the community.

Furthermore, medical tourism attracted by the hospital contributes significantly to the local economy. International patients and their accompanying persons spend on accommodation, dining, shopping, and tourism activities, benefiting hotels, restaurants, retail stores, and tour operators. This diversification of economic activity reduces dependency on traditional sectors and enhances overall economic resilience. **“This impact extends nationally and internationally, promising long-term benefits.”**

Impact No. 11: Increase in Government Revenue:

The hospital also plays a crucial role in increasing government revenue through taxes and fees. As a large-scale employer and purchaser of goods and services, the hospital contributes directly to tax revenues through payroll taxes, income taxes from employees, and corporate taxes. Additionally, the hospital generates revenue for the government through licensing fees, permits, and tariffs on imported medical equipment and supplies.

Moreover, the economic activities spurred by the hospital, including medical tourism and increased local consumption, contribute to indirect tax revenues such as value-added tax (VAT), sales taxes, and customs duties. These revenues are essential for funding public services, infrastructure development, and social welfare programs, thereby enhancing the overall socio-economic development of Tanzania and supporting sustainable growth. **“This impact is nationally based, promising long-term benefits.”**

Impact No. 12: Adding value to the neighborhood properties

The establishment and operation of a cardiac teaching and research hospital can indeed add significant value to neighborhood properties in several ways.

Firstly, the influx of jobs created by the hospital can attract more residents to the area, thereby increasing demand for housing and boosting property values. The presence of stable employment opportunities enhances the attractiveness of the neighborhood as a residential destination. Furthermore, the hospital's presence often stimulates the development of supporting amenities and services in the vicinity. These may include restaurants, cafes, retail shops, and recreational facilities. Such amenities contribute to a vibrant community

atmosphere and enhance the overall desirability of the neighborhood, thereby positively impacting property values. In addition, the hospital's ability to attract medical tourists from other regions or countries can significantly raise the neighborhood's profile internationally. This exposure not only enhances the area's reputation but also increases interest from investors and businesses, further driving up property values as the neighborhood becomes more recognized and desirable.

In summary, the establishment and operation of a cardiac teaching and research hospital not only enhance healthcare provision but also contribute to economic growth, community development, and increased property values in the surrounding neighborhood. These factors collectively underscore the hospital's role as a catalyst for positive socio-economic impact and neighborhood enhancement. **“This impact is localized and long term”.**

6.3.4.2 Negative Impacts

Impact No. 1: Occupational Health and Safety Risks

Occupational health and safety hazards within the proposed cardiac teaching and research hospital setting, particularly related to chemical handling, radiation sources, and general workplace safety practices:

Chemical and Radiation Handling: Hospitals utilize various chemicals and sources of radiation for diagnostic and treatment purposes. Improper handling of these substances can lead to exposure risks for workers, potentially causing health issues if proper precautions are not taken.

Personal Protective Equipment (PPE): The absence or inadequate use of PPE, such as gloves, goggles, and protective clothing, increases the risk of occupational hazards. Workers must be equipped with appropriate PPE to minimize exposure to chemicals and radiation.

Other Physical Hazards: Slippery surfaces, operation of machinery and tools, handling of glass bottles, and poorly designed working and walking surfaces contribute to physical hazards in the workplace. Implementing safety measures like machine guards and ergonomic workplace design is crucial to preventing injuries. **“This impact is site specific, medium-term and of medium significance.”**

Impact No. 2: Environmental contamination from increased waste generation.

The operation of a cardiac teaching and research hospital poses several environmental challenges, primarily concerning water pollution, land degradation, air pollution, and increased waste generation.

The proposed project will utilize a wide array of pharmaceuticals, chemicals, and produce wastewater containing contaminants like pharmaceutical residues and biological materials. Improper disposal practices and inadequate wastewater treatment systems can lead to the leaching of these substances into soil and groundwater, potentially reaching water bodies and posing risks to aquatic ecosystems and human health.

The hospital will generate significant quantities of waste, including general, hazardous, and biomedical wastes. Inadequate segregation, storage, transportation, treatment, and disposal of these wastes can contaminate soil and nearby land areas, especially hazardous biomedical wastes containing infectious materials, chemicals, and pharmaceuticals. Improper disposal of chemicals and pharmaceuticals can further contribute to soil contamination and groundwater pollution, endangering both the environment and public health.

During operations, substantial amounts of solid and liquid wastes are expected to be generated, including general wastes like paper, food waste, and plastic bottles, as well as medical and hazardous wastes such as needles, syringes, and expired drugs. Inadequate waste management practices, from sorting and segregation to collection and disposal, pose significant environmental pollution risks, potentially leading to the contamination of soil, groundwater, and local water bodies. Improper management of liquid wastes, including wastewater from various hospital facilities and contaminated laboratory and theatre wastewater, can exacerbate soil and groundwater pollution, as well as pose risks of disease transmission within the community. **This impact is localized and medium-term and of medium significance."**

Impact No. 3: Increased Surface Water Run-off

The project shall involve roofing of the buildings and paving the project area thus reducing water infiltration into the ground. This implies that surface runoff from the site will increase. The project will occupy an area of about 10Ha out of the 1286.17Ha (MUHAS whole area). The amount of runoff will increase slightly due to lowered infiltration of rainwater into the soil. Uncontrolled storm water has the potential to cause floods or water logging either within the Hospital building area and its infrastructure or the Mloganzila surrounding areas. Floods can cause damage to properties, injuries to people or even loss of life, depending on the magnitude. Water logging can be breeding sites for diseases vectors especially mosquitos, but also cause visual pollution apart from blocking access (if happen on access road). **"This impact is site specific and short-term and of low significance."**

Impact No. 4: Fire Risks

The proposed hospital building is prone to fire hazards due to the various types of combustible materials and machines used and installed, respectively. Electrical faults are largely the main culprit in fire accidents in buildings in Tanzania. Since the project will use extensive electrical equipment and systems to power medical devices, lighting, HVAC (Heating, Ventilation, and Air Conditioning), and other essential services, faulty wiring, overloaded circuits, or equipment malfunctions can lead to electrical fires. Additionally, the storage and use of a variety of combustible materials, including cleaning agents, sterilizing agents, medical gases, and flammable liquids for procedures and cleaning, present a fire hazard. Improper storage, handling, or accidental spills of these materials can lead to fire hazards. Moreover, during construction or renovation activities within the hospital, hot work such as welding, soldering, or cutting can create sparks or open flames that pose fire hazards. Adequate fire safety protocols and supervision are necessary to prevent incidents.

This impact is site specific and short-term and of low significance."

6.4 CUMULATIVE IMPACTS

Cumulative impacts refer to the combined effects of multiple simultaneous or sequential projects on the environment, community and infrastructure of a particular area. These impacts result from the interaction and aggregation of individual effects, which can amplify, diminish, or modify the overall outcomes beyond what would occur from each action or project in isolation.

For the construction of the Cardiac hospital, Cumulative impacts may arise when considering the collective consequences of existing conditions and structures including the Muhimbili-Mloganzila Hospital and East African research centre for cardiovascular science, proposed developments including the construction of the MUHAS college of medicine, planned activities in the surrounding Mloganzila community as well as and socioeconomic dynamics. Cumulative impacts foreseen shall be addressed with consideration of a wide range of interrelated factors, including holistic assessments, strategic planning, and collaborative decision-making processes that consider the interconnectedness and long-term implications of development activities on the Mloganzila area collectively and its stakeholders.

Impact No. 1: Increased traffic congestion

The presence of two hospitals (the Muhimbili-Mloganzila Hospital) and the Cardiac Teaching and research Hospital in close proximity can significantly increase traffic congestion, especially during peak hours. This congestion can affect not only patients trying to access healthcare services but also residents and commuters' times, road safety concerns, and frustration among the existing hospital residents and Mloganzila community at large.

Construction activities associated with the college of medicine (the HEET project) for such as material deliveries, equipment movement, and workers commuting, can add to the existing traffic burden in the area. Heavy construction vehicles and machinery may further congest roads and disrupt traffic flow, impacting residents, businesses and emergency services.

In addition, during the construction phase for both projects, there will be an influx of construction vehicles such as trucks, cranes, and excavators, which can contribute to traffic congestion on local roads and highways. Large deliveries of construction materials such as steel, concrete, and machinery can further congest roads, especially if they coincide with peak traffic hours for the Mloganzila community as well. The hospital construction project will also increase the number of workers commuting to and from the construction site, adding to existing traffic volumes and possibility of accident occurrence.

Impact No. 2: Increased Dust Generation and Gaseous Emissions

Both construction and operational activities associated with the proposed cardiac hospital and the Muhimbili-Mloganzila hospital respectively can contribute to noise and air pollution. Construction activities such as excavation, demolition, and machinery operation generate dust and emissions, which can disturb nearby residents and disrupt daily activities. Furthermore, air pollutants such as particulate matter, volatile organic compounds (VOCs), and nitrogen oxides (NO_x) are highly expected at the CTH in cumulative implication with the existing Muhimbili-Mloganzila hospital and the road use at the Mloganzila area from sources life generators, boilers, and medical waste incineration. These pollutants can have adverse effects

on air quality and public health, especially for vulnerable populations such as children, the elderly, and individuals with respiratory conditions.

Impact No.3: Increased Noise Level

The Cardiac teaching and research Hospital project activities may result to increase in noise levels during the construction and operational phases which are concurrent to noise pollution anticipated during the execution of the HEET college of medicine construction project as well as the pre-existing Mloganzila Hospital operational activities and the Mloganzila community. Additionally, traffic to and from the hospitals and the aforementioned projects components, ambulance sirens, and HVAC systems can cumulatively contribute to noise pollution.

Impact No. 4: Environmental Contamination from Increased Waste Generation.

The establishment of the cardiac hospital construction and increased human activity can pose environmental risks to the existing Mloganzila community. Habitat destruction, loss of green spaces and disruption of natural ecosystems can degrade biodiversity and diminish Mloganzila’s ecosystem and quality of life. Moreover, increased pollution from construction activities, vehicular traffic, and industrial emissions can worsen air and water quality, exacerbating respiratory illness, allergies and other health problems among the Mloganzila community residents as well ground water pollution.

Solid and liquid waste mismanagement during the construction and operational phases of the proposed CTH project, can result to environmental pollution that will be enhanced by concurrent projects at the Mloganzila area including the existing Muhimbili-Mloganzila Hospital and the proposed HEET project; these can result to soil contamination which is cumulatively anticipated in all project phases execution. The densely populated area of the Mloganzila community being at a relatively far distance from the project site, these impacts are expected to be experienced within the project site and vicinity and therefore relatively less significant.

6.5 SUMMARY OF SIGNIFICANCE IMPACTS BEFORE APPLICATION OF MITIGATION MEASURES

The matrix shown below (Table 6.6) gives the summary of the impacts identified and respective significance ratings prior to application of mitigation measures. The methodology is provided in section 6.5.

Table 6. 6: Summary Significance of impacts before application of Mitigation Measures

| S/N | Environmental and Social Impacts | Impact Significance Rating | | | |
|-----|---|----------------------------|--------------------|----------------------|-----------------|
| | | Mobilization Phase | Construction Phase | Demobilization Phase | Operation Phase |
| 1. | Increased noise | Moderate | Moderate | Minor | Negligible |
| 2. | Increased dust generation and emission of gases | Moderate | Moderate | Minor | Negligible |
| 3. | Population Influx | Minor | Major | Minor | Major |
| 4. | Increased surface water run-off | Negligible | Negligible | Negligible | Moderate |
| 5. | Fire risks | Negligible | Minor | Negligible | Moderate |
| 6. | Soil disturbance | Minor | Moderate | Minor | Minor |
| 7. | Occupational safety and health risks. | Minor | Moderate | Minor | Moderate |

| | | | | | |
|-----|--|-------|----------|-------|----------|
| 8. | Transmission of vector-borne and communicable diseases. | Minor | Moderate | Minor | Minor |
| 9. | Impacts associated with the transmission of sexually transmitted infections. | Minor | Moderate | Minor | Moderate |
| 10. | Visual intrusion. | Minor | moderate | Minor | Minor |

Source: Consultant, 2024

The impacts were further rated at a scale of “-3” to “+3” through “0” in the following manner as;

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

Table 6. 7: Impact Correlation Matrix for the Proposed Cardiac Teaching and Research Hospital Project

| Impacts | Project Phase | | | |
|--|---------------|--------------|----------------|-----------|
| | Mobilization | Construction | Demobilization | Operation |
| Positive | | | | |
| Job creation/employment opportunities | +2 | +3 | +1 | +3 |
| Local economic boost (increased income) | +1 | +2 | 0 | +2 |
| Creation of business opportunities | +3 | +3 | 0 | +3 |
| Economic Stimulus | +1 | +1 | 0 | +3 |
| Increase of government revenue | +2 | +2 | 0 | +3 |
| Skills development of local workforce | +1 | +2 | 0 | +3 |
| Accessibility to Quality Cardiovascular Services | 0 | 0 | 0 | +3 |
| Reduces cost of treatment for cardiac cases | 0 | 0 | 0 | +3 |
| Reduces the cost of education for students pursuing cardiovascular studies. | 0 | 0 | 0 | +3 |
| Development of Highly Skilled Human Resources | 0 | 0 | 0 | +3 |
| Decreased Morbidity and Mortality | 0 | 0 | 0 | +3 |
| Promoting medical tourism | 0 | 0 | 0 | +3 |
| Establishing the country as a regional medical hub | 0 | 0 | 0 | +3 |
| Adding value to the neighborhood properties | 0 | +1 | 0 | +3 |
| Negative | | | | |
| Increased noise | -1 | -2 | 0 | 0 |
| Increased dust generation and emission of gases | -1 | -2 | 0 | 0 |
| Population Influx | -1 | -3 | 0 | -2 |
| Increased surface water run-off | 0 | 0 | 0 | -1 |
| Fire risks | 0 | -1 | 0 | -2 |
| Soil disturbance | -1 | -1 | 0 | 0 |
| Occupational safety and health risks. | -1 | -2 | -1 | -1 |
| Transmission of vector-borne and communicable diseases. | -1 | -2 | -1 | -1 |
| Impacts associated with the transmission of sexually transmitted infections. | -1 | -2 | -1 | -1 |
| Visual intrusion. | -1 | -2 | -1 | -1 |
| Environmental contamination from increased waste generation. | -1 | -2 | -1 | -2 |

Source: consultant's analysis, 2024

6.6 PROJECT ALTERNATIVES

In the ESIA process it is important to consider different alternatives, or options, which will achieve the project's objectives. It is also important to include a consideration of what would happen without the project – that is the no project alternative. Environmental assessment for each alternative is also carried out, since each alternative is likely to have a different set, or degree, of impacts. In this ESIA consultations with stakeholders and site visits provided basis for identifying alternatives. The following types of alternatives are presented for consideration:

It is important to note that site alternatives were not considered in the assessment because the proposed project will be implemented within the MUHAS Mloganzila premises. This is the second phase of the East African Center of Excellence for Cardiovascular Science, eliminating the need for alternative sites or land acquisition. Additionally, since the project is within the MUHAS Mloganzila premises, there is no requirement for a Resettlement Action Plan (RAP).

6.6.1 No project alternative

The no project alternative entails retaining the current status quo (No construction of the proposed cardiac teaching and research hospital). Adopting this option would mean avoiding most of the negative effects associated with the presence of the building and missing all the positive benefits such as;

- Increase in employment opportunities
- Accessibility to quality cardiovascular services
- Increased government revenue
- Economy diversification
- Community investment and contribution
- Increase in practical skilled workforce
- Encourage Regional integration
- Strengthening the culture of environmental and social risk mitigation

6.6.2 Energy Alternative

The use of alternative energy sources, apart from power from the national grid and diesel generators, was considered for the project. As is the case in most developing countries, the supply of electricity from national grids is often unreliable, primarily because it originates from hydroelectric power generators, which depend on rainfall frequency, intensity, and patterns. Diesel generators, commonly used during power interruptions, emit a significant amount of greenhouse gases, especially when operated for extended periods.

This Environmental and Social Impact Assessment (ESIA) proposes that MUHAS consider the use of solar energy for lighting. Solar energy is abundant, renewable, and significantly lowers greenhouse gas emissions. It is also cost-effective, as, after the initial investment, solar power can drastically reduce electricity bills. The design team is encouraged to explore the feasibility of using this alternative at the proposed site. However, the national grid will remain the primary energy source.

Additionally, it emphasizes the importance of energy-efficient lighting design, including:

- LED Lighting: Implement energy-efficient LED lighting throughout the building to reduce electricity consumption.

- Daylighting Controls: Install daylight sensors and dimmable lighting controls to adjust artificial lighting based on the availability of natural light.
- Occupancy Sensors: Utilize occupancy sensors to automatically turn off lights in unoccupied rooms and areas, ensuring efficient energy use.

These measures will enhance energy efficiency, reduce operational costs, and contribute to a sustainable hospital environment.

6.6.3 Technology and Building Materials Alternatives

Construction technology involves the choice of building materials and the technique and means used to erect buildings. As with the building design process, cautious consideration of contextual conditions is crucial to developing appropriate construction technologies. In addition, any selected technology must be constantly reviewed and, if necessary, upgraded during the construction process. A number of construction technologies were considered. The following criteria were used to select the most suitable technology options for this project;

- The use of locally available, low-energy-consumption building materials, especially those produced with renewable energy sources;
- The use of materials from sustainable production chains (e.g., avoid use of timber from savage deforestation);
- The use of non-toxic materials; and
- The use of materials easily dismantled (and recyclable as building materials or energy sources).

6.6.4 Collection, Treatment, and Disposal of Sewage

Two alternatives were considered for wastewater collection and disposal which includes the use of offsite sanitation or onsite sanitation. Onsite sanitation includes treatment and disposal of liquid wastes on site while offsite sanitation means collection of wastewaters from the site for treatment and disposal outside of the site (i.e., Sewerage system). Onsite sanitation was preferred because at the project site there is no sewer system indicating an additional cost and technical inconvenience for requiring offsite sanitation; onsite sanitation shall therefore be more feasibly used.

Four alternatives were considered for managing liquid waste from the proposed of cardiac Hospital at Mloganzila area :

Alternative 1: Use of existing stabilization ponds at Mloganzila Hospital

Mloganzila Hospital currently uses stabilization ponds to treat liquid waste from the hospital. Being constructed closely to this wastewater facility, the project design will consider the connection of generated liquid wastes to the existing Mloganzila Hospital *stabilization ponds*. This will minimize cost for constructing new or other liquid wastes management facilities.

Alternative 2: Up-flow anaerobic sludge blanket (UASB)

UASB would treat wastewater using anaerobic digestion to break down organic matter and produce biogas and nutrient-rich effluent. This promotes resource recovery and generation of energy. However, additional aerobic treatment may be needed to fully remove nutrients before discharge depending on location. Moreover, UASB has higher cost implication and requires space, infrastructure and technical operation and maintenance.

Alternative 3: Constructed wetland

Wetlands mimic natural systems to biologically treat wastewater through physical, chemical and biological processes. They are lower maintenance than mechanical plants but require land area. Surface flow wetlands could produce odour issues while subsurface flow has operational challenges.

Alternative 4: Septic tank and soak away pits

Multi septic tanks connected to underground soak away pits would be a low-cost option but require regular emptying and pose contamination risks if not properly managed and maintained. Space is also required for multiple soak pits considering there would be expected large number of people (students, staff and patients).

Alternative 5: Centralized Biodigester

is a large-scale facility that processes organic waste materials to produce biogas. In the biodigester facility, the organic waste undergoes anaerobic digestion, a biological process where microorganisms break down the organic matter in the absence of oxygen. This process produces biogas and digestate. The biogas produced from the organic waste can be used on-site to generate electricity and heat or upgraded to natural gas.

6.6.5 Design Alternative

The proposed project involves the construction of a nine-floor building with varying area sizes as detailed in sections 2.4.1 and 2.4.2, designed to accommodate all hospital activity requirements. This vertical design is appropriate given the nature of the hospital's operations and the available space. The National Human Settlement Policy encourages multi-storey buildings over horizontal expansion as a strategy for space optimization. With prime land becoming increasingly scarce, optimal land use is essential.

CHAPTER SEVEN

7.0 ENHANCEMENT AND MITIGATION MEASURES

This chapter describes measures or interventions that should be implemented to mitigate the negative impacts and enhance the positive ones identified in the preceding chapter. Many of the proposed mitigation measures are simply good engineering practices that should be adhered to during all project phases.

The following section outlines measures that MUHAS should follow to ensure that the anticipated environmental and social impacts are enhanced, avoided, abated, or remediated. Chapter 7 presents enhancement and mitigation measures for the potential positive and negative impacts identified in Chapter 6. These mitigation measures are presented according to the impact category occurring in different phases. If the impact occurs in all stages of project development i.e., design, mobilization and construction, operations and maintenance, and demobilization, then the mitigation measure is discussed only once.

The project is expected to result in both positive environmental, economic, and socio-cultural impacts as well as negative impacts. The positive impacts will be enhanced, while potential negative impacts will be mitigated.

7.2 ENHANCEMENT MEASURES FOR POSITIVE IMPACTS

Enhancement measures for the general positive impacts of a cardiac teaching and research hospital can be targeted to maximize their benefits. Here are specific measures for each impact:

Impact No. 1: Employment Benefits to The Community

- Employment opportunities should be offered fairly to individuals of all genders.
- The contractor shall be motivated to hire local individuals who are willing to work diligently but are currently unemployed, with an emphasis on utilizing up to 50% unskilled labour, as long as it remains feasible. This approach aims to maximize the benefits of the project for the local population.
- The contractor is responsible for offering on-the-job training.
- Local communities shall be motivated to produce high-quality goods and services within shops located near the project site.

Impact No. 2: Creation Of Business Opportunities

- Encourage the hospital to source supplies and services from local businesses and minority-owned enterprises.
- Partner with local businesses to develop healthcare-related start-ups and innovations.
- Create programs to connect local businesses with the hospital for providing goods and services, thereby stimulating local commerce.

Impact No. 3: Economic Stimulus and Increase Government Revenue

- Foster collaborations between the hospital and government entities to fund infrastructure and healthcare projects.

- Allocate a portion of hospital profits to community development projects, thus stimulating further economic growth.
- Implement favourable taxation policies to attract investment in the healthcare sector.
- Promote medical tourism to increase foreign exchange earnings.
- Develop revenue-sharing models with private healthcare providers.
- Invest in healthcare innovations that can be patented and commercialized.

Impact No. 4: Accessibility To Quality Cardiovascular Services

- Develop mobile clinics and telemedicine services to reach underserved communities.
- Implement sliding scale fees and financial assistance programs to make services accessible to all income levels.
- Partner with other healthcare providers to ensure a seamless referral system and integrated care for patients.

Impact No. 5: Decrease Morbidity and Mortality

- Invest in cutting-edge research to develop new treatments and improve patient outcomes.
- Continuously monitor and improve the quality of care through evidence-based practices and regular audits.

Impact No. 6: Development Of Highly Skilled Human Resources

- Partner with universities and medical schools to provide training and internship opportunities.
- Offer scholarships and grants for advanced medical training and specialization in cardiology.
- Establish mentorship programs to cultivate future leaders in cardiovascular medicine and healthcare administration.

Impact No. 7: Reduces Cost of Treatment for Cardiac Cases

- Work with insurers to expand coverage for cardiovascular treatments.
- Provide government subsidies or grants to offset treatment costs.
- Promote the use of cost-effective generic drugs for cardiovascular treatment.
- Foster partnerships to share costs and resources.

Impact No. 8: Reduces the Cost of Education for Students Pursuing Cardiovascular Studies

- Offer scholarships, grants, and financial aid to students in cardiovascular programs.
- Implement loan forgiveness programs for graduates who work in underserved areas.
- Provide paid internships and fellowships to offset educational costs.

Impact No. 9: Promoting Medical Tourism

- Develop and execute international marketing campaigns to promote medical tourism.
- Obtain international accreditation for cardiovascular centers to assure quality standards.
- Enhance the overall patient experience with streamlined processes and excellent customer service.

- Offer attractive package deals that include treatment, accommodation, and post-treatment care.

Impact No. 10: Establishing the Country as a Regional Medical Hub

- Develop world-class medical facilities and infrastructure.
- Invest in research and innovation in cardiovascular medicine.
- Collaborate with regional health organizations to share best practices and resources.
- Develop supportive policies to facilitate international patient inflow and professional exchanges.

These measures can significantly enhance the positive impacts of the proposed cardiac teaching and research hospital, leading to substantial benefits for the community and the healthcare system as a whole.

7.3 MITIGATION MEASURES FOR NEGATIVE IMPACTS

7.3.1 During Preliminary/Mobilization Phase

Impact No. 1: Increased Noise Levels Due To The Movement Of Trucks To And From The Site.

- The material mobilization and transportation process shall be well scheduled to be done during night hours.
- Mobilization works will not be permitted during peak activity hours at the Mloganzila Hospital and other project neighbours.
- All vehicles and machinery used at the project site during material and labour mobilization will be subject to regular maintenance. The vehicles and machines that are excessively noisy due to poor engine adjustment or damage noise control devices shall be used upon maintenance.
- The Mloganzila community shall be informed of the planned works and the noise levels and periods during which they will occur.
- The location of noisy equipment will be chosen as far as possible from sensitive receptors including the Mloganzila Hospital, East African centre for cardiovascular sciences.
- Good management practice will be used to properly muff and distribute noise at the undeveloped plots near the project site.

Impact No. 2: Increased Dust Generation from Moving Vehicles During The Transportation of Construction Materials.

- Trucks transporting building materials such as cement, sands from source to the site should be covered so as to reduce dust pollution, and
- proper housekeeping of the site such as regularly watering the site.
- Ground will be moistened during loading and unloading of aggregates in trucks;
- Truck dumpers carrying spoil or other dusty materials will be covered with tarps;
- Loaded trucks should be washed down prior to exit from the working site to ensure that loose material is not tracked onto the roads;

Impact No. 3: Increased Traffic

- A comprehensive traffic management plan to control and manage traffic flow during the mobilization phase shall be prepared and adhered to.
- Whenever necessary, the material and equipment transporting vehicles shall take specifically designated routes to minimize disruption and interference of local traffic.
- All construction vehicles shall be well maintained and equipped with safety features including reflective strips for night driving.

7.3.2 During Construction Phase

Impact No. 1: Increased Noise Level Due To The Movement And Operation Of Construction Machines.

- Whenever possible, all construction equipment will comply with the requirements of the Tanzania Bureau of Standards (TBS) on noise emission for outdoor equipment. All equipment shall bear the TBS marking, indicate the guaranteed sound power level, and be accompanied by a TBS declaration of conformity.
- Construction work will not be permitted at night; operations on site shall be restricted to the period from 0700hrs to 1800hrs.
- All vehicles and machinery used at the construction sites will undergo regular maintenance. Vehicles and machines that are excessively noisy due to poor engine adjustment or damaged noise control devices shall not be operated until corrective measures have been taken.
- The **Construction Traffic Management Plan** (TMP) will establish speed limits for construction vehicles and machinery at the construction site and on haulage roads, and organize traffic to avoid populated areas as much as possible.
- The Mloganzila community, Mloganzila hospital patients and staff, and other project neighbors will be kept informed in a timely manner about planned works, noise levels, and the periods during which they will occur.
- The location of noisy equipment will be chosen to be as far as possible from sensitive receptors (such as hostels and offices). When near sensitive receptors, construction works will be scheduled and resourced to minimize the time of exposure.
- Good management practices will be used to distribute heavy noise equipment at the site to avoid cumulative noise effects.
- Workers will be instructed to maintain moderate sound levels and tranquility at the project site.
- Physical barriers or acoustic screens will be erected around construction sites to reduce noise propagation to nearby sensitive areas.
- Regular maintenance of construction equipment will ensure they operate within acceptable noise levels and minimize vibration.
- Noisy activities will be limited to daytime hours, and coordination with nearby facilities will be undertaken to avoid critical times of operation.
- A noise monitoring program will be implemented to continuously assess noise levels and ensure compliance with regulatory standards.
- Silencers and mufflers will be installed on equipment to reduce noise emissions.
- Appropriate and adequate personal protective equipment (PPE), such as hearing protection devices, will be provided to workers exposed to high noise levels.

- The local community and nearby facilities will be informed about the construction schedule and anticipated noise levels, and communication channels for feedback and complaints will be established.

Impact No. 2: Increased Dust Generation and Gaseous Emissions

- Accesses and construction sites will be kept moist to reduce dust formation; water sprays should be implemented at all times.
- During the dry season, hygroscopic additives will be used in water to increase its presence in the ground.
- Dust-generating activities will be slowed down on days of strong wind.
- The ground will be moistened during the loading and unloading of aggregates in trucks.
- Truck dumpers carrying spoil or other dusty materials will be covered with tarps.
- Loaded trucks will be washed down prior to exiting the working site to ensure that loose material is not tracked onto the roads.
- Hoardings will be constructed around the construction sites to minimize the spread of dust.
- Vehicles and construction machinery will be required to be properly maintained and comply with relevant emission standards.
- Unnecessary idling of construction vehicles at the construction sites will not be allowed.
- Construction truck traffic will be optimized to ensure a minimum number of trucks carry the maximum volume of materials, as addressed in the Construction Traffic Management Plan.
- Truck routes will be planned to avoid peak traffic hours or routes with heavy traffic.

Impact No. 3: Environmental Contamination From Increased Waste Generation

The main mitigation measures during the construction phase to minimize wastes and to manage wastes would be contained in the **Waste Management Plan** which shall contain among other things;

- Brick, concrete and masonry can be recycled on site as fill, subbase material or driveway bedding.
- Identification and classification of the different waste types that could be generated at the construction site (due to the materials used and waste generated in different sections) according to the Environmental Management Regulations (Hazardous Waste Control), 2009;
- Completely separate hazardous from non-hazardous waste streams at the construction site should be done;
- Immediate removal of waste material (concrete, iron, rocks, etc.) waste from site.
- Collection and disposal of municipal solid waste generated in the construction site and camps (food, beverages, packaging waste such as paper, bottles, glass, etc., glass bottles) according to national legislation (separation of recycling waste materials from the waste stream that will be disposed at the dumpsite). Recyclable waste shall be given to an authorized recycling company;
- Signing a contract with the company for waste collection (registered by NEMC/VPO) and transportation of the hazardous waste generated at the construction site to the authorized dumpsite;

- Ensuring that the contracts signed with the companies dealing with waste recycling and recovery will take delivery and acceptance of the waste streams is performed on a frequent basis so that the construction sites remain clean at any time;
- Reusing excavated soil and construction waste as much as possible;
- There should be separate collection of possible hazardous waste (motor oils, vehicle fuels, scrap metals etc) and sub-contracting an authorized collector and transporter to transport, recovery or finally dispose the hazardous waste;
- Establishing the Temporary Hazardous Waste Storage Points according the national legislation on handling, labelling, storage and management with hazardous waste;
- Establishing and following the hazardous waste management procedure;
 - Ensuring that the hazardous waste is packaged and labelled showing the R and S phrases (risk and safety statements of the hazardous waste) and it is temporary stored on safety storage facility equipped with adequate ventilation, fire resistant conditions;
 - Ensuring that the access to these temporary hazardous waste storage points be only allowed for trained and equipped staff, and entrance prohibited for untrained workers and public;
- Promptly cleaning up All waste spills;
- Making available for inspections full records of the type of waste stream generated, quantity composition, origin, disposal destination and method of transport for all different waste streams;
- Contractor shall cooperate with local government offices for smooth collection of solid wastes from the project area;
- Undertaking the selective removal and storage of top soil;
- The reuse of topsoil to restore cuttings;
- Burning and burying of wastes shall be strictly prohibited.

Impact No. 4: Occupational Safety and Health Risks

- Implementation of comprehensive safety training programs for all personnel involved in construction activities.
- Compliance with regulatory standards and ongoing assessment of workplace conditions are essential to safeguarding the health and well-being of all personnel involved in the construction activities.
- Provision of proper personal protective equipment (PPE) for workers.
- Regular assessment and mitigation of potential hazards through thorough risk assessments.
- Establishment of emergency response plans and drills to effectively manage any accidents or incidents.
- **Health and Safety Management Plan** shall be prepared by contractor and adhered during construction taking stock of HSMP in;

In addition, MUHAS shall develop and implement a Health and Safety Plan in order to eliminate and/or reduce impacts, plus measures related to the following five areas:

- **Code Of Practices at Work Place:** Instate a work place code of practice to comply with relevant Tanzania (OSHA, 2003)/International Performance Standards on health and safety requirements. Code of practice includes procedures and guidelines for specific

operations, as well as inspections and maintenance systems, include in-house health and safety manual /guidelines.

- **Personal Protective Equipment (PPE) and Working Conditions:** Equipment and working condition shall be monitored and maintained through provision of adequate an appropriate equipment and enforcement of use of PPE should be done.
 - **Faulty Equipment and Risky Practices:** The contractor shall Set and follow standards for operation and equipment use, such as for control devices, monitors, electrical isolation, manual handling, fitness for work, hand tools, housekeeping, vessel and navigation, hazardous substances etc. Engagement of human resource only of trained/qualified and competent personnel as operators and mechanics, with supervisors and specialists on site at all times during the operation shall be done.
 - **Water and Sanitation:** MUHAS and the contractor shall conduct a thorough assessment of water needs prior to the commencement of operations. Additionally, they must ensure adequate water storage capacity is established where necessary to meet both operational and emergency requirements as follows:
 - Conduct a comprehensive analysis of water requirements for the project, including drinking water, sanitation, construction, and emergency needs.
 - Install sufficient water storage facilities to ensure continuous water supply during peak demand and emergencies. This may include overhead tanks, underground reservoirs, and rainwater harvesting systems.
 - Implement regular water quality testing to ensure safe and potable water for all purposes. Develop a plan for water purification and treatment if necessary.
 - Incorporate water-saving technologies and practices, such as low-flow fixtures and efficient irrigation systems, to minimize water usage.
 - **Emergency Response Plan (ERP):** MUHAS and the contractor shall establish a comprehensive First Aid and Emergency Response (ER) facility on-site. Prior to the commencement of construction activities, they must conduct a detailed Risk Assessment and develop a robust Emergency Response Plan (ERP) to address potential hazards and ensure prompt response to emergencies as follows.
 - Set up a well-equipped First Aid and Emergency Response facility on-site, staffed with trained medical personnel.
 - Conduct a comprehensive risk assessment to identify potential hazards related to construction activities. This includes evaluating risks associated with equipment, materials, environmental factors, and human activities.
 - Develop a detailed ERP that includes:
 - Clearly defined evacuation routes and assembly points.
 - Established lines of communication for reporting and managing emergencies.
 - Regular training sessions and drills for all personnel to ensure preparedness.
 - Allocation of necessary resources, such as emergency medical kits, fire extinguishers, and rescue equipment.
 - **Safety and Security:** MUHAS and the contractor shall ensure that project personnel are accommodated in a dedicated camp. They shall implement strict policies to discourage the use of alcohol during construction activities. Furthermore, they must conduct thorough screening of all security personnel to maintain a safe and secure work environment.
 - Provide safe and secure accommodation for all project personnel in a dedicated camp. Ensure the camp is equipped with necessary amenities and complies with
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health and safety standards.

- Implement a strict policy prohibiting the use of alcohol during construction activities. Conduct regular checks and awareness programs to enforce this policy.
- Conduct thorough background checks and screening of all security personnel. Ensure they are adequately trained and equipped to handle security issues professionally.
- Provide comprehensive safety training to all workers, emphasizing the importance of following safety protocols and reporting unsafe conditions.
- Establish a system for continuous monitoring and enforcement of safety and security measures. Conduct regular audits and inspections to ensure compliance with established policies.

Impact No. 5: Soil Disturbance

- Ensure the uses of less invasive machinery and techniques so as to reduce the impact on soil structure.
- Carefully removing and storing topsoil during excavation to be replaced afterward to preserve soil fertility.
- Planting trees or vegetation so as to protect soil from possible erosion and improve its structure and fertility.
- Ensure the movement of heavy construction machineries and equipment are limited to designated paths so as to reduce compaction over a broader area.
- Ensure proper waste management both solid and liquid

Impact No. 6: Population Influx

- Local employment: Prioritize hiring local labour to reduce the need for external workers, supporting the local economy and minimizing social tensions.
- Business opportunities: Encourage local businesses to supply goods and services to the construction project, fostering economic growth and creating jobs.
- *Fair wages and working conditions*: Ensure all workers receive fair wages and are provided with safe working conditions, preventing exploitation and promoting social stability.

Impact No. 7: Impacts Associated with Transmission of Vector Borne and Communicable Diseases

In order to minimize negative impacts from communicable diseases, a ***Worker Health and Safety Management Plan*** will be developed and will include the following general vector management plan:

- Develop and implement pre-employment screening measures for workers, which will cover applicable diseases. Individuals found to be suffering from communicable diseases will need to seek treatment prior to mobilization to site. However, no one should be denied employment because of their health status as long as they are able to undertake the required duties (following treatment if relevant).
- Workers should receive training as part of their induction and then at least every 6 months on potential high risk communicable and vector borne diseases, symptoms, preventative measures and transmission routes as well as treatment options. This will be particularly important for diseases with which non-local workers are unfamiliar and in case of any emerging disease outbreaks.

- A Worker Code of Conduct should be developed providing a site code of behaviour including worker-worker interactions, worker-community interactions and development of personal relationships with members of the Community. This would apply to all Project workers and visitors to the construction sites within MUHAS.
- In the event of a new disease, increased transmission or outbreak compared to the baseline, the Project should interact with local health care facilities and workers to ensure there is an appropriate response in place. This involves community education and awareness, training of health care workers etc
- For all contractors and sub-contractors, at worker sites the following will be implemented at a minimum in order to minimize disease transmission:
 - Providing workers with appropriate sanitary facilities which are appropriately designed to prevent contamination.
 - Developing a robust waste handling system to avoid the creation of new vector breeding grounds or attracting rodents to the area.
 - Implementing measures to reduce the presence of standing water onsite through environmental controls and source reduction to avoid the creation of new breeding grounds.
 - Ensuring the construction site is kept clean and free from any accumulation of wastes as well as supplied with clean potable water.
 - Ensuring appropriate food preparation and monitoring measures are in place.
 - Monitoring to ensure that all standards are being met by the relevant departments.
- The workforce will be provided with access to treatment at health facilities near the site. Access to health care should include direct employees, sub-contractors and employees of the supply chain working on based on site.
- The Project should implement TB prevention measures including testing and referral for treatment for all personnel working on the Project. This approach should be explained clearly to the workforce along with making it clear that there are no consequences for their employment.
- The Project should monitor the emergence of major pandemics through World Health Organization (WHO) alerts and in the event of a pandemic review mobilization and demobilization of ex-patriate Project personnel and/ or implement appropriate control measures and Emergency Response Plans.

In addition, MUHAS shall prepare and implement an inclusive **Vector Borne Disease Management Plan** focusing on prominent vector borne diseases including Malaria, which includes vector control, avoidance, diagnosis, treatment and training.

Impact No. 8: Impacts associated with Transmission of Sexually Transmitted Infections

- Development of a Code of Conduct / rules for worker-community interaction and on-site behaviour.
- MUHAS/contractor should develop an **STD Management Plan** designed to minimize the spread of HIV infection and other STDs. The plan should be prepared with the assistance of a specialist in sexually transmitted diseases. A plan would include, among other things, the following measures:
 - An HIV/AIDS training course and on-going education on transmission of HIV/AIDS and STDs, to employees, through workshops, posters and informal information sessions;

- o Encouragement of employees to determine their HIV status;
- o Supply of condoms/ femidoms at the construction site(s) and Development of a comprehensive Construction Site Management Plan, including rules for on-site behaviour, entrance and exit policies and prohibition of sex workers on site.
- o As part of STD Management Plan, information should be provided to workers on STD prevalence rates in Tanzania as well as the expectations of local communities if a woman is made pregnant by a worker (e.g., marriage, financial implications etc.).
- o Workers should have access to confidential health care for the treatment of STDs through medical facilities/ health care at Project site.
- o The Project should partner with other NGOs and CBOs to support the provision of information, education and communication campaigns around safe sexual practices and transmission of STDs.
- **A Grievance Mechanism** should be developed, whereby affected people can raise issues and concerns associated with social vices, prostitution and the behaviour of workers and drivers.
 - Respect for people affected by HIV/AIDS shall be promoted, gender stereotypes and discrimination/stigma against people with HIV/AIDS shall be actively opposed;
 - MUHAS shall ensure access to HIV/AIDS testing, treatment, and prevention services for workers and local Songo Songo communities.
 - MUHAS/contractor shall collaborate with local healthcare providers and organizations to implement targeted HIV/AIDS and STI prevention strategies.

Impact No. 9: Visual Intrusion

- Erect temporary fences or barriers around the construction site to shield the view of construction activities from the surrounding areas.
- Use informative hoardings and barriers that blend with the local environment or provide community information to improve the visual appeal.
- Place construction materials and equipment in less visible areas to reduce visual clutter.
- Keep the height of temporary structures and equipment as low as possible to minimize their visual impact.
- Maintain a tidy and organized construction site by regularly clearing debris and arranging materials neatly.
- Employ low-intensity lighting that is sufficient for safety and security but does not cause excessive glare.
- Install informative signage around the construction site to keep the community informed about the project and its benefits, reducing negative perceptions.

Impact No. 10: Gender based violence (GBV), equity, rape and sexual harassment

- Contractor and implementing agency to prepare and implement a **GBV Action plan** to include at minimum, in conformance with local laws and customs, equal opportunity for employment;
- Contractor to prepare and enforce a No Sexual Harassment Policy in accordance with national law where applicable
- All workers and Community and stakeholders will be educated on preventing and responding to sexual harassment and GBV ahead of any project related works.

- Workers shall be provided with identification cards and shall put on uniforms all the time while at the Hospital project site
- The community within the vicinity of the project site where construction will take place will also be educated on gender-based violence and sexual offences such as sexual harassment, rape and defilement in the context of labour influx and the prevention and response measures.
- Strategies such as male involvement will be employed in preventing and responding to GBV and sexual harassment
- Partnerships will be established with relevant government agencies and NGOs to ensure survivors of GBV and sexual offences access survivor centred services such as medical care, psychosocial support, legal redress, safety, etc as and when necessary
- Impose zero tolerance on sexual harassment, all forms of gender-based violence and discrimination at all phases of the project

7.3.3 During Demobilization Phase

Impact No. 1: Loss of employment to some workers

Mitigating the impact of loss of employment for workers during the demobilization phase requires thoughtful planning and supportive measures to help affected individuals transition smoothly. Here are mitigation measures:

- Provide workers with ample notice about the demobilization timeline and potential job loss. Transparency will help workers to be prepared for the transition.
- Conduct information sessions to explain the demobilization process, available support services, and next steps for workers.
- Providing relevant skills to workers through on job training to make them marketable after decommission.

7.3.4 During Operation Phase

Impact No. 1: Occupational Health and Safety Risks

Mitigating occupational health and safety risks for the proposed cardiac teaching and research hospital involves implementation of a comprehensive safety program that addresses various hazards specific to the healthcare environment. Here are some key mitigation measures:

- Ensure that workstations are designed to reduce repetitive strain and musculoskeletal disorders.
- Implement strict hand hygiene protocols, including the use of alcohol-based hand sanitizers.
- Ensure the availability and use of appropriate PPE such as gloves, gowns, masks, medical scrubs and eye protection.
- Provide vaccinations for staff against common infections like influenza and hepatitis B.
- Maintain and provide access to MSDS for all chemicals used in the hospital.
- Store chemicals safely according to regulatory guidelines and provide appropriate labeling.

- Use lead aprons, shields, and other protective equipment to minimize exposure.
- Regularly monitor radiation levels and exposure.
- Provide specialized training on the safe use of the equipment.
- Use puncture-resistant sharps containers and ensure proper disposal of needles and other sharp instruments.
- Utilize needleless systems and safety-engineered devices to reduce the risk of needlestick injuries.
- Conduct regular emergency drills, including fire drills and evacuation procedures.
- Promote a healthy work-life balance with adequate rest breaks and reasonable working hours.
- Provide ongoing training and education on safety protocols and new procedures.
- Regularly assess staff competency in safety procedures and practices.
- Train staff on the proper handling and disposal of hazardous and non-hazardous waste.
- Develop and regularly review evacuation plans.
- Conduct regular health screenings and surveillance to detect work-related health issues early.
- Provide rehabilitation programs for staff recovering from work-related injuries or illnesses.
- Stay up-to-date with local, national, and international regulations and standards related to occupational health and safety.
- Conduct regular audits and inspections to ensure compliance with safety regulations.

Impact No. 2: Environmental contamination from increased waste generation

MUHAS shall implement a comprehensive waste management and environmental protection plan to ensure the sustainable operation of the proposed cardiac teaching and research hospital, mitigating potential environmental contamination from its operations. The plan shall include the following key elements:

i. Daily Maintenance and General Waste Handling:

- Engage a cleaning company for daily maintenance of structures and surrounding areas.
- Collect ordinary household waste, including paper, food scraps, and yard debris, at an on-site transfer station and transport it to an authorized dumpsite at least twice a week.

ii. Hazardous and Medical Waste Management:

Prepare and adhere to a Medical Waste Management Plan that includes:

- Proper segregation and storage of waste using separate bins for infectious, hazardous, and radioactive wastes.
- Regular training for hospital staff, patients, students, and project staff on proper waste handling, storage, and disposal.
- Use of personal protective equipment (PPE) during waste handling.
- Safe transportation and disposal of medical waste from the hospital site to treatment points.
- Regular monitoring and evaluation to track the types, amounts, sources, and final destinations of medical waste.

- Prepare a detailed Hazardous Waste Management Plan accounting for special solid and medical wastes generated during the project's operational phase, including:
 - Proper segregation into categories: general, infectious, hazardous, and radioactive.
 - Use of leak-proof, labelled containers for hazardous and infectious waste.
 - On-site treatment of infectious and hazardous waste using autoclaves, incinerators, or chemical disinfection.
 - Guidelines for disposal of expired or unused medications to prevent them from entering the sewage system.
 - Disposal of chemicals according to regulatory standards, using licensed disposal companies.
 - Installation of an on-site wastewater treatment facility to treat hospital effluents, removing contaminants such as pharmaceuticals, pathogens, and hazardous chemicals.
 - Implementation of pre-treatment systems for specific contaminants before they enter the main treatment plant.
 - iii. Spill Prevention and Response:**
 - Develop and implement spill prevention and response plans, including regular training for staff on spill containment and clean-up procedures.
 - Conduct regular groundwater quality monitoring around the hospital to detect any signs of contamination early.
 - Ensure wastewater discharge complies with local environmental regulations through regular testing and reporting.
 - Install containment systems for storage areas of chemicals and hazardous materials to capture any spills or leaks.
 - iv. Sustainable Practices and Environmental Compliance:**
 - Use environmentally friendly cleaning agents and disinfectants.
 - Implement sustainable practices to reduce the overall environmental impact.
 - Regularly inspect and maintain sewage and drainage systems to prevent leaks and blockages.
 - Ensure that all waste management and treatment facilities are well-maintained and functioning properly.
 - Work closely with environmental regulatory bodies to ensure compliance with all relevant laws and regulations.
 - Collaborate with local authorities for coordinated responses to significant spills or contamination events.
 - Invest in research and development of new technologies and methods for reducing and treating hospital waste.
 - Stay informed about and implement best practices from other healthcare institutions and industry standards.
 - v. Specialized Waste Handling:**
 - Designate specific areas for waste oil collection, ensuring they are well-paved with concrete, equipped with bund walls, and covered.
 - Place all hazardous material in a designated concreted and lined area.
 - Ensure generators are placed on concrete bases and enclosed by concrete bund walls.
 - Replace contaminated soil and store it for disposal with other hazardous waste.
 - vi. Contracting and Compliance:**
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- Engage a GCLA Certified and VPO Environment registered hazardous waste disposal contractor on a framework contract to ease hazardous waste removal.
- Ensure regular monitoring, training of staff, and proactive maintenance of infrastructure to minimize environmental impact and ensure sustainable operation.

MUHAS is committed to environmental stewardship and the sustainable management of all waste generated by its operations.

Impact No. 3: Increased Surface Water Run-off

- Roofs of all project building and its facilities shall be installed with gutters and downward pipes to direct rain water to the designated storm water drains within the site
- The paved area surrounding the buildings shall have a slope towards storm water channels that direct storm water to the large storm water channel along Mloganzila road.
- Designs shall explore option for rain water harvesting and if found feasible it shall be implemented

Impact No. 4: Fire Risks

To mitigate fire risks in a cardiac teaching and research hospital, several measures should be implemented:

- Strictly enforce predetermined measures and activities to timely prevent, curb, and avoid conditions that may result in fires.
- Always ensure sufficient water is available for firefighting purposes.
- Sensitize all personnel about responsible fire protection measures and good housekeeping, including the removal of flammable materials such as rubbish, dry vegetation, and hydrocarbon-soaked soil from the vicinity of port facilities.
- Establish collaboration with the Fire and Rescue Force and neighbouring companies within the vicinity.
- Ensure the dedicated firefighting team on-site is properly equipped.
- Timely service portable fire extinguishers at the port facilities.
- Regularly test and certify installed firefighting facilities by the appropriate authority.
- Install fire detection and alarm systems in all hospital buildings and offices.
- Conduct regular drills and simulations to train workers in fire prevention and rescue skills.
- Communicate and sensitize staff, contractors, and other stakeholders on the hospital's emergency response plan for the entire site.
- Install and maintain fire detection and alarm systems, including smoke detectors, heat detectors, and automatic sprinkler systems, to detect and suppress fires promptly.
- Develop and regularly review emergency response plans, including fire evacuation procedures, training for staff on fire safety protocols, and conducting fire drills to ensure preparedness.
- Properly store and secure flammable and combustible materials in designated areas with appropriate ventilation and fire suppression systems.
- Regularly inspect and maintain electrical systems, medical equipment, and fire safety equipment to ensure they are in good working condition and compliant with safety standards.
- Provide comprehensive training to hospital staff on fire prevention, evacuation procedures, the use of fire extinguishers, and handling emergencies involving fire hazards.

7.4 PROJECT GRIEVANCES REDRESS MECHANISM (GRM)

The project contractors shall establish a structured process or system to address and resolve complaints or grievances raised by individuals and stakeholders, with facilitation from MUHAS for implementation. The Grievance Redress Mechanism (GRM) will include procedures for receiving, investigating, and resolving issues or concerns expressed by stakeholders, ensuring a fair and transparent resolution of problems within the system. To establish an effective grievance redress mechanism for the project, the following tasks shall be undertaken by the project contractor:

- i. Establish a dedicated cell to receive, document, and address grievances related to the proposed construction project. This central point of contact will streamline the process.
- ii. Provide multiple channels for stakeholders to submit grievances, such as dedicated hotlines, email, or online platforms, ensuring accessibility for the public and project participants.
- iii. Maintain transparency in the grievance redress process by clearly outlining how grievances will be addressed, establishing timelines for resolution, and ensuring accountability for actions taken.
- iv. Develop a standardized form for submitting grievances, including essential details such as the complainant's information, nature of the grievance, location, and any supporting documentation.
- v. Conduct awareness campaigns to educate stakeholders about the grievance redress mechanism, its usage, and the expected timeline for resolution.
- vi. Acknowledge receipt of grievances promptly and keep complainants informed about the status of their complaints and any actions taken. A responsive system builds trust.
- vii. Appoint local liaison officers who can engage with local government (ward/mtaa offices), communities and stakeholders, address grievances at the grassroots level, and facilitate effective communication.
- viii. Establish clear escalation protocols for grievances that are not resolved at lower levels, defining the hierarchy and steps for higher-level attention.
- ix. Consider incorporating an independent review panel to objectively assess complex grievances and provide recommendations for fair resolution.
- x. Maintain detailed records of grievances, resolutions, and actions taken. Regular reporting on status and outcomes demonstrates accountability and supports continuous improvement.
- xi. Regularly review the effectiveness of the grievance redress mechanism, incorporating feedback and lessons learned from resolved cases to make necessary improvements.

By implementing these measures and procedures and aligning with national laws, standards, and procedures, the contractor will establish a robust grievance redress mechanism. This initiative aims to foster transparency, ensure accountability, and facilitate timely resolution of stakeholder concerns.

CHAPTER EIGHT

8.0 ENVIRONMENTAL AND SOCIAL IMPACT MANAGEMENT PLAN

8.1 IMPACT MANAGEMENT PLAN

Below are the provided plans for the implementation of mitigation measures for the proposed project. These plans outline institutional responsibilities, timelines for action, and estimated costs. It's important to note that the proposed costs are only approximate, and the developer will determine the actual costs and include them in the overall project budget if the suggested changes are implemented. According to the Environmental Management Act (URT 2004), the National Environmental Management Council (NEMC) is responsible for ensuring compliance with all authorized conditions. The specific measures can be found in Table 8.1. The developer is fully committed to implementing the mitigation measures recommended by the Environmental and Social Impact Management Plan (ESMP).

8.2 IMPLEMENTATION OF THE MANAGEMENT PLAN

The contractor will receive and be responsible for the implementation of environmental and social mitigation measures, as outlined in the detailed engineering design, during the construction period. It is expected that the contractor will familiarize themselves with the contents of the Environmental and Social Management Plan (ESMP) related to the project. The implementation of the ESMP during the construction period will be closely monitored by a supervising firm on behalf of the management team. Once the construction phase is complete, the building management and the real estate firm in charge of managing the block will continue to implement the ESMP during the operation phase.

8.3 ENVIRONMENTAL AND SOCIAL COST

The principal environmental and social cost includes the cost for implementing the mitigation measures proposed. The estimated costs for the mitigation measures are indicative and are based on the informed judgment of the Environmental Assessment (EA) consultants. These costs are indicated in Table 8.1. The developer shall cover all the costs proposed in the ESMP.

8.4 ESMP IMPLEMENTATION INDICATORS TO MONITOR

Key Environmental and Social Management Plan (ESMP) implementation indicators to monitor for the proposed cardiac teaching and research hospital project include:

- vi. Compliance with Legal and Regulatory Requirements
 - Adherence to environmental laws and regulations.
 - Fulfilment of permit conditions.

 - vii. Environmental Performance Indicators
 - Air quality levels (e.g., particulate matter, NO_x, SO_x).
 - Water quality parameters (e.g., pH, turbidity, chemical pollutants).
 - Noise levels.
 - Soil quality metrics (e.g., contamination levels).

 - viii. Social Performance Indicators
 - Community health and safety statistics.
-

- Employment and labour conditions (e.g., number of local hires, working conditions).
- Stakeholder engagement activities (e.g., number of consultations, grievance redressal cases).

ix. Waste Management:

- Volume and type of waste generated.
- Waste disposal methods and compliance with disposal regulations.
- Recycling and reuse rates.

x. Monitoring and Reporting

- Frequency and accuracy of monitoring activities.
- Timeliness and quality of reports.
- Corrective actions taken based on monitoring results.

MUHAS shall regularly tracking these indicators to ensures the ESMP is effectively implemented, helps identify areas needing improvement, and ensures compliance with environmental and social safeguards.

Table 8. 1: Environmental and Social Impact Management Plan for the Proposed Cardiac Teaching and Research Hospital Project

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|--|---|--|---|--------------------------------------|-----------------------------------|---|-------------|-------|
| | | | | | | | TZS | USD |
| During project preliminary/mobilization (PM) phase | | | | | | | | |
| PM-01 | Increased noise levels due to the movement of trucks to and from The site. | <ul style="list-style-type: none"> The material mobilization and transportation process shall be well scheduled to be done during night hours. Mobilization works will not be permitted during peak activity hours at the Mloganzila Hospital and other project neighbours. All vehicles and machinery used at the project site during material and labour mobilization will be subject to regular maintenance. The vehicles and machines that are excessively noisy due to poor engine adjustment or damage noise control devices shall be used upon maintenance. The Mloganzila community shall be informed of the planned works and the noise levels and periods during which they will occur. The location of noisy equipment will be chosen as far as possible from sensitive receptors including the Mloganzila Hospital, East African centre for cardiovascular sciences. Good management practice will be used to properly muff and distribute noise at the undeveloped plots near the project site. | Mobilization phase | Noise levels within regulatory limit | MUHAS/ Contractor | Project Manager/ Environmental Specialist | 5,000,000 | 1,910 |
| PM-02 | Increased Dust Generation from Moving Vehicles During the Transportation of Construction Materials. | <ul style="list-style-type: none"> Trucks transporting building materials such as cement, sands from source to the site should be covered so as to reduce dust pollution, and proper housekeeping of the site such as regularly watering the site. Ground will be moistened during loading and unloading of aggregates in trucks; Truck dumpers carrying spoil or other dusty materials will be covered with tarps; Loaded trucks should be washed down prior to exit from the working site to ensure that loose material is not tracked onto the roads; | Mobilization phase-Continuous during transportation | Dust level within regulatory limits | MUHAS/ Contractor | Project Environmental Specialist | 5,000,000 | 1,910 |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|--|---|---|-------------------------------|---|-----------------------------------|--------------------------------------|-------------|-------|
| | | | | | | | TZS | USD |
| PM-03 | Increased Traffic | <ul style="list-style-type: none"> A comprehensive traffic management plan to control and manage traffic flow during the mobilization phase shall be prepared and adhered to. Whenever necessary, the material and equipment transporting vehicles shall take specifically designated routes to minimize disruption and interference of local traffic. All construction vehicles shall be well maintained and equipped with safety features including reflective strips for night driving. | Mobilization phase- | <p>Traffic flow maintained without incidents,</p> <p>No traffic jam</p> | MUHAS/ Contractor | MUHAS/ Traffic Management Specialist | 5,000,000 | 1,910 |
| During project construction (C) phase | | | | | | | | |
| C-01 | Increased Noise Level Due to The Movement and Operation Of Construction Machines. | <ul style="list-style-type: none"> Whenever possible, all construction equipment will comply with the requirements of the Tanzania Bureau of Standards (TBS) on noise emission for outdoor equipment. All equipment shall bear the TBS marking, indicate the guaranteed sound power level, and be accompanied by a TBS declaration of conformity. Construction work will not be permitted at night; operations on site shall be restricted to the period from 0700hrs to 1800hrs. All vehicles and machinery used at the construction sites will undergo regular maintenance. Vehicles and machines that are excessively noisy due to poor engine adjustment or damaged noise control devices shall not be operated until corrective measures have been taken. The Construction Traffic Management Plan (TMP) will establish speed limits for construction vehicles and machinery at the construction site and on haulage roads, and organize traffic to avoid populated areas as much as possible. The Mloganzila community, Mloganzila hospital patients and staff, and other project neighbors will be kept informed in a timely manner about planned works, noise levels, and the periods during which they will occur. The location of noisy equipment will be chosen to be as far as possible from sensitive receptors (such as hostels | Throughout construction phase | <p>Noise level within regulatory limits</p> <ul style="list-style-type: none"> TZS 932:2006 of TBS, the acceptable noise levels for industrial activities are 85dB <p>Compliance with Environmental Management (Quality Standards for Control of Noise and Vibration Pollution) Regulations, 2015.</p> | MUHAS/ Contractor | Project Environmental Specialist | 25,000,000 | 9,310 |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|------|---|---|-------------------------------|---|-----------------------------------|----------------------------------|-------------|-------|
| | | | | | | | TZS | USD |
| | | <p>and offices). When near sensitive receptors, construction works will be scheduled and resourced to minimize the time of exposure.</p> <ul style="list-style-type: none"> • Good management practices will be used to distribute heavy noise equipment at the site to avoid cumulative noise effects. • Workers will be instructed to maintain moderate sound levels and tranquility at the project site. • Physical barriers or acoustic screens will be erected around construction sites to reduce noise propagation to nearby sensitive areas. • Regular maintenance of construction equipment will ensure they operate within acceptable noise levels and minimize vibration. • Noisy activities will be limited to daytime hours, and coordination with nearby facilities will be undertaken to avoid critical times of operation. • A noise monitoring program will be implemented to continuously assess noise levels and ensure compliance with regulatory standards. • Silencers and mufflers will be installed on equipment to reduce noise emissions. • Appropriate and adequate personal protective equipment (PPE), such as hearing protection devices, will be provided to workers exposed to high noise levels. • The local community and nearby facilities will be informed about the construction schedule and anticipated noise levels, and communication channels for feedback and complaints will be established. | | | | | | |
| C-02 | Increased Dust Generation and Gaseous Emissions | <ul style="list-style-type: none"> • Accesses and construction sites will be kept moist to reduce dust formation; water sprays should be implemented at all times. • During the dry season, hygroscopic additives will be used in water to increase its presence in the ground. • Dust-generating activities will be slowed down on days of strong wind. | Throughout construction phase | Dust level within regulatory limits Adherence to the Environmental Management (Air | MUHAS/ Contractor | Project Environmental Specialist | 25,000,000 | 9,310 |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|------|---|---|-----------------------------|--|-----------------------------------|----------------------------------|-------------|--------|
| | | | | | | | TZS | USD |
| | | <ul style="list-style-type: none"> The ground will be moistened during the loading and unloading of aggregates in trucks. Truck dumpers carrying spoil or other dusty materials will be covered with tarps. Loaded trucks will be washed down prior to exiting the working site to ensure that loose material is not tracked onto the roads. Hoardings will be constructed around the construction sites to minimize the spread of dust. Vehicles and construction machinery will be required to be properly maintained and comply with relevant emission standards. Unnecessary idling of construction vehicles at the construction sites will not be allowed. Construction truck traffic will be optimized to ensure a minimum number of trucks carry the maximum volume of materials, as addressed in the Construction Traffic Management Plan. Truck routes will be planned to avoid peak traffic hours or routes with heavy traffic. | | Quality Standards) Regulations G.N No. 237 of 2007 | | | | |
| C-03 | Environmental Contamination From Increased Waste Generation | <p>The main mitigation measures during the construction phase to minimize wastes and to manage wastes would be contained in the Waste Management Plan which shall Contain among other things;</p> <ul style="list-style-type: none"> Brick, concrete and masonry can be recycled on site as fill, subbase material or driveway bedding. Identification and classification of the different waste types that could be generated at the construction site (due to the materials used and waste generated in different sections) according to the Environmental Management Regulations (Hazardous Waste Control), 2009; Completely separate hazardous from non-hazardous waste streams at the construction site should be done; Immediate removal of waste material (concrete, iron, rocks, etc.) waste from site. | Ongoing during construction | <p>Proper waste disposal records,</p> <p>Adherence to: Environmental Management (Solid waste Management) Regulation, 2009 as amended in 2016</p> <p>Environmental Management (Soil Quality</p> | MUHAS/ Contractor | Project Environmental Specialist | 35,000,000 | 13,030 |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|------|--------|---|-------------------------|---|-----------------------------------|----------------------|-------------|-----|
| | | | | | | | TZS | USD |
| | | <ul style="list-style-type: none"> • Collection and disposal of municipal solid alike waste generated in the construction site and camps (food, beverages, packaging waste such as paper, bottles, glass, etc., glass bottles) according to national legislation (separation of recycling waste materials from the waste stream that will be disposed at the dumpsite). Recyclable waste shall be given to an authorized recycling company; • Signing a contract with the company for waste collection (registered by NEMC/VPO) and transportation of the hazardous waste generated at the construction site to the authorised dumpsite; • Ensuring that the contracts signed with the companies dealing with waste recycling and recovery will take delivery and acceptance of the waste streams is performed on a frequent basis so that the construction sites remain clean at any time; • Reusing excavated soil and construction waste as much as possible; • There should be separate collection of possible hazardous waste (motor oils, vehicle fuels, scrap metals etc) and subcontracting an authorized collector and transporter to transport, recovery or finally dispose the hazardous waste; • Establishing the Temporary Hazardous Waste Storage Points according the national legislation on handling, labelling, storage and management with hazardous waste; • Establishing and following the hazardous waste management procedure; • Ensuring that the hazardous waste is packaged and labelled showing the R and S phrases (risk and safety statements of the hazardous waste) and it is temporary stored on safety storage facility equipped with adequate ventilation, fire resistant conditions; • Ensuring that the access to these temporary hazardous waste storage points be only allowed for trained and | | <p>Management) G. N. No. 239 of 2007</p> <p>Environmental Management (hazardous Waste Control and Management) Regulations, 2021</p> | | | | |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|------|--------------------------------------|--|-------------------------------|--|-----------------------------------|--------------------------------------|-------------|--------|
| | | | | | | | TZS | USD |
| | | <p>equipped staff, and entrance prohibited for untrained workers and public;</p> <ul style="list-style-type: none"> • Promptly cleaning up All waste spills; • Making available for inspections full records of the type of waste stream generated, quantity composition, origin, disposal destination and method of transport for all different waste streams; • Contractor shall cooperate with local government offices for smooth collection of solid wastes from the project area; • Undertaking the selective removal and storage of top soil; • The reuse of topsoil to restore cuttings; • Burning and burying of wastes shall be strictly prohibited. | | | | | | |
| C-04 | Occupational Safety and Health Risks | <ul style="list-style-type: none"> • Implementation of comprehensive safety training programs for all personnel involved in construction activities. • Compliance with regulatory standards and ongoing assessment of workplace conditions are essential to safeguarding the health and well-being of all personnel involved in the construction activities. • Provision of proper personal protective equipment (PPE) for workers. • Regular assessment and mitigation of potential hazards through thorough risk assessments. • Establishment of emergency response plans and drills to effectively manage any accidents or incidents. • Health and Safety Management Plan shall be prepared by contractor and adhered during construction taking stock of HSMP in; <p>In addition, MUHAS shall develop and implement a Health and Safety Plan in order to eliminate and/or reduce impacts, plus measures related to the following five areas: (v) Code Of Practices at Work Place: Instate a work place code of practice to comply with relevant Tanzania (OSHA, 2003)/International Performance Standards on</p> | Throughout construction phase | Reduced accident rates, compliance with the Occupational Health and Safety Act, 2003 | MUHAS/ Contractor | Project Health and Safety Specialist | 40,000,000 | 14,890 |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|------|--------|---|-------------------------|---------------------------|-----------------------------------|----------------------|-------------|-----|
| | | | | | | | TZS | USD |
| | | <p>health and safety requirements. Code of practice includes procedures and guidelines for specific operations, as well as inspections and maintenance systems, include in-house health and safety manual /guidelines.</p> <p>(vi) Personal Protective Equipment (PPE) and Working Conditions: Equipment and working condition shall be monitored and maintained through provision of adequate an appropriate equipment and enforcement of use of PPE should be done.</p> <p>(vii) Faulty Equipment and Risky Practices: The contractor shall Set and follow standards for operation and equipment use, such as for control devices, monitors, electrical isolation, manual handling, fitness for work, hand tools, housekeeping, vessel and navigation, hazardous substances etc. Engagement of human resource only of trained/qualified and competent personnel as operators and mechanics, with supervisors and specialists on site at all times during the operation shall be done.</p> <p>(viii) Water and Sanitation: MUHAS and the contractor shall conduct a thorough assessment of water needs prior to the commencement of operations. Additionally, they must ensure adequate water storage capacity is established where necessary to meet both operational and emergency requirements systems, to minimize water usage.</p> <ul style="list-style-type: none"> • Emergency Response Plan (ERP): MUHAS and the contractor shall establish a comprehensive First Aid and Emergency Response (ER) facility on-site. Prior to the commencement of construction activities, they must conduct a detailed Risk Assessment and develop a robust Emergency Response Plan (ERP) to address potential hazards and ensure prompt response to emergencies. • Safety and Security: MUHAS and the contractor shall ensure that project personnel are accommodated | | | | | | |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|------|--|--|-------------------------------|--|-----------------------------------|--|-------------|-------|
| | | | | | | | TZS | USD |
| | | in a dedicated camp/place. They shall implement strict policies to discourage the use of alcohol during construction activities. Furthermore, they must conduct thorough screening of all security personnel to maintain a safe and secure work environment. | | | | | | |
| C-05 | Soil Disturbance | <ul style="list-style-type: none"> • Ensure the uses of less invasive machinery and techniques so as to reduce the impact on soil structure. • Carefully removing and storing topsoil during excavation to be replaced afterward to preserve soil fertility. • Planting trees or vegetation so as to protect soil from possible erosion and improve its structure and fertility. • Ensure the movement of heavy construction machineries and equipment are limited to designated paths so as to reduce compaction over a broader area. • Ensure proper waste management both solid and liquid | Ongoing during construction | Stabilized soil, vegetation growth Compliance with Environmental Management (Soil Quality Management) G. N. No. 239 of 2007 | MUHAS/ Contractor | Project Environmental Specialist | 15,000,000 | 5,590 |
| C-06 | Population Influx | <ul style="list-style-type: none"> • Local employment: Prioritize hiring local labour to reduce the need for external workers, supporting the local economy and minimizing social tensions. • Business opportunities: Encourage local businesses to supply goods and services to the construction project, fostering economic growth and creating jobs. • Fair wages and working conditions: Ensure all workers receive fair wages and are provided with safe working conditions, preventing exploitation and promoting social stability. | Throughout construction phase | Social harmony, employment record | MUHAS/ Contractor | Project Sociologist/ community development officer | 15,000,000 | 5,590 |
| C-07 | Impacts Associated with Transmission of Vector Borne and Communicable Diseases | <p>In order to minimize negative impacts from communicable diseases, a Worker Health and Safety Management Plan will be developed and will include the following general vector management plan:</p> <ul style="list-style-type: none"> • Develop and implement pre-employment screening measures for workers, which will cover applicable diseases. Individuals found to be suffering from communicable diseases will need to seek treatment prior to mobilization to site. However, no one should be denied employment because of their health status as long as they | Ongoing during construction | Reduced incidence of diseases | MUHAS/ Contractor | Health department | 25,000,000 | 9310 |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|------|--------|--|-------------------------|---------------------------|-----------------------------------|----------------------|-------------|-----|
| | | | | | | | TZS | USD |
| | | <p>are able to undertake the required duties (following treatment if relevant).</p> <ul style="list-style-type: none"> • Workers should receive training as part of their induction and then at least every 6 months on potential high risk communicable and vector borne diseases, symptoms, preventative measures and transmission routes as well as treatment options. This will be particularly important for diseases with which non-local workers are unfamiliar and in case of any emerging disease outbreaks. • A Worker Code of Conduct should be developed providing a site code of behaviour including worker-worker interactions, worker-community interactions and development of personal relationships with members of the Community. This would apply to all Project workers and visitors to the construction sites within MUHAS. • In the event of a new disease, increased transmission or outbreak compared to the baseline, the Project should interact with local health care facilities and workers to ensure there is an appropriate response in place. This involves community education and awareness, training of health care workers etc • For all contractors and sub-contractors, at worker sites the following will be implemented at a minimum in order to minimize disease transmission: <ul style="list-style-type: none"> ○ Providing workers with appropriate sanitary facilities which are appropriately designed to prevent contamination. ○ Developing a robust waste handling system to avoid the creation of new vector breeding grounds or attracting rodents to the area. ○ Implementing measures to reduce the presence of standing water onsite through environmental controls and source reduction to avoid the creation of new breeding grounds. | | | | | | |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|------|---|---|-----------------------------|--|-----------------------------------|----------------------|-------------|-------|
| | | | | | | | TZS | USD |
| | | <ul style="list-style-type: none"> ○ Ensuring the construction site is kept clean and free from any accumulation of wastes as well as supplied with clean potable water. ○ Ensuring appropriate food preparation and monitoring measures are in place. ○ Monitoring to ensure that all standards are being met by the relevant departments. ● The workforce will be provided with access to treatment at health facilities near the site. Access to health care should include direct employees, sub-contractors and employees of the supply chain working on based on site. ● The Project should implement TB prevention measures including testing and referral for treatment for all personnel working on the Project. This approach should be explained clearly to the workforce along with making it clear that there are no consequences for their employment. ● The Project should monitor the emergence of major pandemics through World Health Organization (WHO) alerts and in the event of a pandemic review mobilization and demobilization of ex-patriate Project personnel and/or implement appropriate control measures and Emergency Response Plans. <p>In addition, MUHAS shall prepare and implement an inclusive Vector Borne Disease Management Plan focusing on prominent vector borne diseases including Malaria, which includes vector control, avoidance, diagnosis, treatment and training.</p> | | | | | | |
| C-08 | Impacts associated with Transmission of Sexually Transmitted Infections | <ul style="list-style-type: none"> ● Development of a Code of Conduct / rules for worker-community interaction and on-site behaviour. ● MUHAS/contractor should develop an STD Management Plan designed to minimize the spread of HIV infection and other STDs. The plan should be prepared with the assistance of a specialist in sexually transmitted diseases. | Ongoing during construction | Increased awareness, reduced infection rates, Adherence to the HIV and AIDS | MUHAS/ Contractor | Health department | 20,000,000 | 7,450 |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|------|--------|--|-------------------------|------------------------------------|-----------------------------------|----------------------|-------------|-----|
| | | | | | | | TZS | USD |
| | | <p>A plan would include, among other things, the following measures:</p> <ul style="list-style-type: none"> o An HIV/AIDS training course and on-going education on transmission of HIV/AIDS and STDs, to employees, through workshops, posters and informal information sessions; o Encouragement of employees to determine their HIV status; o Supply of condoms/ femidoms at the construction site(s) and Development of a comprehensive Construction Site Management Plan, including rules for on-site behaviour, entrance and exit policies and prohibition of sex workers on site. o As part of STD Management Plan, information should be provided to workers on STD prevalence rates in Tanzania as well as the expectations of local communities if a woman is made pregnant by a worker (e.g., marriage, financial implications etc.). o Workers should have access to confidential health care for the treatment of STDs through medical facilities/ health care at Project site. o The Project should partner with other NGOs and CBOs to support the provision of information, education and communication campaigns around safe sexual practices and transmission of STDs. <ul style="list-style-type: none"> • A Grievance Mechanism should be developed, whereby affected people can raise issues and concerns associated with social vices, prostitution and the behaviour of workers and drivers. • Respect for people affected by HIV/AIDS shall be promoted, gender stereotypes and discrimination/stigma against people with HIV/AIDS shall be actively opposed; • MUHAS shall ensure access to HIV/AIDS testing, treatment, and prevention services for workers and local Songo Songo communities. | | (Prevention and Control) Act, 2008 | | | | |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|------|---|---|-----------------------------|--|-----------------------------------|----------------------------------|-------------|-------|
| | | | | | | | TZS | USD |
| | | <ul style="list-style-type: none"> MUHAS/contractor shall collaborate with local healthcare providers and organizations to implement targeted HIV/AIDS and STI prevention strategies. | | | | | | |
| C-09 | Visual Intrusion | <ul style="list-style-type: none"> Erect temporary fences or barriers around the construction site to shield the view of construction activities from the surrounding areas. Use informative hoardings and barriers that blend with the local environment or provide community information to improve the visual appeal. Place construction materials and equipment in less visible areas to reduce visual clutter. Keep the height of temporary structures and equipment as low as possible to minimize their visual impact. Maintain a tidy and organized construction site by regularly clearing debris and arranging materials neatly. Employ low-intensity lighting that is sufficient for safety and security but does not cause excessive glare. Install informative signage around the construction site to keep the community informed about the project and its benefits, reducing negative perceptions. | Ongoing during construction | Improved visual impact | MUHAS/ Contractor | Project Environmental Specialist | 20,000,000 | 7,450 |
| C-10 | Gender based violence (GBV), equity, rape and sexual harassment | <ul style="list-style-type: none"> Contractor and implementing agency to prepare and implement a GBV Action plan to include at minimum, in conformance with local laws and customs, equal opportunity for employment; Contractor to prepare and enforce a No Sexual Harassment Policy in accordance with national law where applicable All workers and Community and stakeholders will be educated on preventing and responding to sexual harassment and GBV ahead of any project related works. Workers shall be provided with identification cards and shall put on uniforms all the time while at the Hospital project site The community within the vicinity of the project site where construction will take place will also be educated on gender-based violence and sexual offences such as | Ongoing during construction | Increased awareness, reduced GBV incidence | MUHAS/ Contractor | Project GBV Specialist | 25,000,000 | 9310 |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|--|--------------------------------------|---|---------------------------|---|-----------------------------------|--------------------------------|----------------------|----------------------|
| | | | | | | | TZS | USD |
| | | sexual harassment, rape and defilement in the context of labour influx and the prevention and response measures. <ul style="list-style-type: none"> • Strategies such as male involvement will be employed in preventing and responding to GBV and sexual harassment • Partnerships will be established with relevant government agencies and NGOs to ensure survivors of GBV and sexual offences access survivor centred services such as medical care, psychosocial support, legal redress, safety, etc as and when necessary • Impose zero tolerance on sexual harassment, all forms of gender-based violence and discrimination at all phases of the project | | | | | | |
| During project demobilization (D) phase | | | | | | | | |
| D-01 | Loss of employment to some workers | <ul style="list-style-type: none"> • Provide workers with ample notice about the demobilization timeline and potential job loss. Transparency will help workers to be prepared for the transition. • Conduct information sessions to explain the demobilization process, available support services, and next steps for workers. • Providing relevant skills to workers through on job training to make them marketable after decommission. | End of construction phase | Reduced unemployment impact | MUHAS/ Contractor | Human Resources Department | | |
| During project operation (O) phase | | | | | | | | |
| O-1 | Occupational Health and Safety Risks | <ul style="list-style-type: none"> • Ensure that workstations are designed to reduce repetitive strain and musculoskeletal disorders. • Implement strict hand hygiene protocols, including the use of alcohol-based hand sanitizers. • Ensure the availability and use of appropriate PPE such as gloves, gowns, masks, medical scrubs and eye protection. • Provide vaccinations for staff against common infections like influenza and hepatitis B. • Maintain and provide access to MSDS for all chemicals used in the hospital. • Store chemicals safely according to regulatory guidelines and provide appropriate labelling. | Ongoing during operation | Reduced accident rate, Adherence to the Occupational Health and Safety Act, 2003 | MUHAS | Health and Safety (HS) Officer | Part of project cost | Part of project cost |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|------|---|---|--------------------------|---|-----------------------------------|-----------------------|-------------|-------|
| | | | | | | | TZS | USD |
| | | <ul style="list-style-type: none"> • Use lead aprons, shields, and other protective equipment to minimize exposure. • Regularly monitor radiation levels and exposure. • Provide specialized training on the safe use of the equipment. • Use puncture-resistant sharps containers and ensure proper disposal of needles and other sharp instruments. • Utilize needleless systems and safety-engineered devices to reduce the risk of needlestick injuries. • Conduct regular emergency drills, including fire drills and evacuation procedures. • Promote a healthy work-life balance with adequate rest breaks and reasonable working hours. • Provide ongoing training and education on safety protocols and new procedures. • Regularly assess staff competency in safety procedures and practices. • Train staff on the proper handling and disposal of hazardous and non-hazardous waste. • Develop and regularly review evacuation plans. • Conduct regular health screenings and surveillance to detect work-related health issues early. • Provide rehabilitation programs for staff recovering from work-related injuries or illnesses. • Stay up-to-date with local, national, and international regulations and standards related to occupational health and safety. • Conduct regular audits and inspections to ensure compliance with safety regulations. | | | | | | |
| O-02 | Environmental contamination from increased waste generation | MUHAS shall implement a comprehensive waste management and environmental protection plan to ensure the sustainable operation of the proposed cardiac teaching and research hospital, mitigating potential environmental contamination from its operations. The plan shall include the following key elements: iii. Daily Maintenance and General Waste Handling: | Ongoing during operation | Adherence to the: Environmental Management (hazardous Waste Control and Management) Regulations, 2021 | MUHAS | Environmental Officer | 20,000,000 | 7,620 |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|------|--------|--|-------------------------|--|-----------------------------------|----------------------|-------------|-----|
| | | | | | | | TZS | USD |
| | | <ul style="list-style-type: none"> Engage a cleaning company for daily maintenance of structures and surrounding areas. Collect ordinary household waste, including paper, food scraps, and yard debris, at an on-site transfer station and transport it to an authorized dumpsite at least twice a week. <p>iii. Hazardous and Medical Waste Management: Prepare and adhere to a Medical Waste Management Plan that includes:</p> <ul style="list-style-type: none"> Proper segregation and storage of waste using separate bins for infectious, hazardous, and radioactive wastes. Regular training for hospital staff, patients, students, and project staff on proper waste handling, storage, and disposal. Use of personal protective equipment (PPE) during waste handling. Safe transportation and disposal of medical waste from the hospital site to treatment points. Regular monitoring and evaluation to track the types, amounts, sources, and final destinations of medical waste. Prepare a detailed Hazardous Waste Management Plan accounting for special solid and medical wastes generated during the project's operational phase, including: <ul style="list-style-type: none"> Proper segregation into categories: general, infectious, hazardous, and radioactive. Use of leak-proof, labeled containers for hazardous and infectious waste. On-site treatment of infectious and hazardous waste using autoclaves, incinerators, or chemical disinfection. Guidelines for disposal of expired or unused medications to prevent them from entering the sewage system. Disposal of chemicals according to regulatory standards, using licensed disposal companies. | | <p>Environmental Management (Soil Quality Management) G. N. No. 239 of 2007</p> <p>Environmental Management (Solid waste Management) Regulation, 2009 as amended in 2016</p> | | | | |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|------|--------|--|-------------------------|---------------------------|-----------------------------------|----------------------|-------------|-----|
| | | | | | | | TZS | USD |
| | | <ul style="list-style-type: none"> • Installation of an on-site wastewater treatment facility to treat hospital effluents, removing contaminants such as pharmaceuticals, pathogens, and hazardous chemicals. • Implementation of pre-treatment systems for specific contaminants before they enter the main treatment plant. <p>ix.Spill Prevention and Response:</p> <ul style="list-style-type: none"> • Develop and implement spill prevention and response plans, including regular training for staff on spill containment and clean-up procedures. • Conduct regular groundwater quality monitoring around the hospital to detect any signs of contamination early. • Ensure wastewater discharge complies with local environmental regulations through regular testing and reporting. • Install containment systems for storage areas of chemicals and hazardous materials to capture any spills or leaks. <p>x.Sustainable Practices and Environmental Compliance:</p> <ul style="list-style-type: none"> • Use environmentally friendly cleaning agents and disinfectants. • Implement sustainable practices to reduce the overall environmental impact. • Regularly inspect and maintain sewage and drainage systems to prevent leaks and blockages. • Ensure that all waste management and treatment facilities are well-maintained and functioning properly. • Work closely with environmental regulatory bodies to ensure compliance with all relevant laws and regulations. • Collaborate with local authorities for coordinated responses to significant spills or contamination events. | | | | | | |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|------|---------------------------------|--|--------------------------|--|-----------------------------------|-----------------------|-------------|-------|
| | | | | | | | TZS | USD |
| | | <ul style="list-style-type: none"> Invest in research and development of new technologies and methods for reducing and treating hospital waste. Stay informed about and implement best practices from other healthcare institutions and industry standards. <p>xi.Specialized Waste Handling:</p> <ul style="list-style-type: none"> Designate specific areas for waste oil collection, ensuring they are well-paved with concrete, equipped with bund walls, and covered. Place all hazardous material in a designated concreted and lined area. Ensure generators are placed on concrete bases and enclosed by concrete bund walls. Replace contaminated soil and store it for disposal with other hazardous waste. <p>xii.Contracting and Compliance:</p> <ul style="list-style-type: none"> Engage a GCLA Certified and VPO Environment registered hazardous waste disposal contractor on a framework contract to ease hazardous waste removal. Ensure regular monitoring, training of staff, and proactive maintenance of infrastructure to minimize environmental impact and ensure sustainable operation. | | | | | | |
| O-03 | Increased Surface Water Run-off | <ul style="list-style-type: none"> Roofs of all project building and its facilities shall be installed with gutters and downward pipes to direct rain water to the designated storm water drains within the site The paved area surrounding the buildings shall have a slope towards storm water channels that direct storm water to the large storm water channel along Mloganzila road. Designs shall explore option for rain water harvesting and if found feasible it shall be implemented | Ongoing during operation | Controlled runoff, water quality standards met | MUHAS | Environmental Officer | 6,000,000 | 2,290 |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|------|------------|---|--------------------------|--|-----------------------------------|---|----------------------|----------------------|
| | | | | | | | TZS | USD |
| O-04 | Fire Risks | <ul style="list-style-type: none"> • Strictly enforce predetermined measures and activities to timely prevent, curb, and avoid conditions that may result in fires. • Always ensure sufficient water is available for firefighting purposes. • Sensitize all personnel about responsible fire protection measures and good housekeeping, including the removal of flammable materials such as rubbish, dry vegetation, and hydrocarbon-soaked soil from the vicinity of port facilities. • Establish collaboration with the Fire and Rescue Force and neighbouring companies within the vicinity. • Ensure the dedicated firefighting team on-site is properly equipped. • Timely service portable fire extinguishers at the port facilities. • Regularly test and certify installed firefighting facilities by the appropriate authority. • Install fire detection and alarm systems in all hospital buildings and offices. • Conduct regular drills and simulations to train workers in fire prevention and rescue skills. • Communicate and sensitize staff, contractors, and other stakeholders on the hospital's emergency response plan for the entire site. • Install and maintain fire detection and alarm systems, including smoke detectors, heat detectors, and automatic sprinkler systems, to detect and suppress fires promptly. • Develop and regularly review emergency response plans, including fire evacuation procedures, training for staff on fire safety protocols, and conducting fire drills to ensure preparedness. • Properly store and secure flammable and combustible materials in designated areas with appropriate ventilation and fire suppression systems. | Ongoing during operation | <p>Reduced fire incidents</p> <p>Adhere to the Fire and Rescue Force Act No. 14 of 2007</p> <p>Adhere to the Fire and Rescue (Fire Precautions in Buildings) Regulations, 2015</p> | MUHAS | Fire Safety Officer/ Health and Safety (HS) Officer | Part of project cost | Part of project cost |

| Code | Impact | Mitigation Measures | Deadline for Completion | Key Performance Indicator | Implementation and Responsibility | Monitoring Oversight | Annual Cost | |
|------------------------------|--------|--|-------------------------|---------------------------|-----------------------------------|----------------------|-------------|---------|
| | | | | | | | TZS | USD |
| | | <ul style="list-style-type: none"> Regularly inspect and maintain electrical systems, medical equipment, and fire safety equipment to ensure they are in good working condition and compliant with safety standards. Provide comprehensive training to hospital staff on fire prevention, evacuation procedures, the use of fire extinguishers, and handling emergencies involving fire hazards. | | | | | | |
| Total Management Cost | | | | | | | 280,000,000 | 106,880 |

Source: Consultant, 2024

CHAPTER NINE

9.0 ENVIRONMENTAL AND SOCIAL MONITORING PLAN

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

- **Baseline monitoring** – the measurement of environmental parameters during a pre-project period and operation period to determine the nature and ranges of natural variations and where possible establish the process of change.
- **Compliance monitoring:** takes the form of periodic sampling and continuous measurement of levels of compliance with standards and thresholds – e.g., for waste discharge, air pollution.
- **Impact/effect monitoring:** involves the measurement of parameters (performance indicators) during establishment, operation and decommissioning phase in order to detect and quantify environmental and social change, which may have occurred as a result of the project. This monitoring provides experience for future projects and lessons that can be used to improve methods and techniques.
- **Mitigation monitoring** aims to determine the suitability and effectiveness of mitigation programs, designed to diminish or compensate for adverse effects of the project.

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

Table 9. 1: Social and Environmental Monitoring Plan for the Proposed Cardiac Teaching and Research Hospital Project

| Environmental and social Aspect | Parameters | Monitoring frequency | Sampling Area | Measurement Units | Method | Target level/ Standard | Responsibility for monitoring | Cost estimate (Tsh) | |
|---|--|--------------------------------|---|---|------------------------------------|---|--|---------------------|-------|
| | | | | | | | | TZS | USD |
| Mobilization Phase | | | | | | | | | |
| Air Quality | Dust (PM ₁₀) | Once before construction start | Project sites | g/Nm ³ | Micro-dust Pro (TZS 837 Part 3) | <0.25 | MUHAS | 3,500,000 | 140 |
| Noise Baseline | Noise level | Once before construction start | Project sites | dBa | Noise Level Meter | <55 (Day Time) <45(Night Time) | MUHAS | 3,500,000 | 140 |
| Construction Phase | | | | | | | | | |
| Air Quality | Dust (PM ₁₀) | daily /weekly | Project sites | g/Nm ³ | Micro-dust Pro (TZS 837 Part 3) | <0.25 | Contractor/ MUHAS | 10,000,000 | 3,810 |
| Noise pollution | Noise level | daily/weekly | Project sites | dBa | Noise Level Meter | <55 (Day Time) <45(Night Time) | | 5,000,000 | 1,910 |
| Employment opportunity | Percentage of local construction laborer's | Twice a year | Project sites | Number of local people employed in the project | Records, inquiries and observation | >140 | MUHAS/ Contractor/ Kwembe ward leaders | 4,000,000 | 1,530 |
| Safety and health risks | Number and type of safety equipment such as mask, helmet gloves and ear plugs. Health and sanitation facilities in site. | Daily | Project sites | Number of safety measures provided | Records, inquires and inspection | - | Contractor/ MUHAS/ OSHA | 15,000,000 | 5,720 |
| Waste Management | Solid and Liquid waste collection facilities | Once a week | Project sites | Presence of Skip bucket and Proper connection of wastewater system to the sewer network | Observations | At Least 1 Skip bucket and connection to sewer. | Contractor/ MUHAS | 12,000,000 | 4,580 |
| Gender based violence (GBV), equity, rape and | GBV | Monthly | Project site and the whole of Community | Number of GBV | Records and Inquiries | Zero cases of GBV | Contractor/ MUHAS | 8,000,000 | 3,050 |

| | | | | | | | | | |
|---|--|-----------------------------|---|--|----------------------------------|--|--------------------------------------|------------|-------|
| sexual harassment | | | | | | | | | |
| Transmission of Vector Borne and Communicable Diseases | Community and Contractor's Workers | Monthly | Project site and the whole of Community | Number of workers got ill from communicable diseases | Records | Zero (0) | Contractor/ MUHAS | 10,000,000 | 3,810 |
| Impacts associated with Transmission of Sexually Transmitted Infections | Community and Contractor's Workers | Monthly | Project site and the whole of Community | Number of workers got ill from STDs | Records | Zero (0) | Contractor/ MUHAS | 10,000,000 | 3,810 |
| Impacts on Labor and Working Conditions | Contractor Workers | Daily | Project Site | Preparation and implementation of Human Resources Policy, Labor and Employment Plan | Records, Observations, Inquiries | Presence of the Plan and Enforcement | Contractor/ MUHAS | 6,000,000 | 2,290 |
| Workers and Community Grievances | Grievance management System | Monthly | Community and Site Area | Number of Cases | Records, Inquiries, Observations | All grievances have closure action plan | MUHAS | 10,000,000 | 3,810 |
| Operation phase | | | | | | | | | |
| Safety risk due to fire | Awareness and Signage number of fire extinguishers | Once a year | Project sites | Number of safety measures provided | Records, injuries and inspection | | MUHAS/ OSHA / Fire and rescue forces | 8,000,000 | 3,050 |
| Waste Management | Solid and Liquid waste | Twice per week Quarterly | Project sites | Presence of Waste Collection facilities Proper connection of wastewater system to the sewer network | Observations | At least 1garbage collection point Proper connection to sewer | MUHAS/ Ubungo Municipal council | 10,000,000 | 3,810 |
| Increased pressure to Social Services and Utilities | Water Supply, Electricity, Sewer system, Solid waste collection facilities | quarterly | Mloganzila Mtaa | Respective Units | Records, Inquiries, Observations | No decrease of service and utilities provision and availability | MUHAS/ Mtaa leaders | 5,000,000 | 1,150 |

| | | | | | | | | | |
|----------------------------------|-----------------------------|-----------|-------------------------|-----------------|----------------------------------|---|-------|--------------------|---------------|
| Workers and Community Grievances | Grievance management System | quarterly | Community and Site Area | Number of Cases | Records, Inquiries, Observations | All grievances have closure action plan | MUHAS | 7,000,000 | 1,150 |
| Total monitoring costs | | | | | | | | 127,000,000 | 43,670 |

Source: Consultant, 2024

CHAPTER TEN

10.0 COST BENEFIT ANALYSIS

10.1 INTRODUCTION

Cost Benefit Analysis (CBA) is a simple technique used to create non-critical financial decisions. It involves adding the benefits of a particular action then providing a comparison with the associated costs. The results of the analysis are expressed as payback period which is the duration needed for the benefits to repay the costs. CBA is an important tool in project management and it is applicable in situations like evaluating a new project, assessment of any change initiative and determining the feasibility of different purchases.

Muhimbili University of and Allied Health Sciences (MUHAS) intends to construct cardiac teaching and research hospital located at Mloganzila Mtaa, Kwembe ward, Ubungo Municipal council in Dar es salaam Region. The Hospital will conduct patient care, medical education, and clinical research. It will provide hands-on training for medical students and residents, treating patients while integrating academic learning. Additionally, it will advance medical knowledge through research, developing new treatments and improving healthcare practices.

The project will entail construction of a 9-storey building with components such as doctors' offices; visitors waiting lounge; occupants ward; nurse station; boardrooms; administration offices; occupants ward; control room; recovery rooms; laboratory; surgical center unit; nurse stations; medical rooms; storage area; biomedical workshops; intensive care unit; operation rooms; laundry and a mortuary. The project will also include a 200Kva generator for alternative power source. Through this project, MUHAS expects to employ about 100 to 150 people as both contracted and casual staff working in two (2) shifts for 24 hours throughout the week.

10.2 SOCIO-ECONOMIC AND ENVIRONMENTAL COST BENEFIT ANALYSIS

The cost-benefit analysis for the Cardiac Teaching and Research Hospital involves weighing the financial investments required against the potential returns and societal benefits. Furthermore, the analysis is considering whether the impacts can be mitigated and the costs of mitigating the impacts are reasonable. As it has been mentioned in Chapters 6 and 7, the benefits of the project, in terms of social benefit are substantial, the negative environmental impacts are mitigatable and the financial resources needed to mitigate the impacts are relatively small compared with the actual capital investment.

Muhimbili University of Health and Allied Sciences commits to ensure that operation of their facility is done with maximum safety measures. Due to low level of the mentioned potential risks, apparently, this project has more benefits to the environment, economy and the society as a whole.

10.3 BENEFITS

10.3.1 Socio-Economic Benefits

It is expected that this development will contribute to the provision of both permanent and temporary employments for the neighborhood and beyond during construction and operation phases of the project. In addition, the investment will contribute to government revenue through various fees, charges and taxes. Improvement of the economy of the area and the nation at large as the proponent will participate in the community development activities as well create both direct and indirect employments.

The project will also contribute to training the medical practitioners who are currently lacking as well as improving the public health services.

10.3.2 Environmental Benefits

The proposed project will optimize and increase the land utility by developing the cardiac teaching and research hospital. This development will have direct impact to the economy of the country through various taxes, fees and rents.

10.3.3 Summary of Benefits

- a) **Tuition Revenue:** Income generated from students' tuition and fees.
- b) **Research Grants:** Potential funding for medical research projects conducted by faculty and students.
- c) **Clinical Services:** Revenue from affiliated hospitals or clinics associated with the medical school.
- d) **Philanthropic Support:** Donations and endowments from alumni, foundations, and other supporters.
- e) **Workforce Development:** Producing a skilled healthcare workforce to address local and global healthcare needs.
- f) **Community Impact:** Improving healthcare access, outcomes, and public health in the region, wide Tanzanian community and beyond.
- g) **Intangible Benefits:** Include qualitative factors like reputation, alumni success, and societal impact
- h) **Land Use Optimization:** Value will be added to the land used for the project as through this development will contribute to the humanity in many ways as mentioned above.
- i) **Environmental Protection:** The development design has provisions for the landscaping of the project area that includes planting of trees, flowers and lawn that would as result beautify and protect the environment for soil erosion and other forms of degradations.

10.4 COSTS

10.4.1 Socio-Economic and Environmental Costs

- a) **Infrastructure:** Building of the 9-storey building with its components
-

- b) **Faculty and Staff:** Salaries, benefits, and training for lecturers, administrators, and support staff.
- c) **Curriculum Development:** Designing, updating, and implementing a comprehensive medical curriculum.
- d) **Equipment and Technology:** Purchasing medical equipment, simulation tools, and IT infrastructure.
- e) **Regulatory Compliance:** Meeting accreditation standards and regulatory requirements may incur additional costs.
- f) **Operating Expenses:** Utilities, maintenance, insurance, and other ongoing operational costs.
- g) **Fire Hazards:** The building may be prone to fire risks due to electrical installation if improperly done or lack of fire safety measures observation.
- h) **Air Pollution:** The pollution will be contributed by the vehicles transporting raw materials and people to the site during construction and operation phases of the project. Operation of the facility may as well contribute to air pollution particularly when the power generator is being used.
- i) **Waste Generation:** Various types of wastes such as medical, domestic, hazardous will be generated from all phases of the project.
- j) **Health and Safety Risks:** The project may compromise the health of the workers during the implementation from risks such as vehicles or machine accidents.

The provided Environmental Management Plan should be adhered to, to make sure the environment, health and safety of the workers and the environment are well protected.

CHAPTER ELEVEN

11.0 DECOMMISSIONING PLAN

11.1 INTRODUCTION

Decommissioning is not anticipated in the foreseeable future of this project. However, if it were to occur, it may entail changes in land use, including functional alterations or demolition prompted by changes in land use. Due to this uncertainty, specific mitigation measures regarding the environmental impacts of decommissioning works cannot be proposed at this time with a reasonable degree of certainty.

A decommissioning plan that considers environmental concerns should be prepared by the developer before commencing decommissioning activities. If decommissioning is carried out, it might involve alterations in land use, such as functional changes or demolition due to changes in land use. Therefore, below are brief details of a preliminary decommissioning plan that the MUHAS should consider, in case it becomes necessary.

11.2 PRELIMINARY DECOMMISSIONING PLAN

This part gives a concise description of the tasks necessary to demolish the planned project on the area, should that scenario arise. The framework for ensuring that demolition activities on the site don't negatively impact the environment, traffic, or the health of the general public and nearby properties is provided by this Plan, which will be used as a reference document.

Before starting demolishing activities on site, the Contractor will be expected to create a thorough demolition plan and construction management plan to meet the requirements of the developer as well as required authorities.

11.2.1 Type of buildings to be demolished

The blocks that will be demolished are typically made of load-bearing masonry structures, steel or timber roof frames, and roofing made of metal. The blocks are built on top of a slab of concrete supported by strip and pad footings.

11.2.2 Demolition Methods

Before undertaking demolition operations on site, it is expected that the contractor will create a complete demolition plan. In the meanwhile, the following demolition process will serve as a guide:

- Bobcats, 3-5t excavators, and dingo-style loaders will be used along with hand labor to strip out and remove non-structural components.
- With the aid of small to medium-sized vehicles, the materials will be removed from the location.
- The buildings will be dismantled using heavier machinery, such as hydraulic excavators weighing 15 to 40 tons. These tools will be outfitted with rock breakers, pulverizers, and similar devices that will be utilized in succession.
- The expert in question will be hired to offer additional engineering guidance about back propping, or temporary support, of the building during deconstruction.

- Erosion prevention measures will be installed during demolition. The management of dust and subsequent discharge into storm water drainage channels will be among them.

11.2.3 Materials Handling

Excavators, bobcats, and other mechanical equipment will be used for material handling, and these materials will be loaded onto trucks (bogie tippers and semi-trailers) to a designated trash facility or recycling location, the waste will be transported off-site.

The contractor shall submit a Demolition Waste Management Plan to Ubungo Municipal Council which outlines the objectives of:

- Maximization, reuse and recycling of demolition material
- Minimization of waste disposal
- Evidence of implementation for specified arrangements of waste management

Reusable items will be stored at the facility. Collection vehicles will also be able to park here with recycling and disposal bins. The hazardous wastes will be handled differently. A certified specialist will inspect the hazardous items and prepare a report. The removal of hazardous items shall follow EMA 2004. The hygienist will offer a final clearance report, which will contain tip dockets from waste facilities.

11.2.4 Proposed Sequence

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

- Dilapidation Survey
- Construction Waste Management Plan
- Demolition Management Plan

The demolition process is often carried out in the opposite order from building. Interior decorations will basically be removed. After that, services like air conditioning, conduit, and piping will be taken out. Where necessary, exteriors will be taken off before the building is destroyed with the use of heavier machinery. The site's demolition and clean up are anticipated to take three months.

11.2.5 Protective Measures

Before the start of the demolition process, an A Class hoarding will be placed around the perimeter of the construction site. Additionally, overhead protection in the shape of a B Class hoarding will be supplied everywhere there is a risk of debris falling into public spaces. To facades where items may fall more than 4 meters, scaffolding will be installed. To contain trash and dust on the site, the scaffolding will be covered with chain wire and shade cloth. To minimize dust dispersal from the demolition site, dust control techniques will be implemented. To guarantee adherence to the safety regulations and established work techniques, the contractor will have a senior representative on the job site at all times.

11.2.6 Traffic Management

An extensive traffic management strategy must be provided in order to control construction traffic throughout the decommissioning phase. The Contractor will create this plan for the various demolition phases. All traffic will be restricted to the perimeter of the property during demolition. The location will continue to be secured and off-limits to pedestrians.

11.2.7 Occupational Health and Safety

A detailed Occupational, Health and Safety (OH&S) Policy will be provided by the Contractor prior to work initiation. A detailed Site Safety Plan will be prepared for the specific project.

11.2.8 Environmental Management Plan

A detailed Environmental Management Plan will be provided by the Contractor prior to the commencement of the work.

11.2.9 Potential Impacts and Mitigation Measures

Dust and Noise Pollution

Since the demolition work is anticipated to be completed utilizing the traditional manner using mechanical breakers and jackhammers, the demolition operations for the remaining portion (foundation structure) will be accompanied by the emission of a lot of dusts. However, other demolition strategies, such as explosive methods can be used.

Mitigation Measures

- Water sprinkling shall be applied to open earth to reduce dust emission.
- Trucks transporting construction materials shall be covered if the load is dry and prone to dust emissions.
- The demolition area shall be fenced by iron sheets; this will prevent the dust at the ground to be picked up by the wind.
- Community notification shall be undertaken where appropriate where work is likely to cause dust impact on the public and nearby residents.
- Sound construction equipment, with noise sinks, shall be used
- Machine operators in various sections with significant noise levels shall be provided with noise protective gear.
- Construction equipment shall be selected, operated and maintained to minimize noise.

Increased Waste

A lot of demolition waste is expected as a result of the demolition of these blocks. These shall include walls concrete, reinforcements, pipes etc. Most of the materials shall be salvaged and recycled.

Mitigation Measures

- All materials which can be reused shall be reused
- Materials that cannot be reused shall be sent to the authorized dumpsite

CHAPTER TWELVE

12.0 CONCLUSIONS AND RECOMMENDATIONS

12.1 SUMMARY

MUHAS, through the Government of the United Republic of Tanzania (URT) has received financial support from AFDB to implement The East Africa's Centres of Excellence in Skills and Tertiary Education in Biomedical Sciences Project Phase II - 2022-2026. MUHAS plans to establish a 600-bed cardiac teaching and research Hospital and associated facilities within MUHAS-Mloganzila compound at Kwembe ward, Ubungo Municipality.

The proposed project is located within the premises of MUHAS. The area is Mloganzila Mtaa, Kwembe Ward, Ubungo Municipality in Dar es Salaam Region. The premises owned by MUHAS, is located about 5km from the Morogoro road and it has the total area of 1,286.17Ha, at Latitude 6.491400 South and Longitude 39.033200 East. The proposed site is bordered with the Tanzania Peoples Defence Force (TPDF) to the West, Mloganzila Hospital to the North, undeveloped area on East and East Africa centre of Excellence for cardiovascular sciences (EACECS) on the South. The proposed site can be accessed through Mloganzila Road when coming from Morogoro Road which is about 4km. The Key benchmark is Muhimbili Mloganzila Hospital which is near the project site

The proposed cardiac teaching and research hospital will be a nine-story building with four wings to allow thorough ventilation and will have the following functional areas: Emergency area sufficient to handle 10 emergency cases at a time, ambulance bay, Outpatient services sufficient to handle 60 patients at a time, Cardiac Diagnostic Services – Echo, X-ray, CT Scan, MRI, a comprehensive cardiac laboratory, blood bank, Cardiac Angiography Services, Coronary care Unit, four (4) Cath lab Hybrid theatres, and provision for another six (6) cardiothoracic theatres making a total of 10 operating theatres. Cardiac High Dependency area/Cardiac Intensive care services and patient wards (ordinary, private and IPPM and VIP). Other units will include: Hospitality services i.e., genetic counselling, nutritional counselling, Physiotherapy and Rehabilitation services, pharmacy and compounding, therapeutic drug monitoring unit, quality assurance unit, centralized sterilization unit, minor workshop/biomedical engineering unit for addressing immediate faults in equipment, (a larger workshop within campus will be available from other projects). The administrative wing will have administrative offices, finance, logistics and supply chain management, procurement and social welfare offices, legal unit and public relations unit. Heads of Departments and Heads of Firm offices as well as seminar rooms will be available to facilitate teaching and learning. To avoid duplication and promote optimal use of available resources, the current mortuary

Research will be an integral part of the hospital functions, and hence facilities for data collection (including sample collection), data archiving, and all the main aspects of data science will be made available. The data bases will be the cornerstone of developing AI algorithms for risk stratification and aiding diagnostics. The CTH will have facilities for next generation sequencing, gene and cell therapy. Equipment for other research approaches, will be made available at both the hospital and laboratories at the Multipurpose building.

Long term storage of research biological samples will be done at the University Biorepository at the Multipurpose Building of the EACECS.

The project investment cost is approximately USD 75 Million which includes all costs for engineering, procurement of construction equipment and materials acquisition as well as the actual construction process. The envisaged life span of the project construction implementation is about 24 months and more and the operation plus or minus 50 years depending on proper maintenance and rehabilitation of project infrastructure.

The main source of electricity at the site will be electricity from TANESCO, all construction works employing the use of electricity will be conducted by the use of electricity for construction sites. The proposed project will use TANESCO as source of energy for lighting during operational phase, but will also explore other options such as solar panels.

The main water source at the proposed site will be from DAWASA. However, consultations from the stakeholders revealed that water is not sufficient in the area. Establishment of the cardiac teaching and research hospital will further increase stress of water. Therefore, the proposed project should consider conservation of water through rain water harvesting during operational phase. The contractor should take note of this and find alternative source of water during construction phase.

The ESIA study is conducted in accordance with the Environmental Impact Assessment and Audit regulations (2005); and, formulated after the Environmental Management Act (EMA) No. 20 of 2004. The Regulations give mandate to NEMC to oversee the ESIA process, which culminates with an award of the ESIA Certificate by the Ministry responsible for Environment. The ESIA Certificate is among the prerequisite approvals required before the project takes off. This project will need this approval before it is implemented. In addition, ESIA study will adhere to the AFDB Policies and Legal Framework and Environmental and Social Operating Safeguards (E&S OSs).

Stakeholders' identification and engagement process was conducted based on EIA and Audit Regulations, 2005 and its amendment of 2018, AFDB Environmental and Social Operating Safeguards (E&S OS10-“Stakeholders Engagement and Information Disclosure”). The project involved various stakeholders considering gender, vulnerable people as well as people with special needs. They were consulted to get their views throughout the project life. In addition, a mechanism was put in place to address grievances, Gender based Violence (GBV), Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH).

Key stakeholders were consulted during ESIA study, include the following; Ubungu Municipal Council (Environmental Officer, Town Planner and Community development Officer), Occupational Safety and Health (OSHA), Tanzania Electric Supply Company Limited (TANESCO), Fire and Rescue Forces (Kinondoni), Kwembe Ward Office (WEO); and Mloganzila, and Kwembe Development Committees. Also scoping reports were submitted to the Ministry of Education, Science and Technology (MoEST), Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) and Tanzania Electric Supply Company Limited (TANESCO), East Africa Community (EAC), Tanzania Atomic Energy

Commission (TAEC) Fire and Rescue Forces (Kinondoni), to seek for comments/issues. The main issues and concerns identified include the following:

- Stakeholders anticipate that the hospital will significantly enhance the quality of cardiac care available in the region, and EAC providing advanced treatment options and better patient outcomes
- The facility's teaching component is expected to offer valuable educational opportunities for medical students, residents, and healthcare professionals, fostering a new generation of skilled cardiologists and researcher
- The research component of the hospital has the potential to drive advancements in cardiac care, leading to innovative treatments and improved health outcomes on a broader scale
- The establishment of a cutting-edge cardiac hospital can enhance the region's reputation as a center for medical excellence, attracting top talent and further investment in healthcare
- Collaborating with international experts will facilitate the exchange of resources, including state-of-the-art medical equipment, advanced technologies, and specialized medical supplies

The construction of the proposed cardiac teaching and research hospital at MUHAS Mloganzila shall cause a wide range of environmental and social impacts on a number of receptors. The impacts are of both positive and negative nature. The identified significant environmental and social impacts during construction phase include; Employment opportunities; air and noise pollution; waste generation and management; occupational safety and health risks; erosion of cleared areas; construction vibration and community health and safety risks. The identified significant environmental and social impacts during operation phase include; benefits to communities resulting from employment, reduction of gender gap in enrollment and completion rates increase in economic activities, regional Integration, increased revenue to the council and country as a whole, increased pressure on social services and utilities, health and safety risks due to fire hazards, waste generation and management.

Different alternatives were considered in this study including no project alternative, alternative sites, alternative designs, Energy Alternative, Wastewater treatment Alternatives. The no project alternative was disqualified because choosing that alternative shall mean to remain with the status quo (without project) and losing all the benefits of the project. Existing water sources (boreholes) was preferred than other water sources like rainwater harvesting. Electricity from National grid was preferred, however solar energy shall be explored and if feasible shall be used. For wastewater management, onsite sanitation system (Centralized Bio-digester) was preferred because there is no sewer system.

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

needed to implement the recommended mitigation measures. The engineering designs shall include the mitigation measures recommended in this report.

The EIA study results show that although there are some limited negative environmental implications of the project, the project will have high benefits to the EAC, MUHAS and Tanzania as whole. The associated negative impacts, to a large extent have been minimized through good engineering design and envisaged construction practices. Specific mitigation measures have been suggested in this report to offset some of the inherent adverse impacts. Implementing these mitigation measures would increase environmental soundness of the project.

12.2 CONCLUSIONS

It can therefore be concluded that the proposed construction of the Cardiac Teaching and Research Hospital at the Mloganzila area will entail no significant impacts, provided that the recommended mitigation measures are adequately and timely implemented. The identified impacts will be managed through the proposed mitigation measures and implementation regime outlined in this Environmental and Social Impact Assessment (ESIA).

The developer is committed to implementing all the recommendations given in this ESIA and will further carry out environmental auditing and monitoring as scheduled. Additionally, the Muhimbili University of Health and Allied Sciences (MUHAS) will ensure that the recommendations from stakeholders are considered for the long-term success and improvement of the project.

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APPENDICES

APPENDIX I: TERMS OF REFERENCE

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR
THE PROPOSED CARDIAC TEACHING AND RESEARCH
HOSPITAL LOCATED ON PLOT 3, MLOGANZILA MTAA,
KWEMBE WARD, UBUNGO MUNICIPALITY IN DAR ES
SALAAM REGION**

TERMS OF REFERENCE



Proponent:
**MUHIMBILI UNIVERSITY OF HEALTH
AND ALLIED SCIENCE (MUHAS)**
P.O. Box 65001,
Dar-es-Salaam, Tanzania
Website: www.muhas.ac.tz

Submitted to:
**NATIONAL ENVIRONMENT
MANAGEMENT COUNCIL (NEMC)**
Regent Estate, Plot No. 29/30
P. O. Box 63154, Dar es Salaam,
Tanzania
Tel. +255 22 2774852/4889 Fax:
+255 22 2774901
E-mail: dg@nemc.or.tz

Consultant:
KAMARIYA MIKIDADI MOHAMED
Plot No. 132/2, Migombani Street
Regent Estate Area, Mikocheni
P.O. Box 36086, Dar es Salaam,
Tanzania
Tel: +255 653 577 247
Email: qamariya.mohamed@gmail.com

Submission Date: 11TH JUNE 2024

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR
THE PROPOSED CONSTRUCTION OF TEACHING AND RESEARCH HOSPITAL AT MLOGANZILA
LOCATED AT KWEMBE WARD, UBUNGO MUNICIPAL IN
DAR ES SALAAM REGION.**

1. INTRODUCTION

Muhimbili University of Health and Allied Sciences (MUHAS) came into being University by His Excellence the President of the United Republic of Tanzania in 2007. MUHAS was conceived in 1963 when the then Dar es Salaam College of Medicine was established. In 1968 the School became a Faculty of Medicine and was upgraded to a constituent College of the University of Dar es Salaam in 1991 with the aim of nurturing it to a full-fledged university and was later merged with the Muhimbili hospital to create the Muhimbili Medical Centre (MMC). Over the years MUCHS made significant achievements in terms of increased student enrollment and development of several new academic programmes. The Parliament Act No 9 of 1991 that established MUCHS was repealed in 2005 through the universities Act no 7 of 2005. Subsequently, in 2007 Article 1 of the Charter of Incorporation established MUHAS; in line with the Universities act no 7 of 2005.

MUHAS has grown from a small Unit with an enrolment of 10 students and a single program, Doctor of Medicine (MD) to an institution with an enrolment of 4,200 students with a total of 91 accredited academic programs, which includes 10 diploma programs, 14 undergraduate programs and 67 postgraduate programs. It has developed from a Faculty of Medicine, which housed all current academic units as departments to an institution with 5 Schools, 2 Institutes and 12 Directorates.

MUHAS through the Ministry of Education, has received funding from AFDB to build a 600-bed Cardiac Teaching Hospital. This facility aims to complete the Centre of Excellence by offering an accessible, well-equipped teaching hospital situated near the Centre's Multipurpose building to enhance the synergy between teaching and learning.

The hospital will be a nine-story building with four wings to allow through ventilation and will have the following functional areas: Emergency area sufficient to handle 10 emergency cases at a time, ambulance bay, Outpatient services sufficient to handle 60 patients at a time, Cardiac Diagnostic Services – Echo, X-ray, CT Scan, MRI, a comprehensive cardiac laboratory, blood bank, Cardiac Angiography Services, Coronary care Unit, four (4) Cath lab Hybrid theatres, and provision for another six (6) cardiothoracic theatres making a total of 10 operating theatres. Cardiac High Dependency area/Cardiac Intensive care services and patient wards (ordinary, private and IPPM and VIP). Other units will include: Hospitality services i.e. genetic counselling, nutritional counselling, Physiotherapy and Rehabilitation services, pharmacy and compounding, therapeutic drug monitoring unit, quality assurance unit, centralized sterilization unit, minor workshop/biomedical engineering unit for addressing immediate faults in equipment, (a larger workshop within campus will be available from other projects). The administrative wing will have administrative offices, finance, logistics and supply chain management, procurement and social welfare offices, legal unit and public relations unit. Heads of Departments and Heads of Firm offices as well as seminar rooms will be available to facilitate teaching and learning. To avoid duplication and promote optimal use of available resources, the current mortuary

The detailed scope for undertaking Environmental and Social Impact Assessment is intended to guide the Consultant to address relevant environmental and social issues during the assessment process. Among others, the EIA shall be conducted in accordance with the requirements of the Environmental Management Act (2004) and AFDB Standards. The Consultant shall do everything necessary to meet the objectives of the services and not less than the following task that should be undertaken during the Environmental and Social Impact Assessment. In the process of consultation (Scoping process) with relevant stakeholders like environmental authorities, the Consultant may further be required to finalize the TOR according to the agreement with these stakeholders.

2. SCOPE OF WORK

Task 1: Description of the Proposed Project

The Consultant shall provide a brief description of the relevant parts of the project using maps of appropriate scale where necessary and include the following information:-

- Project justification;
- Location;
- General layout, size, and capacity;
- Area of influence of the Project
- Pre-construction activities
- Construction activities
- Schedule of project activities
- Staffing and support;
- Facilities and services
- Operation and maintenance activities
- Life span

Task 2: Description of the Environment

Assemble, evaluate, and present baseline data on the relevant environmental characteristics of the study area. Include information on any changes anticipated before the project commences. Modify the lists below to show the critical information for this project category or which is relevant to it. Environmental characteristics of the study area shall be presented on a map to facilitate the understanding of the study area:

- (a) Physical environment: This shall cover geology; topography; soils; climate and meteorology; physical structures at site, utilities and services available.
- (b) Biological environment: All flora and fauna present at the project site
- (c) Socio-cultural environment; population, land use; planned development activities community structure; goods and services; recreation; public health; Gender equality and GBV, HIV/AIDS, Cultural/historic properties and attitudes to the project.

Task 3: Legislative, Policies, Administration Framework

Describe the pertinent regulations and standards governing environmental quality, health and safety, protection of sensitive areas, protections of endangered species, siting, and land use control at international, national regional and local levels. The Consultant shall undertake a review of policies, legislation and administrative framework within which the environmental management of the proposed construction of the Hospital will be carried out. The following and any other relevant legislation and policies shall be reviewed:-

➤ **Policies**

- National Environmental Policy (NEP) of 2021
- Education and Training Policy (2014)
- Construction Industry Policy (2003)
- National Land Policy (1995)
- National Human Settlements Development Policy (2000)
- National Gender Policy (2002)
- Energy Policy (1992)
- The National Water Policy (URT, 2002)
- The National Health Policy (URT, 2003)

➤ **Acts and Regulations**

- Environmental Management Act No. 20 of (2004), Cap. 191
- The Water Supply and Sanitation Act No. 12 of 2009
- The Land Act, 1999
- The Urban Planning Act (2007)
- Occupation Health and Safety (2003)
- Employment and Labour Relations Act No. 6 Of 2004
- Engineers Registration Act and its Amendments 1997 and 2007
- The Contractors Registration Act (1997)
- The Architects and Quantity Surveyors Act (1997)
- The Local Government Laws (Urban Authorities) Act (1999)
- Public Health Act 2009
- The Tanzania Development Vision 2025
- Fire and Rescue Act (2007)
- Environmental Impact Assessment and Auditing Regulations (2005)
- The Environmental Regulations (Standards for control of noise and Vibrations, 2014)
- The Environmental Management (Air Quality Standards) Regulations, 2007
- Solid waste Management Regulation, 2009 GN. NO. 263

➤ **AFDB Environmental and Social Operating Safeguards**

- E&S OS1- Assessment and Management of Environmental and Social Risks and Impacts;
- E&S OS2 - Labor and Working Conditions;
- E&S OS3 - Resource Efficiency and Pollution Prevention and Management;

- E&S OS4 - Community Health and Safety;
- E&S OS Biodiversity Conservation and Sustainable Management of Living Natural Resources; and
- E&S OS10 - Stakeholder Engagement and Information Disclosure .

Task 4: Stakeholders Involvement

Assist in coordinating the ESIA with other government agencies, in obtaining the views from affected groups, and in keeping records of meetings and other activities, communications, and comments and their disposition. Establish the views of the public with regards to the potential impacts of the proposed construction of the proposed Hospital. Identify the different groups of stakeholders, and then use the most appropriate method to establish their views. Particular attention shall be paid to the disadvantage groups (e.g. children, the elderly and women) that may be affected by the proposed Construction of the Hospital.

The Consultant shall undertake an open and transparent consultation process to ensure that the views of interested and affected parties are and approximately incorporated in the project design.

Task 5: Analysis of Alternatives to the Proposed Project

Describe alternatives that were examined in the course of developing the proposed project and identify other alternatives, which would achieve the same objectives. The concept of alternatives extends to siting, design, technology selection, construction techniques and phasing, and operating and maintenance procedures. Compare alternatives in terms of potential environmental and social impacts; capital and operating costs; suitability under local conditions; and institutional, training, and monitoring requirements. When describing the impacts, indicate which are irreversible or unavoidable and which can be mitigated. To the extent possible, qualify the costs and benefits of each alternative, incorporating the estimated costs of any associated mitigating measures. Include the alternative of not constructing the project to demonstrate environmental and social conditions without the project.

Various environmental and social criteria should be developed to select the best alternatives.

Task 6: Identification, Analysis and Assessment of Potential Impacts

The Consultant shall identify, analyze and assess environmental and social impacts of the proposed construction of the Hospital. The Consultant shall distinguish between positive and negative impacts, direct and indirect impacts, and immediate and long-term impacts. Identify impacts that are unavoidable or irreversible. Wherever possible, describe impacts quantitatively, in terms of environmental components affected (area, number), environmental and social costs and quality of available data, explaining significant information deficiencies and any uncertainties associated with the predicted impacts.

The assessment should focus on the potential for negative environmental and social impacts caused by planned and unplanned (spontaneous) Air and noise pollution; Safety and health risks and increased pressure on social services and utilities.

The significance of impacts of the proposed construction of the Hospital shall be assessed, and the basis of this assessment shall be specified. The consultant should take into consideration existing by-laws, national and international environmental standards, legislation, treaties, and conventions that may affect the significance of identified impacts. The consultant shall use the most up to date data and methods of analyzing and assessing environmental and social impacts. Uncertainties concerning any impact shall be indicated.

Task 7. Mitigation Measure

The consultant shall suggest cost-effective measures for minimizing or eliminating adverse impacts of the proposed construction and operation of the Hospital. The costs of implementing these measures shall wherever possible be estimated and presented. If compensation is recommended as one form of mitigation, the Consultant shall identify all the names and physical addresses of people to be compensated.

Task 8. Environmental and Social Management Plan (EMP)

The Environmental Management Plan focuses on three generic areas: implementation of mitigation measures, institutional strengthening and training, and monitoring. The consultant shall prepare an Environmental and social Management Plan, Which will include proposed work programme, budget estimates, schedules, staffing and training requirements and other necessary support services to implement the mitigation measures. Institutional arrangements required for implementing this management plan shall be indicated. The cost of implementing the monitoring and evaluation including staffing, training and institutional arrangements must be specified. Where monitoring and evaluation will require inter-agency collaboration, this should be indicated.

Identify institutional needs to implement environmental assessment recommendations. Review the authority and capability of institutions at local, regional, and national levels and recommend how to strengthen the capacity to implement the environmental and social management and monitoring plans. The recommendations may cover such diverse topics as new laws and regulations, new agencies or agency functions, inter-sectoral arrangements, management procedures and training, staffing, operation and maintenance training, budgeting, and financial support.

Prepare detailed arrangements to monitor the implementations of mitigating measures and the impacts of the project during construction and operation. Include in the plan an estimate of capital and operating costs and a description of other required inputs.

3. REPORTING

The ESIA reports should be concise and limited to significant environmental Issues. The Main text should focus on findings, conclusions, and recommended actions supported by summaries of the data collected and citations for any references used in interpreting data. Detailed or un-interpreted data are not appropriate in the main text and should be presented in appendices or separate volume. Unpublished documents used in the ESIA may not be

readily available and should also be assembled in appendices. In organizing the ESIA reports according to the outline in the Environmental Impact Assessment and Audit Regulations (2005). The main report contains separate an Executive Summary both in English and Swahili. The following is the tentative Schedule that shall be followed for completion of the work;


| S/N | EIA Process | Reports Submitted To NEMC/DoE | Approval From NEMC/DoE | Actors | Time Allocated |
|-----|-------------------------------|-------------------------------|---|--|----------------|
| 1. | Scoping and Screening | Scoping Report and Draft ToR | Approved ToR and Budget for site verification | Consultant/ NEMC | 14 Days |
| 2. | Environment Impact Assessment | Draft EIA Report | N/A | Consultant | 2 weeks |
| 3. | Site Verification | N/A | N/A | Client, Consultant, NEMC, Sector | 1 week |
| 4. | TAC Meeting | N/A | Comments to be incorporated in the Final EIA | Client, Consultant, NEMC, Sector Ministries, Selected Stakeholders | 2 weeks |
| 5. | Submission of Final EIA | Final EIA | N/A | Consultant, NEMC | 1 Week |

4. STAFFING

The Consultant should employ an Environmental Impact Assessment Expert (registered), Environmental Engineer, Sociologist and GBV Expert to carry out the EIA study. In addition, the Consultant may wish to absorb other supporting staff to facilitate efficient expedition of the work.

APPENDIX II: TITLE DEED

TITLE NO. 100933
 REGISTERED 10-1-07
 AT 11:00 Am



[Signature]
 Registrar of Titles

Land Form No. 22
TANZANIA STAMP DUTY ACT
 Stamp Duty Shs. 100/- Paid
 and Revenue Receipt No. 26007668
 of 2-5-06 issued.
[Signature]
 Stamp Duty Officer

TANZANIA STAMP DUTY ACT
 Duty Shs. 795900/- Paid
 on original Receipt No. 26007668
 of 2-5-06
[Signature]
 Stamp Duty Officer

THE UNITED REPUBLIC OF TANZANIA
 THE LAND ACT, 1999
 (NO. 4 OF 1999)
CERTIFICATE OF OCCUPANCY
 (Under Section 29)

Title No. 100933
 L.O. No. 234044
 L.D. No. 246321

The 28th day of December, 2006

THIS IS TO CERTIFY that MUHIMBILI UNIVERSITY COLLEGE OF HEALTH SCIENCES (MUCHS) a Constituent College of the University of Dar es Salaam established by an Act of Parliament No. 9 of 1991 of P.O. Box 65001 DAR ES SALAAM (hereinafter called "the Occupier") is entitled to the Right of Occupancy (hereinafter called "the Right") in and over the land described in the Schedule hereto (hereinafter called "the Land") for a term of **Ninety nine** years from the first day of **April, Two thousand and six** 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 there for or amendment thereof and to the following special conditions:-

1. The Occupiers having paid rent up to the thirtieth day of June, 2006, shall hereafter pay rent of shillings **Fifteen million nine hundred and ten thousand (Shs.15,910,000/=)** a year in advance on the first day of July in every year of the term without deduction PROVIDED that the rent may be revised by the Commissioner for Lands.
2. The Occupiers shall:-
 - (i) Be responsible for the protection of all beacons on the land throughout the term of the Right. Missing beacons will have to be re-established at any time at the Occupier's expenses as assessed by the Director responsible for Surveys and Mapping.
 - (ii) Do everything necessary to preserve the environment and protect the soil and prevent soil erosion on the land and do all things which may be required by the authorities responsible for environment and to achieve such objective.
 - (iii) Building shall be in permanent materials.

- (iv) Building plans to be submitted to the **Kisarawe District Council** within six months from the commencement of the Right.
- (v) Building construction to begin within six months after approval of the plans.
3. The Occupier shall further:-
- (i) make and maintain on the land throughout the term adequate arrangements for water supply, drainage and disposal of trade refuse and effluent to the satisfaction of the Authority;
- (ii) make and keep all the buildings on the land rat-proof and carry out such measures as the Medical Officer of Health for the Authority may require for this purpose;
- (iii) provide and maintain on the land such ablution facilities and take and maintain such hygienic measures as may be required by the said Medical Officer of Health.
4. The Occupier shall pay to the Minister on demand made by the Commissioner on his behalf:-
- (i) any further fees or stamp duties which may be discovered to be payable by the Occupier in connection with the Right.
- (ii) an amount equal to any contribution in lieu of rates which may be payable by Government for the land during the term of the Right;
- (iii) such sum as the Commissioner shall assess as a proper share payable for the land of the cost of making up the road or improvement of same upon which the land fronts, abuts or adjoins, whether such demand is made before during or after such making or improvement thereof. This condition does not oblige the Government to make or improve roads.
5. **USER:** Only one main building together with the usual and necessary outbuildings shall be built on the land and the same shall be used for **EDUCATION BUILDINGS** purposes only. Use Group 'K' use class (b) as defined in the Town and Country Planning (Use Classes) Regulations, 1960 as **amended in 1993**.
6. The Occupiers shall not assign the Right within three years of the date hereof without the prior approval of the Commissioner.
7. The Occupiers shall deliver to the Commissioner notification of disposition in prescribed form before or at the time the disposition is carried out together with the payment of all premia, taxes and dues prescribed in connection with that disposition.

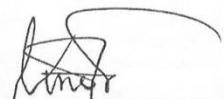


8. The President may revoke the right for good cause and in public interest.

SCHEDULE

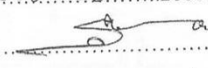
ALL that Land known as Plot No. 3 situated at **Mlonganzila in Kisarawe District** containing **one thousand two hundred eighty six decimal point one seven (1286.17) Hactres** shown for identification only edged **red** on the plan attached to this Certificate and defined on the registered Survey Plan Numbered **43075** deposited at the Office of the Director for Surveys and Mapping at Dar es Salaam.

Given under my hand and my official seal the day and year first above written.


COMMISSIONER FOR LANDS

The within named **MUHIMBILI UNIVERSITY COLLEGE OF HEALTH SCIENCES (MUCHS)** hereby accept the terms and conditions contained in the foregoing Certificate of Occupancy.

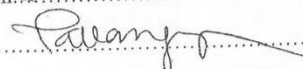
SEALED with the COMMON SEAL of the)
 said MUHIMBILI UNIVERSITY COLLEGE)
 OF HEALTH SCIENCES (MUCHS) and)
 DELIVERED in the presence of us this ^{29TH})
 day of ~~NOVEMBER~~ ^{29TH} 2006.)

Signature: )

Postal Address: UNIVERSITY OF)

DAR ES SALAAM BOX 3509 DAR ES SALAAM)

Qualification: BOARD CHAIRMAN)
 & VICE CHANCELLOR)

Signature: )

Postal Address: MUCHS)

P.O. BOX 65001 DAR ES SALAAM)

Qualification: PRINCIPAL)

UNIVERSITY OF DAR-ES-SALAAM
CHANGE OF NAME

S.F.

Registration No. 143481

Date of Issue 7.5.2012 1:00P.M.

MUHIMBILI UNIVERSITY OF HEALTH
AND ALLIED SCIENCES Box 35091
DAR-ES-SALAAM.




Senior Lect. English of Titles

APPENDIX III: LIST OF CONSULTED STAKEHOLDERS


LIST OF THE KEY STAKEHOLDERS CONSULTED FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED CONSTRUCTION OF CARDIAC TEACHING AND RESEARCH HOSPITAL LOCATED AT MLOGANZILA MTA, KWEMBE WARD, UBUNGO MUNICIPALITY IN DAR ES SALAAM REGION

| S/N | Date | Name | Organization, Address and Title | Views/Opinions/Concerns | Phone No | Signature |
|-----|----------|--|---|---|-----------------------|---|
| 1 | 21/06/24 | Dr. Stanley Sersen -EAC Kigali Delanywe | EAC R.O. Box 1096 Kigali Rwanda | <p>The proposed project will enhance cardiac vascular services in the East Africa Community since this will be the first cardiac hospital to be constructed in EAC. student mobility guidelines and labour mobility protocols are currently on process.</p> <p>-EAC Community is supportive of the proposed project and sees this as a great opportunity for EAC community.</p> <p>-The should be a proper and efficient web/charge system for patients, especially those from other countries.</p> <p>-Dedicated specialists should be assigned to their project.</p> <p>-Each African country should have a dedicated hospital for cardiac clinical care and follow ups after patients are discharged.</p> <p>-All countries should cooperate to facilitate the project implementation.</p> <p>-Competent individuals should be appointed for project supervision.</p> <p>-A strong and positive relationship on health service issues should be established between countries.</p> <p>-Strong and positive relationship on health services issues should be established.</p> <p>-Proper management of medical waste both solid, liquid should be ensured to prevent pollution.</p> <p>-Partnerships with International Cardiac hospitals in countries such as SA, India, Korea, China, etc. should be formed for knowledge transfer.</p> | +255 685 5094 2818 | Stanley Sersen stanley.sersen@africa-union.org |

LIST OF THE KEY STAKEHOLDERS CONSULTED FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED CONSTRUCTION OF CARDIAC TEACHING AND RESEARCH HOSPITAL LOCATED AT MLOGANZI LA MTA A, KWEMBE WARD, UBUNGO MUNICIPALITY IN DAR ES SALAAM REGION

| S/N | Date | Name | Organization, Address and Title | Views/Opinions/Concerns | Phone No | Signature |
|-----|------------|-------------------|--|---|------------|---|
| 1 | 20/11/2024 | ESTHER JUMA CAJUM | DSTH P.O. Box 519 DAR ES SALAAM - DEPARTMENTAL HYGIENE INSPECTOR | <ul style="list-style-type: none"> - Request the project through WIMS - Review OHS Policy and Risk assessment. - Request plan for supply of safe & clean drinking water - Request for DSTH inspection General/ergonomic, hygiene, electrical & plant inspection. - Request for occupational medical checkup. - Prepare emergency Preparedness Plan. - Put Adequate warning signs - Identify emergency assembly point. - Put proper changing room with personal lockers - Provide proper PPE to workers - Ensure availability of Toilets. - Train First Aider & First Aid kit - Train SHS Representative. | 0752562847 |  |


LIST OF THE KEY STAKEHOLDERS CONSULTED FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED CONSTRUCTION OF CARDIAC TEACHING AND RESEARCH HOSPITAL LOCATED AT MLOGANZILA MTAQ, KWEMBE WARD, UBUNGO MUNICIPALITY IN DAR ES SALAAM REGION

| S/N | Date | Name | Organization, Address and Title | Views/Opinions/Concerns | Phone No | Signature |
|-----|------------|---------------|---------------------------------|---|-------------|---|
| 01 | 08/08/2024 | SF PETER MTAU | Fire & Rescue Force - Kwanondo | <p>→ Submission of Architectural and fire fighting drawings to fire and rescue force for review and consultation based on safety of proposed project.</p> <p>→ Contractor will be paying fire and rescue force for consultation fee for the proposed project.</p> <p>→ Fire and rescue report based on consultation review and drawings to submit to contractor.</p> <p>⇒ drawings should be assessed by fire and rescue forces as per regulation requirements.</p> <p>⇒ Do not start construction without site inspection. The Contractor should be issued by a fire safety certificate (compliance certificate) that is issued annually depending on project construction phase duration.</p> | 0714 970825 |  |


LIST OF THE KEY STAKEHOLDERS CONSULTED FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED CONSTRUCTION OF CARDIAC TEACHING AND RESEARCH HOSPITAL LOCATED AT MLOGANZILA MTA, KWEMBE WARD, UBUNGO MUNICIPALITY IN DAR ES SALAAM REGION

| S/N | Date | Name | Organization, Address and Title | Views/Opinions/Concerns | Phone No | Signature |
|-----|----------|---------------------------|--|---|------------|-----------|
| 1 | 6/6/2024 | Dr Sabakhi 7 Mudaya | TMDA Zaire, Dar Principals Director | <ul style="list-style-type: none"> - Adhere to (Books and storage distribution of products practices) Regulations, 2021. - Adhere to all Acts and regulations concerning purchasing and storage of medicine. - Have with the respective organization ie (MSD) for supply of medicine and medical equipment - In the cases of expired medicine, submit disposal request at TMDA online system and liaise with NEMC to safely dispose the medicine expired. - Medical devices should be of required standards to avoid banu from regulatory authorities. | 0718788880 | Red |

LIST OF THE KEY STAKEHOLDERS CONSULTED FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED CONSTRUCTION OF CARDIAC TEACHING AND RESEARCH HOSPITAL LOCATED AT MLOGANZILA MTAA, KWEMBE WARD, UBUNGO MUNICIPALITY IN DAR ES SALAAM REGION

| S/N | Date | Name | Organization, Address and Title | Views/Opinions/Concerns | Phone No | Signature |
|-----|------|-------------------|---|--|------------|--|
| | | ALEN JOHN MJIINDO | KNY WED KUSEMBE WARD P.O. BOX 55068 DSW | <ul style="list-style-type: none"> - Wakati wa yenzi, Aira ndopondogo aipene kwa wakazi wa kata ya Kwenbe. - Mkandaras'i wa yenzi atae toadwan zinaozoreza kutoka mapema. - mfono, kuweka, alama za kuashiria yenzi; barga la kuoleza mradi - Wazingathe uhimzi wa naziingira <p>hasa wakati wa yenzi, hususani kundi la wumbi na kelele za Wifa na mntambo.</p> <p>- Mwekezaji atae ushirikiano mzuri na ofisi za kata ya kwenbe na idara zake.</p> | 0625918654 |  |
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LIST OF THE KEY STAKEHOLDERS CONSULTED FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED CONSTRUCTION OF CARDIAC TEACHING AND RESEARCH HOSPITAL LOCATED AT MLOGANZILIA MTA, KWEMBE WARD, UBUNGO MUNICIPALITY IN DAR ES SALAAM REGION

| S/N | Date | Name | Organization, Address and Title | Views/Opinions/Concerns | Phone No | Signature |
|-----|------------|---------------|--------------------------------------|---|------------|---|
| 01 | 23/05/2024 | JESCA STANLEY | (EMO) Ubungo Municipality Council | <ul style="list-style-type: none"> - Ensure Consultation with all neighbours of the project site - Ensure land rehabilitation and Vegetation replacement throughout the project phases. - Project should be fenced and apply necessary dust pollution preventive measures at the project site. | 0622-73715 |  |
| | | | | <ul style="list-style-type: none"> - Observe the use of PPE's and ensure site safety - Observe proper solid waste management at project site by allocating collection point for construction waste as well as food remains - All chemical waste should not be directed to open stream, Instead ensure the preparation and use of proper wastewater management system | | |

GOVERNMENT CHEMIST LABORATORY AUTHORITY

E – Mail: gcla@gcla.go.tz
Telephone: 255-22-2113383/4, 0739 -350350
Fax: 255 – 22 – 2113320
Website: www.gcla.go.tz
Address all correspondence to:
Chief Government Chemist.
In reply please quote:

Your Ref. No. GCLA/20052024/EIA/01

Our Ref. No. CD.34/162/01B/142



GCLA – HEAD QUATER,
P.O. BOX 2925.
138 – 140 BLOCK MEDELI,
DODOMA.

23rd May, 2024

Kamariya, Mikidadi Mohamed,
P.O. Box 36086
DAR ES SALAAM.

RE: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT CONSTRUCTION OF CARDIAC TEACHING AND RESEACH HOSPITAL LOCATED AT MLONGAZILA MTAA, KWEMBE WARD UBUNGO MUNICIPALITY CITY IN DAR ES SALAAM REGION.

Kindly refer to the heading above.

2. The Government Chemist Laboratory Authority (GCLA) is the Regulatory Authority for the implementation of the Industrial and Consumer Chemicals (Management and Control) Act No.3 of 2003 and its Regulations of 2020. The Act provides requirements for registration of producers, importers, distributors, user, exporters, transporters, warehouse operators, storage, waste disposal facility and dealers of chemicals in any way.

3. GCLA acknowledge the receipt your request to provide the views, opinion and recommendation for the proposed construction of Cardiac Teaching and Research Hospital Located at Mlongazila Mtaa, Kwembe Ward Ubungo Municipality city in Dar es Salaam region.

3. Be informed that, GCLA views that the proposed construction of Cardiac Teaching and Research Hospital requires the use of industrial consumer chemicals during construction. Therefore, you are recommended to be registered to the Registrar of Industrial and Consumer Chemicals in order to comply to the Industrial and Consumer Chemicals (Management and Control) Act No.3 of 2003 and its regulations of 2020 as follows:

- a) Register and obtain GCLA certificate as a chemical dealer.
- b) Apply for chemical permits for imported chemicals.
- c) Provide quarterly report of chemical transactions.
- d) Apply for disposal of expired, unused and or obsolete as per requirement.

4. Thank you for your continued cooperation.

David L. Elias

FOR: CHIEF GOVERNMENT CHEMIST

APPENDIX IV: MEETING MINUTES

HALMASHAURI YA MANISPAA YA
UBUNGO DAR-ES-SALAAM
MUHTASARI WA KIKAO CHA KAMATI YA
MTAA NA MSHAURI MWELEKEZI WA
MAZINGIRA KILICHOKETI TAREHE 28/05/2024

AGENDA

1. KUFUNGUWA KIKAO
2. UTAMBULISHO
3. UJENZI WA HOSPITALI YA MAFUNZO NA
UTAFITI YA CHUO KIKUU MUHAS.
4. KUFUNGUWA KIKAO

AGENDA Na. 1. KUFUNGUWA KIKAO
Mwenyekiti alifungua kikao mnamo saa nne na
nusu (04:30) Asubuhi kwa kuwakambisha
ndugu wajumbe kwa kuti wito huu na kuu-
taka wawe wasikivu ili tumaze kujadili
agenda zetu.

AGENDA Na. 2. UTAMBULISHO
Mh. Kiti aliruhusu ndugu wajumbe wajitambu-
lisho kwa nafasi zao na baadaye kumkambisha
ndugu Mshauri kutoka Chuo Kikuu cha
Muhimbili (MUHAS)

AGENDA Na. 3. UJENZI WA
HOSPITALI YA MAFUNZO NA UTAFTI
YA CHUO KIKUU MUHAS
Ml. Kiti alimkambisha Mtaalamu wa Mazingira
ndugu REGINA KILIMA kutueleza juu ya
Mtaalamu huo umotarajiwa kuamza hivi karibuni

Nae alieleza kua Mradi huu utaanza buada ya vifuni vyote vitakapokanuliwa na wanatajiri kua endapo ujenzi huo utakamiliwa wanatajiri kupokea wanafunzi takribani mia tano na kuendelea. Pia amieleza kua ujenzi huo pindi utakapokanuliwa wataanza kupokea wanafunzi kuamika Mwaka 2025. Hivyo bari amewataka ndugu wajumbe kwa maoni yao kama wadai wa mradi waeleze utamupokeaje Mradi huo. Nae wameeleza kwa umoja wao hakuna tatizo lolote ila Changanoto kubwa ni swala la miundombinu ya barabara Zetu na pia tunaomba kama wadai wa mtaa wetu mtupatie eneo kwa ajili ya ujenzi wa Shule kwa sababu ndiyo Changanoto kubwa katika mtaa wetu hatuna eneo la kufengea Shule. Pia tunaomba Mradi huo wa ujenzi wa hospitali utakapozama busi wale viligama watakaos tumika watoe kipaumbele wathubug wakazi wa mtaa wa Mloganzila. Sisi kama Viongozi wa Serikali ya Mtaa tumonichia mradi huo uendelee tunashukuru kwa kutusogeeza huduma Kabibu na Makazi yetu.

AGENDA No. 4 KUFUNGA KIKAO

M/Wali wa Simtaa aliahirisha Kikao Mnamo Saa tano na Nusu Asubuhi kwa kuashukuru ndugu wajumbe kwa maoni yao mazuri na pia ameshukuru taasisi hiyo ya MUHAS kwa kutuletea huduma hizo muhimu katika mtaa wetu wa Mloganzila.

Hawajilizi



SAUDA R. M. M. M. M.
AFISA MTEWAZI MLOGANZILA

HAMED JALALI
MKATI MLOGANZILA
XIRI LA

MAHUDHURIO YA KIKAO CHA KAMATI YA
 Mtaa wa Mshauri Mwekekezi Maswala ya
 Mazingira 23/05/2024.
 JINA KAMILI CHEO Namu MSAKI

| | JINA KAMILI | CHEO | Namu | MSAKI |
|----|-------------------|---------------------------------------|-------------|------------------|
| 1. | HAMED J. RADACK | Mikiti | 0656401278 | MSAKI |
| 2. | SAUDA R. MKILAH | MEO. | 0658235708 | MSAKI |
| 3. | MONICA KAYUNI | Mjumba | 0754-75027 | MSAKI |
| 4. | JUMA MSEKEKEZI | Mjumba | 0743617730 | Juma |
| 5. | ATHUMA MENDE | Mjumba | 069-3557966 | athuma |
| 6. | AMINA KONDO | Mjumba | 0684 817300 | MSAKI |
| 7. | LISTON G. UGILUMU | Mjumba | 0629720322 | MSAKI |
| 8. | REGINA KILIMA | Mshauri, Mwekekezi wa Mazingira | 0757269756 | R. Kilima |

ARCHITECTURAL DRAWINGS

PROPOSED DESIGN OF MULTI-STOREY CARDIAC HOSPITAL BUILDING FOR MUHAS AT MLOGANZILA-DAR ES SALAAM



PROJECT DETAIL

PROJECT:

PROPOSED DESIGN OF MULTI-STOREY CARDIAC HOSPITAL BUILDING FOR MUHAS AT MLOGANZILA-DAR ES SALAAM

CLIENT:

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCE
P.O BOX 65001,
DAR ES SALAAM.



CONSULTANT:



ARU BUILT ENVIRONMENT CONSULTING COMPANY
LIMITED (ABECC),
P.O. BOX 35176,
UNIVERSITY ROAD, SURVEY,
KINONDONI MUNICIPALITY,
DAR-ES-SALAAM, TANZANIA.

DATE:

MAY, 2024

FINISHINGS SPECIFICATION

① **STRUCTURAL GLAZING CURTAIN WALL**

Structural Glazing Curtain wall: Supply; fabricate and install 4-Sided Structurally Glazed Curtain Walling system; Polyester Powder Coated aluminium profile; RAL Colour 7011; Supported by Independent test certificate in confirming extruded aluminium grade 6063 T6 to BSEN12020; from approved aluminium extrusion Company; including smoke seal at each floor level; infill 28mm thick AGC Guardian/ Saint Gobain Double Glazed Unit (Outer 6mm performance solar control tempered glass + 16mm Air Gap + 6mm Heat strengthened glass inside) to accommodate 30-60% Light transmission, 1.9 U-Value, Solar heat gain coefficient < 0.34; complete with Phonosorb desiccant, gasket and all necessary standard fittings and accessories (Refer to specifications attached)

② **ALUMINIUM WINDOW DOUBLE GLAZING:**

- External and internal

Aluminium sliding window ,profile 10cm; double glazed 6mm toughened tempered glass (Outer 6mm performance solar control tempered glass + 16mm Air Gap + 6mm Heat strengthened glass inside) to accommodate 30-60% Light transmission, 1.9 U-Value, Solar heat gain coefficient < 0.34; complete with Phonosorb desiccant, gasket and all necessary standard fittings and accessories)
 . Grilles: Mild steel 25x40x4mm RHS

③ **SANITARY APPLIANCES**

- Urinal - Hans grohe / Castle Ware / Arrow or any other equal as per Architect's specifications and client's approval
 - Hand wash basin (HWB) - Hans grohe / Castle Ware / Arrow or any other as per Architect's specifications and client's approval
 - European (in disabled toilets), and Asian (in female and male public toilets) washingcloset
 (WC) Hans grohe / Castle Ware / Arrow or any other as per architect's specifications and client's approval
 - Water taps, brush holder, toilet paper holder , Hansgrohe / Castle Ware / Arrow or similar to architect's and client approval

④ **FLOORS**

- 10x600x600mm full body polished non-slip spanish tiles floor finish, adhesive and painted with coloured grout, as per Architect's specifications and client's

⑤ **WET AREA FLOOR FINISH:**

Waterproofing membrane a thin layer of water-resistant material underlayment followed by 10x600x600mm unpolished non-slip spanish tiles fullbody toilets to details

⑥ **BALUSTRADES**

STAIRS, RAMP & ALL VOIDS OPEN TO BELOW OR ABOVE
 - 900mm height, stainless steel balustrades on the ramps, voids and all stairs.

- Ex-Italy non-slippery full bodied grooved or carborundum striped spanish floor tiles / grooved marble as per Architect's specifications and client's approval. (selected tiles will be diagonally arranged - (600 x 600 x 10) mm).

⑦ **EXTERNAL AND INTERNAL WALL**

External wall constructed from 230mm blocks, laid in class -3 mortar, plastered with 2 coat 15mm thick 1:4 cement-sand plaster with wood-float finish. Skimmed and painted with one coat of alkali primer and two coats of final weatherguard paints, colors to Architect's approval.

For toilet partition walls: 2100mm in height sand-cement block wall to be constructed from 150mm blocks laid to in class - 3 mortar plastered with 2 coat 15mm thick 1:4 cement - sand plaster with steel - float finish.
 -For full height walls: sand-cement block wall to be constructed from 150mm / 230mm blocks laid to in class- 3 mortar plastered with 2 coat 15mm thick 1:4 cement - sand plaster with steel - float finish. The same shall be used on constructed reinforce concrete walls.

⑧ **GROOVED LINTEL/ COPING**

Coping -100mm thick x350mm wide

⑨ **RAMP**

with Livigno Groove Polished Non slip Spanish Tiles for ramp floor finish laid to parten shape with black tile boarder and 100mm high skirting all to approval

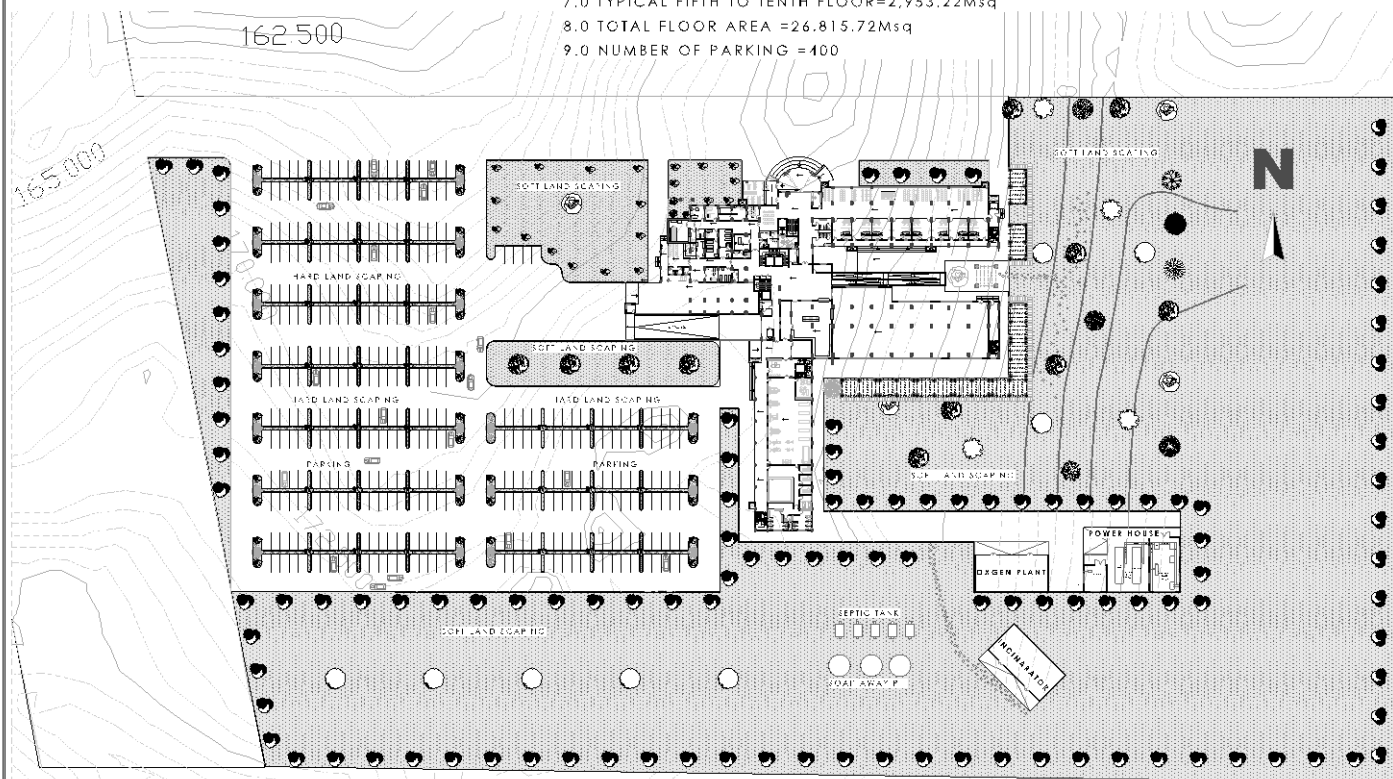
⑩ **CEILING .**

-Ceiling: 600 x 600 x 15mm Acoustic mineral fiber suspended ceiling system; 12mm thick gypsum board ceiling as per architect's specification and client's approval.

| GENERAL NOTES | |
|---------------|--|
| 1. | ALL WORK SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS AND DRAWINGS. |
| 2. | ALL MATERIALS SHALL BE OF THE HIGHEST QUALITY AND SHALL BE APPROVED BY THE ARCHITECT BEFORE USE. |
| 3. | ALL WORK SHALL BE COMPLETED WITHIN THE SPECIFIED TIME FRAME. |
| 4. | ALL WORK SHALL BE COMPLETED TO THE SATISFACTION OF THE ARCHITECT. |
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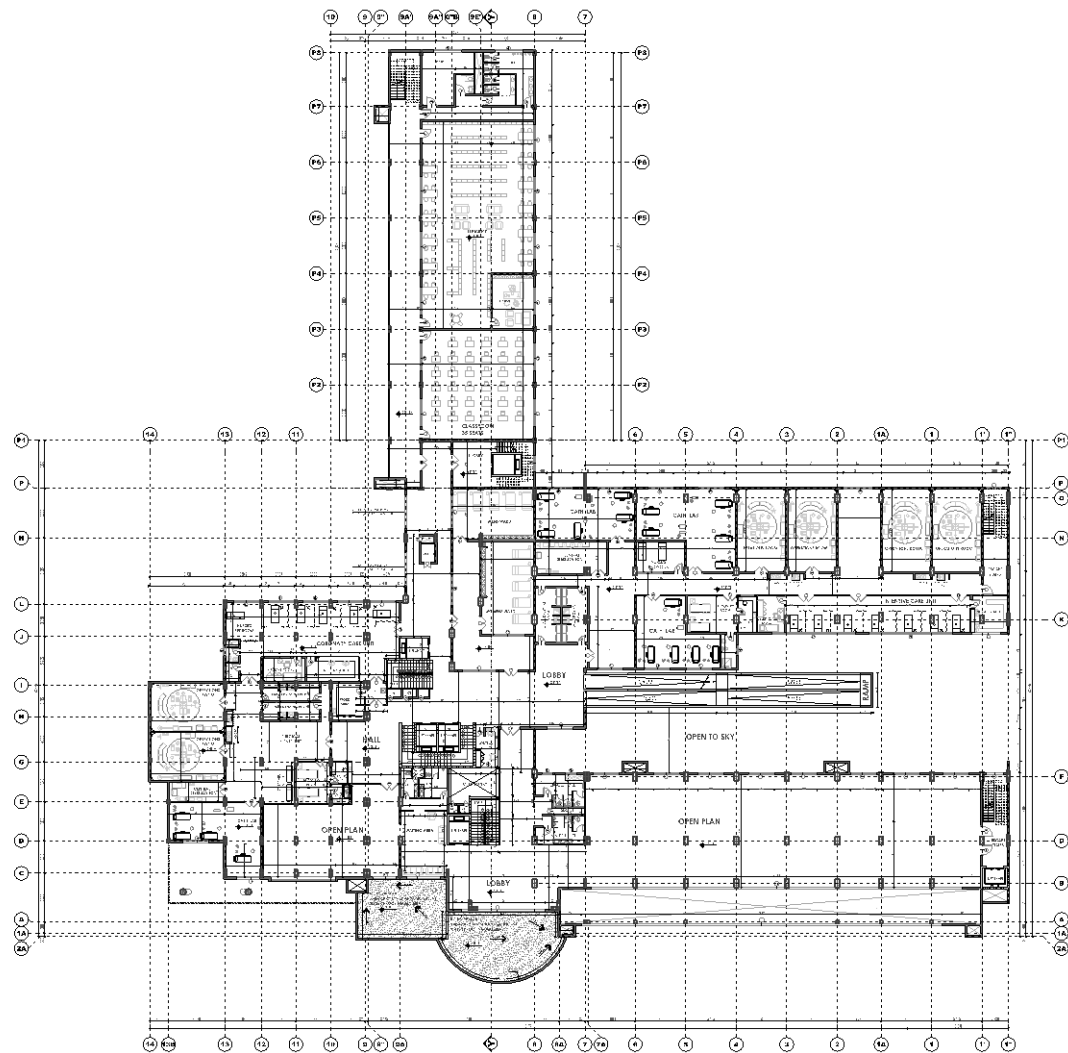
SCHEDULES OF AREA

- 1.0 BASEMENT FLOOR AREA =4,307.18Msq
- 2.0 GROUND FLOOR PLAN= 4,203.97Msq
- 3.0 FIRST FLOOR PLAN = 3,747.21Msq
- 4.0 SECOND FLOOR PLAN=3,966.80Msq
- 5.0 THIRD FLOOR PLAN=3,911.01Msq
- 6.0 FOURTH FLOOR PLAN=3,726.33Msq
- 7.0 TYPICAL FIFTH TO TENTH FLOOR=2,953.22Msq
- 8.0 TOTAL FLOOR AREA =26.815.72Msq
- 9.0 NUMBER OF PARKING =400



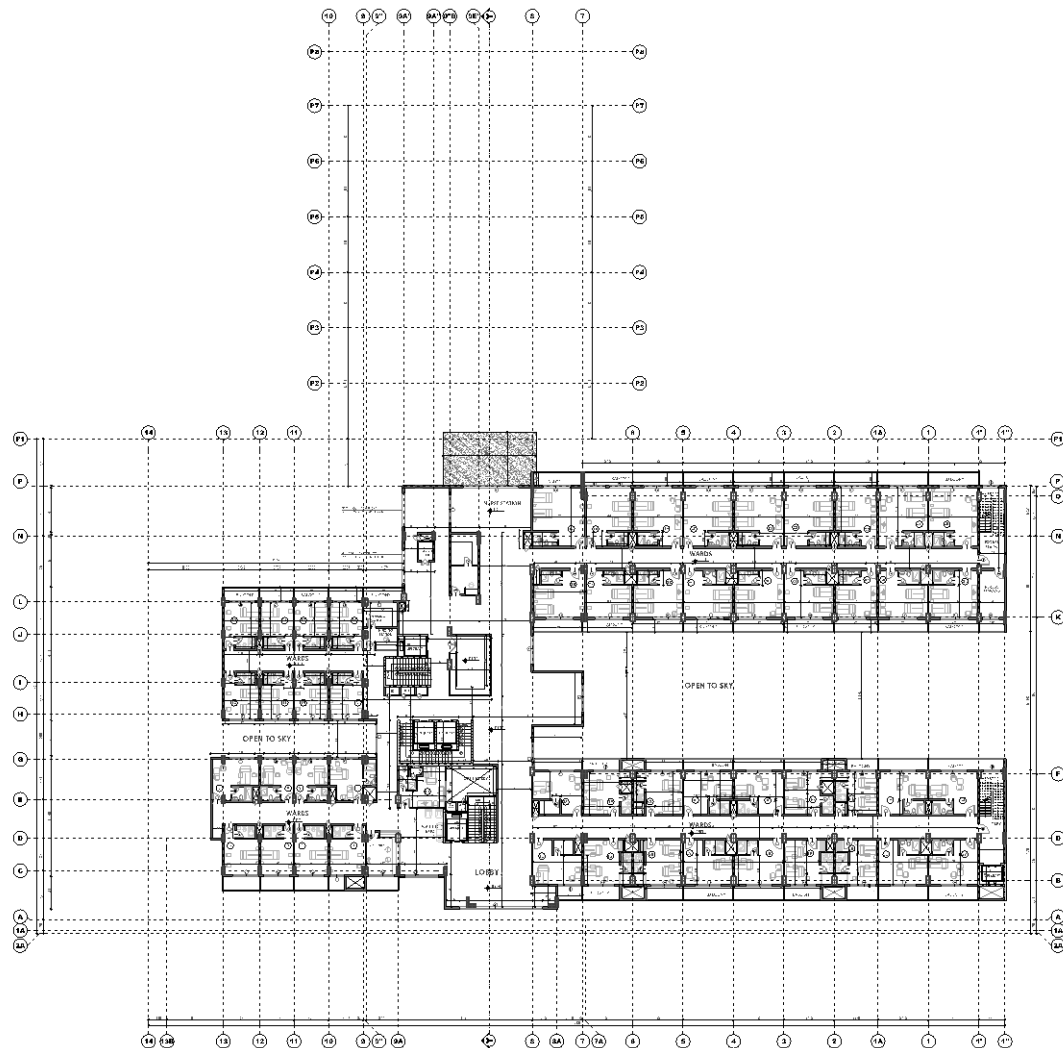
SITE LAY OUT PLAN

| | |
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| FORMA NO. 15 | |
| 1. PROJECT NAME 2. PROJECT LOCATION 3. PROJECT AREA 4. PROJECT PERIOD 5. PROJECT BUDGET 6. PROJECT STATUS | |
| 7. PROJECT DESCRIPTION 8. PROJECT OBJECTIVES 9. PROJECT RATIONALE 10. PROJECT JUSTIFICATION 11. PROJECT IMPACTS 12. PROJECT RISKS 13. PROJECT MONITORING & EVALUATION 14. PROJECT REPORTING 15. PROJECT DOCUMENTATION | |
| 16. PROJECT CONTACT INFORMATION 17. PROJECT APPROVALS 18. PROJECT SIGNATURES 19. PROJECT DATE 20. PROJECT VERSION | |



03 **FIRST FLOOR PLAN**
 CARDIAC HOSPITAL, MLOGANZELA
 FLOOR AREA: 17,213M²

| | |
|--|--|
| CLIENT: SOUTH AFRICAN NATIONAL BUREAU OF HEALTH SERVICES | |
| PROJECT NAME: CARDIAC HOSPITAL, MLOGANZELA | |
| PROJECT LOCATION: MLOGANZELA, EASTERN CAPE PROVINCE | |
| PROJECT PHASE: CONCEPTUAL DESIGN | |
| DATE: 2014 | |
| PROJECT CHIEF: ARCHITECT: [Logo] | |
| PROJECT MANAGER: ARCHITECT: [Logo] | |
| PROJECT TEAM: ARCHITECT: [Logo] | |
| PROJECT LOCATION: MLOGANZELA, EASTERN CAPE PROVINCE | |
| PROJECT PHASE: CONCEPTUAL DESIGN | |
| DATE: 2014 | |
| PROJECT CHIEF: ARCHITECT: [Logo] | |
| PROJECT MANAGER: ARCHITECT: [Logo] | |
| PROJECT TEAM: ARCHITECT: [Logo] | |
| PROJECT LOCATION: MLOGANZELA, EASTERN CAPE PROVINCE | |
| PROJECT PHASE: CONCEPTUAL DESIGN | |
| DATE: 2014 | |



07 TYPICAL FIFTH - TENTH FLOOR PLAN
 CARDIAC HOSPITAL-MLOCANZILA
 FLOOR AREA: 105,221.72

OWNER: DOH
 DIVISION OFFICE
 DIVISION OF HEALTH SERVICES
 DIVISION OF HEALTH SERVICES
 DIVISION OF HEALTH SERVICES

PROJECT CHIEF:
 DIVISION OF HEALTH SERVICES
 DIVISION OF HEALTH SERVICES
 DIVISION OF HEALTH SERVICES



PROJECT MANAGER:
 DIVISION OF HEALTH SERVICES
 DIVISION OF HEALTH SERVICES
 DIVISION OF HEALTH SERVICES

CONSULTANT: NEW WORLD CONSULTING ENGINEERS INC.
 10010 N. W. 11th Ave., Suite 100
 Miami, FL 33157
 TEL: 305-555-1234
 FAX: 305-555-5678



DATE OF ISSUE:
 2023-10-20

REVISIONS:
 NO. DESCRIPTION DATE
 01 Initial Issue 2023-10-20



FRONT VIEW-CARDIAC HOSPITAL BUILDING



**VIEW AT LEFT SIDE ANGLE-CARDIAC
HOSPITAL BUILDING**



**VIEW AT RIGHT SIDE ANGLE-CARDIAC HOSPITAL
BUILDING**



TOP VIEW-CARDIAC HOSPITAL BUILDING



APPENDIX VI: NEMC'S LETTER APPROVING ToR



THE UNITED REPUBLIC OF TANZANIA

VICE PRESIDENT'S OFFICE

NATIONAL ENVIRONMENT MANAGEMENT COUNCIL (NEMC)



In reply please quote:

Ref: HA.145/88/111/02

Date: 26/06/2024

Muhimbili University of Health
and Allied Science (MUHAS)
P.O. Box 65001,
DAR-ES-SALAAM.

RE: APPROVAL OF SCOPING REPORT AND TERMS OF REFERENCES (TORs) FOR THE PROPOSED CARDIAC TEACHING AND RESEARCH HOSPITAL, LOCATED ON PLOT 3, MLOGANZILA MTA, KWEMBE WARD, UBUNGO MUNICIPALITY IN DAR ES SALAAM REGION

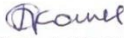
Reference is made to the above heading.

2. The National Environment Management Council (NEMC) acknowledges receipt of submitted Scoping report and ToRs for undertaking Environmental and Social Impact Assessment (ESIA) of the above-stated project.
3. After a thorough review of the submitted documents, the Council determine that the ToRs are generally adequate and thus can guide the ESIA study for the proposed project, thus they are approved. Therefore, you are required to proceed with EIA study, prepare the ESIA report as required by Environment Impact Assessment and Audit Regulations, 2004 as amended in 2018 and submit the report to the Council.
4. Please, take a note that ESIA study should be carried out by team of Experts whose professions are directly related to the nature of the project.
5. The EIS should encompass the following informations among others:-
 - i) Content and structure of EIA report should adhere with Regulation 18 (1) and (2) of Environment Impact Assessment and Audit Regulations, 2005 as amended in 2018;
 - ii) The report should have the following attachments:
 - a) Legal Land ownership document with compatible land use;
 - b) Detailed, approved engineering designs and architectural drawings;
 - c) Site layout plan that clearly identifies arrangement of all project components;
 - d) Other legal, permits and certificate regarding the project;
 - iii) Provide description pertaining to Site location, accessibility and adjacent development (existing and proposed) project area, along with an assessment of the physical area that may be impacted by the project activities.

Eastern Zone North, 35 Regent Street, P.O Box 63154, 11404 Dar es Salaam, Phone: +255 22 2774852,

- iv) A comprehensive account of all activities to be undertaken in all project phases such as pre-mobilization, mobilization, construction, operation and decommissioning phases.
- v) A quantified estimate of material and sources that will be used to the proposed project during construction phase and their source.
- vi) Detailed information of all types of wastes and their estimated quantities (solid, liquid, hazardous and e-waste) that will be generated in all project phases and its detailed comprehensive waste management plan;
- vii) Information on storm water management at the proposed project site during all project phases;
- viii) Provide the specific and most current baseline data on the physical, biological, socio-economic and cultural environment. Also provide data of various parameters such as ambient Air quality, Noise level, water quality and Geotechnical survey data at the project site;
- ix) All applicable legal and Policy Framework and their respective requirements relating to the project are addressed in the ESIA report;
- x) All Safety Management aspects (Fire Safety and Occupational Health and Safety) encompassing various practices, procedures and protocols aimed at ensuring the safety and well-being of individuals in workplace or other settings;
- xi) The potential environmental impacts of the project and the mitigation measures to be taken during and after implementation of the project;
- xii) A Comprehensive consultation with all stakeholders, including but not limited Mloganzila Mtaa, Kwembe Ward, Ubungo Municipality, DAWASA, TANESCO, and any other relevant institutions;
- xiii) Subsequently, the views and concerns of the consulted stakeholders should be well addressed and incorporated into the final report. The names and signatures of all consulted stakeholders should be appended to the ESIA report. Submission that does not observe this note will be subjected for rework
- xiv) Specific and Most Current Baseline data regarding the physical, biological, socio-economic, and cultural environment as well as on various parameters such as air quality, soil quality, and surface and groundwater quality within the project area;
- xv) A list of experts who conducted the ESIA study, with their original signatures (not scanned or forged), and clear indication of wheatear they are registered or non-registered environmental experts. Failure to observe this will constitute to an offence as per EMA Cap 191 of 2004.

4. Upon the completion of EIA study, you will be required to submit to the Council eight (8) hard copies of the EIA reports for the review. Prior to review, the representative of the Council will visit a project site and surrounding environment to verify adequacy of the EIA report as per EMA Cap 191 of 2004 on section 87 (2). Thereafter, Council will arrange for a technical review of the document by the Technical Advisory Committee (TAC).
5. In Technical Advisory Committee (TAC) meeting, the leading environmental experts and proponent should attend the meeting, in case of emergency the representatives of the two parties must have a clear understanding of the project and have a recommendation letter from the represented.
6. Alongside with the submission of the ESIA reports, you are required to remit the review costs generated by the system.
7. Please, note that the review costs do not cover transportation expenses for Council Officers during the site verification visit, therefore with that regard it should be organized by the developer as per EMA Cap 191 of 2004 on section 88 (1)
8. Should you require any clarifications, please do not hesitate to contact us at Telephone No. **+225 624232782**.
9. We are looking forward for your continued cooperation.


Glory J. Kombe
For: DIRECTOR GENERAL

