ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN FOR INSTALLATION OF A HEALTHCARE WASTE MECHANICAL INCINERATOR AT ZOMBA MENTAL HOSPITAL IN ZOMBA CITY, MALAWI.

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JULY 2024

Executive Summary

This is an Environmental and Social Management Plan (ESMP) for installing and operating a mechanical incinerator at Zomba Mental Hospital in Zomba City. Under the auspices of the Malawi Ministry of Health, the Malawi Covid-19 Emergency Response and Health System Preparedness Project (MCERHSPP) seeks to fortify the national framework to detect, prevent, and respond to the ongoing COVID-19 pandemic and future health threats. The project's development objective is to prevent, detect and respond to the threat posed by COVID-19 in Malawi and strengthen national systems for public health preparedness. The project costs were not yet known at the time of the assessment but is expected to be completed in six months.

The incinerator house will cover an overall length of 13.95 meters and a width of 7.85 meters. The building's height varies due to its sloped roof design, with one side at 3.85 meters and the other side at 3.3 meters. The building's structure is made of concrete blocks with a painted finish. The primary entrance (E1) is located on the left side of the building, opening into a corridor that leads to an office. The entrance door (D1) is 0.9 meters wide. The office space is strategically positioned near the entrance for easy supervision and administration. It measures 4.0 meters in length and 2.2 meters in width, providing ample space for office activities. The main area of the building is dedicated to the incinerator, which is centrally located. The room's total length is 13.55 meters, and its width is 3.44 meters, providing sufficient working space around the incinerator. Adjacent to the incinerator room, are several rooms designated for waste handling and hygiene. These include (i) Bathroom: 1.0 meters wide and 1.5 meters in length; (ii) Toilet Room: 1.0 meters wide and 1.5 meters in length; and (iii) Waste Room (WRRM): Each washroom is 1.05 meters in width and 1.5 meters in length, with five rooms in total. These waste rooms are designated rooms where waste will be temporarily stored and managed before incineration. These rooms are critical for ensuring proper segregation, handling, and preparation of waste materials prior to their incineration. An ash pit will be constructed to contain the ash generated from the incineration process securely. The ash pit will have a total depth of 4.0 meters, with the main section being 3.75 meters deep equipped. It will be covered with a 24-gauge galvanized steel lift-off lid, which will include a handle to facilitate easy access. This design will ensure that the ash pit can be securely closed to prevent any spillage or contamination while allowing for straightforward removal when needed. The top layer of the ash pit will include 300mm of well-compacted hardcore.

The general steps followed during the assessment were desk studies, physical inspection of the site and surrounding areas, stakeholder consultations, and reporting and documentation. The desk studies involved reviewing project-related documents. Site inspection and stakeholder consultations were conducted between 14 and 15 June 2024. This ESMP has outlined the potential positive and negative environmental and social impacts of the project's construction phase. The construction phase is divided into specific activities to track their impacts: mobilisation,

demolition, construction, finishing, and demobilisation. The key impacts identified are presented as follows:

i. **Enhanced Waste Management and Environmental Protection:** The installation of a healthcare waste mechanical incinerator will help in ensuring the safe and efficient disposal of medical waste, the risk of infection within the hospital is significantly reduced.
ii. **Creation of Job Opportunities:** The construction project will create short-term job opportunities, employing around thirty construction staff for less than 90 days. This impact, while temporary, provides valuable employment to the local community.
iii. **Traffic Congestion and Accidents:** Increased construction and renovation activity can lead to additional vehicular traffic around the hospital, exacerbating congestion and raising the risk of road accidents.
iv. **Air Quality Deterioration:** Though unlikely to exceed ambient air quality standards, dust and particulate matter emissions are anticipated during demolition and construction. Activities such as breaking down structures and using machinery can generate significant dust and emissions.
v. **Elevated Noise Levels from Machinery and Construction Activities:** Construction machinery and equipment generate noise that may impair workers' hearing and disturb the hospital community.
vi. **Potential for Accidents and Injuries On-site:** Workers will be exposed to various occupational risks during construction, including using large machinery, working at height, and handling hazardous materials.
vii. **Gender-based violence (GBV) and Sexual Exploitation and Abuse (SEA) Impact:** The construction site may create environments where GBV and SEA can occur, affecting both workers and the surrounding community.
viii. **Generation of Solid Wastes, Spills, and Effluent:** Various construction activities will generate waste and spills that can impact the environment.
ix. **Land degradation resulting from sand mining:** The construction works will require sand for concrete works, likely sourced from rivers within the district. Sand extraction can potentially impact the aquatic habitat, water quality, river dynamics, key aquatic species, and food availability.
x. **Water and Soil Pollution:** Demolition activities can lead to water and soil pollution, which can affect the water bodies and land.

Table of Contents

List of Tables

List of Figures

Chapter One: Introduction

This is an Environmental and Social Management Plan (ESMP) for installing and operating a healthcare waste mechanical incinerator at Zomba Mental Hospital in Zomba City. This chapter provides background information on the project, details of the project proponent, project justification, objectives for developing the ESMP, methodology employed, and potential users of the ESMP.

1.1 Background Information

Under the auspices of the Malawi Ministry of Health, the Malawi Covid-19 Emergency Response and Health System Preparedness Project (MCERHSPP) seeks to fortify the national framework to detect, prevent, and respond to the ongoing COVID-19 pandemic and future health threats. The project's development objective is to prevent, detect and respond to the threat posed by COVID-19 in Malawi and strengthen national systems for public health preparedness. The Zomba Mental Hospital benefits from the MCERHSPP initiative, which includes installing a mechanical incinerator. Considering the proposed civil works at the health facility, MCERHSPP recognises the need to assess anticipated positive and negative environmental and social impacts and propose measures for managing these impacts. This report is a basis for managing, mitigating, and monitoring the environmental and social impacts associated with the construction and operation phases of the proposed project.

The proposed project of installing a mechanical incinerator at Zomba Mental Hospital are vital for infection control. The mechanical incinerator ensures proper medical waste disposal, minimising the risk of infection spread within the hospital and surrounding areas. Aligned with national public health preparedness initiatives, these works reinforce Zomba Mental Hospital 's role in combating current health challenges while laying the groundwork for sustainable healthcare infrastructure development in the district. The objective of the ESMP was to assess and predict potential positive and negative social and environmental impacts and develop suitable enhancement and mitigation measures, which are documented in an ESMP.

1.5 Spatial Location and Size of Land

Zomba Mental Hospital is in Zomba City, Southern Region, Malawi. It is approximately 1.5 km west of the M3 road when branching off at Zomba General Hospital (Figure 1-1). The proposed site for the incinerator is 10 meters to the west of an old occupational therapy hall and is five meters from the burnt brick batch burner used for burning health care waste (Figure 1-2). The hospital is surrounded by a Kalimbuka residential area, with the nearest residential house approximately 100 meters west. The site is an idle land within the hospital campus.

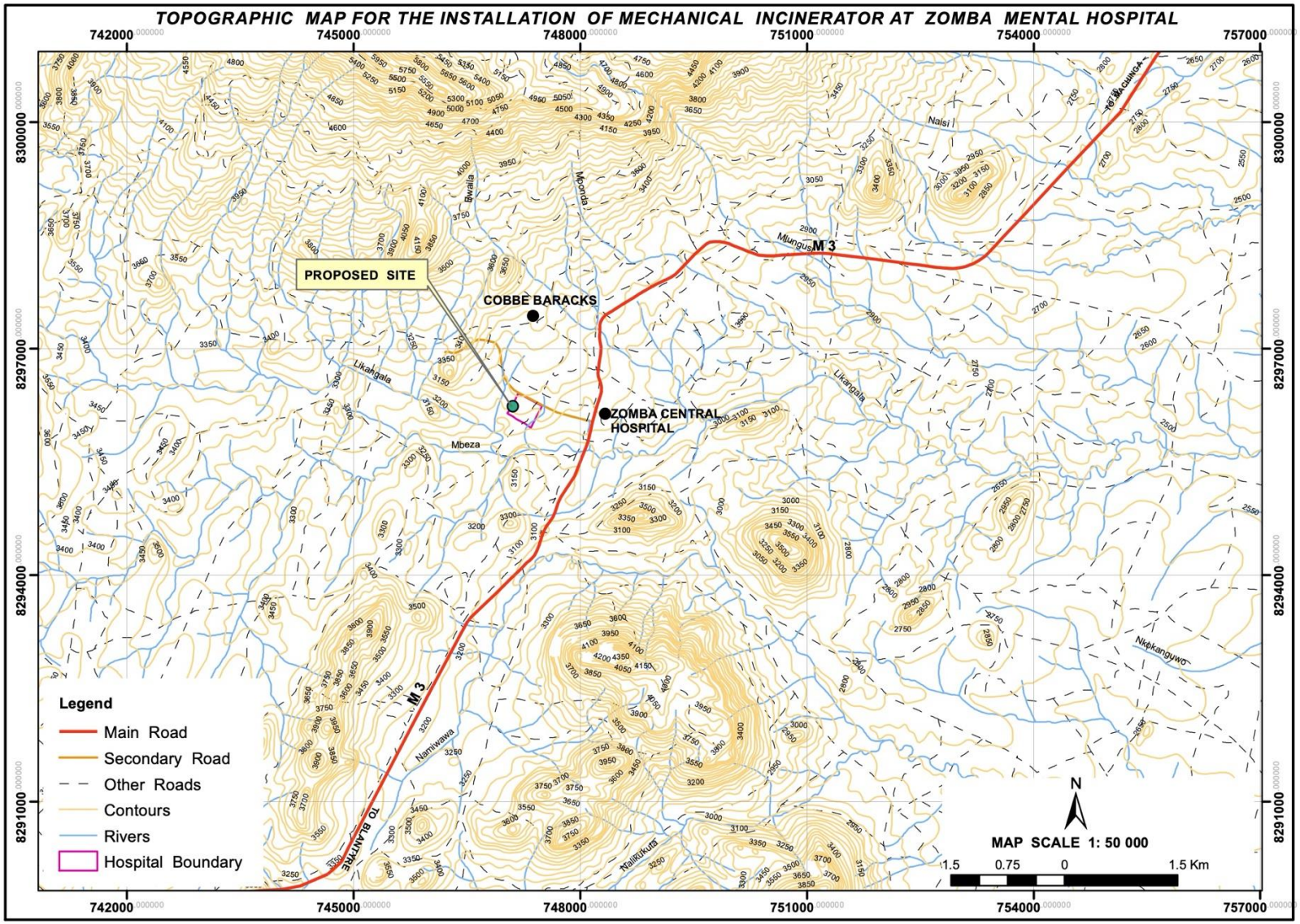


Figure 1-1: Topographic Map of Zomba Mental Hospital.

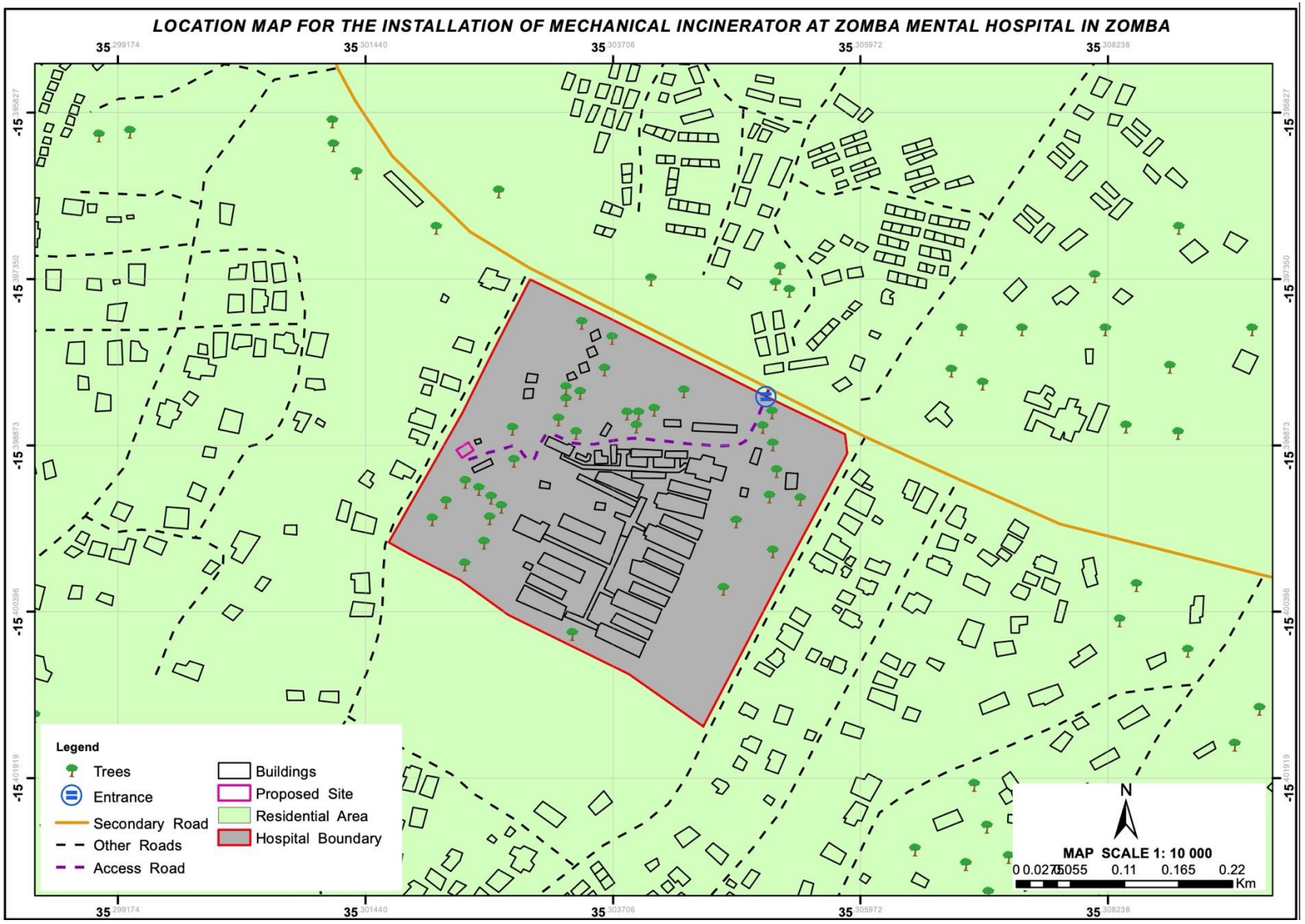


Figure 1-2: Location Map of Zomba Mental Hospital.

1.3 Methodology for Preparing ESMP

The general steps followed during the assessment were desk studies, physical inspection of the site and surrounding areas, stakeholder consultations, and reporting and documentation.

1.3.1 Desk Studies

The desk studies involved a review of Project Appraisal Document (PAD), Project Implementation Manual (PIM), World Banks Environmental and Social Framework (ESF), WB Industry EHS guidelines, Malawi CERHSPP Environmental and Social Management Framework (ESMF), Environmental and Social Commitment Plan (ESCP), Labour Management Plan (LMP), the Stakeholder Engagement Plan (SEP), and the socioeconomic profile for Zomba City Council.

1.3.2 Physical Inspection of Project Sites

The study team conducted a site inspection on June 14th, 2024, to conduct a detailed environmental and social screening of the proposed site and its surroundings. Various factors were assessed during this environmental and social screening process to identify potential impacts and devise appropriate mitigation measures. This comprehensive analysis encompassed environmental, social, health, economic, and legal considerations, ensuring a holistic approach to decision-making and sustainable development. Environmental factors were meticulously examined to identify sensitive nearby features. Social factors were equally paramount, focusing on understanding the impact on nearby communities. Assessing potential land use patterns or changes in community dynamics ensured that the proposed works respected and preserved local social structures. Health impacts were carefully evaluated, particularly regarding potential risks associated with emissions from the incinerator.

1.3.3 Stakeholder Consultations

Considering that the proposed project will be done within the hospital campus, stakeholder consultations were mainly conducted through key informant interviews with relevant heads of hospital departments. These consultations were conducted on June 14 and 15, 2024. Participants included the Hospital administrator, the District Environmental Health Officer, the incinerator attendant, Maintenance Supervisors (who oversee Waste Management Staff), and Waste Management Staff. Interviews with patients were also conducted with randomly selected patients at the hospital. Consulting patients helped identify concerns about indoor air quality, noise levels, or other environmental factors affecting their rehabilitation work experience. Consulting patients also allowed us to assess potential risks and develop mitigation strategies to minimise environmental impacts on patient health and safety. Key issues raised during the KIIs are provided in Annex 3.

Chapter Two: Project Description

This chapter provides an overview of the project's current status within the project cycle, aiming to facilitate comprehension regarding the level of detail and the available planning or design options. It delineates the primary activities carried out during the project's implementation phase, encompassing details such as the machinery type to be utilised during the installation, the nature of generated waste, on-site facilities, waste management strategies, and estimated project costs.

2.1 Nature of the Project

The project involves the comprehensive installation of a mechanical incinerator to ensure proper disposal of healthcare waste generated during medical procedures. This will contribute to infection control and environmental sustainability within the hospital premises. The proposed site is an idle piece within the hospital campus and five meters from the burnt brick batch burner used to burn healthcare waste (Figure 2-1). The layout plan for the healthcare waste incinerator house, as shown in Annex 1 (A1.1), is meticulously designed to ensure functionality and safety in handling healthcare waste.

Idle site for incinerator house

Current disposal site

Figure 2-1: Proposed Incinerator Site

2.1.1 Description of the Incinerator House Plan

The building's dimensions and facilities are tailored to support efficient waste management operations as shown in Annex 1 (A1.2). The structure clearly separates different functional areas, enhancing the workflow and minimising contamination risks. The incinerator house has an overall length of 13.95 meters and a width of 7.85 meters. The building's height varies due to its sloped roof design, with one side at 3.85 meters and the other side at 3.3 meters as shown in Annex 1 (A1.3). The building's structure is made of concrete blocks with a painted finish.

The primary entrance (E1) is located on the left side of the building, opening into a corridor that leads to an office. The entrance door (D1) is 0.9 meters wide. The office space is strategically positioned near the entrance for easy supervision and administration. It measures 4.0 meters in length and 2.2 meters in width, providing ample space for office activities. The office includes two windows (W1 and W2) for natural light and ventilation. The main area of the building is dedicated to the incinerator, which is centrally located. The incinerator itself is 6.0 meters in length and 1.5 meters in width. The surrounding space ensures safe operation and maintenance, with clear access from multiple points within the room. The room's total length is 13.55 meters, and its width is 3.44 meters, providing sufficient working space around the incinerator.

Adjacent to the incinerator room, along the top side of the building, are several rooms designated for waste handling and hygiene. These include (i) Bath Room: 1.0 meters wide and 1.5 meters in length; (ii) Toilet Room: 1.0 meters wide and 1.5 meters in length; and (iii) Waste Room (WRRM): Each washroom is 1.05 meters in width and 1.5 meters in length, with five rooms in total. These waste rooms are designated rooms where waste will be temporarily stored and managed before incineration. These rooms are critical for ensuring proper segregation, handling, and preparation of waste materials prior to their incineration. On the right side of the building is a designated area for the fuel tank, which is crucial for operating the incinerator. The fuel tank space measures 1.5 meters in width and 2.0 meters in length, providing adequate room for safe fuel storage and access.

2.1.2 Description of the Ash-pit

An ash pit will be constructed to securely contain the ash generated from the incineration process and the design is presented in Annex 1 (A1.4). The ash pit will be equipped with a 24-gauge galvanized steel lift-off lid, which will include a handle to facilitate easy access. This design will ensure that the ash pit can be securely closed to prevent any spillage or contamination while allowing for straightforward removal when needed. The top layer of the ash pit will include 300mm of well-compacted hardcore. This compacted layer will provide a stable and solid base for the ash pit, enhancing its durability and ensuring it remains structurally sound over time.

The walls of the ash pit will be constructed with solid brickwork, ensuring the containment of ash and providing the necessary strength to withstand the pressures of long-term use. The inner surfaces of these walls will be finished with screed-on plaster, creating a smooth and resilient surface that will aid in maintaining cleanliness and preventing ash from adhering to the walls. The base of the pit will be lined with packed stone, facilitating proper drainage and stability, ensuring that any moisture within the ash is appropriately managed and that the structure remains secure.

The ash pit will have a total depth of 4.0 meters, with the main section being 3.75 meters deep. This depth will provide ample capacity for storing ash, reducing the frequency of required maintenance and emptying. The internal width of the ash pit will be 1.0 meter, providing sufficient volume for ash accumulation. The external width, accounting for the thickness of the walls, will

extend an additional 0.5 meters on either side, making the total external width 2.0 meters. This design will ensure the structure is robust and capable of containing large volumes of ash. The top opening of the ash pit, where the lid will be placed, will measure 0.3 meters by 0.3 meters. This size will ensure that the opening is large enough for easy deposition of ash while being small enough to maintain security and prevent unauthorized access.

2.1.3 Description of the Hospital Incinerator

A medical waste incinerator is a crucial component of healthcare waste management systems, designed to safely and efficiently dispose of hazardous medical waste generated by hospitals, clinics, and other healthcare facilities. Engineered to meet stringent environmental and safety standards, these incinerators are pivotal in mitigating public health risks associated with improper medical waste disposal. Powered by diesel fuel, these incinerators utilise high temperatures to completely destroy pathogens, infectious agents, and other hazardous substances present in medical waste, safeguarding the health and well-being of healthcare workers and the community.

At the time of preparing this ESMP, details of the Medical Waste Incinerator were not available and specific designs of the building to have the incinerator were unavailable. Considering that the installation and operation of medical waste incinerators follow prescribed standards, the ESMP utilised the WHO Safe Management of Wastes from Healthcare Activities guidelines. Based on WHO recommendations, the following are the key design considerations of the incinerator:

i. *Load Capacity:* The incinerator's load capacity has to be designed to accommodate the estimated volume of medical waste generated by the healthcare facility. WHO guidelines suggest that incinerators for healthcare waste should have a minimum capacity of 50-100 kg per hour to effectively handle the waste generated by hospitals and clinics. The incinerator is expected to have a capacity of 50 kg per hour.
ii. *Energy Source:* The incinerator will be powered by diesel fuel, commonly used in Malawi. Diesel fuel is preferred to electricity because it is reliable and more convenient, as the Zomba can have times of extensive blackouts. Diesel engines provide the necessary heat to reach and maintain the high temperatures required for the complete combustion of medical waste.
iii. *Combustion Chamber:* The incinerator will feature a combustion chamber where medical waste is loaded for disposal. The chamber will be lined with refractory materials to withstand high temperatures and ensure efficient combustion. WHO guidelines recommend a minimum operating temperature of 850-1100°C to ensure complete destruction of pathogens and hazardous substances in the waste.
iv. *Air Pollution Control Devices:* To mitigate air pollution emissions, the incinerator has to be equipped with air pollution control devices such as scrubbers, filters, and particulate matter control systems. These devices remove harmful pollutants, including dioxins,

furans, and heavy metals, from the incinerator's exhaust gases before they are released into the atmosphere.

v. *Required Space:* The incinerator installation requires a designated area within the healthcare facility. WHO guidelines recommend that the incinerator be located in a well-ventilated area away from patient care areas and residential buildings. The incinerator should also have a stable foundation with adequate space for safe operation and maintenance.

vi. *Operational Safety Features:* Safety features such as temperature monitoring systems, flame detection sensors, and automatic shut-off mechanisms must be incorporated into the incinerator to prevent accidents and ensure safe operation. Additionally, the incinerator should be equipped with fire suppression systems and emergency backup power sources to minimise risks during operation.

vii. *Associated Incinerator Facilities:* The description provided above

2.2 Project Cost, and Duration and Estimated Number of Employees

The project costs were not yet known at the time of the assessment but is expected to be completed in six months. The demolition and rehabilitation works will require between 25 and 30 people, with the roles depicted in Table 2-1. Gender representation will be prioritised, striving for at least 30% representation of females wherever feasible.

Table 2-1: Proposed Rehabilitation Workforce

Role	Number of Workers
Project Manager	1
Site Supervisor/Foreman	1
Architect/Engineer	1
Masons/Bricklayers	2-4
Carpenters	4-6
Plumbers	1-2
Electricians	1-2
Laborers	4-5
Painters/Plasterers	1-2
Roofers	1-2
Security Personnel	1-2

2.3 Main Activities of the Project

The project implementation cycle comprises planning, design, construction, operation, and decommissioning phases. The following sections highlight the main activities carried out during these phases.

2.3.1 Planning and Design Phase

During the planning and design phase for installing a medical waste incinerator at Zomba Mental Hospital, several key activities will be undertaken to implement these essential healthcare infrastructure projects successfully. Throughout the planning and design phase, regulatory compliance will be a paramount consideration. Project planners will work closely with local authorities and regulatory agencies to obtain necessary permits and approvals for the installation works. This will involve securing environmental permits, building permits, and other regulatory clearances to ensure the project meets legal requirements and standards.

2.3.2 Construction phase

During the construction and installation phase of a medical waste incinerator at Zomba Mental Hospital, several activities will be undertaken to ensure the successful completion of the project. Here's a description of the key activities:

2.3.2.1 Site Preparation for Construction of Incinerator House and Associated Facilities

During the site preparation phase, meticulous efforts are undertaken to prepare the construction site for installing the medical waste incinerator and associated facilities at Zomba Mental Hospital. The following activities will be done as part of site preparation:

1) *Site Clearing and Preparation*
    - Clearing the designated area for the standalone building and incinerator installation currently consists of idle land covered with grass.
    - The grass and vegetation will be removed to create a clean and level surface conducive to building construction and equipment installation.
2) *Utility Assessment and Relocation*
    - Assessment of existing utilities, notably moving the two-phase electricity power line traversing the construction site.
    - Coordination with utility providers, specifically ESCOM, to relocate the power line, ensuring safety and unimpeded access for construction activities.
3) *Soil Stabilization and Drainage*
    - Implement soil stabilisation measures to fortify the stability and integrity of the construction site and prevent soil erosion.
    - Establish adequate drainage systems to manage surface water runoff effectively, thereby averting water accumulation during construction and incinerator operation.

2.3.2.2 Construction of Standalone Building for the Incinerator

Constructing the standalone building to house the new medical waste incinerator and associated facilities, such as storage areas, ventilation systems, and administrative offices. The construction will follow architectural and engineering plans to ensure the building meets structural and safety

requirements, including proper ventilation and fire safety measures. The main activities to be executed on the site during building work are as follows:

- *Foundation excavation*—To construct a brick-and-mortar building, foundation excavation will begin with site preparation and marking the layout. Hand tools will be employed to excavate to a depth of 1.5 meters, adhering to building requirements. Concrete footings will then be installed to distribute the building's weight evenly. After the concrete foundation is poured and cured, waterproofing and drainage systems will be implemented. The final step will involve backfilling around the foundation with compacted soil to ensure stability and prevent settling, which is crucial for the building's longevity and safety.
- *Concrete Mixing*—Concrete production for constructing a brick-and-mortar building will adhere to high-quality standards, particularly in sourcing materials and preparing the concrete mix. Cement will be obtained from reputable suppliers within Zomba City, and fine and coarse aggregates will come from licensed quarries that meet rigorous laboratory testing standards. The mixing water, crucial for achieving the correct concrete consistency, will be sourced from the existing Central Region Water Board water mains, which meet the quality standards to achieve maximum concrete strength and durability. Additives such as retarders or plasticisers will be used as the mix design requires to modify the concrete's properties.
- *Material transportation*—Materials (fine and coarse aggregates) from quarries in Lilongwe will be transported by tipper trucks to Zomba Mental Hospital. A ten-tonne truck will be adequate to transport other materials like cement, timber, and reinforcement bars from local suppliers found at Zomba Boma.
- *Material Storage*—Materials like aggregates will be stored in specific areas near construction sites. Cement and reinforcement bars will be stored in special storage rooms. Timber will be used directly in the required areas, so there will be no stockpiling of timber.
- *Masonry, Concrete Works, and Related Activities* - The construction of the building walls, foundations, floors, pavements, and drainage systems, among other components of the project, will involve a lot of masonry work and related activities. General masonry and related activities will include stone shaping, concrete mixing, plastering, slab construction, foundation construction, erection of building walls, and curing of fresh concrete surfaces. These activities are known to be labour-intensive and will be supplemented by lite machinery such as concrete mixers.
- *Steel Structure Works*—Where necessary, the buildings will be reinforced with structural steel for stability. Structural steelworks will involve cutting, welding, and erection.
- *Roofing and sheet metal work*—Roofing activities will include sheet metal cutting, raising roofing materials such as clay roofing tiles and structural steel, and fastening the roofing materials to the roof.
- *Electrical Work*—Electrical work during the construction of the premises will include installing electrical equipment and appliances, including electrical cables, lighting apparatus,

power sockets, etc. In addition, other activities involving electricity use, such as welding and metal cutting, will be performed.

- *Plumbing* - Pipework installation for water supply and distribution will occur within all units and associated facilities. Similarly, pipework installation for wastewater and sewer pipes will occur within all units and associated facilities.

2.3.3 Operation and Maintenance Phase

The operation and maintenance phase of the newly installed hospital facilities is a critical component of the overall project lifecycle. This phase encompasses all necessary activities to ensure that the medical waste mechanical incinerator to operate efficiently, safely, and sustainably over their intended lifespan. The following are detailed operational tasks and maintenance routines that will be put in place to facilitate the smooth running of these essential medical technologies.

i. *Training of Staff*: Personnel responsible for operating the incinerator will be trained in proper medical waste handling and operational procedures.
ii. *Proper Segregation of Waste*: Medical waste will be segregated by type at the point of generation to ensure effective disposal.
iii. *Regular Inspections*: Routine inspections are conducted to assess the condition of the incinerator.
iv. *Replacement of Parts*: Critical parts such as filters or refractory lining are replaced according to wear and usage.

2.4 Construction Process Inputs and Outputs

The construction process for the incinerator house and ash pit involves various inputs and outputs, crucial for the project's successful completion. These inputs include construction materials, equipment, and human resources, while the outputs primarily consist of the constructed facility and various types of waste generated during the process.

2.4.1 Construction Material

Table 2-2 provides estimates based on standard practices and the assumed size and scope of the project. Considering local material availability and specific project requirements, the estimated materials and quantities are not final and can change.

Table 2-2: Estimated Construction Material and its Usage

Component	Material	Quantity
Foundation	Concrete	15 cubic meters
	Reinforcement Steel Bars	1.5 tons
Walls	Concrete Blocks	5000 blocks
	Mortar (cement and sand)	50 bags of cement, 5 m^3 sand
Roof	Steel Roofing Sheets	150 square meters

Component	Material	Quantity
	Timber for Roof Trusses	1.5 cubic meters
Flooring	Concrete	10 cubic meters
	Screed Finish	5 bags of cement, 2 m³ sand
Doors and Windows	Steel Doors	3 units
	Steel Windows	8 units
Paint	Exterior and Interior Paint	60 liters (exterior), 40 liters (interior)
Special Features	Incinerator Unit	Prefabricated, ~2 tons
	Plumbing (PVC pipes, fittings)	100 meters piping
	Electrical Wiring	Standard wiring, conduits, switches, sockets
Ash Pit Structure	Concrete Blocks	1000 blocks
	Mortar (cement and sand)	10 bags of cement, 1 m³ sand
Base and Lid	Concrete	2 cubic meters
	Packed Stone	1 cubic meter
	Steel Lid	20 kilograms
Finishing	Plaster (internal)	5 bags of cement, 1 m³ sand
	Compacted Hardcore	0.5 cubic meters

2.4.2 Construction Equipment

In a low-construction technology setting such as Malawi, the construction equipment will typically be more basic and less mechanised. Table 2-3 provides a summary of construction equipment for the construction phase.

Table 2-3: Summary of Construction Material and Equipment

SN	Raw Material	Source	Mode of Delivery
1	Diesel (for the operation of the generator and machinery)	Local approved suppliers	Road truck
2	Construction Water	Existing water sources from Southern Region Water Board	Existing water mains
3	Equipment (Tippers, scaffolding materials, light passenger vehicles, Engine generator and hand tools)	Contractor	Road truck

2.4.3 Construction Waste Generation and Management

The project is expected to produce different types of waste. **Error! Reference source not found.** shows the expected type of waste and proposed management measures. For this project, each construction and rehabilitation work is expected to generate non-hazardous waste that can either be recycled, reused or disposed of at the Zomba City Council recommended dumpsite within a radius of 5 kilometres from the site.

Table 2-4: Construction Waste and Proposed Management Measures

Material	Estimated Quantity Used	Waste Percentage	Estimated Waste Quantity	Management Measures
Concrete	27 cubic meters	5%	1.35 cubic meters	Reuse as aggregate or base for roads and pavements; otherwise dispose
Reinforcement Steel	1.5 tons	2%	30 kg	Send to recycling facilities
Concrete Blocks	6000 blocks	10%	600 blocks	Use as fill material or crush for aggregate
Mortar (Cement, Sand)	60 bags of cement, 6 m^3 sand	10%	6 bags, 0.6 m^3 sand	Reuse for non-structural work or as fill
Steel Roofing Sheets	150 square meters	5%	7.5 square meters	Recycle scrap metal
Timber	1.5 cubic meters	15%	0.225 cubic meters	Reuse in other projects or recycle.
Plaster	10 bags of cement, 2 m^3 sand	10%	1 bag, 0.2 m^3 sand	Reuse in other plastering work or dispose of properly
Paint	100 liters	5%	5 liters	Store for touch-ups or future projects, dispose of properly
Plumbing Materials	100 meters piping	10%	10 meters	Store for future projects, return to suppliers, recycle damaged pieces
Electrical Materials	Standard amount	10%	10% of total	Reuse in future projects, recycle excess material

Chapter Three: Legal Framework

This chapter provides a review of the legal framework relevant to the proposed project and outlines its potential impacts on the project. It also references key legislation. Additionally, the chapter offers an account of all the regulatory licenses and approvals necessary for the proposed project to align with environmentally sound management practices and comply with pertinent existing legislation.

3.1 Relevant Malawi Policies and Legislation

Malawi, committed to the 1992 Rio Declaration's Principle 17, mandates environmental impact assessments (EIA) for activities with significant environmental impacts. The project aligns with the 2017 EMA and various sectoral policies, ensuring sustainable environmental management and responsible resource use.

Piece of Legislation	Description	Relevance to Project Activities
National Environmental Policy (2004)	The policy provides strategies for environmental and social planning, environmental and social impact assessment, environmental and social audits, and environmental and social monitoring, among others. On ESIAs, the objective is to regularly review and administer the guidelines for ESIAs, audits, monitoring, and evaluation so that adverse environmental and social impacts can be eliminated or mitigated and environmental and social benefits enhanced.	Project activities will integrate environmental and social management and protection during project planning and implementation.
Environmental Management Act (2017)	The Act is the main law for environmental protection and sustainable resource use. Section 7 establishes MEPA and its authority over environmental assessments. Section 31provides requirements for MEPA approval for projects needing an ESIA. Sections 99-104 prescribe penalties for ESIA non-compliance, hazardous substance mismanagement, and pollution, including fines of up to fifty million Kwacha and imprisonment of up to fifteen years.	The proposed works will comply with Malawi's 2017 Environment Management Act, ensuring MEPA approval for ESMP, adherence to environmental standards, and avoidance of non-compliance penalties.
National Gender Policy (2015)	The National Gender Policy provides guidelines to reduce gender inequalities, promote participation, and achieve equitable development. Section 1.3 provides guidelines for mainstreaming gender, and section 3.6 promotes the economic development and empowerment of women. Section 3.7 recognizes that GBV, especially violence against women, girls, and vulnerable groups, severely impedes social well-being and poverty reduction.	The proposed project will contribute to addressing GBV by identifying risks and mitigation measures for workers and surrounding communities, sexual exploitation (for those seeking job opportunities), sexual harassment at the workplace, and other GBV related spillover effects of the project.
Gender Equality Act (2015)	The Act in Chapter 25:06 promotes gender equality and equal integration, influences empowerment, dignity, and opportunities for men and women in all functions of society, prohibits and provides redress for sex discrimination, harmful practices, and sexual harassment, provides for	The implication of the Act on the proposed project is that sexual harassment must be addressed by contractors holistically, including by instituting the measures prescribed by law.

Piece of Legislation	Description	Relevance to Project Activities
	public awareness on the promotion of gender equality and connected matters. Section 6(1) of the Act states that a person who commits an act of harassment if he or she engages in any form of unwanted verbal, non-verbal, or physical conduct of a sexual nature in the circumstances would have anticipated that the other person would be offended, humiliated or intimidated, and (2) a person who sexually harasses another in terms of the preceding subsection is liable to a fine and imprisonment specified under subsection (2).	
National Water Policy (2005)	Section 1.3 of the National Water Policy explains that the policy provides an enabling framework for integrated water resources management in Malawi. Section 3.4.9 stresses that Pollution control of water resources shall adopt the 'Polluter–Pays' principle to ensure water user's responsibility. Section 5 points out that environmental degradation has negatively affected surface and groundwater quality, among other factors. Section 5.2.2 - Ensuring and promoting proper management and disposal of wastes.	The project activities have the potential to negatively affect the water resources of the rivers in the project area. It is therefore recommended that the implementation of the project's activities should minimize pollution of the public water, promoting public health and hygiene and environmental sustainability.
National Sanitation Policy (2008)	The National Sanitation Policy provides a vehicle to transform Malawi's hygiene and sanitation situation. Section 3.1.1 promotes the improvement of hygiene, sanitation, and waste recycling in the country.	The proposed project will ensure that liquid and solid waste management encourages waste reduction, recycling, and reuse before final disposal, complying with the policy's provisions.
National HIV and AIDS Policy (2005)	The policy aims to prevent HIV infections, reduce vulnerability, improve treatment and support for those living with HIV/AIDS, and mitigate its socio-economic impact. Chapter 7 addresses HIV/AIDS in the workplace, highlighting issues like absenteeism, low productivity, and discrimination.	The proposed project will implement an HIV/AIDS policy and support program, ensuring no pre-employment HIV testing or discrimination based on HIV status. Employees will not be forced to disclose their HIV status, and any voluntary disclosures will remain confidential.
National Equalization of Opportunities for Persons with Disabilities Policy (2006)	The Policy promotes the rights of people with disabilities and integrates them to enable them to play a full and participatory role in society. Section 2, subsections 2.3 and 2.4.8 of the policy state that people with disabilities are most affected by poor infrastructure, such as buildings not designed to accommodate or meet their special needs. Similarly, Subsection 2.45 of the policy states that people with disabilities have restricted employment opportunities, mainly due to discrimination, inadequate education, job experience, and confidence.	The policy on the proposed project implies that the contractor will be required to provide job opportunities to people with disabilities to ensure that they are also economically empowered.

Piece of Legislation	Description	Relevance to Project Activities
Disability Act (2013)	This act is a significant step towards ensuring equal opportunities and rights for persons with disabilities. Promoting policies and legislation that aim to equalise opportunities, protect rights, and fully integrate persons with disabilities into all aspects of life recognises their inherent dignity and well-being. Sections 9 and 13 of the acts are particularly commendable, as they prohibit discrimination in accessing premises, provision of services, and employment opportunities based on disability.	The project will ensure that buildings, facilities, and infrastructure are accessible to all persons with disabilities. and promote equal employment opportunities for persons with disabilities.
Public Health Act (1948)	The Public Health Act of 1948 governs health-related issues, including environmental and occupational health and solid waste management. Section 59 prohibits nuisances in workplaces, such as unclean conditions, offensive odours, poor ventilation, and inadequate lighting, which endanger employee health. It also addresses the need for sanitary latrines and proper wastewater discharge. Section 88 mandates separate toilets for males and females in public buildings.	The proposed projects must ensure suitable toilet facilities for all genders, manage stormwater effectively and prevent nuisances to maintain public health and safety. Compliance with these provisions is essential for the project's success.
Occupation Safety, Health, and Welfare Act (1997)	The Act regulates employment conditions for safety, health, and welfare in workplaces in Malawi. It mandates workplace registration, inspection of plant and machinery, and accident prevention. Part II requires workplaces to be registered with the director maintaining a register. Part III outlines employer duties, including providing safe work systems, risk-free handling of substances, and adequate employee training and supervision.	Safety measures, particularly shielding and limiting radiation exposure, will be prioritised. Personal protective equipment will be used supplementally or in emergencies. The hospital must implement all ESMP safety measures.
Environment Management (Waste Management and Sanitation) Regulations (2008)	The regulations, under the Environment Management Act, expand on the 1948 Public Health Act. Hazardous waste is identified by categories in the Seventh Schedule and characteristics in the Eighth Schedule, such as corrosiveness and flammability. Section 8 mandates waste generators to safely store general waste to prevent health hazards.	The health facility must manage all waste during rehabilitation, ensuring compliance with these regulations for safe storage, handling, and disposal to protect public health and the environment.
Public Health Corona Virus Disease of 2019 (COVID-19) (Prevention, Containment and Management) Rules (2020)	Public Health rules mandate both employers and employees to implement general preventive measures, such as self-quarantine for at-risk individuals, covering mouth and nose when coughing or sneezing, avoiding touching the face, eating thoroughly cooked food, and avoiding handshakes and close contact. Employers must form a team to implement these guidelines and disseminate them to all employees. Employees must cooperate and report non-compliance.	The Ministry of Labour will inspect workplaces for adherence. The developer of the two proposed projects must ensure COVID-19 guidelines are implemented and followed by both employers and employees.

Piece of Legislation	Description	Relevance to Project Activities
Child Care, Protection and Justice (Amendment) Act (2010)	The Act in Part II, division 6 emphasizes the protection of children from undesirable practices. The undesirable practices are outlined in sections 79 and 80. Section 79 of the Act protects any child from child trafficking. Section 80 protects a child from harmful cultural practices.	The implication of the Act on the proposed project is that plans and strategies must be in place to guard against child trafficking, including through recruitment (child labor).
Penal Code, Chapter 7:01	Section 138 (1) of the Penal Code punishes the defilement of girls under sixteen years of age (punishable with life imprisonment). Sexual abuse and exploitation of children is a common practice in construction in sites.	The ESMP has articulated how project will guard against the perpetuation of the crime by project workers.

3.3 World Bank Environmental and Social Framework

The World Bank Environmental and Social Framework sets out the World Bank's commitment to sustainable development through a Bank Policy and a set of Environmental and Social Standards designed to support Borrowers' projects to end extreme poverty and promote shared prosperity. The Environmental and Social Standards set out the requirements for Borrowers relating to the identification and assessment of environmental and social risks and impacts associated with projects supported by the Bank through Investment Project Financing. The Bank believes that the application of these standards, by focusing on the identification and management of environmental and social risks, will support Borrowers in their goal to reduce poverty and increase prosperity in a sustainable manner for the benefit of the environment and their citizens. The Environmental and Social Standards that apply to the project are given in Table 3-1.

Table 3-1: Relevance of WB Environmental and Social Standards to the project

Environmental & Social Standards	Main requirements and conducted activities to meet them
ESS 1 - Assessment and Management of Environmental and Social Risks and Impacts	ESS1 sets out the Client's responsibilities for assessing, managing, and monitoring environmental and social risks and impacts associated with each stage of a project supported by the Bank through Investment Project Financing, to achieve environmental and social outcomes consistent with the Environmental and Social Standards (ESSs). The objective of the standard is to identify, assess, evaluate, and manage environment and social risks and impacts in a manner consistent with the ESF. Adopt differentiated measures so that adverse impacts do not fall disproportionately on the disadvantaged or vulnerable, and they are not disadvantaged in sharing development benefits and opportunities. *The proposed work has identified E&S risks and impacts based on consultations with health facility stakeholders. This ESMP has also been prepared in line with the standard.*
ESS 2 – Labour and Working Conditions	ESS2 recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. Borrowers can promote sound worker-management relationships and enhance the development benefits of a project by treating workers in the project fairly and providing safe and healthy working

Environmental & Social Standards	Main requirements and conducted activities to meet them
	conditions. ESS2 applies to project workers, including fulltime, part-time, temporary, seasonal, and migrant workers. *The project has a Labour Management Plan that guides implementation of its activities and this will apply to this sub-project. This ESMP has also identified impacts related to labour and working conditions and their mitigation measures are also provided.*
ESS 3 – Recourse and Efficiency, Pollution Prevention and Management	ESS3 Promote the sustainable use of resources, including energy, water, and raw materials. Avoid or minimise adverse impacts on human health and the environment caused by pollution from project activities. Avoid or minimise project-related emissions of short and long-lived climate pollutants. Avoid or minimise generation of hazardous and non-hazardous waste. Minimise and manage the risks and impacts associated with pesticide use. Requires technically and financially feasible measures to improve efficient consumption of energy, water, and raw materials, and introduces specific requirements for water efficiency where a project has high water demand. *The MCERHSP project has prepared a Construction Manual for construction workers that will guide them in environmentally friendly construction methods that will use cement blocks but also promote efficient energy and water usage and management during construction.*
ESS 4 – Community Health and Safety	ESS4 addresses the health, safety, and security risks and impacts on project-affected communities and the corresponding responsibility of Borrowers to avoid or minimize such risks and impacts, with particular attention to people who, because of their circumstances, may be vulnerable. *The construction works under the MCERHSP project will take place in Hospitals where there will be patients that need special protection from possible accidents. The project has ensured that the ESMP documents has provided mitigation measures to ensure community safety.*
ESS 10 – Stakeholder Engagement and Information Disclosure	This ESS recognizes the importance of open and transparent engagement between the borrower and project stakeholders as an essential element of good international practice. Effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation. *The MCERHSP project has been engaging with stakeholders and will continue to do so throughout the project life cycle. This ESMP also has a Grievance Redress Mechanism that is to be used at each project site and this GRM is in line with provisions of the projects Stakeholder Engagement Plan (SEP).*

Chapter Four: Environmental and Social Setting

This chapter provides an overview of the existing environment related to the proposed project areas, covering physical, biological, socio-economic, and structural aspects. It offers basic baseline information within the project area, serving as a foundation for understanding potential changes resulting from project implementation or future environmental shifts. This information also contributes to the baseline data set for future planning within the project area.

4.1 Physical Environment

4.1.1 Topography

Zomba is situated at an elevation of approximately 951.13 meters above sea level. The hospital itself is relatively flat but is surrounded by hilly and mountainous terrain, typical of the Zomba Plateau region. To the north and northwest of the hospital, the Zomba Plateau rises significantly, reaching elevations of up to 2,087 meters (6,847 feet). The plateau is a prominent feature, providing a dramatic backdrop with steep slopes and lush vegetation.

4.1.2 Geology

The geology of the area is defined by several key features. The primary geological formation comprises Precambrian basement complex rocks, including granites, gneisses, and schists. These ancient rocks form the region's foundation and are typical of the African Shield. A significant geological feature in the area is the Zomba Plateau, located north and northwest of the hospital. It is composed mainly of syenite, a coarse-grained intrusive igneous rock. The plateau's steep slopes and elevated terrain result from tectonic uplift and erosion, making it a prominent feature in the landscape. Minerals such as quartz and feldspar are available in the area; however, there are no significant commercial mining activities near the hospital.

4.1.3 Soils

The soil composition primarily originates from the weathering of Precambrian basement complex rocks, including granites, gneisses, and schists. The soil types vary from sandy loams to clay loams, depending on the specific location and the underlying rock type.

4.1.4 Land Use

The proposed project's primary land use is a hospital facility, which includes hospital buildings, emergency services areas, parking lots, support services areas, educational and research facilities, accessibility features, and security infrastructure. These elements are strategically planned to ensure efficient patient care, safety, and sustainability.

4.1.5 Vegetation

The proposed site for the incinerator is currently undeveloped and surrounded by existing hospital structures. Grass and cassava plants cover the area.

4.1.6 Climatic Conditions

Climatic conditions play a crucial role in operating a medical waste mechanical incinerator. This section highlights key factors, including temperature, rainfall, and wind speed, all of which significantly impact the incinerator's efficiency.

4.1.6.1 Temperature

The average annual temperature at Zomba Mental Hospital hovers around 20°C (68°F). Seasonal variations shape the weather patterns, with the warm season lasting from November to April. During this period, temperatures range between 20°C to 28°C, accompanied by higher humidity due to frequent rainfall. The cool season spans from May to October, with cooler temperatures ranging from 15°C to 25°C. Nights in Zomba can be relatively cooler, especially in elevated areas like the nearby Zomba Plateau.

4.1.6.2 Rainfall Trend

Rainfall around Zomba Mental Hospital is characterised by a distinct wet and dry season typical of the region's tropical climate. The area receives an average annual rainfall of approximately 1,200 to 1,800 millimetres (47 to 71 inches). The wet season typically spans from November to April, with frequent and often heavy rainfall peaking between December and March. This abundant rainfall supports lush vegetation and agricultural activities but can also lead to challenges such as flooding and soil erosion if not properly managed. The dry season, lasting from May to October, is marked by minimal rainfall and generally dry conditions.

4.1.6.3 Average Humidity

The average humidity around Zomba Mental Hospital in Zomba, Malawi, reflects the region's tropical climate and varies seasonally. The annual average relative humidity is approximately 75-80%. During the wet season (November to April), humidity levels are higher, often exceeding 80%, due to frequent rainfall and increased moisture in the air. In the dry season (May to October), humidity levels are lower, typically from 60% to 70%, due to reduced rainfall and drier air masses. Humidity levels fluctuate during the day, being lower in the mid-afternoon when temperatures peak and higher in the early morning and late evening. At night, humidity tends to increase as temperatures drop and moisture condenses.

4.2 Facility Management and Health Safety Protocols.

4.2.1 Water Supply

Zomba Mental Hospital faces significant water supply challenges, despite receiving potable water from the Southern Region Water Board. These issues stem from outdated plumbing prone to frequent breakdowns, limited funding for necessary infrastructure upgrades, and increased demand due to population growth. The proposed project aims to address these challenges by utilising the

same Southern Region Water Board water source throughout the construction and operational phases.

4.2.2 Sanitation Facilities

The facility has eight wards with eight sanitary facilities, including five toilets for patients and four toilets for staff (two for females and two for males). However, some of these toilets are not in use and require rehabilitation to be fully functional. This rehabilitation involves repairing or replacing broken equipment, ensuring the availability of necessary supplies, and maintaining cleanliness and hygiene standards. Additionally, there is a critical need to install pit latrines as an essential backup solution, ensuring sanitation needs are met even when there is no access to running water that will also be used by workers during construction phase

4.2.3 Hygiene Practices

The Hospital is equipped with handwashing stations in each ward, each stocked with hand sanitisers, to promote hygiene practices throughout the premises. They also have designated waste bins that collect and segregate waste.

4.2.4 Infections Prevention and Control

Zomba Mental Hospital uses chlorine-soapy water twice daily to clean and decontaminate its wards and other areas, ensuring high standards of cleanliness and hygiene. Chlorine, a powerful disinfectant, effectively kills bacteria, viruses, and other pathogens, reducing the risk of infections.

4.3.5 Waste Management

Waste from various hospital departments and wards is collected and disposed of accordingly. Infectious waste, such as used bandages and gloves, is incinerated to destroy hazardous biological materials and prevent the spread of infection. Non-infectious waste, including paper and packaging, is placed in designated bins, which are collected by the Zomba City Council for disposal.

4.2.6 Health Facility Capacity

Zomba Mental Hospital offers a comprehensive range of mental health services tailored to support individuals facing mental health challenges. With 378 patients, the average stay is 36 days unless extended. The hospital's infrastructure includes wards for inpatient care, outpatient departments, laboratory facilities, and pharmacy services. In addition to mental health services, the hospital provides outpatient consultations, maternal and child health services, emergency care, laboratory services, pharmacy services, and management of HIV and AIDS. This diverse array of medical services underscores the hospital's commitment to holistic healthcare delivery within the community.

4.2.7 Healthy Status and HIV &AIDS Prevalence at the Facility

Zomba Mental Hospital houses 378 patients undergoing mental health treatment. The HIV prevalence rate at Zomba Mental Hospital is 22.4%. Over a period of six months, from December 2023 to May 2024, the most common diseases among patients receiving mental health care and admitted at this facility were upper respiratory infections, 598 cases, malaria, 158 cases, diarrhoea, 44 cases, general body pains, 103 cases, and sepsis, 43 cases. Figure 4-1 shows the cases of common diseases at the facility.

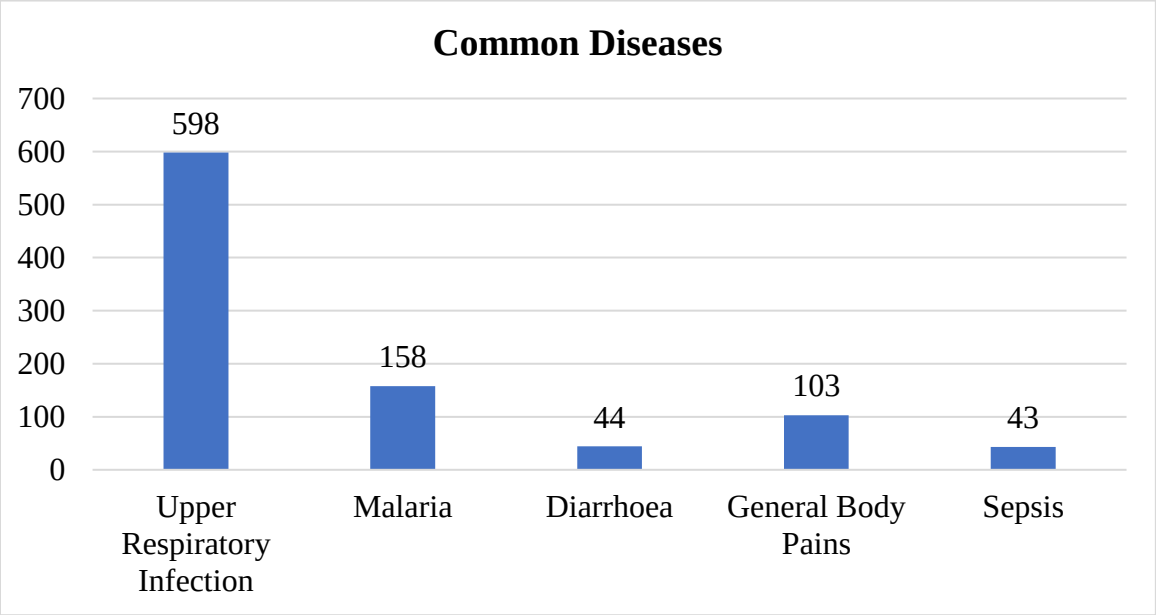


Figure 4-1: Common Diseases for the Past Six Months

4.2.8 Communication and Transport Systems

According to Socio-Economic Profiles (2017-2022), Telekom Networks Malawi Limited (TNM) and Airtel are the main providers of mobile phone services in the project area, resulting in widespread cellular network coverage. At the facility, they usually use MTL.

4.2.9 Security

Security at Zomba Mental Hospital includes perimeter fencing and gates. Visitor access is regulated through registration procedures to maintain a secure environment for patients, staff, and visitors and ensure safety across the hospital grounds.

Chapter Five: Assessment of Environmental and Social Impacts

This chapter outlines the anticipated beneficial and adverse impacts, direct and indirect, on each environmental feature at the project site.

5.1 Impact identification

Identifying impacts involves considering positive and negative effects resulting from the interaction between project-related activities and valued environmental components (VECs). These VECs encompass physical, biological, social, economic, or cultural aspects. The potential environmental impacts identified are based on the interactions between project activities and selected VECs. The selection of VECs was informed by the existing project environment (environmental baseline conditions), stakeholder consultations, and the consultant's professional judgment. The potential interactions between the Project Related Activities and the Selected VECs for each project implementation phase are illustrated in Table 5-1.

Table 5-1: Potential Interactions of the Project with VECs.

Valued Environmental Component	**Project Phase**						
	Mobilisation	***Construction***				***Demobilisation***	***Operation***
		Earthworks	*Super-Structure*	*Structural Framing*	*Fit Out*		
Air Quality	-	x	x	-	-	-	x
Noise & Vibration	-	x	x	x	x	-	-
Water Resources	-	-	-	-	-	-	-
Terrestrial Biodiversity	-	x	-	-	-	-	-
Public Health & Safety	-	x	x	x	x	x	x
Labour & Economic Conditions	-	x	x	x	x	x	x
Service Infrastructure & Utilities	-	x	x	-	-	-	-
Soil and Land Capability	-	x	-	-	-	-	-
Visual Impact	-	x	x	x	x	-	-
Waste Management	-	x	x	x	x	x	x
Social Dynamics and Community Well-being	-	-	-	-	-	-	-
Climate Change and Greenhouse Gas Emissions	-	-	-	-	-	-	x
Hazardous Materials and Contamination Risks	-	-	-	-	x	-	x
Key							
No Substantial Interaction	-						
Possible Interaction	x						

5.2 Significance Ranking of the Impacts

The primary goal of implementing this methodology was to identify potential environmental issues and associated impacts from the proposed project and assign them a significance ranking. Issues or aspects were reviewed and evaluated against a series of significance criteria to identify and document interactions between activities and aspects, as well as resources and receptors, providing a detailed discussion of impacts. The significance of environmental aspects is determined and ranked by considering criteria presented in Table 5-2.

Table 5-2: Impact Assessment Criteria and Scoring System

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
IMPACT SIGNIFICANCE RATING					
Total Score	**4 to 15**	**16 to 30**	**31 to 60**	**61 to 80**	**81 to 100**
Environmental Significance Rating (Negative (-))	**Very low**	**Low**	**Moderate**	**High**	**Very High**
Environmental Significance Rating (Positive (+))	**Very low**	**Low**	**Moderate**	**High**	**Very High**

5.3 Impact Significance Rating for the Identified Impacts

Annexe 2 presents the assessed potential environmental and social impacts and their significance rankings. The impact significance without mitigation measures is assessed with the design controls. The residual impact remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during project implementation to verify that actual impacts are the same as predicted in this report.

5.4 Description of Identified Impacts

This section outlines the project's construction phase's potential positive and negative environmental and social impacts. The construction phase has been subdivided into specific activities to track the specific impacts. The impacts are organised according to the stages of the project life cycle, specifically construction and operation.

5.4.1 Anticipated Positive Impacts

The positive impacts of the proposed project are described in the subsections below.

5.4.1.1 Enhanced Waste Management and Environmental Protection

Installing a healthcare waste mechanical incinerator brings substantial waste management and environmental protection benefits. Ensuring the safe and efficient disposal of medical waste significantly reduces the risk of infection within the hospital. Proper incineration of hazardous materials prevents the release of harmful substances into the environment, thereby protecting soil, water, and air quality. This upgrade also enhances the overall operational efficiency of the hospital, as modern waste management systems streamline processes and reduce the burden on staff. This allows the hospital to focus more resources on patient care, improving the quality of healthcare services provided.

5.4.1.2 Skill transfer

The project installation of the incinerator will facilitate the transfer of valuable skills to local workers. Through targeted training programs and hands-on experience during the project, workers will acquire new technical skills and knowledge related to incinerator operations and maintenance. This not only enhances their employability in the waste management sector but also contributes to the overall skill level of the local workforce, fostering sustainable development and improved job prospects in the community.

5.4.1.3 Creation of job opportunities

During the construction phase, the contractor will employ construction staff, and prepare relevant environmental and social safeguard documents. The impact is short-term as it will last for less than 90 days during the construction phase but will also involve at least twenty people. Hence the impact is of low significance.

5.4.1.4 Improved project compliance to environmental and social legislations

During the mobilisation phase, the project will involve preparing related environmental and social instruments that will be used for the project's lifespan. These documents could include a Contractors-ESMP and other related documents. The impact is expected to be of high significance as it will be used for the entirety of the project.

5.4.2 Anticipated Negative Impacts

5.4.2.1 Temporary Air Quality Deterioration

Durist and particulate matter emissions are anticipated as short-term impacts of the construction activities during the site clearing and excavation for the foundations of the incinerator housing. Site clearing and excavation work generate dust from the disturbance of soil and other materials. This dust can present respiratory problems and cause nuisance issues when redeposited on clothes and surfaces, as well as hinder visibility.

During the construction of the building to house the incinerator, the use of cement and aggregates will further increase dust levels. Additionally, vehicles, electricity generators, and other machinery likely to be used during construction will emit gases and particulate matter, including carbon dioxide (CO_2), sulfur dioxide (SO_2), nitrogen oxides (NOx), and various other hydrocarbons. Despite these emissions, it is considered unlikely that ambient air quality standards will be exceeded.

5.4.2.2 Elevated noise levels from machinery and construction activities.

Construction machinery and equipment will generate noise that may impair the hearing of workers as well as the hospital community. Maximum noises generated can be audible over long distances but are generally of short duration. If maximum noise levels exceed 65dBa at a receptor, or if it is clearly audible with a significant number of instances where the noise level exceeds the prevailing ambient sound level with more than 15dBA, the noise can increase annoyance levels and may ultimately result in noise complaints.

5.4.2.3 Loss of a tree and other ground cover

The impact of the loss of trees is expected to be of low significance as the project sites has a several of trees on the boundary of that site that is not going to be cut down.

5.4.2.4 Potential for accidents and injuries on-site affecting workers

Workers involved in construction works will be exposed to various occupational risks; the project activities will bring about hazards such as the use of large machinery and equipment, working in proximity to water, working at height, use of electrical tools, trips and falls, use of hazardous and flammable chemicals just to mention a few.

5.4.2.5 Potential for accidents and injuries on-site affecting nearby communities.

The construction works will involve the movement of vehicles carrying various construction materials. Civil and structural construction will increase traffic on the hospital premises as vehicles will be used for various activities. During construction, there is expected to be an increase in road traffic on the access roads due to the transportation of goods, and equipment.

5.4.2.6 Infectious Disease Impact (spread of STIs, HIV and AIDS, and Covid 19)

Interactions between workers and the communities and even amongst themselves can increase the likelihood of spreading HIV and AIDS. It is therefore important for the Project to put in place measure to control the spread of the disease at the workplace. The Ministry of Health declared a cholera outbreak in Malawi on 3 March 2022, following laboratory confirmation of a case in in the country. Cholera is an acute enteric infection caused by ingesting the bacteria Vibrio cholera present in contaminated water or food. It is mainly linked to insufficient access to safe drinking water and inadequate sanitation. It is an extremely virulent disease that can cause severe acute watery diarrhoea resulting in high morbidity and mortality, and can spread rapidly, depending on the frequency of exposure, the exposed population and the setting.

5.4.2.7 Gender-Based Violence (GBV) and Sexual Exploitation and Abuse (SEA) Impact

The construction site has the potential to create environments where gender-based violence (GBV) and sexual exploitation and abuse (SEA) may occur. These impacts can affect both workers and the surrounding community, including hospital staff, patients, and residents. The presence of construction workers, often from different areas and backgrounds, can increase the vulnerability of local women and girls to GBV and SEA. In addition, female workers on the construction site may face sexual harassment, discrimination, or exploitation from their colleagues or supervisors. A hostile work environment can lead to mental health issues, reduced job satisfaction, and decreased productivity among female workers.

5.4.2.8 Generation of solid wastes, spills, and effluent

Various construction activities are expected to generate many types and varying quantities of wastes that will include construction rubbles, spoil from land clearing, packaging materials, vehicles and machine maintenance wastes, remains from form works, general mixed wastes (glass, wooden pallets, plastic, paper, metal scraps and cut-offs, fillings, food items etc.), material residues, hazardous wastes (used oils, discarded fuels and paints, termite proofing material residues, discarded thinners and cleaning agents etc.) and others. Spillages of chemicals, oils, paints, thinners, fuel, and other hazardous fluids, pastes or powders together with affected soils or surfaces should be regarded as hazardous waste. Effluents may include concrete spills, kitchen and bath wastewater cleaning wastewater and others.

Chapter Six: Environmental and Social Management Plan

6.1 Environmental and Social Management Plan

An Environmental and Social Management Plan (ESMP) has been developed to assist in mitigating and managing environmental impacts associated with the construction works. It is noteworthy that key factors and processes may change during the construction works and considerable provisions have been made for dynamism and flexibility of the ESMP. As such, the ESMP will be subject to a regular regime of periodic review during project implementation. **Error! Reference source not found.** forms the core of this ESMP for the construction phase of the proposed project respectively. In general, the table outlines the potential environmental and social risks associated with the project and details all the necessary mitigation measures, their financial costs, as well as the institutions responsible for their implementation.

6.2 Implementation of ESMP

The ESMP shall be implemented to address all activities that have been identified to have potentially significant impacts on the environment during normal operations and upset conditions. The implementation of the project environment and social component will be overseen by different institutional arrangements. The players include the following:

6.2.1 Ministry of Health

The Ministry of Health (MoH) has established a Project Implementation Unit (PIU) to oversee the responsibility of coordinating all matters pertaining to the implementation of the project. The PIU has recruited an environmental and social expert to monitor environmental compliance and the social dimensions of the project. The PIU as such will be responsible for overseeing the monitoring activities conducted by the Construction Supervision Consultant. The main activities of the PIU regarding environmental and social safeguards are:

i. Planning and implementation of ESMP.
ii. Ensuring that the social and environmental protection and mitigation measures in the ESMP are incorporated in the site specific Environmental and Social Action Plans.
iii. Supervision and monitoring of the progress of activities of the contractors.
iv. Provide guidance to construction teams in conducting subsequent monitoring and reporting and in undertaking corrective options.
v. Responsible for modifications to the ESMP when unforeseen changes are observed during implementation.
vi. Ensure submission of periodical environmental and social management and monitoring reports to the World Bank.
vii. Promote improved social and environmental performance through the effective use of management systems; and

viii. External communications with other implementing partners, government ministries and agencies, and non-government organisations on the matters of mutual interest related to environmental management under the project development.

6.2.2 Supervision Consultant

Monitoring activities will be the responsibility of the supervision with the Resident Engineer being the leader. Among other staff, the Resident Engineer will have a qualified Environmental and Social Expert. Among the immediate and follow-up tasks of the Environmentalist and Social Experts at the Resident Engineers office will include.

i. Development of a monitoring tool or checklist based on the ESMP and guided by the project physical layout.
ii. Develop a monitoring program for the works targeting specific project working sites, material sites, sensitive environment and social areas, etc.
iii. Prepare monthly site meetings to involve the Contractor, Client and Stakeholders.
iv. Monthly reports in addition to continuous communications to the Contractor, Client, the Authorities and
v. the Stakeholders as situations require,
vi. The Resident Engineer will convene monthly meetings for progress reporting by the Contractor and the supervision team.

6.2.3 The Contractor

The Contractor is expected to integrate environmental and social focus during project Management. To ensure effective implementation of the project impacts mitigation measures, therefore, the contractor will mobilise in-house Environment and Social Expert with the following responsibilities.

i. Evaluate and review the ESMP developed from the main ESIA process and internalise the provisions for implementation based on the realities of the project.
ii. Customise the project ESMP and generate a Construction Environmental and Social Management Plan as a tool to guide the implementation and monitoring of indicators. File a copy with the Resident Engineer.
iii. Procure necessary equipment for environment measurements or engage some appropriate expert personnel for the activity in specific environment quality aspects including air quality, noise, water, and soil quality,
iv. Monthly reporting throughout the project period.

Table 6-1: Environmental and Social Management Plan

Impact Code	Impact	Mitigation Measures	Implementation Period	Implementation Cost (MWK)	Key Performance Indicator	Monitoring Frequency	Implementation Responsibility	Mo Res
P-1M2	Enhanced Waste Management and Environmental Protection	i. Implement strict protocols for segregating different types of medical waste at the source. Categories include infectious waste, hazardous waste, and general waste, as per WHO guidelines.	Ongoing on monthly basis during post-construction	MK1,000,000.00	Compliance with waste segregation protocols	Monthly	Hospital Waste Management Team	Mo Env Pro Aut (M
		ii. Ensure that color-coded bins and clearly labelled containers are used for different types of waste.	Ongoing on monthly basis during post-construction	MK2,000,000.00	Number of bins and containers in use; compliance rate	Monthly	Hospital Waste Management Team	Mo
		iii. Train hospital staff on proper waste handling and segregation practices to minimize the risk of infection and contamination.	Ongoing on monthly basis during post-construction	MK1,500,000.00	Number of training sessions; staff compliance	Monthly	Hospital Waste Management Team	Mo
		iv. Designate storage areas for hazardous and non-hazardous waste, ensuring they are secure and comply with health and safety standards outlined in the World Bank's Environmental, Health, and Safety (EHS) Guidelines.	Ongoing on monthly basis during post-construction	MK2,000,000.00	Designated storage areas; compliance with standards	Monthly	Hospital Management	Mo
		v. Ensure that waste storage areas are well-ventilated, protected from the elements, and inaccessible to unauthorized personnel.	Ongoing on monthly basis during post-construction	MK1,500,000.00	Storage area conditions; security measures	Monthly	Hospital Management	Mo

Impact Code	Impact	Mitigation Measures	Implementation Period	Implementation Cost (MWK)	Key Performance Indicator	Monitoring Frequency	Implementation Responsibility	Mo Res
		vi. Implement measures to prevent spills and leaks, including secondary containment systems for liquid waste.	Ongoing on monthly basis during post-construction	MK1,000,000.00	Number of spill incidents; containment measures in place	Monthly	Hospital Waste Management Team	Mo
		vii. Establish a routine maintenance schedule for the incinerator to ensure it operates efficiently and effectively.	Annually during and post-construction	MK2,000,000.00	Maintenance logs; incinerator efficiency	Annually	Hospital Maintenance Team	Mo
P-1M1	Skill transfer	i. Conduct regular training programs for medical staff on the use and maintenance of the incinerator	Ongoing during and post-construction	MK2,000,000.00	Number of training sessions conducted; staff competency levels	Quarterly	Hospital Management	Mi Hea
		ii. Organize health awareness campaigns to inform the community about ways of managing waste	Monthly during post-construction period.	MK500,000.00	Number of awareness campaigns; community awareness level	Monthly	Hospital Management	Mo
		iii. Conduct regular service of the incinerator	Ongoing; quarterly basis	MK2,000,000.00	Maintenance logs; machine uptime	Quarterly	Hospital Maintenance Team	Mo
P1M1;	Creation of Job Opportunities	i. Inform local communities of employment opportunities and prioritize their employment.	Before construction phase starts	MK100,000.00	Number of local workers employed	Once before construction starts	Contractor	Dis Off PIU Exp
		ii. Treat employees in compliance with Malawi Labour Regulations and labor and working conditions as per the project's Labour Management Plan.	Ongoing during construction phase	MK0.00	Compliance with labor regulations	Ongoing	Contractor	DL Exp

Impact Code	Impact	Mitigation Measures	Implementation Period	Implementation Cost (MWK)	Key Performance Indicator	Monitoring Frequency	Implementation Responsibility	Mo Res
		iii. Pay the same rates for workers working on similar tasks regardless of gender and origin.	Ongoing during construction phase	MK0.00	Pay equity records	Ongoing	Contractor	DL Exp
		iv. Have workers sign a code of conduct.	Before employment starts	MK0.00	Number of signed codes of conduct	Once before employment starts	Contractor	DL Exp
		v. Sensitize workers to a full range of risks related to occupational health and safety, labor rights, public health, community safety, sexual harassment, and GBV.	During induction and ongoing	MK50,000.00	Number of sensitization sessions; worker awareness levels	Ongoing	Contractor	DL Exp
		vi. Ensure that 30% of the workforce are women.	Ongoing during construction phase	MK0.00	Workforce gender ratio	Ongoing	Contractor	DL Exp
P1M2	Improved project compliance to environmental and social legislations	i. Develop a contractors ESMP that will include Occupational Health and Safety Plan, Traffic Management Plan, Waste Management Plan among others.	Before construction phase starts	MK5,000,000	Approved C-ESMP	Once before construction starts	Contractor	PIU Exp
		ii. Solicit views of the public and stakeholders through consultations to ensure that their concerns are considered in the project documents.	Before construction phase starts	MK75,000.00	Number of consultations held; stakeholder feedback incorporated	Once before construction starts	Project Management Team	Env Dis (ED E&
		iii. Undertake community liaison meetings to notify the community of the commencement date, inform	Before construction phase starts	MK50,000.00	Number of liaison meetings; community awareness level	Once before construction starts	Project Management Team	ED Exp

Impact Code	Impact	Mitigation Measures	Implementation Period	Implementation Cost (MWK)	Key Performance Indicator	Monitoring Frequency	Implementation Responsibility	Mo Res
		them of the grievance mechanism, and labor policy.						
		iv. Obtain relevant approvals and certificates from authorities, including the Malawi Environment Protection Authority and Zomba City Council.	Before construction phase starts	MK2,000,000.00	Number of approvals and certificates obtained	Once before construction starts	Project Management Team	ED Exp
P2-1M1	Temporary Air Quality Deterioration	i. Sprinkle water during the site clearing and excavation phase regularly, particularly during dry and windy periods, to mitigate dust dispersion.	During site clearing and excavation	MK200,000.00	Frequency of water sprinkling; dust levels	Daily	Contractor	ED Exp
		ii. Transport particulate or powdery construction materials or residues with adequate load cover to prevent/restrain the dispersion of particulate matter.	Ongoing during transport	MK150,000.00	Compliance with transport protocols	Ongoing	Contractor	ED Exp
		iii. Unload transported powdery materials to drop-height regulation equipment to ensure the lowest drop height possible in these operations.	Ongoing during material handling	MK0.00	Drop-height compliance; dust levels	Ongoing	Contractor	ED Exp
		iv. Minimize stockpiling of excavated soils within the construction site by immediate removal and transportation to the dumping site.	Ongoing during excavation	MK150,000.00	Amount of soil stockpiled; compliance with removal schedule	Ongoing	Contractor	ED Exp
		v. Carry out regular maintenance of vehicles and avoid the use of old vehicles and mobile	Ongoing; monthly maintenance	MK150,000.00	Maintenance logs; vehicle emission levels	Monthly	Contractor	ED Exp

Impact Code	Impact	Mitigation Measures	Implementation Period	Implementation Cost (MWK)	Key Performance Indicator	Monitoring Frequency	Implementation Responsibility	Mo Res
		construction equipment which emit black smoke.						
P2-1M2	Elevated noise levels from machinery and construction activities	i. Limit noisy construction activities only to daytime hours.	Ongoing during construction phase	MK0.00	Compliance with work hours; noise level readings	Daily	Contractor	ED Exp
		ii. Notify hospital management and staff residential area at least twenty-four hours in advance if particularly noisy activities are anticipated.	As needed during construction phase	MK0.00	Number of notifications sent; community feedback	As needed	Contractor	ED Exp
		iii. Ensure that noise levels at the hospital do not exceed 55 dB (A) and keep noise levels for workers below 80 dB (A).	Ongoing during construction phase	MK100,000.00	Noise level readings; compliance with standards	Weekly	Contractor	ED Exp
		iv. Place stationary noise sources (e.g., the generator) away from sensitive receptors such as wards and staff houses.	During equipment setup	MK100,000.00	Placement compliance; noise level readings	Once during setup	Contractor	ED Exp
P2-1M3	Loss of a tree and other ground cover	i. Confining land clearing to worksite.	During site preparation	MK0.00	Area cleared; compliance with site boundaries	Once during preparation	Contractor	ED Exp
		ii. Protect the existing tree on the project site's boundary by installing physical barriers to prevent accidental damage during construction activities.	Before and during construction	MK50,000.00	Condition of tree; effectiveness of barriers	Once before construction and regularly during	Contractor	ED Exp
P2-1M4	Potential for accidents and injuries on-	i. Develop and implement an Occupational Health and Safety Plan that aims to avoid, minimize, and mitigate the site-	Before construction phase starts	MK250,000.00	Existence of OH&S plan; compliance with safety protocols	Once before construction starts	Contractor	DL Exp

Impact Code	Impact	Mitigation Measures	Implementation Period	Implementation Cost (MWK)	Key Performance Indicator	Monitoring Frequency	Implementation Responsibility	Mo Res
	site affecting workers	specific risk of workplace accidents.						
		ii. Provide OSH orientation training and hazard-specific training.	During induction and ongoing	MK50,000.00	Number of training sessions; worker awareness levels	Ongoing	Contractor	DL Exp
		iii. Conduct a thorough risk assessment before excavation to identify potential hazards and implement necessary safety measures.	Before excavation starts	MK50,000.00	Risk assessment report; implementation of safety measures	Once before excavation starts	Contractor	DL Exp
		iv. Install barriers and warning signs around the excavation area to prevent unauthorized access and to alert workers to potential hazards.	During excavation	MK150,000.00	Number of barriers and signs; compliance with safety protocols	Ongoing	Contractor	DL Exp
		v. Use secure and stable ladders or scaffolding that meet safety standards for working at height.	During construction	MK1,000,000.00	Equipment inspection logs; compliance with safety standards	Ongoing	Contractor	DL Exp
		vi. Provide personal protective equipment (PPE), including safety harnesses, helmets, and non-slip footwear to all workers working at height.	Before work at height begins	MK1,000,000.00	PPE availability and usage; compliance with safety standards	Once before work starts and ongoing	Contractor	DL Exp
		vii. Provide PPE, including gloves, work suits, and boots, to all workers handling cement during construction works.	Before construction begins	MK500,000.00	PPE availability and usage; compliance with safety standards	Once before work starts and ongoing	Contractor	DL Exp
		viii. Carry out regular toolbox talks as specified in the Health and Safety Plan of the project.	Ongoing; weekly	MK50,000.00	Number of toolbox talks; worker attendance	Weekly	Contractor	DL Exp

Impact Code	Impact	Mitigation Measures	Implementation Period	Implementation Cost (MWK)	Key Performance Indicator	Monitoring Frequency	Implementation Responsibility	Mo Res
		ix. Install first aid kits proportionate to each project site activity.	Before construction begins	MK250,000.00	Availability and accessibility of first aid kits	Once before work starts and ongoing	Contractor	DL Exp
		x. Obtain medical insurance for the workforce.	Before construction begins	MK200,000.00	Number of insured workers	Once before work starts	Contractor	DL Exp
		xi. Compensate injured workers in line with the Workers' Compensation Act of 2000.	As needed	MK200,000.00	Number of compensation cases handled; compliance with Workers' Compensation Act	As needed	Contractor	DL Exp
P2-1M5	Potential for accidents and injuries on-site affecting nearby communities	i. Erect safety barriers around the construction site to prevent unauthorized access.	Before construction begins	MK150,000.00	Number of barriers erected; incidence of unauthorized access	Once before construction starts and ongoing	Contractor	DL Exp
		ii. Schedule construction deliveries and heavy machinery movement during off-peak hours to minimize disruption.	During construction phase	MK0.00	Delivery schedule compliance; community feedback	Ongoing	Contractor	DL Exp
		iii. Coordinate with hospital administration to ensure that alternative routes and access points are available during construction.	Before construction begins	MK0.00	Number of coordination meetings; availability of alternative routes	Once before construction starts and ongoing	Contractor	DL Exp
		iv. Hire transporters whose vehicles have valid Certificate of Fitness (CoF) and drivers with the appropriate driving licence category.	During construction phase	MK0.00	Number of compliant vehicles and drivers	Ongoing	Contractor	DL Exp

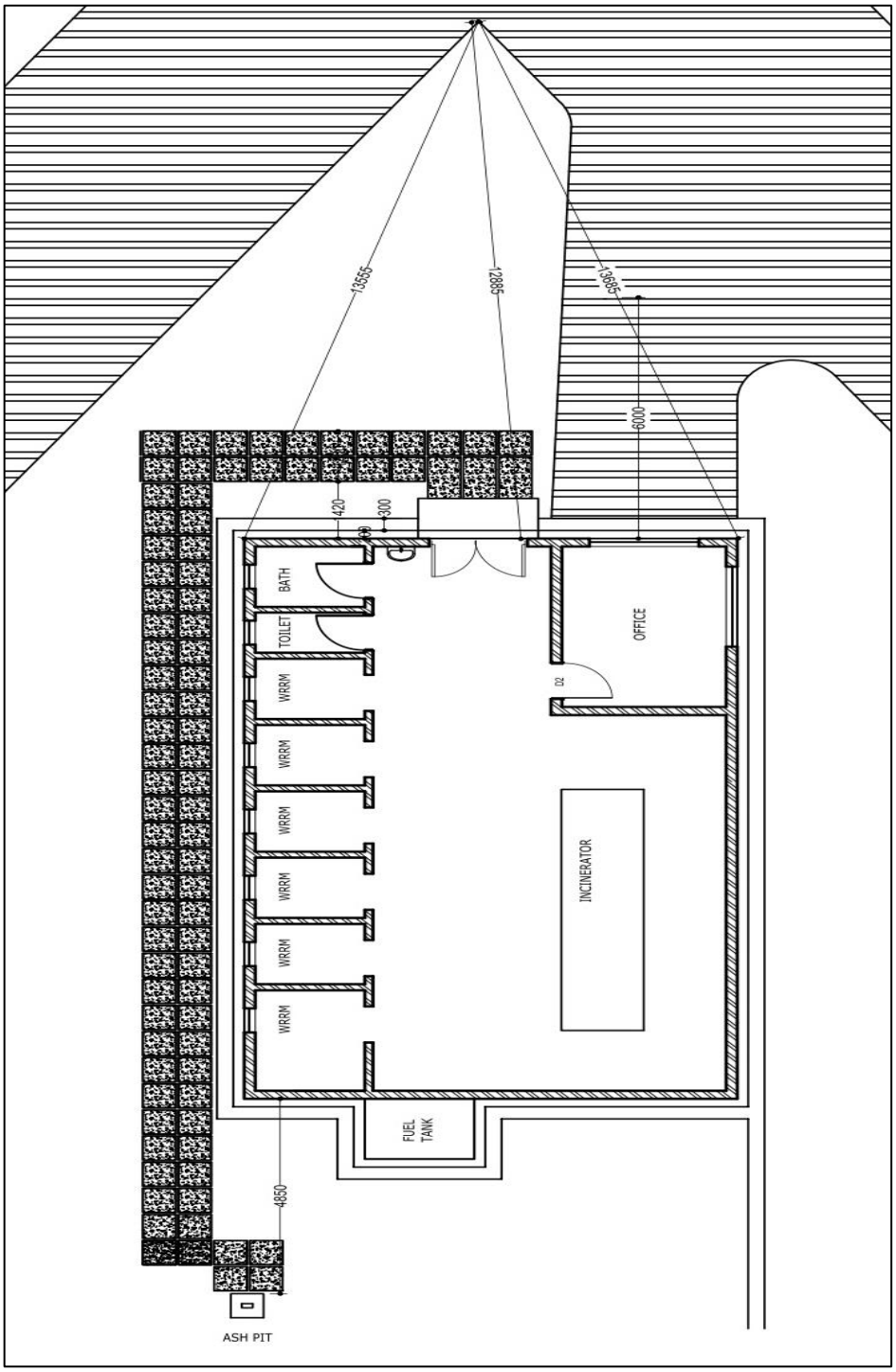
Impact Code	Impact	Mitigation Measures	Implementation Period	Implementation Cost (MWK)	Key Performance Indicator	Monitoring Frequency	Implementation Responsibility	Mo Res
		v. Construction vehicles to observe a 20 km/hr speed limit on the hospital campus. Put in place signposts indicating the speed limits on the construction site.	During construction phase	MK50,000.00	Compliance with speed limits; number of signposts	Ongoing	Contractor	DL Exp
P2-1M6	Infectious Disease Impact (spread of STIs, HIV and AIDS, and Covid-19)	i. Carry out monthly health education for construction workers in liaison with health personnel using the toolbox talks.	Ongoing; monthly	MK150,000.00	Number of health education sessions; worker participation	Monthly	Contractor	DE (DE E&
		ii. Free condoms are to be made available to all (100%) workers by placing them in the workers' toilets to ensure access and confidentiality.	Ongoing	MK100,000.00	Availability and usage of condoms	Ongoing	Contractor	DE E&
		iii. Sensitize construction workers on Covid-19 prevention including hand washing with soap, use of hand sanitizers, proper use of face masks, and workspace disinfection among others.	Ongoing	MK50,000.00	Number of sensitization sessions; worker compliance	Ongoing	Contractor	DE E&
		iv. Distribute information, education, and communication (IEC) materials on Covid-19, HIV and AIDS prevention, and cholera.	Ongoing	MK250,000.00	Number of IEC materials distributed; worker awareness	Ongoing	Contractor	DE E&
		v. Provide necessary PPE and other materials (e.g. cloth masks, hand sanitizers, hand-	Ongoing	MK150,000.00	Availability and usage of PPE;	Ongoing	Contractor	DE E&

Impact Code	Impact	Mitigation Measures	Implementation Period	Implementation Cost (MWK)	Key Performance Indicator	Monitoring Frequency	Implementation Responsibility	Mo Res
		washing facilities) to help prevent construction workers from contracting and spreading Covid-19 at the workplace.			compliance with health protocols			
P2-1M7	GBV and SEA Impact	i. Develop an induction program including a code of conduct for all workers which they will be required to sign prior to starting their work.	Before construction phase starts	MK50,000.00	Existence of induction program; number of signed codes of conduct	Once before work starts	Contractor	Dis We (DS E&
		ii. Ensure a copy of the code of conduct is presented to all construction workers and signed by each of them.	Before construction phase starts	MK50,000.00	Number of signed codes of conduct	Once before work starts	Contractor	DS E&
		iii. Implement a GBV management plan as presented in Annex 4.	During construction phase	MK250,000.00	Existence and implementation of GBV management plan	Ongoing	Contractor	DS E&
		iv. Provide clear, trusted, and responsive channels for filing GBV/SEA/SH cases to the police or other relevant government authorities.	Ongoing during construction phase	MK150,000.00	Number of reported cases; resolution time	Ongoing	Contractor	DS E&
		v. Ensure the availability of an effective Grievance Redress Mechanism (GRM).	Ongoing during construction phase	MK50,000.00	Existence and accessibility of GRM; number of grievances addressed	Ongoing	Contractor	DS E&
P2-1M8	Generation of solid wastes, spills, and effluent	i. Provide adequate on-site waste receptors such as colour-coded bins or skips for temporary	Before construction phase starts	MK250,000.00	Number and type of waste receptors; compliance with	Once before construction starts and ongoing	Contractor	ED Exp

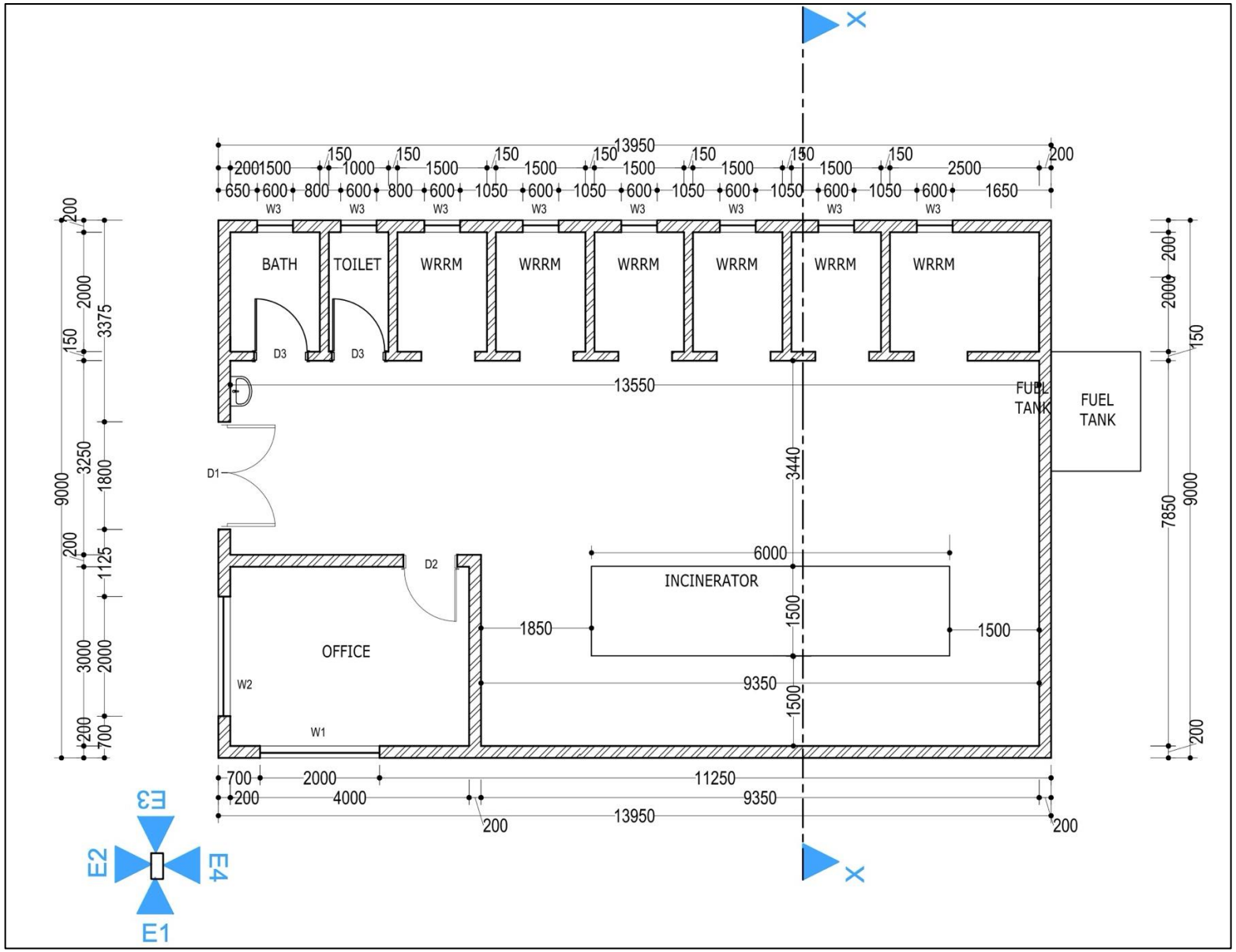
Impact Code	Impact	Mitigation Measures	Implementation Period	Implementation Cost (MWK)	Key Performance Indicator	Monitoring Frequency	Implementation Responsibility	Mo Res
		waste storage. Use of rubbish pits should be discouraged.			waste management protocols			
		ii. Arrange with the District Council to identify a suitable site or sites (new or existing) for waste disposal at different project sites if possible, within 5 km radius.	Before construction phase starts	MK50,000.00	Number of waste disposal sites identified; compliance with disposal protocols	Once before construction starts and ongoing	Contractor	ED Exp
		iii. Obtain permits to handle, store, transport, and dispose of hazardous waste from the Environmental Authority in advance of construction.	Before construction phase starts	MK50,000.00	Number of permits obtained; compliance with hazardous waste regulations	Once before construction starts and ongoing	Contractor	ED Exp
		iv. Segregate and clearly label hazardous waste and store in suitable drums or containers in secure facilities that have a banded impermeable layer.	During construction phase	MK100,000.00	Segregation and labeling compliance; condition of storage facilities	Ongoing	Contractor	ED Exp
		v. Promote good housekeeping and sanitation practices at each site.	Ongoing	MK50,000.00	Cleanliness and organization of the site; worker compliance	Ongoing	Contractor	ED Exp
		vi. Provide spill-control kits and materials (e.g. oil binding agents, sand, shovels, etc.) to drivers and workers, to clean up spills, if necessary.	During construction phase	MK100,000.00	Availability and usage of spill-control kits; number of spill incidents	Ongoing	Contractor	ED Exp

Annex 1: Layout Plans of the Incinerator Building

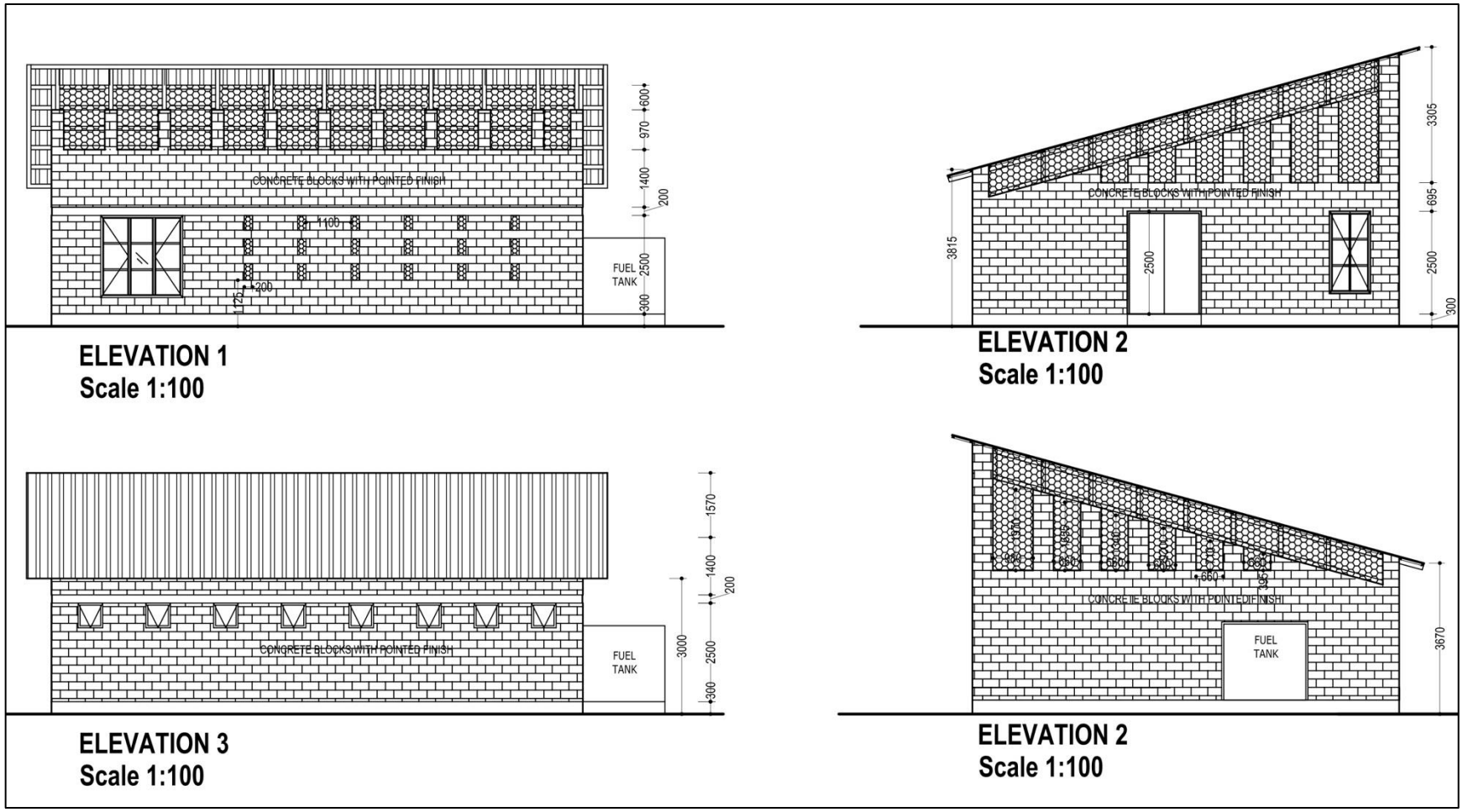
A1.1 Site Layout Plan



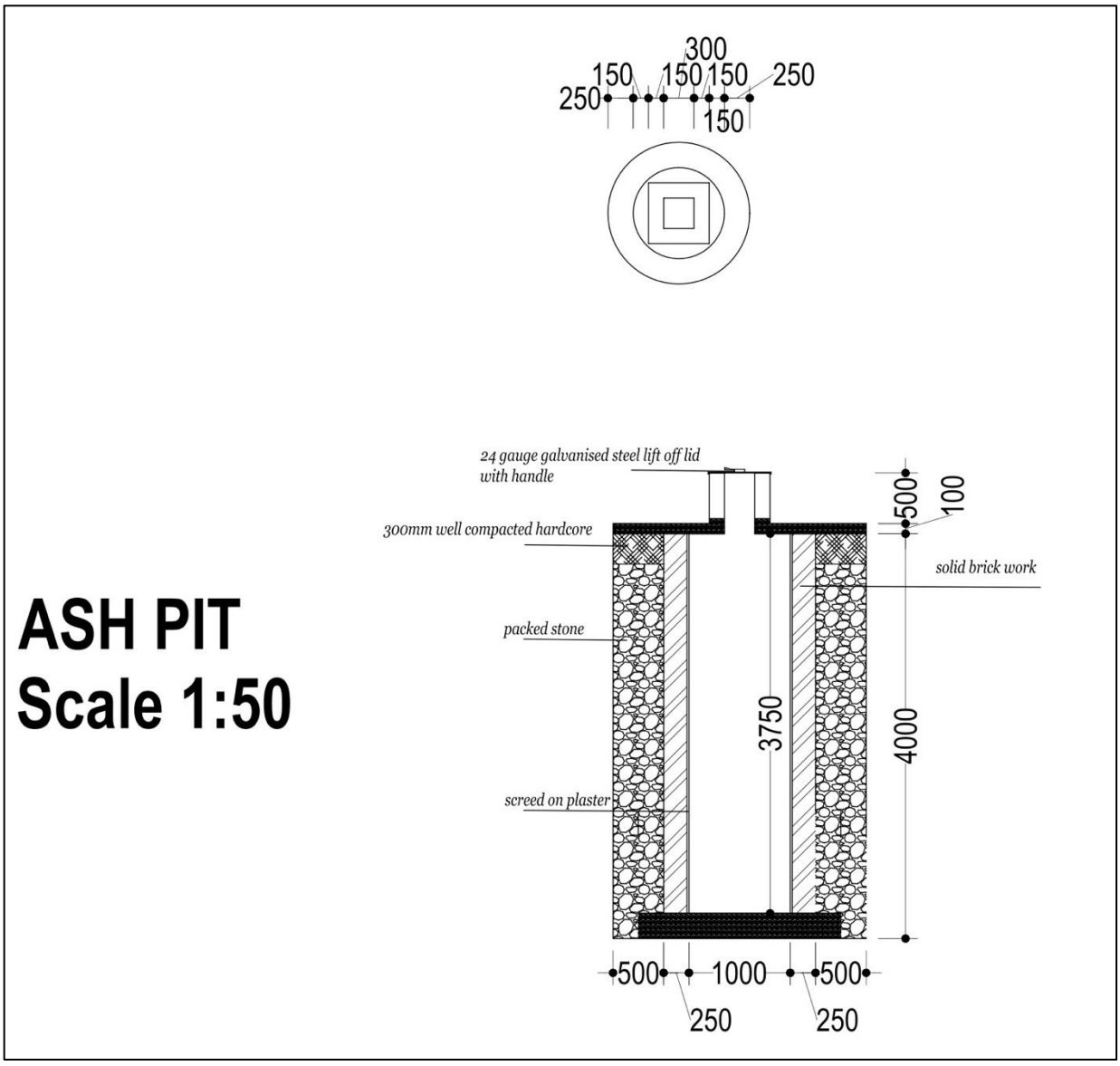
A1.2 Incinerator House Layout Plan



A1.3 Incinerator House Elevation Details



A1.4 Ash Pit Design



Annex 2: Project impacts and their ratings

Activity Code	Project Activity	VEC	Potential Environmental & Social Impact	Impact Code	Nature of Impact	Impact Magnitude	Impact Extent	Impact Reversibility	Impact Duration	Probability of Occurrence	Significance	Significane Rating
P1	Mobilisation	Labour & Economic Conditions	Creation of job opportunities.	P1M1	Positive	2	3	3	2	3	30	Low
P1	Mobilisation	Labour & Economic Conditions	Improved project compliance to national environmental and social requirements	P1M2	Positive	3	3	3	2	3	33	Moderate
P2-1	Site clearing & Excavation	Air Quality	Temporary Air Quality Deterioration	P2-1M1	Negative	2	2	1	1	2	12	Very Low
P2-1	Site clearing & Excavation	Noise & Vibration	Elevated noise levels from machinery and construction activities.	P2-1M2	Negative	3	2	1	1	3	21	Low
P2-1	Site clearing & Excavation	Terrestrial Biodiversity	Loss of trees and other ground cover.	P2-1M3	Negative	2	3	1	2	2	16	Low
P2-1	Site clearing & Excavation	Public Health & Safety	Potential for accidents and injuries on-site affecting workers.	P2-1M4	Negative	3	2	3	2	3	30	Low
P2-1	Site clearing & Excavation	Public Health & Safety	Potential for accidents and injuries on-site affecting near-by communities.	P2-1M5	Negative	3	2	3	2	2	20	Low
P2-1	Site clearing & Excavation	Public Health & Safety	Infectious Disease Impact (spread of STIs, HIV and AIDS, and Covid 19)	P2-1M6	Negative	3	3	5	5	2	32	Moderate
P2-1	Site clearing & Excavation	Social Dynamics and Community Well-being	Gender-Based Violence (GBV) and Sexual Exploitation and Abuse (SEA) Impact	P2-1M7	Negative	3	3	3	2	3	33	Moderate
P2-1	Site clearing & Excavation	Waste Management	Generation of solid and hazardous waste requiring proper disposal and management.	P2-1M8	Negative	3	2	1	2	3	24	Low

Activity Code	Project Activity	VEC	Potential Environmental & Social Impact	Impact Code	Nature of Impact	Impact Magnitude	Impact Extent	Impact Reversibility	Impact Duration	Probability of Occurrence	Significance	Significane Rating
P2-2	Super Structure	Labour & Economic Conditions	Creation of job opportunities.	P2-2M1	Positive	3	3	3	2	3	33	Moderate
P2-2	Super Structure	Air Qulity	Temporary Air Quality Deterioration	P2-2M2	Negative	2	2	1	1	2	12	Very Low
P2-2	Super Structure	Noise & Vibration	Elevated noise levels from machinery and construction activities.	P2-2M3	Negative	2	2	1	1	3	18	Low
P2-2	Super Structure	Public Health & Safety	Potential for accidents and injuries on-site affecting workers.	P2-2M4	Negative	3	2	3	2	3	30	Low
P2-2	Super Structure	Public Health & Safety	Potential for accidents and injuries on-site affecting near-by communities.	P2-2M5	Negative	2	1	3	2	3	24	Low
P2-2	Super Structure	Public Health & Safety	Infectious Disease Impact (spread of STIs, HIV and AIDS, and Covid 19)	P2-2M6	Negative	3	3	5	2	3	39	Moderate
P2-2	Super Structure	Waste Management	Generation of solid and hazardous waste requiring proper disposal and management.	P2-2M8	Negative	3	2	1	2	3	24	Low
P2-2	Super Structure	Social Dynamics and Community Well-being	Gender-Based Violence (GBV) and Sexual Exploitation and Abuse (SEA) Impact	P2-2M9	Negative	3	2	1	2	3	24	Low
P2-3	Structural Framing	Labour & Economic Conditions	Creation of job opportunities.	P2-3M1	Positive	3	3	3	2	3	33	Moderate
P2-3	Structural Framing	Noise & Vibration	Elevated noise levels from machinery and construction activities.	P2-3M2	Negative	3	2	1	1	3	21	Low
P2-3	Structural Framing	Public Health & Safety	Potential for accidents and injuries on-site affecting workers.	P2-3M3	Negative	3	2	3	1	3	27	Low

Activity Code	Project Activity	VEC	Potential Environmental & Social Impact	Impact Code	Nature of Impact	Impact Magnitude	Impact Extent	Impact Reversibility	Impact Duration	Probability of Occurrence	Significance	Significane Rating
P2-3	Structural Framing	Public Health & Safety	Potential for accidents and injuries on-site affecting near-by communities.	P2-3M4	Negative	2	2	3	2	3	27	Low
P2-3	Structural Framing	Public Health & Safety	Infectious Disease Impact (spread of STIs, HIV and AIDS, and Covid 19)	P2-3M5	Negative	3	3	5	2	3	39	Moderate
P2-3	Structural Framing	Visual Impact	Visual intrusion from construction equipment, structures, and stockpiles.	P2-3M6	Negative	2	2	3	2	3	27	Low
P2-3	Structural Framing	Waste Management	Generation of solid and hazardous waste requiring proper disposal and management.	P2-3M7	Negative	2	2	1	1	3	18	Low
P2-4	Fit Out	Labour & Economic Conditions	Creation of job opportunities.	P2-4M1	Positive	3	3	3	2	3	33	Moderate
P2-4	Fit Out	Noise & Vibration	Elevated noise levels from machinery and construction activities.	P2-4M2	Negative	3	2	1	1	3	21	Low
P2-4	Fit Out	Public Health & Safety	Potential for accidents and injuries on-site affecting workers.	P2-4M3	Negative	3	2	3	1	3	27	Low
P2-4	Fit Out	Public Health & Safety	Potential for accidents and injuries on-site affecting near-by communities.	P2-4M4	Negative	2	2	3	2	3	27	Low
P2-4	Fit Out	Public Health & Safety	Infectious Disease Impact (spread of STIs, HIV and AIDS, and Covid 19)	P2-4M5	Negative	3	3	5	2	3	39	Moderate
P2-4	Fit Out	Visual Impact	Visual intrusion from construction equipment, structures, and stockpiles.	P2-4M6	Negative	2	2	3	2	3	27	Low
P2-4	Fit Out	Waste Management	Generation of solid and hazardous waste requiring proper disposal and management.	P2-4M7	Negative	2	2	1	1	3	18	Low

Activity Code	Project Activity	VEC	Potential Environmental & Social Impact	Impact Code	Nature of Impact	Impact Magnitude	Impact Extent	Impact Reversibility	Impact Duration	Probability of Occurrence	Significance	Significane Rating
P3	Demobilisation	Labour & Economic Conditions	Creation of job opportunities.	P3-M1	Negative	3	3	3	2	3	33	Moderate
P3	Demobilisation	Noise & Vibration	Elevated noise levels from machinery and construction activities.	P3-M2	Negative	2	2	3	1	2	16	Low
P3	Demobilisation	Public Health & Safety	Potential for accidents and injuries on-site affecting workers.	P3-M3	Negative	2	2	3	2	3	27	Low
P3	Demobilisation	Waste Management	Generation of solid and hazardous waste requiring proper disposal and management.	P3-M4	Negative	3	2	1	1	3	21	Low

Annex 3: Stakeholder Consultations

A3.1 Stakeholder Consultation Checklist for the ESMP

1. What type of environmental and social positive impacts will result from this proposed project and how will these impacts be enhanced (State positive impacts for each phase of construction and operation)?
2. What type of environmental and social negative impacts should be expected during the construction of the proposed project and what are the proposed mitigation measures?
3. What type of environmental and social negative impacts should be expected during the operation and maintenance phase of the proposed project and what are the proposed mitigation measures?
4. Who else should be consulted regarding the environmental and social impacts of the proposed project?

A3.2 Stakeholder Consultations

Stakeholder participation involved engaging institutions within the project impact area and selected public institutions who expressed their views about the proposed projects. The stakeholder participation process tried to ensure that due consideration will be given to stakeholder values, concerns, and preferences when decisions regarding the project are made.

The key objectives of stakeholder involvement were to:

- Facilitate consideration of alternatives, mitigation measures and trade-offs (if any).
- Ensure that important impacts are not overlooked, and benefits are maximized.
- Reduce chances of conflict through early identification of contentious issues.
- Provide an opportunity for the stakeholders to influence project design in a positive manner (thereby creating a sense of ownership of the proposal).
- Improve transparency and accountability of decision-making; and
- Increase public confidence in the Environmental and Social Impact Assessment process.

Stakeholder participation in this project was facilitated through interviews and was guided by a checklist of questions that are presented in following sections.

A3.3 Stakeholders Comments

The comments stakeholders raised were collated and analysed to see which issues are of concern and should be addressed through the ESMP and are presented in Box below. The following subsections list these stakeholders and the comments they raised, whilst referencing to the impact assessment section and the proposed mitigation measures to elaborate how they contributed to the formulation of the ESMP of this report. This was done in respect to the fact that public concern is fundamental to the delineation and management of the project's significant risks.

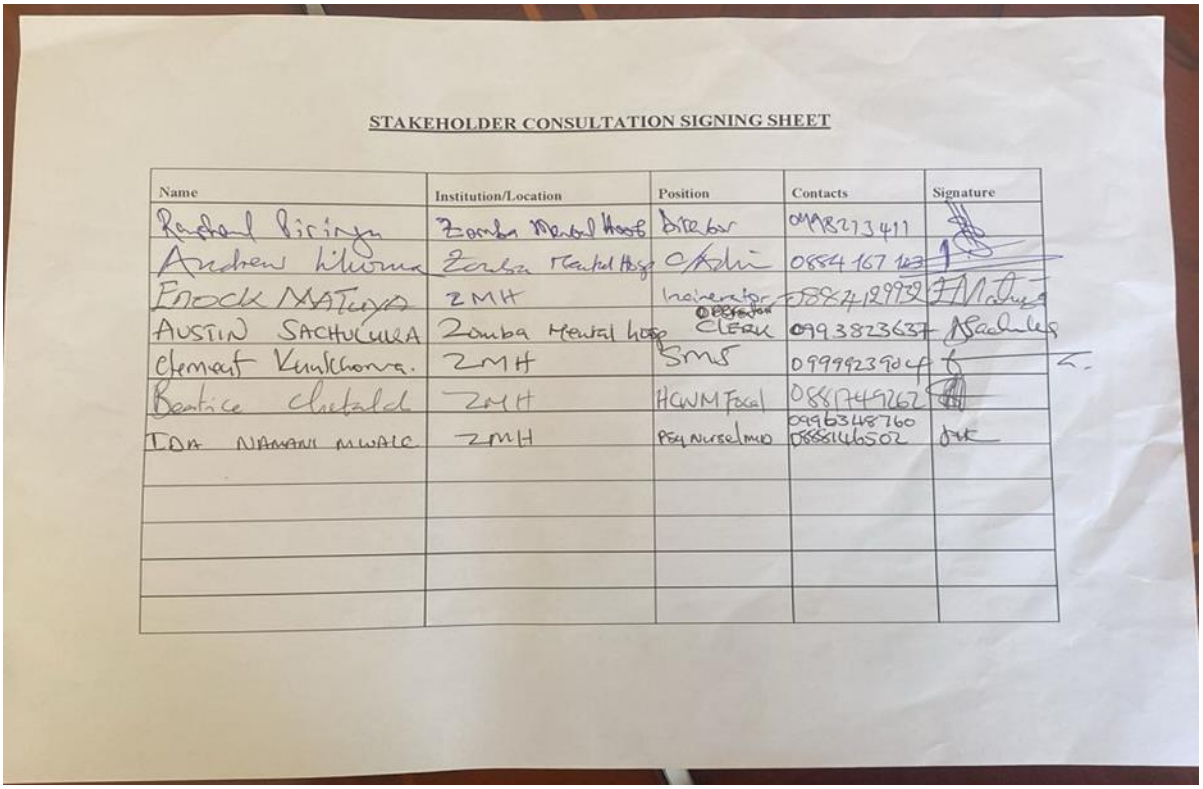
Key issues raised during the consultations.

SN	NAME	ISSUES RAISED	RECOMMENDATIONS
1	Austin Sachuluka (Zomba Mental Hospital)	***Positive impacts***	**Enhancement measure**
		The incinerator will improve sanitation by safely disposing of hazardous waste materials, including medical waste, chemicals, and other harmful substances.	Protecting incinerator workers and nearby residents from pollutants and hazardous materials through comprehensive health and safety protocols.
		The implementation of this project will lead to an increase in job opportunities for residents during the construction phases.	Give preference to residents with the necessary skills for the project
		Negative Impacts	**Mitigation measure**
		Increase in accidents during the construction period	Emphasizing health and safety measures throughout the construction process.
		Construction activities can generate significant dust, posing health risks to workers and potentially aggravating respiratory illnesses	Implement dust suppression techniques, including water spraying
2	Enock Matiya- (Incinerator Attendant- Zomba Mental Hospital)	***Positive impacts***	**Enhancement measure**
		Waste Management: Efficient disposal of medical waste such as used bandages and gloves, reducing the risk of contamination and infection spread.	Regular inspections and maintenance to ensure the incinerator operates efficiently and safely.
		Enhances overall hygiene by eliminate hazardous biological materials, promoting a safer environment for patients, staff, and the community.	comprehensive training programs for staff on safe handling of medical waste and proper operation of the incinerator to minimize risks and maximize efficiency.
		Employment opportunities in the area are expected to improve significantly because of the project	they should make sure that they employ people from within the area and even the disabled should be considered

SN	NAME	ISSUES RAISED	RECOMMENDATIONS
		Incinerators burn waste at high temperatures, ensuring complete combustion and reducing pollutant release.	Treat and stabilize the ash produced from incineration to reduce its toxicity.
		Negative Impacts	**Mitigation measure**
		Dust pollution during construction works	They should be used of ppe and dust suppressor
		increase in child labor because of the project	they should make sure they employ people that above the minimum recommended age
			There is need to create safe space for children
		Increased risk of sexual harassment between employers and employees	Mainstream issues of awareness on the project
		Increased risk of spread of STIs including HIV/AIDS	Consider distributing contraceptives on the project i.e. condoms
		Increased employment opportunities especially for the local people	Ensure that there is equal opportunity for both men and women
			Contractor should Ensure that labour laws are followed
3	Idah Mwale (psychiatric nurse -Zomba Mental Hospital)	***Positive impacts***	**Enhancement measure**
		the upcoming incinerator will significantly reduce waste volume through a more efficient disposal method on a large scale.	The incinerator should be equipped with modern technology.
		The upcoming project of the incinerator will help proper waste management	Integrate waste-to-energy processes to convert non-recyclable waste into valuable energy, reducing reliance on fossil fuels.
		Negative Impacts	**Mitigation measure**
		The project's introduction could lead to unintended social consequences, such as an increase in HIV/AIDS and sexually transmitted infections (STIs).	Educating workers about sexually transmitted diseases

SN	NAME	ISSUES RAISED	RECOMMENDATIONS
		The convenience of incineration as a waste disposal method could lead to a decrease in recycling and waste reduction initiatives	Measures should be put prioritize waste minimization initiatives, including source reduction and reuse programs, to lessen the overall waste burden.
4	Dr Raphael Pingiri (Director of health and social services)	**Positive impacts**	**Enhancement measures**
		The coming of the incinerator will reduce transportation issues associated with the need to transport medical waste to Lilongwe for disposal.	Implementing a schedule for routine inspections to assess the condition of the incinerator, identify potential issues early, and prevent breakdowns.
		Preventing the spread of diseases and contamination that can occur from open dumping of medical waste.	providing comprehensive training for operators on proper incinerator operation,

A3.4 Evidence of consultations (Signing sheets and pictures)



STAKEHOLDER CONSULTATION SIGNING SHEET

Name	Institution/Location	Position	Contacts	Signature
Rachael Kiriya	Zomba Mental Hosp	Director	0998273411	
Andrew Liwoma	Zomba Mental Hosp	C/Adm	0884 167 163	
Enock Matoya	ZMH	Inservice Coordinator	0884129932	
AUSTIN SACHUCHULA	Zomba Mental Hosp	CLERK	0993823637	
Clement Kenkhonga	ZMH	SMS	0999923904	
Beatrice Chatalala	ZMH	HCWM Focal	0887449262	
IDA NAMANI MWALE	ZMH	PSY Nurse/MHO	0996348760 0888146502	

Picture taken during consultation at Zomba Mental Hospital

Annex 4: Code of Conduct for Contractor in Relation to Child Protection

The contractor will be required to prepare a code of conduct in relation to child protection among others that they shall be following when undertaking construction works. These rules shall form part of the assessment criteria when selecting the contractor. A satisfactory code of conduct will contain obligations on all project staff (including sub-contractor s and day workers) that are suitable to address the following issues, as a minimum. Additional obligations may be added to respond to concerns of the region, the location, and the project sector or to specific project requirements. The issues to be addressed include:

1. Compliance with applicable laws, rules, and regulations of the jurisdiction.
2. Protection of children (including prohibitions against abuse, defilement, or otherwise unacceptable behaviour with children, limiting interactions with children, and ensuring their safety in project areas).
3. Sexual harassment (for example to prohibit use of language or behaviour, towards women or children, that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate).
4. Violence or exploitation (for example the prohibition of the exchange of money, employment, goods, or services for sex, including sexual favours or other forms of humiliating, degrading, or exploitative behaviour).
5. Compliance with applicable health and safety requirements (including wearing prescribed personal protective equipment, preventing avoidable accidents and a duty to report conditions or practices that pose a safety hazard or threaten the environment).
6. The use of illegal substances.
7. Non-discrimination (for example based on family status, ethnicity, race, gender, religion, language, marital status, birth, age, disability, or political conviction).
8. Interactions with community members (for example to convey an attitude of respect and non-discrimination).
9. Sanitation requirements.
10. Avoidance of conflicts of interest (such that benefits, contracts, or employment, or any sort of preferential treatment or favours, are not provided to any person with whom there is a financial, family, or personal connection).
11. Respecting reasonable work instructions (including regarding environmental and social norms).
12. Protection and proper use of property (for example, to prohibit theft, carelessness or waste).
13. Duty to report violations of this Code; and
14. Non-retaliation against workers who report violations of the Code, if that report is made in good faith.

The Code of conduct should be written in local and plain language, and signed by each worker to indicate that they have:

- Received a copy of the code.
- Had the code explained to them;
- Acknowledged that adherence to this Code of conduct is a condition of employment; and
- Understood that violations of the Code can result in serious consequences, up to and including dismissal, or referral to legal authorities.

Annex 5: GBV Management Plan

Prevention of GBV is a multifaceted effort which should deal with or focus on:

1. women empowerment or agent of change
2. women participation and capacity to influence decision making
3. women economic empowerment
4. increased access to sexual and reproductive health and rights
5. incorporate men and boys in efforts (as perpetrators, victims and agents of change)
6. social gender norms and behaviour transformation (challenging gender stereotyping)

The specific prevention measures have been included in a GBV Management plan to ensure the implementation of actions in this regard and to allow for close monitoring of the contractor.

Activities	**Action party**	**Responsibilities**
Stakeholder engagement	Zomba Mental Hospital (NDH); DSWO	• Identify GBV service providers in the area. • Identify vulnerable groups within the community. • Inform community members about the details of the Project and the GBV risks associated with the project. • GBV training including what to do in case of grievance.
GBV training for GRC, contractor and staff, consultants and adjoining community members	NDH; Contractor; DSWO	• Training and sensitisation of all workers associated with the Project on GBV and how the project can contribute to GBV risks. • Training and sensitisation of adjoining communities on GBV risks, channels to report GBV incidents and services available for GBV survivors.
Codes of conduct signed and understood	NDH; Contractor	• Have the CoCs signed by all those with physical presence in the site. • Train construction workers on the behaviour obligation under the CoCs.
Handling GBV complaints (including support of survivors)	GRM	• Grievance redress committees to ensure confidential complaint uptake mechanisms are in place. • The GBV cases should be immediately reported to the Police (Victim Support Unit), District Social Welfare Office, psychosocial support institutions working in the project area or district.
Provision of separate, safe and easily accessible facilities for women and men working on the site	NDH; Contractor	• Ensure construction sites have separate facilities like toilets and/or bathrooms for men and women.
Monitoring and reporting	NDH; Contractor; DSWO	• Selection of monitoring indicators (such as: No. of reported cases of GBV; Resolved cases and time it took to address the complaints, No. of workers that have attained GBV training courses; No./percentage of workers that have signed CoC and No. of GBV cases that were referred to the GBV service provider). • Ensure new risks are uncovered and mitigated.