Environmental and Social Management Plan for the proposed Construction of an Ebola Virus Diseases Treatment Centre at Kamuzu Central Hospital

06 May 2016
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<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>DPPD</td>
<td>Department of Policy and Planning Development</td>
</tr>
<tr>
<td>DEHO</td>
<td>District Environmental Health Officer</td>
</tr>
<tr>
<td>EHO</td>
<td>Environmental Health Officer</td>
</tr>
<tr>
<td>ESIA</td>
<td>Environmental and Social Impact Assessment</td>
</tr>
<tr>
<td>ESMP</td>
<td>Environmental and Social Management Plan</td>
</tr>
<tr>
<td>EVD</td>
<td>Ebola Virus Disease</td>
</tr>
<tr>
<td>EPA</td>
<td>Extension Planning Areas</td>
</tr>
<tr>
<td>GoM</td>
<td>Government of Malawi</td>
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<tr>
<td>IPC</td>
<td>Infection Prevention Control</td>
</tr>
<tr>
<td>KCH</td>
<td>Kamuzu Central Hospital</td>
</tr>
<tr>
<td>MGDS II</td>
<td>Malawi Growth and Development Strategy II</td>
</tr>
<tr>
<td>MNREM</td>
<td>Ministry of Natural Resources, Energy and Mining</td>
</tr>
<tr>
<td>MoH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>NCIC</td>
<td>National Construction Industry Council of Malawi</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-governmental Organisation</td>
</tr>
<tr>
<td>NEAP</td>
<td>National Environmental Action Plan</td>
</tr>
<tr>
<td>NCE</td>
<td>National Council for the Environment</td>
</tr>
<tr>
<td>NEP</td>
<td>National Environmental Policy</td>
</tr>
<tr>
<td>PPE</td>
<td>Personal Protective Equipment</td>
</tr>
<tr>
<td>TCE</td>
<td>Technical Committee on the Environment</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organisation</td>
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ACKNOWLEDGEMENTS

The Consultant, Kent Kafatia, is indebted to the National AIDS Commission (NAC), the Ebola Coordination Unit, and the Department of Planning and Policy Development of the Ministry of Health for the support that was provided during the preparation of this Environmental and Social Management Plan (ESMP). This ESMP is a result of information and knowledge gathered during stakeholder consultations, community consultations and site investigations. Therefore the Consultant wishes to express deep gratitude to all the people that were met with and participated in the consultations.
EXECUTIVE SUMMARY

Introduction

The Government of Malawi, with support from the World Bank, is implementing the Ebola Virus Disease (EVD) preparedness activities which include infection control interventions, particularly provision and use of Personal Protective Equipment (PPEs); and construction of EVD quarantine/treatment centres. The project is being implemented in selected border districts and referral hospitals. Kamuzu Central Hospital is among the referral hospitals where the EVD Treatment Centres are proposed to be constructed.

The project is important for Malawi as during the Ebola outbreak of 2014, worst hit countries were those with a weak health-care system and poor infrastructure, thus unprepared. In addition, with the Ebola threat still existing in other countries, Malawi is at risk of an Ebola Virus Disease outbreak due to migration.

Objectives of the ESMP

The proposed construction of the EVD treatment centre at Kamuzu Central Hospital (KCH) is likely to result in moderate environmental and social impacts; hence this ESMP. The ESMP is in line with the World Bank’s category B projects, within which this project is classified. The ESMP is also prepared in response to the “Environment Management Act, 1996” and the “Guidelines for Environmental Impact Assessment (EIA) for Malawi, 1997”, which recommend an ESMP for projects with moderate Environmental and Social Impacts. The main objective of the ESMP is to provide measures to minimize adverse effects on the biophysical and socio-economic environment during construction and operation of the Kamuzu Central Hospital EVD Treatment Centre.

Methodology for the study

In order to predict the impacts of construction of the EVD Treatment Centre at Kamuzu Central Hospital, field investigations were conducted at and around the project site to appreciate the extent of impact of the project activities and determine their environmental and social footprint. The field investigations were also conducted to collect biophysical and socio-economic data and hold discussions with relevant stakeholders. In addition literature review was conducted, including the review of World Health Organisation Ebola guidelines for environmental management and infection control in Ebola Units.

Impacts of the Project

Potential environmental and social impacts for the EVD treatment centre at KCH will emanate from the project activities during the construction, operation and maintenance and decommissioning phase. The following are identified as potential positive impacts of the project:

i. Increase in knowledge and skills in infection control and prevention

ii. Employment opportunities

iii. Income for material/ equipment suppliers
iv. Increased space for medical services  
v. Improved EVD surveillance, isolation and treatment

On the other hand, potential negative impacts that are likely to occur include:

i. Noise and vibrations disturbances  
ii. Water pollution  
iii. Waste generation, defacing and land degradation  
iv. Accidents  
v. Dust nuisance  
vi. Increased costs of electricity and water  
vii. Fear of being infected  
viii. Air pollution from incineration of wastes  
ix. Increased runoff and erosion  
x. Occupation safety and health risks  
xii. Air, land and water contamination  
xiii. Risk of infection from contaminated equipment

Management of the Impacts

In view of the negative impacts outlined above, this document has presented an environmental and social management plan (ESMP) in Chapter 6, which outlines mitigation measures that must be implemented by the Ministry of Health and other key stakeholders in order to eliminate or mitigate the impacts on the socio-economic environment. A monitoring plan, which outlines responsibilities for the Ministry of Health and other key stakeholders; along with monitoring verifiable indicators for each of the mitigation measures, has been provided in this ESMP. It is expected that if the ESMP is effectively and efficiently implemented, the negative impacts will be reduced to low or will be eliminated such that the project can be implemented sustainably.
CHAPTER 1 INTRODUCTION

1.1. PROJECT BACKGROUND

Ebola virus disease (formerly known as Ebola haemorrhagic fever) is a severe, often fatal and highly infectious disease. The virus is transmitted to people from wild animals and spreads in humans through direct contact with the blood, body fluids and tissues of infected people. Severely ill patients require intensive supportive care. During an outbreak, those at high risk of infection are health workers, family members and others in close contact with the sick and deceased.

The recent Ebola Virus Disease (EVD) outbreak started in March 2014 in the West African countries of Liberia, Guinea and Sierra Leone. A few cases were also reported in Italy, Mali, Nigeria, Senegal, Spain, United Kingdom and United States of America as a result of migration. Since the outbreak began, there have been approximately 28,602 cases of the virus, causing 11,301 deaths (WHO, 2016). The worst hit countries were Liberia and Sierra Leone due to a weak health-care systems and a lack of infrastructure. The countries have been declared Ebola Free but enhanced surveillance is continuing.

Ebola preparedness and response planning has been in effect since shortly after the outbreak in Western Africa in 2014. Ebola infection prevention and control training has been administered across the entire country based on World Health Organization (WHO) guidance. Training included nurses and clinicians (doctors/ clinical officers) and focused on clinical management of Ebola patients based on WHO training materials. A training-of-trainers program was also established by the WHO in Brazzaville, Congo to provide a foundation on which to administer more regular Ebola response training.

With regards to Ebola waste management, specific Infection Prevention and Control (IPC) is built on already existing hospital IPC infrastructure. There is an IPC Unit in the Ministry of Health and the National Focal Officer is part of the team of Trainers on Ebola.

Ebola response equipment is also already in place at all the hospitals where EVD treatment centres are being constructed as part of this project. This includes vehicles (ambulances, double cabin 4X4 utility vehicles and motor cycles) washing machines, patient beds, mattresses and blankets. The different supplies and logistics necessary for IPC personal protective equipment (PPEs- coveralls, aprons, N-95 mask, gumboots, goggles, etc) have also been supplied to all district hospitals.

According to WHO the introduction of an EVD case into unaffected countries remains a risk as long as cases exist in any country. With adequate preparation, however, such an introduction can be contained through a timely and effective response. Therefore, the Government of Malawi (GoM), with support from the World Bank, is implementing EVD preparedness activities, which comprise construction of EVD quarantine/Treatment Centres and Infection Control Interventions.

EVD quarantine centres are being proposed at Karonga, Dedza, Mchinji and Mwanza Districts to be constructed inside the fences of the respective District Hospitals. In these locations, the major activity will be screening and isolation of suspected cases. Treatment for confirmed cases will be provided at the referral centres to be constructed in the major cities of Malawi – Lilongwe (the capital city), Blantyre and Mzuzu. In Lilongwe the EVD Treatment Centre will be at Kamuzu Central Hospital (KCH). In Mzuzu the Centre will be at Mzuzu Central Hospital and in Blantyre the facility will be at an undeveloped site owned by the government, along the M1 road after Kameza Roundabout, near the Kamuzu College of Nursing complex.

Karonga, Mwanza, Mchinji and Dedza are border districts. Karonga borders with Tanzania to the North of Malawi; Mwanza boarders with Mozambique to the east; and Mchinji and Dedza border with Zambia and Mozambique to the west of Malawi. A map showing the districts for the EVD quarantine/treatment centres is provided in figure 1.1.
Figure 0.1: Map of Malawi showing the districts for the proposed EVD Centres
1.2. NATURE OF THE PROJECT

EVD preparedness activities for Malawi aim to develop infrastructure and strengthen the health-care system in readiness of an outbreak. The activities started during the recent outbreak in East Africa. In Malawi, the World Bank is supporting the following two components:

**Component 1:** This Component will focus on Infection Control Interventions, specifically provision and use of Personal Protective Equipment (PPEs). Under this component, health-care workers will be trained in the use of PPEs, provision of care and treatment to Ebola patients, infection prevention and control and waste management. This component will also provide $20,000 for each of the seven districts where the project’s Ebola component is being implemented to increase capacity for district health authorities and the community to manage infectious disease response, including Ebola. This includes developing and implementing training of trainer programs with district health authorities where the EVD treatment centres are being constructed. Front-line staff are also being recruited and trained as part of this effort to investigate suspected cases, provide early warning and community level response. The community will also be targeted with social behaviour change communication programs to increase knowledge, shift attitudes and cultural norms and produce changes in a wide variety of behaviours. These activities are separate from the project’s Health Care Waste Management Plan (HCWMP).

**Component 2:** Construction EVD quarantine/treatment centres.

**Seven** Ebola Virus Disease quarantine/treatment centres are proposed to be constructed in Karonga, Mzuzu, Dedza, Mchinji, Mwanza, Lilongwe and Blantyre districts. Karonga, Dedza, Mchinji and Mwanza have been proposed because they are border districts. In these districts, health-care workers will be working with immigration officers at the borders to identify suspected cases and isolate them in the quarantine centres, in addition to surveillance of cases within the districts. When a suspected case is confirmed to be Ebola infected, the person will be referred to Blantyre, Lilongwe or Mzuzu EVD treatment centre. In Lilongwe the EVD treatment centre is being constructed at Kamuzu Central Hospital (KCH) by the Ministry of Health (MoH).

The scope of the project for all the sites, except Lilongwe include construction of the EVD pre-fabricated structure on a concrete base, construction of septic tanks, installation of incinerators construction of ash pits and the construction of a safety fence around the treatment centre. For the Lilongwe EVD centre, the structure itself is being financed by the Government of Malawi. The scope of work financed by the World Bank is limited to the construction of a septic tank and an ash pit in addition to provisions for Ebola centre furniture. At Lilongwe, Kamuzu Central hospital already has an incinerator that will be used for the EVD.

As a requirement for all World Bank supported infrastructure development projects; and in consideration of the highly infectious nature of EVD, the project was screened for potential environmental and social impacts. The results showed that the construction activities of the EVD quarantine/treatment centres and the activities in the operational and maintenance
phases will have moderate Environmental and Social Impacts. The project was assigned to the World Bank’s category B projects. Hence, preparation of the Environmental and Social Management Plans (ESMPs) was recommended for all the seven sites. The screening and the preparation of the ESMP are also in line with the “Guidelines for Environmental Impact Assessment (EIA) for Malawi, 1997”.

1.3. **OBJECTIVE OF THE ESMP**

The main objective of the ESMP is to provide measures to minimize adverse effects on the biophysical and socio-economic environment; during construction and operation of the Ebola Virus Disease (EVD) treatment centre for Lilongwe. The ESMP predicts and describes impacts of the project; and outlines the enhancement and mitigation measures to be implemented by Ministry of Health and other key stakeholders. These impacts were determined through investigations carried out on and around the project site of the Ebola treatment centre; as well as consultations with key stakeholders.

1.4. **SCOPE OF THE ESMP STUDY**

This ESMP is specifically for the identification of impacts related to construction and operation activities at the Ebola Treatment Centre at KCH; focusing on waste management during operation and maintenance phases. Due to the fact that the septic tank and waste management systems being financed by the World Bank are connected to the EVD treatment centre, both in terms of construction, operations and maintenance, this ESMP considers all the potential environmental and social impacts together.

Preparation of the ESMP included the following activities:

- review of project reports, relevant literature and government regulations;
- identification and analysis of potential environmental and social impacts, which the project activities are likely to trigger and generate within and around the project site;
- determination of appropriate mitigation measures to minimize undesirable effects resulting from the proposed development;
- determination of costs of environmental management activities;
- preparation of an ESMP, which details the negative effects of the proposed project activities on the biophysical and socio-economic environment; and
- recommendations for future environmental protection during operation and maintenance of the EVD treatment centre.

1.5. **ASSESSMENT METHODOLOGY FOR THE ESMP**

The following assessment methods were employed in order to prepare the ESMP:

- a) surveys on the project site, to appreciate the magnitude of project activities and determine their environmental and social footprint. The surveys facilitated the collection of biophysical and social data and discussions with relevant stakeholders and surrounding communities;
- b) surveys of the waste management facilities at the hospital (incinerators and placenta pits) to appreciate the existing waste management and infection control practices;
- c) literature review on the policies, regulations and environmental standards for the ESMP preparation. The purpose of reviewing such documents was to develop a
comprehensive and guided policy and legal framework so that the ESMP is responsive and aligned with government’s and financiers’ policies;
d) interviews with key stakeholders including, The Hospital Director, Environmental Health Officer and Maintenance Supervisor at KCH;
e) interviews with key informants from the surrounding communities; affected directly or indirectly by the project; and
f) assessment of the socio-economic and the health-care systems data and prevailing national regulations, policies and standards.
CHAPTER 2 POLICY AND LEGAL FRAMEWORK FOR THE PROJECT

2.1 POLICIES

In Malawi, the overarching legislation is the 1996 Environment Management Act, currently under revision. The Malawi Guidelines for Environmental Impact Assessment were developed in 1997 and are also under revision. The Environmental Affairs Department determines whether an ESIA is required or not, for all projects. The Technical Committee on the Environment (TCE) reviews environmental impact assessment reports and makes recommendations to the Director, who reports to the National Council for the Environment (NCE). The NCE considers the recommendations and advises the Minister for approval and issuing the environmental certificate for the project to proceed. The Malawi national policies relevant to the activities for EVD preparation include:

2.1.1 The Constitution of the Republic of Malawi, 1995

The Constitution of the Republic of Malawi is supreme over any legal policy or Act in Malawi. Any Act of Government or any law that is inconsistent with the provisions of this Constitution shall, to the extent of such inconsistency, be invalid (Section 5). Hence the policies and legislation, relevant to the project activities have to be in line with the constitution.

In relation to the project, section 13 (c) dictates the provision of adequate health-care, commensurate with the health needs of the Malawian society and international standards of health-care. This is what the project as well as management of medical waste for the EVD aim to achieve. The proposed project must help improve rural life (section 13e).

Sections 13 (d) defines the role of the State as to manage the resources responsibly in order to prevent degradation of the environment, provide a healthy living and working environment for the people of Malawi, accord full recognition to the rights of future generations by means of environmental protection and sustainable development of natural resources and biodiversity of Malawi.

The proposed project at Kamuzu Central Hospital (KCH) must sustainably safeguard the people’s rights to a healthy living environment and protection of natural resources by ensuring that adverse impacts (particularly from medical wastes) on people and natural resources are avoided; and that mitigation measures are implemented for those impacts that cannot be avoided.


The Malawi Growth and Development Strategy II (MGDS II) is a decisive and strategic single reference document to achieve wealth creation through sustainable economic growth and infrastructure development. It acknowledges that a healthy population is key to increased productivity and sustainable economic growth. The following challenges facing the health sector are highlighted in the MGDS II: prevalence of preventable diseases, high mortality
rates, high prevalence of HIV, high incidence of malaria cases, high incidence of TB cases, limited access to maternal health services, low institutional capacity and inadequate supply of essential drugs and health infrastructure.

The project will improve infrastructure in readiness for EVD and improve capacity in infection control and provision of health interventions. All these are in line with the MGDS II.

2.1.3 The National Environmental Policy, 2004

The National Environmental Policy (NEP) developed in 1996 and revised in 2004 advocates for sustainable social and economic development through sound management of the environment and natural resources. Areas of priority include efficient utilization and management of natural resources; through involvement of the private sector, NGOs and communities for sustainable environmental management. The policy empowers communities to protect, conserve and sustainably utilize the nation’s natural resources and advocates for enhancement of public awareness and promotion of public participation.

In line with the requirements of the NEP, the proposed project has included participation of the local communities in the identification of potential impacts and development of appropriate mitigation measures.

2.1.4 The National Environmental Action Plan, 2002

The National Environmental Action Plan (NEAP) of 1994, updated in 2002, provides a framework for integrating the environment into all socio-economic development activities of the country. It documents and analyses major environmental issues and measures to alleviate them; promote sustainable use of natural resources in Malawi; and develop an environmental protection and management plan. The NEAP identifies the following as key environmental issues to be addressed, in relation to the proposed project: soil erosion, water resources degradation, air pollution and climate change. The NEAP also outlines actions to be undertaken to ensure adequate environmental protection. Hence the project must aim to protect the environment by avoiding as many of the significant impacts as possible in the first place; and where this is not possible, mitigation measures are to be implemented through management plans and monitoring has to be done effectively.

2.1.5 The National Water Policy, 2005

The overall goal of the National Water Policy 2005 is to provide an enabling framework for sustainable management and utilization of water resources, to provide water of acceptable quality and in sufficient quantities; and to ensure availability of efficient and effective water and sanitation services for every Malawian. In line with this policy, the project developers and administrators must: advocate for efficient utilization and management of water resources; participate or support efforts towards water resources conservation, harvesting and protection; ensure and promote proper management and disposal of wastes; properly dispose material that can pollute water resources; promote public awareness on guidelines and standards for water quality, public health and hygiene as well as pollution control.
2.1.6 Guidelines for Environmental Impact Assessment (EIA), 1997

The EIA Guidelines of 1997 outline the process for conducting ESIA to ensure compliance with the ESIA process as required in the Environment Management Act 1996. The Guidelines contain a list of prescribed projects for which ESIA is mandatory and those that may require an ESIA; hence they assist in environmental screening. The Guidelines require that no licensing authority issues any license for a project unless the Director of Environmental Affairs (DEA) has given consent to proceed, on the basis of a satisfactory ESIA or non-requirement of an ESIA. The EVD Treatment centre at KCH is being developed within the fenced and existing hospital premises. Hence it is an addition to the existing buildings and will comprise a pre-fabricated structure on a small area of land. An ESIA is not necessary in the case of this subproject.

2.1.7 National Construction Industry Policy, 2015

Construction of EVD quarantine/Treatment centres triggers the Construction Industry Policy, whose broad policy goals include to promote environmental sustainability in implementation of construction projects. In accordance with the policy goal, project implementers must ensure that the contractor protects the environment, in line with national and international policies for environmental sustainability. Other focus areas include disaster risk management; occupational health and welfare; gender; and HIV and AIDS.

2.1.8 Infection Prevention and Control Policy, 2006

This policy was formulated to guide health facility operators in development and implementation of infection prevention and control programs. It emphasises infection prevention and control programs at various levels of health-care delivery system for the public and private sectors. The policy also stipulates that all health-care facilities in Malawi shall have an active IPC program in place; aimed at promoting IPC practices and surveillance focusing on clients, patients, health-care personnel and the environment. Infection control measures to be enforced in the event of EVD must be in line with the existing infection prevention and control programs in the respective hospitals.

2.1.9 National Sanitation Policy, 2007

The policy stipulates the need for delivery of improved sanitation services in Malawi. Some of the strategies for accomplishing this objective include: (1) providing adequate wastewater disposal facilities at all wastewater generation points and (2) ensuring adequate provision of wastewater treatment and disposal facilities for all new piped water supply connections. One of the specific goals in the National Water Policy (NWP), is to ensure water of acceptable quality for all needs in Malawi. Wastewater and solid waste will be
generated in the EVD treatment centre. The Ministry of Health must therefore ensure that there are adequate wastewater disposal facilities.

2.1.10 Decentralization Policy, 1998

The Decentralization Policy was adopted in 1998 to:

- Devolve administration and political authority to the district level;
- Integrate governmental agencies at the district and local levels into one administrative unit, through the process of institutional integration, manpower absorption, composite budgeting and provision of funds for the decentralized services;
- Divert the centre of implementation responsibilities and transfer these to the districts;
- Assign functions and responsibilities to the various levels of government; and
- Promote popular participation in the governance and development of districts.

Through the Decentralisation Policy, some of the roles of the authority at district level are to implement or facilitate development projects; to ensure development projects in their area are implemented in a sustainable manner; and to mobilize masses for socio-economic development at the local level. Therefore, for effective implementation of the project, the MoH must work closely with Lilongwe City Council. The Decentralisation Policy also provides for provision of environmental services such as refuse disposal, sewage removal and disposal, environmental reclamation, and environmental education. MoH must use the existing environmental services where they are not in capacity.

2.1.11 Revised Decentralized Environmental Management Guidelines, 2012

The Decentralized Environmental Management Guidelines (DEMG) were adopted in 2012 to address gaps and inconsistencies from other previous guidelines including the DEMG, 2002 and help ensure that Councils include emerging and critical environmental issues in the preparation of district plans and actions. The DEMG aims at guiding stakeholders to manage the environment and natural resources in a sustainable manner.

In line with the Decentralization Policy, the DEMG promotes local level environmental management, including planning, implementation, monitoring and evaluation.

2.1.12 Malawi Standards (MS) 615: 2005: Waste within health-care facilities, handling and disposal (code of practice)

This standard provides criteria for segregation, collection, movement, storage and on-site disposal of waste within health-care units and biological research facilities, among others. The standards must be observed at the EVD Quarantine/Treatment Centres. The hospital incinerators are being procured by the MoH in accordance with established international standards and no permits are required to have them installed or operated.
2.2 LEGAL FRAMEWORK

2.2.1. The Environment Management Act, 1996
The Act is the legal basis for protection and management of the environment; and the conservation and sustainable utilization of natural resources. Section 24, specifies the types and sizes of activities that require an ESIA before implementation. The Act further outlines the ESIA process to be followed in Malawi; and requires compliance with the process. Non-compliance with the ESIA requirements is an offence and attracts penalties.

The Act also recognises that improper waste disposal can impact various environmental and social resources and therefore regulates the management, transportation, treatment and recycling; as well as safe disposal of waste. The project, therefore, has to be implemented in an environmentally responsible manner to ensure protection of the environment and sustainable utilization of natural resources.

2.2.2. Public Health Act, 1966
The Public Health Act 1966 seeks to preserve public health through the following provisions relevant to the project:

- Parts III, IV, V, VI and VII discuss infectious and epidemic diseases and how to handle them. The Act dictates notifying the Ministry of Health, when diseases such as T.B., Cholera and Measles are identified. A full list of notifiable diseases is presented in Part III. Medical personnel, project managers and family members have to follow the provisions given in the Act, which among others include isolating the patients and allowing medical personnel to attend to the patients.
- Part IX of the Act relates to sanitation and prohibited nuisances. Contractors have to ensure that there are sanitary structures; vehicles and that any other materials used are not in a state that can cause accidents; machine smoke cannot cause injuries to health; and that all material defined as nuisance are not in the work place.
- Part X has provisions for conservancy; sewerage and drainage; and encourages new buildings to have sewage systems, either private or public (connecting to the local authority sewerage). The Act also guides the protection of sewerage systems by preventing the throwing or emptying of waste that may injure the sewer, affect free flow of contents or affect treatment of sewage.

The provisions of the Public Health Act are to be followed and any deviation from the Act is punishable by fines and imprisonment. The Act gives the local authorities the right to inspect any premises for compliance with the Act.

2.2.3. The Water Resources Act, 2013
The Water Resources Act of 2013 supersedes the 1969 Water Resources Act and aims at improving on already existing water resources management efforts in the country. The Act is administered by the Water Resources Authority under the Ministry of Agriculture, Irrigation and Water Development. The Act requires any developer discharging wastewater
(effluent) into surface water ecosystems to have an “Effluent Discharge” permit. One of the conditions in the permit is the need to comply with discharge quality limits for effluent, in accordance with applicable Malawi Standards or any relevant international standards.

2.2.4. **Occupational Safety, Health and Welfare Act, 1997**

The Occupational Safety, Health and Welfare Act has provisions for the registration of a workplace and the regulation of the conditions of employment in workplaces; with regard to the safety, health and wellbeing of employees. The Act provides for inspection of plant and machinery, for the prevention of accidents in the workplaces, including government establishments and operations, as well as building and civil engineering construction works (Section 5). It requires that employees are provided with appropriate protective clothing and equipment to prevent accident and injury.

The project will comply with the Occupational Safety, Health and Welfare Act. Workers will have to be provided with appropriate protective clothing to prevent accidents related to the construction and operation functions; and breathing masks, ear muffs and goggles where they will be exposed to potential risks and offensive substances; as required by Sections 58, 59, 60.

2.2.5. **National Construction Industry Act, 1996**

The Act provides for the establishment of the National Construction Industry Council of Malawi (NCIC), for the promotion and development of the construction industry, registration of persons engaged in the construction industry in Malawi, co-ordination of training of persons engaged in the construction industry and general matters incidental thereto. The NCIC is responsible for regulating the construction industry in Malawi through among others: registering consultants and construction firms, standardising quality control, codes of practice, procurement process; and legal contractual procedures in liaison with other organisation. In accordance with the Act, the NCIC must be involved in identifying the contractors, ensuring that a quality contract is in place, resolving conflicts between contractor and client and ensuring that quality structures are developed.

2.2.6. **The Local Government Act, 1998**

The Local Government Act was enacted to further democratic principles, accountability, transparency and participation of the Malawian people in the decision making and development process. According to the Act, District Councils have the mandate to: promote infrastructure and economic development (Section 6 (c)); establish, maintain and manage services for the collection, removal and disposal of solid and liquid waste (second schedule 2(a). Construction and operation of the EVD Treatment Centre will generate both solid and liquid waste; hence there is need for the developer and contractors to work with the relevant district councils in waste management and disposal in the project areas, in line with the provisions of the Act. During the operation phase medical and domestic wastes will be generated. It will be important to involve the respective district councils in the managing of these wastes.
The Local Government Act also provides for local governance structures through which this Environmental and Social Management Plan must be implemented. These include:

- The District Executive Committee (DEC), which is responsible for implementation of all aspects of the District Development Planning System (DDPS).
- The District Environment Sub-Committee (DESC), which is the focal point on issues of the environment. It acts as a multi-disciplinary forum for environmental management and comprises environmental and natural resources management sector district officers. Some of the functions of the DESC include appraising micro-projects and facilitating their development; conducting awareness campaigns on environmental and natural resources management; and developing capacity on sustainable environmental management at community level so that issues of environment are integrated into decision-making process and planning systems.

### 2.3 ADMINISTRATIVE FRAMEWORK

The mission of the Ministry of Health (MoH) is to raise the level of health of all Malawians by reducing incidences of illness and death of the population. To achieve this, the major objective of MoH is to deliver health services and disseminate health information to the general public. The MoH has the directorate of Administration, Finance, Technical Support Services, Planning and Policy Development, Clinical Services, Nursing Services, Reproductive Health, Physical Assets Management, Pharmaceutical Services and Preventive Health Services (PHS); and a number health institutions throughout Malawi.

The health institutions are categorised into referral (major) hospitals, district hospitals, health centres and clinics. MoH is headed by the Minister of Health who handles policy issues, while operational issues are handled by the Principal Secretary. At district level, there is the District Health Officer (DHO) who is responsible for effective and efficient delivery of quality health services in the district and the District Medical Officer (DMO) in charge of medical services.

Construction activities for the KCH EVD treatment centre, are being implemented by the Department of Planning and Policy Development (DPPD) in the MoH, working hand in hand with the Ebola Coordination Unit under the directorate of Preventive Health. Management of the EVD treatment centre during the operation phase will be done by Kamuzu Central Hospital together with the local council with assistance from the Ebola Coordination Unit.

### 2.4 THE WORLD BANK SAFEGUARD POLICIES

The World Bank has keen interest in protection of the environment, for investment projects they support, in line with its ten environmental safeguards policies. These policies provide guidelines, aimed at preventing and mitigating undue harm to people and the environment, when implementing development projects. The environmental safeguard policies, which provide a platform for the participation of stakeholders in project design and implementation, are:

- a) Environmental Assessment (OP/BP 4.01)
- b) Forests (OP/BP 4.36)
c) Involuntary Resettlement (OP/BP 4.12)
d) Indigenous Peoples (OP/BP 4.10)
e) Safety of Dams (OP/BP 4.37)
f) Pest Management (OP 4.09)
g) Physical Cultural Resources (OP/BP 4.11)
h) Natural Habitats (OP/BP 4.04)
i) Projects in Disputed Areas (OP/BP 7.60)
j) Projects on International Waterways (OP 7.50)

This project triggers OP 4.01 on Environmental Assessment. This is because moderate environmental and social impacts are anticipated since the construction works and waste management activities will be primarily confined to within the existing hospital building premises.

2.4.1. Environmental Assessment (OP/BP 4.01)

The objective of Environmental Assessment is to ensure that project activities are environmentally sound and sustainable and that decision-making is improved through appropriate analysis of actions and mitigation of their likely environmental impacts. This policy is triggered if a project is likely to have potential adverse environmental risks and impacts in its area of influence. *Construction of the EVD Treatment Centre may have negative environmental impacts, which require mitigation. Hence this ESMP has been prepared.*
CHAPTER 3 DESCRIPTION OF THE PROJECT AND COMPONENTS

3.1 THE EVD TREATMENT CENTRE FOR KAMUZU CENTRAL HOSPITAL

Ebola Virus Disease (EVD) preparedness activities in Malawi include the development of a Treatment Centre, dedicated septic tank and ash pit at Kamuzu Central Hospital (KCH). The proposed centre is being financed by the Government of Malawi and will be used for isolation and treatment of EVD suspected and confirmed cases in the Central Region. Careful attention has been paid to isolation (case – case, patient-health care worker, case – visitor), ventilation of the facility, hand hygiene, safe water supply, sanitation and waste management. This is supported by fund allocations under Component 1 of this project for infectious disease management training and surveillance programs targeting district health officials, frontline staff and community.

The EVD Treatment Centre was designed by KCH and the floor plan is as in figure 3.1.

![Figure 0.1: The floor plan for the proposed EVD shelter at Kamuzu Central Hospital](image-url)
The main consideration in the design is infection prevention and control. Hence careful attention has been paid to isolation (case – case, patient-health care worker, case – visitor), ventilation of the facility, hand hygiene, safe water supply, sanitation and waste management.

3.2 COMPARISON OF THE KCH DESIGN AND THE DESIGNS BY MOH

The EVD Treatment Centre currently under construction at KCH has a floor area of 10.0 by 17.060 metres. As shown in figure 3.1; it has a Nurses Station, a Change room, a Disinfection Room, a Bed area, 2 wash rooms for the bed area and 1 wash room for the healthcare workers.

A comparison between the design of the EVD Treatment Centre in figure 3.1 and the standard design for referral hospitals (figure provided in Annex 4) reveals that the proposed structure is similar to the Isolation wards being funded by the World Bank albeit smaller. Therefore the MoH is designing a new plan which extends the facility (by including/adapting the ward for confirmed cases as in the figure of Annex 4). These modifications will make it similar to the proposed EVD Treatment Centres in the other referral hospitals.

3.3 WASTE DISPOSAL SYSTEMS

3.2.1. Liquid Waste Disposal

The EVD treatment centre shall have a dedicated septic tank for liquid waste disposal and treatment that is being funded under this project. The septic tank is a typical two chamber septic tank and a soak-pit. The design by MoH provides for specifications which are to be strictly adhered to during construction. Among others, these specifications include the size of the tank, cement mix ratios, walls thickness, materials to be used and the suitability of different types of soils for effluent disposal. Coarse sand or gravel with no clay silt is specified for disposal of effluent from the soak-pit. The specifications in general, aim at ensuring that there are no pollution effects. The design of the septic tank is provided in figure 3.2.
3.2.2. Solid Waste Disposal

All solid waste from the EVD Quarantine Centre is considered infectious. Hence, all the solid wastes will be treated in an incinerator and the ash will be disposed in a well-covered ash pit.

At KCH there is an existing high temperature, two chamber mechanical incinerator about 30 metres away from the site for the proposed EVD treatment centre. The incinerator is new (installed in 2015) and is working well. It is big and it can take in additional waste and designed to handle all infectious hospital waste, including that to be generated from the EVD treatment centre. Therefore, it is proposed that the EVD treatment centre will use it for incineration of the waste. Since the ash pit is absent however, this project will also finance construction of an ash pit. The architectural design for the proposed ash pit is provided in Annex 5.

3.4 CONSTRUCTION MATERIALS

All construction materials used for the Ebola Virus Disease Treatment Centre at Kamuzu Central Hospital are being sourced locally. A list of the main materials is provided in Table 3.1:

<table>
<thead>
<tr>
<th>Structure</th>
<th>Characteristic feature</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor</td>
<td>Concrete slab with cement finish</td>
<td>cement, sand, concrete, wire mesh, damp proof membrane</td>
</tr>
<tr>
<td>Wall</td>
<td>Plaster and steel windows</td>
<td>burnt bricks, sand, steel, paint</td>
</tr>
<tr>
<td>Roof</td>
<td>Roof sheets and trusses</td>
<td>corrugated iron sheets, timber trusses</td>
</tr>
</tbody>
</table>

3.5 CONSTRUCTION WORKS

Construction activities of the treatment centre have already taken place, but works have stopped until an environmental and social management plan is in place. A local contractor has been engaged by MoH to construct the EVD treatment centre. The construction team consists of 20 people, including the supervisor builders and labourers. Currently the walls have been erected and the building has been roofed as shown in figure 3.3.

Figure 0.3: The EVD Treatment Centre under construction at KCH
CHAPTER 4 ENVIRONMENTAL AND SOCIAL SETTING

4.1 PROJECT SITE LOCATION AND ACCESSIBILITY

The project site is at Kamuzu Central Hospital (KCH) in Lilongwe City, the Capital City of Malawi. Lilongwe City is in Lilongwe District, the largest district in the Central Region of Malawi. The district is bordered by Dedza District to the East and Salima District to the North East. Mchinji District marks the western border. Dowa District lies to the north of Lilongwe with Kasungu to its North-western tip and the Republic of Mozambique to the South West. Figure 1.1 shows the location of the district on the map of Malawi.

Figure 0.1: Map showing location of Lilongwe District and Lilongwe City
Source: Lilongwe District Socio Economic Profile
Kamuzu Central Hospital (KCH) is in Area 33 and is accessed through Mzimba Street which starts from the M1 road at the Cross Roads Roundabout. There are many roads that connect to Mzimba Street including Kenyatta Drive, Chilambula Highway and Lubani Road. Hence, the hospital can be accessed from many directions. The project site can be accessed through the main entrance to the hospital by immediately taking the right turn after entering the hospital premises.

Using Universal Transversal Mercator Coordinates, the project site is at 36L 584653 m E and 36L 8454607 m S. Figure 4.2 is the satellite image of KCH including the proposed site.

Figure 0.2: Satellite image of Kamuzu Central Hospital and the EVD Treatment Structure

4.2 PROJECT SITE SELECTION

The site for the project was selected by KCH because of the following reasons:

- The site is used for infections that require isolation, for example Cholera. Hence it is not frequently visited by people and therefore it is isolated;
- The site can be easily be accessed by healthcare workers as it is within the hospital compound and it would be easily accessed by EVD suspected or confirmed cases as it is right after the entrance; and

4.3 BIO-PHYSICAL CHARACTERISTICS OF THE PROJECT AREA

4.2.1. Topography and Drainage

Lilongwe District is characterized by extensive plains lying at mid-altitude between 1,000 - 1,400 metres above sea level, with isolated inselbergs rising above this level. The hospital
lies at an altitude of 1242 – 1267 metres above sea level. The landform at Kamuzu Central Hospital is slightly flat, gently sloping to Lilongwe River, which runs at the south and east of KCH as shown in figure 4.3. There are a number of draws running from KCH which drain rain water into the Lilongwe River. One of these is near the project site and is a spot for soil erosion (see figure 4.4).

Figure 0.3: Topography and Drainage of Kamuzu Central Hospital and the proposed site

Figure 0.4: An erosion spot near the project site

Figure 0.5: Sloping terrain of the project site
4.2.2. Air Quality/ Air pollution

Lilongwe District does not have a comprehensive air quality database. However, in general, air pollution is not a significant problem in Malawi. The National Environmental Action Plan (2002) identifies gaseous emissions from industries, car exhaust fumes as well as burning of old tyres as the main cause of air pollution in urban centres in Malawi. At Kamuzu Central Hospital the major source of air pollution is incineration of wastes. Since, emissions from incineration accumulate in the air, resulting in significant environmental impacts, solid wastes from the project must be managed carefully.

4.2.3. Geology and Soil

Lilongwe is underlain by Precambrian basement rocks comprising mainly of volcanic and metamorphic rock. The project site is in an area where hard rock formation is close to the surface; hence retarded infiltration of water into the ground. The rocks are low to moderately aquifer and the water table is low.

The soils at the project site are a representative of Ferruginous soils of Latosols group. The soils are basically, dark red sandy clay.

4.2.4. Flora and fauna

The project site is mainly covered by a garden lawn and there is no natural vegetation. Since the site is in an already developed area, there is also no significant population of fauna.

4.2.5. Climate

The climate in Lilongwe is warm and temperate. The dry season is from August to October and the Rainy Season is usually from November to mid-April.

In a year, the average monthly temperature is 20.3°C, with a mean monthly maximum of 23.6°C in November; and a mean monthly maximum of 15.9°C in July. On the other hand, the average rainfall in a year is 860 mm. The greatest amount of precipitation occurs in January, with an average of 225 mm; while the driest month is August, with 0 mm of rain. Figure 4.5 shows the average monthly temperature and rainfall for Lilongwe District.
4.4 SOCIO-ECONOMIC CHARACTERISTICS

4.3.1 Population

As at 2008 National Population Census, the population for Lilongwe was 1,230,834; distributed between Lilongwe Rural and Lilongwe City as follows:

Table 0.1: Population of Lilongwe as at 2008 National Population Census

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lilongwe Rural</td>
<td>600,326</td>
<td>630,508</td>
<td>1,230,834</td>
</tr>
<tr>
<td>Lilongwe City</td>
<td>344,890</td>
<td>329,558</td>
<td>674,448</td>
</tr>
<tr>
<td>Total</td>
<td>945,216</td>
<td>960,066</td>
<td>1,905,282</td>
</tr>
</tbody>
</table>

From the table 4.1, it is seen that there were more people in the rural areas than in the city and there were more females than males. This has trend has continued, as reported by the NSO population projections for 2016 (Table 4.2).

Table 0.2: 2016 Projected Population for Lilongwe District

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lilongwe Rural</td>
<td>728,036</td>
<td>762,605</td>
<td>1,490,641</td>
</tr>
<tr>
<td>Lilongwe City</td>
<td>559,741</td>
<td>538,426</td>
<td>1,098,167</td>
</tr>
<tr>
<td>Total</td>
<td>1,287,777</td>
<td>1,301,031</td>
<td>2,588,808</td>
</tr>
</tbody>
</table>

A comparison of the statistics from the two tables indicates a significant population increase of about 36 percent. According to the NSO Population Projections, the population of Lilongwe will continue to increase. Hence infrastructure development must be planned to support the rapid population increase. The 2008 Census also established that rural areas have high literacy rates and the cities have high population densities. This must be considered in the project, for example through designing EVD communication tools which the rural masses can understand for enhanced contact tracing in the City.
The population in Lilongwe is distributed among the following Traditional Authorities: Chadza, Kalolo, Chiseka, Mazengera, Chitekwere, Khongoni, Chimutu, Chitukula, Mtema, Kalumbu, Tsabango, Kalumbu, Njewa, Malili, Kabudula, Masula, Masumbankhunda and Mbang’ombe. These are local leaders and are culturally respected. Hence they must be involved in the implementation of the project and the ESMP in order to effectively reach the rural population.

4.3.2 Migration

Using statistics in Table 4.1 and Table 4.2 it can be observed that the rural – city population gap has been decreasing. This is as a result of rural – urban migration. According to NSO migration report, there are more people leaving Lilongwe rural and other districts for the City in comparison with the people that leave the City. In the 2008 National Population Census, 14,000 people in the City were enumerated to have been born in Lilongwe Rural.

The 2008 National Population Census also showed a 41.5 % population increase over 10 years from 1,346,360 in 1998 to 1,905,282 in 2008. This cannot be attributed to the birth and death figures only. The 41.5 % (and the projected 36 percent in 2016) increase, according to the Lilongwe District Socio economic profile (2011), can be explained by a high in-migration. The NSO migration report indicates that the City has a 41.2 net immigration percent. This shows that a lot of people come to stay in the City from other districts and countries. Since EVD spreads from one country to another or one district to another through migration, EVD preparedness activities must include the large number of people that immigrate to Lilongwe. Reasons for in-migration include school, work, businesses, farming and marriages. Similar reasons also influence out-migrations.

4.3.3 Economy

Over 90% of the Lilongwe population living in the rural areas derive their livelihood from agriculture. Food crops mostly grown include maize, cassava, sweet potatoes, potatoes, beans, groundnuts, Soya beans and cowpeas. Upland rice is also produced in some areas such as Ukwe, Mkwinda, Thawale, Ming’ongo, Chileka, and Demera Extension Planning Areas (EPA). On the other hand cash crops that are grown include Tobacco (Flue, Burley and NDDF), soya beans, groundnuts and paprika. Coffee is also produced at Mbabzi Estate in Ukwe EPA.

People in the city rely on employment in the civil service and commerce and industrial activities. The civil service employs about 27 percent of the city’s work force\(^2\). The commerce, trade and industry sector is by far the major employment generator and the driving force of economic activities in the district.

The private sector employs about 40 percent and 24 percent are self-employed. Although data is limited, the informal sector is estimated to employ a significant proportion of the labour force. Trading activities in the district include hawking, vegetable selling, second hand clothes selling, fish selling, wholesalers, retailers, hardware, bars and bottle stores,

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\(^2\) Malawi: Lilongwe Urban Profile (2011)
butchery, sugar selling, food vending, chips selling, fuel wood, charcoal and brick selling. Service activities available in the district include tailoring, accommodation, hair dressing, welding battery charging, shoe repairing, laundry, milling, radio repairing, building, hairdressing, minibus operating, motor vehicle repairing and telephone bureaus. There is a small food market near the project site outside the hospital fence. Food and commodity vendors of this market will benefit from the construction workers. The project will also be a source of employment for builders and labourers and a source of income to construction materials manufactures and sellers in the district.

4.3.4 Water, Electricity, Telephone and Internet Services

Lilongwe Water Board (LWB) is responsible for provision of water supply and waterborne sanitation services as mandated by the Waterworks Act, 1995. LWB abstracts its raw water from Lilongwe River. According to information on their website (www.lwb.mw), the raw water is of low quality, mainly during the rainy season, due to the nature of the environment along the river course. The river passes through a rural agricultural area where the environment is heavily degraded. The raw water is very turbid and has high microbial content during the wet months, due to excessive run-off water which carries soil particles, nutrients and other wastes that are deposited into the water bodies. This is because people have encroached the protected areas along the river banks for cultivation and settlement. The raw water undergoes screening, coagulation and flocculation, sedimentation, filtration and disinfection before it is supplied to the consumers. The water supply is relatively reliable and the hospital has reservoir tanks as back up when there is no supply.

Electricity is supplied by the Electricity Supply Cooperation of Malawi (ESCOM). Like the rest of the country, the district experiences intermittent power supply. The hospital is however connected to special lines which are rarely switched off. Hence power supply is almost always available. In addition, the hospital has adequate diesel generators for backup power supply.

Telecommunication services are supplied by the Malawi Telecommunications Limited (MTL) and mobile phone networks (AIRTEL, TELKOM and ACCESS). Internet services are mainly provided by Globe Internet and Skyband. The phone companies also provide internet services.

4.3.5 Health Services

Health services in the district are provided at the three levels of: primary, secondary and tertiary. At primary level, services are delivered through rural hospitals, health centres, health posts, outreach clinics and village health clinics. District and CHAM hospitals provide secondary level health care services to back up the primary level services; while tertiary hospitals provide services similar to those at secondary level, along with a range of specialist surgical and medical interventions.

There are four major hospitals in the districts; Kamuzu Central (area 33), Bwaila/Bottom (area 1), Likuni Mission (area 57), and Dae Young Luke hospital (area 27). There are 33 public and private health centres and clinics run by the government, Lilongwe City Council,
the private sector, and CHAM. The main challenges facing the health sector include high cases of malaria, high HIV and AIDS prevalence rates, high shortage of equipment and facilities, shortage of qualified medical staff in the hospitals and clinics, limited capacity, and poor sanitation and hygiene.

4.5 SPECIAL CHARACTERISTICS OF KAMUZU CENTRAL HOSPITAL

4.4.1. Infrastructure

Kamuzu Central Hospital was opened on 4th of November, 1977. It has 1,000 beds, though the actual number of patients always exceeds the number of beds. The hospital infrastructure accommodates several departments including the Outpatient, Casualty, Eye, Maternity, Tuberculosis, Radiology, Pharmacy, Casualty and the Laboratory departments. In addition, there are a number of patient’s wards, the administration blocks, UNC project and the Ethel Mutharika Maternity Wing. The hospital infrastructure is old, except for the Ethel Mutharika Maternity wing and a few other structures.

The site for construction of the EVD Centre is near a Cholera shelter, which is a slab and a tent. There is also a mortuary, an incinerator and an office for the incinerator manager about 30 metres from the proposed EVD Treatment Centre.

4.4.2. Liquid Waste Management

Liquid waste for Kamuzu Central Hospital is disposed in sewer lines which connect to Lilongwe City Council’s sewage works. The Sewage Treatment Plant for the Council is at Kauma and effluent is discharged in Lilongwe River. The sewage works for Lilongwe City Council is characterised by the following:

- Poor data management, collection and analysis;
- Inadequate repair and maintenance;
- Several unfilled staff positions, spreading the staff too thin;
- Inadequate treatment and removal of sludge from ponds;
- Lack of monitoring of effluent quality.

During studies conducted by this consultant\(^3\) in 2013, it was observed that the effluent which was discharged into the environment at Kauma was alkaline (pH value of 10.1) with high dissolved oxygen (8.3 mg/l) and high suspended solids (68 mg/l). This was possibly due to the algae, which had overgrown at that time. Considering the infectious nature of wastes from an EVD Treatment Centre and the performance of the Lilongwe City Council’s sewage works, liquid waste from the centre must be treated in a septic tank. By using a septic tank for the EVD Treatment Centre, the area potentially exposed to infection is limited to inside the hospital fence.

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\(^3\) Consultant- Kent Kafatia: The studies were conducted for a Sanitation Plan for City of Lilongwe
Kamuzu Central Hospital mainly uses flush toilets for human wastes. There are however, frequent blockages due to improper use of the toilets. In addition, the plumbing system in the old building is decayed, rusty and needs to be replaced (see figure 4.7). During the consultations, it was established that there is a report of blockage of the sewerage system and overflowing of sewage in the wards, almost every week.

![Rusty and decayed plumbing pipes](image)

Figure 0.7: Rusty and decayed plumbing pipes

The EVD Treatment Centre will not connect to any of the KCH’s plumbing systems. It is however recommended that the hospital implement a phased approach to address ongoing issues with operations and maintenance of the plumbing system.

### 4.4.3. Solid Waste Management

Infectious solid waste management at Kamuzu Central Hospital is through incineration. At the point of generation (i.e. wards, laboratory and other departments) solid waste is segregated into sharps (e.g. syringes), infectious waste (e.g. gloves) and non-infectious waste (e.g. papers) and collected in separate receptacles. Segregation is however inadequate due to lack of awareness of best practices for managing the waste, negligence among some healthcare staff and inadequate receptacles. It was observed that in most of the wards there are only two receptacles; for infectious waste and sharps. Hence general waste is mixed with infectious waste. At the laboratory, the situation is different as there are adequate receptacles and the management is strict in ensuring that there is adequate segregation.

Figures 4.8 and 4.9 are receptacles in the wards and the laboratory respectively. The receptacles are colour coded and/or labelled. However in the wards, most of the receptacles do not have bin liners and a cover. During the consultation it was established that the hospital does not frequently buy bin liners due to inadequate funding. When there is funding, ordinary plastic liners (as compared to the standard biohazard bags/bin liners which are expensive) are bought. At the laboratory however, the receptacles are appropriately fitted with bin liners. The laboratory receives funding from other donors and projects including the Early Infant Diagnosis Fund. Hence, it rarely runs out of bin liners.
When full, the receptacles are emptied into 200 litres wheeled bins which are kept in a closed waste collection area, in the respective wards and laboratory. Between 8 and 10 am, and 2 and 3 pm every day, the bins are wheeled to the waste disposal area by hospital support staff for incineration.
Kamuzu Central Hospital has a high temperature and mechanical incinerator which was installed in 2015 through a donation from its international partners. The incinerator uses diesel fuel and has the ability to burn 300 – 500 kg waste/batch, 3 to 6 times a day. It has two chambers; the first chamber is where wastes are loaded and burning takes place (figure 4.10 shows the door of the first chamber); whereas the second chamber allows for re-burn of harmful emissions, thereby reducing air pollutants. The incinerator also has a tall chimney for ensuring that emissions are dispersed at high levels for effective dispersion. The incinerator is in excellent condition and has the capacity and design specifications to properly handle additional highly infectious waste from the new Ebola treatment centre.

During the site visit and consultations, it was observed that there is no closed waste storage area and wastes are kept in the wheelie bins before they are loaded into the chamber of the incinerator. However KCH does not have enough wheelie bins such that some waste is stored on the open ground before loading the incinerator (see figure 4.13).
There is also no ash-pit at KCH. Hence ash is thrown into a skip which is also used for kitchen waste and other general waste. The skip is carried away by a private waste collector every day in the morning and the waste is disposed at Lilongwe City Council’s waste disposal site.

Incinerator operators have been trained to use and maintain the incinerator according to standards set by the Government of Malawi and in line with international best practices. There issues however with a lack of adequate basic personal protective equipment i.e. gumboots, uniforms, mouth and nose masks and heavy duty gloves. Shovels for loading wastes into the chamber are also in short supply.

**CHAPTER 5 IMPACTS OF THE PROJECT**

Construction and operation of the Ebola Virus Disease quarantine centre at Kamuzu Central Hospital in Lilongwe will have both positive and negative impacts on the bio-physical and social-economic environment

5.1 IDENTIFICATION OF THE POTENTIAL IMPACTS

5.1.1. Literature review

The consultant reviewed a number of documents including the Lilongwe Socio-economic Profile and the World Health Organisation (WHO) manual for the care and management of patients in Ebola Care Units. The documents were reviewed to obtain a clear description of the environment in which the project will be implemented, the activities during operation and the anticipated impacts. The WHO has also prepared guidelines for environmental management and infection control in Ebola Units and these have been included in the mitigation measures of some of the anticipated impacts. A list of documents reviewed is indicated in the references.

5.1.2. Site Investigation and Stakeholder Consultations

Site investigation and consultations with key stakeholder were carried out, focussing on the identification of critical environmental and socio-economic elements likely to be affected during implementation project. The consultant particularly visited the hospital departments, the project site and access areas and the waste disposal area including the incinerator. Prior to the site visits, the consultant conducted a Focus Group Discussion with the key stakeholders. A list of people consulted is included in appendix 2.

5.1.3. Study of satellite images

Stakeholder consultations were conducted with key hospital staff including the District Health Officer, District Medical Officer, Environmental Health Officer and others. The list of people consulted is in annex 2 while key issues which were raised in the consultation are in annex 3.

5.2 DESCRIPTION OF POSITIVE IMPACTS

Page | 30
5.2.1. Positive impacts during planning phase

The main activities during this phase include:

i. Training and sensitizations;
ii. Designing of the EVD Treatment Centre;
iii. Assessment of existing infrastructure;
iv. Identification of the contractor; and
v. Identification of the project site.

Anticipated significant impacts from the above activities will be as follows:

5.2.1.1. Increased knowledge and skills in infection control and prevention

The hospital staff that attended the training and sensitization in Ebola Virus Disease case management, Infection Control and Waste Management acquired knowledge and skills which can also be applied to the management of other infectious diseases.

The following measures can help to enhance the impact:

i. Ensure that the Health Care Waste Management Plan completed for the Nutrition and HIV/AIDS Project is implemented and strictly followed to address impacts due to operational activities.
ii. MoH must use standardised procedures when selecting people to participate in trainings to ensure that some people do not feel that they have been left out;
iii. Trained people must sign agreement forms to be available during an outbreak;
iv. Ensure that the trainings are continuous and that many more people are trained and sensitised; and
v. Conduct simulation exercise to firm up EVD response in case there is an outbreak.

5.2.2. Positive impacts during construction phase

Main activities during the construction phase include:

i. Site clearing and excavations for foundation trenches;
ii. Construction of a concrete slab;
iii. Roofing of the building;
iv. Excavation for the septic tank; and
v. Construction of the septic tank as well as installation of incinerators.

4.4.3.1. Employment opportunities

The construction works will provide employment opportunities for builders and labourers. During operation, the facility may also require skilled personnel (e.g. nurses and laboratory assistants); and unskilled workforce (e.g. guards and cleaners).

Enhancement Measures

i. The contractor must observe local labour laws;
ii. Labourers must be fairly treated; and
iii. Workers must be paid fairly for the services rendered.

4.4.3.2. Income to material/equipment suppliers

Construction of the treatment centre will require cement, sand, paint, iron-sheets and other materials. This will provide business opportunities for local materials suppliers hence increased income. The impact can be enhanced by paying suppliers within the agreed time. Local suppliers must also be encouraged to supply quality products. Procurement of construction material should only be permitted from licensed/authorized seller and quarries. This should be specified in the contractor’s agreement.

5.2.3. Positive Impacts during the Operation and Maintenance Phase

5.2.3.1. Increased space for medical services

The EVD Treatment Centre will be an additional infrastructure to the hospital; hence increased space for medical services. The centre will also have a conference room and rooms which can be used for other activities, including staff training, during times when there is no Ebola outbreak.

The impact could be enhanced by taking proper care and maintenance of the EVD Treatment Centre; and ensuring the Centre is not misused.

5.2.3.2. Improved EVD surveillance, isolation and treatment

The project will support surveillance and ready access to isolation and treatment of the Ebola Virus Disease suspected cases and patients. The related trainings will increase knowledge in EVD surveillance to ensure Ebola cases are identified through early warning; the trainings will help improve capacity to handle EVD cases; and the infrastructure will provide space to adequately isolate and provide treatment to EVD cases. These efforts will be further supported under the infectious disease management training and surveillance programs targeting district health officials, frontline staff and community members that are a part of this Ebola response project.

The impact can be enhanced by:

- Providing staff that has been adequately trained in EVD case management, use of equipment and use of PPEs; and
- Ensuring that the Treatment Centre has enough supplies all the time; and
- Ensure that the Health Care Waste Management Plan completed for the Nutrition and HIV/AIDS Project is implemented and followed to address potential environmental and health impacts due to operational activities

5.3 DESCRIPTION OF NEGATIVE IMPACTS

5.3.1. Impacts during the planning and design
There will be no significant impacts on the biophysical and socio-economic environment in this phase.

5.3.2. Impacts during construction

5.3.2.1. Noise and vibration disturbances

Noise and vibration impacts during construction will be related to the use of cement mixers, electricity generators and other machinery. Construction works such as excavations, roofing and metal fabrication activities are also a source of noise. In addition noise is expected from the vehicles delivering construction materials and the construction team itself. The noise will negatively affect the workers and the mourners at the morgue and other people at the hospital.

Mitigation measures include the following:

- Workers and visitors should wear ear muffs during loud noise activities;
- Construction works should be carried out during normal working hours of the day;
- The contractor must use efficient and low noise making machines; and
- Noise reduction measures such as insulators should be applied.

5.3.2.2. Utilizing unlicensed quarry sites

Construction of the treatment centre will require cement, sand and concrete. Indiscriminate mining activities can take place in sensitive areas and create depressions that often block surface drainage system and create pools of stagnant water. Such pools of stagnant water are breeding grounds for mosquitoes.

Mitigation measures include:

- Identify licensed quarries with the suitable materials for construction.
- Procure construction material only from permitted sites and licensed / authorized quarries

5.3.2.3. Use of lead-based paint products

Lead is commonly absorbed into the body by inhalation from use of and/or scrapping of lead-based products like paint. When workers breathe in lead as a dust, fume, or mist, their lungs and upper respiratory tract absorb it into the body. They can also absorb lead through the digestive system if it enters the mouth and is ingested.

Mitigation measures include:

- Ensuring that no paint containing lead or lead products are used.
- Provide facemasks to workers if a surface with lead paint is rubbed and scraped for removal.
5.3.2.4. Risk of Spread of STIs and HIV/AIDS

Enhanced social interaction with the construction employees, most of whom are likely to come from other parts of the country, with the residents (considering the influence of money) is a potential avenue for transmission of HIV/AIDS and other social infections.

Mitigation measures include to:
- Awareness meetings shall be conducted as a part of all construction employee orientation programs; and
- Employees shall be provided with condoms for protection from STIs.

5.3.2.5. Waste generation, defacing and degradation of land

During the construction, waste generation which is likely to deface and degrade the land is anticipated.

Solid waste likely to be generated at the site consist broken bricks, metal cuttings, wood chips, excavated materials, paper/cement bags, empty paint and solvent containers, broken glass among others. The wastes may deface and degrade the land. Some of the wastes may also be hazardous to the environment e.g. paints and cement while others like plastic are not biodegradable. The excavated soils, on the other hand, can be carried by rain water and result in sedimentation on the nearby road and the Lilongwe River during heavy rains.

Land degradation may also occur away from the project site, at the places where construction materials such as sand and quarry stones are sourced, due to uncontrolled mining, mining in areas that are prone to soil erosion and failure to rehabilitate the mined areas and quarrying practices that are not recommended.

To avoid or mitigate the impact:
- Properly segregate and separate wastes to encourage reuse of some of the wastes e.g. cartons and paint containers;
- Provide waste bins in strategic places and empty them in the skip daily;
- Limit site clearing and excavations to the required space;
- Store and contain construction materials on lined surfaces, in covered areas;
- Avoid deposits/piling of loose soils on sloppy ground or near drainage channels or slopping surface;
- Use some of the excavated materials e.g. stones for backfilling and rehabilitating eroded areas;
- Enforce procurement of supplies from licensed suppliers through construction contract;
- Properly landscape and rehabilitate the site after construction is completed; and
- Restore the site to its former condition or to a condition agreed with the client prior to contract completion.

5.3.2.6. Water pollution
Surface water pollution may result from cement, rubbles, paints, lubricants and fuels for generators where they fall or spill on the ground and are washed to the nearby surface water body. Ground water pollution may also occur where the wastes seep into the ground.

To mitigate the impact:

- Line surfaces where cement, paints and oils will be stored;
- Line the floor during painting and use of lubricants;
- Remove soils or spills immediately after they are contaminated and dispose in approved areas;
- Sensitize the workers to appropriately manage construction supplies and wastes;
- Properly supervise the workforce.

5.3.2.7. Accidents and Public Safety

Accidents to construction workers on the project site are anticipated during construction. Sources of accidents may include electricity shocks during welding, objects falling on people, workers falling from heights, nailing or hammering oneself and injuries from lifting and carrying building materials. Accidents to non-construction staff and animals may also occur and are anticipated to be related to construction material supply vehicle accidents, objects falling on the people when they come close to the working site and risk of falling into excavated trenches especially outside the contractor’s working hours.

To mitigate the impact:

- Provide appropriate protective clothing (boots, Hi Vis vest, helmet and gloves, with ear defenders and breathing masks for particular activities) for staff and ensure they use them safely;
- Provide appropriate directional and safety signs for staff and public;
- Restrict hospital staff, the general public and animals from going to the construction site during and outside working hours by placing posters, reflecting tapes and erecting barriers;
- Provide first aid kit;
- Construction vehicle must not use the main entrance but the entrance to the mortuary.

5.3.2.8. Dust nuisance

Activities such as excavations, site cleaning, cement mixing, sand grading and sand mixing will lead to considerable amount of dust. The dust will be a nuisance to the construction team and other people near the construction site. Dust can also degrade the immediate environment or places where it is blown away.

To mitigate the impact:
• Provide and enforce wearing of protective gear (dust masks and dust coats);
• Erect a barrier around the work sites where constructions is taking place to break or reduce wind and dust movement;
• Spray water where active construction is taking place;
• Store and handle sand and cement gently to limit dust generation;
• Dispose excavated materials and cleared soils properly; and
• Minimize the amount of time that loose soil spoils remain exposed.

5.3.2.9. Increased costs of electricity and water

An increase in the cost of electricity and water may result due to the contractor using the utilities from the hospital supply lines. This can be a source of conflicts, considering that the hospital is underfunded and therefore is likely to have problems to pay additional utility charges. Costs may also increase where the contractor connects to the hospital’s diesel generator.

To avoid or mitigate the impact:

• A proper arrangement for apportioning the costs must be agreed upon between the contractor and the hospital administration; and
• The contractor should provide a separate electricity generator to be used during construction of the EVD Treatment Centre.

5.3.3. Impacts during Operation and Maintenance

Activities during operation and maintenance phase include:

i. Isolation and of suspected EVD cases;
ii. Provision of health-care and treatment to confirmed cases;
iii. Laboratory tests – the designs have included a laboratory which will be able to carry out some tests;
iv. Specimen handling (collection and transportation) to South Africa for tests;
v. Waste management (collection, transportation, treatment and disposal); and
vi. Trainings and conferences.

Significant negative impacts anticipated during this phase include:

5.3.3.1. Fear of being infected

EVD is a highly infectious disease and causes fear of being infected among health workers and the general public. During operational there is likely to be fear among the hospital staff, suspected cases, guardians and the nearby market vendors. Some of the staff may be reluctant to work in the facilities and others may abscond for fear of getting the virus. Fear may also result from the proximity of the EVD treatment centre to the mortuary and the use of nearby burial sites.

To avoid or mitigate the impact the following measures must be taken:
• Adequately sensitize staff and people in the district on how the EVD may be contracted and transmitted;
• Adequately train staff on EVD case management, Occupational Safety and Health and Infection Control;
• Motivate staff to ensure their availability during an outbreak, after attending appropriate trainings;
• Inform and demonstrate to the staff and the community how safe burial practices may be conducted for EVD dead bodies;
• Secure consent to bury EVD corpses, at nearby graveyards, from the chiefs and local leaders;
• Frequently update the public on the activities in the EVD Treatment Centre

5.3.3.2. Air pollution and operational risks from incineration of wastes

Air pollution from incineration of wastes is expected to increase during the operation phase; as a result of additional wastes from activities in the EVD treatment centre. EVD centres generally produce a lot of wastes (2 – 20kg/person/day). The wastes will be treated in the existing incinerator, which was designed to produce minimal emissions. Large amounts of emissions, if allowed to accumulate in the air may contribute to climate change effects. In addition, the current solid waste management practices at the hospital may result in smoke and emissions; and these could also contribute to cumulative impacts of climate change.

To mitigate the impact:
• Ensure that international industry best practices related to hazardous waste incineration are followed in accordance with the International Finance Corporation’s environmental, health, and safety technical (EHS) guidelines for waste management facilities.¹
• Sort the waste to ensure only combustible waste goes into incinerators;
• Train staff on how to operate the incinerators;
• Plant trees around the hospital area to compensate for emissions;
• Regularly maintain the incinerator; and
• Orient staff to the Infection Control and Waste Management (ICWM) practices.

5.3.3.3. Increased runoff and erosion

The roof of the EVD treatment centre will act as a water collector, thereby increasing run-off around the centre. The terrain of the site steadily slopes to the mortuary entrance and there

¹ The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry- specific examples of Good International Industry Practice. When a member of the World Bank Group is involved in a project, these EHS Guidelines are applied as required by their respective policies and standards. The World Bank Group’s EHS Guidelines for Health Care Facilities can be found at: http://www.ifc.org/wps/wcm/connect/bc554d80488658b6b6e6f66a6515bb18/Final%2B-%2BHealth%2BCare%2BFacilities.pdf?MOD=AJPERES&id=1323161961169 and the General Environmental Health and Safety Guideline can be found at http://www.ifc.org/wps/wcm/connect/532f480486583ab4d6f66a6515bb18/1-%2BAir%2BEmissions%2Band%2B Ambient%2BAir%2BQuality.pdf?MOD=AJPERES
are rock protrusions which are evidence of erosion. Hence, increased runoff may lead to increased erosion and damage to the road to the hospital and mortuary. In the event that there is a lot of rainfall, run-off is likely to reach the Lilongwe River; carrying infectious waste and sediments which can pollute the stream.

To avoid or mitigate the impact:

- Carefully design the surface drainage for the EVD Treatment Centre and the site; and
- Rehabilitate the entrance to the mortuary and upgrade the road to tarmac.
- Installation of rain gutters to harvest rain water and reuse the water.
- Use of soft and hard landscaping techniques around the project site after civil works.

5.3.3.4. Water pollution

Water pollution is anticipated during the operation phase where wastewater and chemicals from the EVD Treatment Centre spill onto ground surfaces may occur. The sewage disposal facility for the EVD Treatment Centre will be a septic tank which may also be a source of ground water pollution when it overflows either through the manholes or broken pipes. Since the wastes from the EVD Quarantine and Treatment Centre will be infectious, groundwater pollution can also result in indirect and cumulative impacts. Surface water pollution is anticipated when the wastewater is carried away by runoff.

To mitigate the impact:

- Ensure that wastewater disposal is adequately budgeted to ensure regular cleaning of the septic tank;
- Only licensed waste collectors shall be employed for this disposal;
- Ensure wastewater does not spill onto the ground surface;
- Construct the septic tank according to the design specifications;
- Sensitize people to properly use the sewage system to avoid blockages; and
- The septic tank should be regularly monitored to ensure early detection of blockages and spillage.

5.3.3.5. Occupation safety and health risks

The main health and safety issues are likely to relate to the following:

1) Exposure to highly infectious waste, especially by the waste handlers who operate the incinerator;
2) Inadequate wheelie bins at the incinerator area which results in wastes being stored on bare ground;
3) Inadequate supply of PPE including waste bin liners;
4) Failure or neglecting to use PPE.
5) Improper use of personal protective equipment e.g. the Ebola Suit;
6) Shortage of medical supplies;
7) Failure of medical equipment; and
8) Loss of supply of electricity or water.
To mitigate the impact:

- KCH shall be responsible for ensuring an adequate and sustainable supply of water and electricity to the EVD treatment centre;
- The MoH and KCH must continue to train and sensitize its staff in infection control and best practices for managing infectious wastes in accordance with the World Health Organization’s *Safe Management of Wastes from Health-care Activities*\(^5\) handbook and its *Interim Infection Prevention and Control Guidance for Care of Patients with Suspected or Confirmed Filovirus Haemorrhagic Fever in Health-Care Settings*\(^6\). Other relevant infection prevention and control guidelines provided by WHO should further inform operational procedures;
- Ensure that a fence around the EVD treatment centre is constructed according to WHO guidelines to keep visitors at distance but allowing them to see through;
- Regularly monitor performance of equipment and carry out planned maintenance;
- Ensure there is enough supply of PPE;
- Provide adequate wheelie bins at the waste holding area;
- Regularly train staff on how to use PPE;
- Ensure that the project’s Health Care Waste Management Plan and the infectious disease management training and surveillance programs targeting district health officials, frontline staff and community members are implemented.

5.3.3.6. Increased work load

The hospital is understaffed and the workloads for health workers are high. During the operational phase the workers will have more work which will be stressful.

Mitigate the impact by recruiting staff specifically for the treatment centre

5.3.4. Impacts during Decommissioning

Decommissioning entails closure of the facilities and services. Consideration of impacts of decommissioning is important so that on closure of these facilities, due consideration is given to mitigate impacts from abandoned structures and equipment. Consideration should also be given to staff that may be made redundant.

5.3.4.1. Air, land and water contamination

Air, land and water contamination from waste would result from cleaning of premises and equipment and from transportation and disposal of wastes. The impact can be mitigated through the following measures:

- Disposing wastewater in appropriate and approved drainage systems; and

\(^5\) [http://apps.who.int/iris/bitstream/10665/85349/1/9789241548564_eng.pdf?ua=1](http://apps.who.int/iris/bitstream/10665/85349/1/9789241548564_eng.pdf?ua=1)
\(^6\) [http://apps.who.int/iris/bitstream/10665/130596/1/WHO_HIS_SDS_2014.4_eng.pdf?ua=1&ua=1&ua=1](http://apps.who.int/iris/bitstream/10665/130596/1/WHO_HIS_SDS_2014.4_eng.pdf?ua=1&ua=1&ua=1)
- Incinerating contaminated solid waste and disposing ash in approved landfill sites

5.3.4.2. Risk of infection from contaminated equipment

The decontamination team and other people are likely to be at risk of infection of handling equipment that has not been fully decontaminated. Mitigation measures would include to:

- Provide appropriate PPE for staff for destroying equipment used in the centre; and
- Destroy all equipment used in the EVD Treatment Centre.

5.4. SIGNIFICANCE RATING OF NEGATIVE IMPACTS

The significance of the identified potential negative environmental and social impacts has been determined by assessing and rating the impacts as (-1), (-2) or (-3), using the available information, professional judgement and experience from similar development projects. The ratings are based on:

a) Likelihood of occurrence (L) – a measure of the likelihood of the impact to occur;
b) Spatial Distribution (SD) - size of the area to be impacted; and
c) Time (duration) of impact Distribution (TD) - the period of time over which the impact may occur.

The significance of the impact has been determined by the product of L, SD and TD. Table 5.1 provides the significance rating of the impacts of the construction and operation of the EVD Quarantine Centre at Kamuzu Central Hospital before mitigation. After implementation of the mitigation measures, the impacts are assessed as low to nil.

Table 5.1 has provided the significance rating of the impacts of construction and operation of the EVD Treatment Centre at Kamuzu Central Hospital before mitigation. After implementation of the mitigation measures, the impacts are assessed as Low to Nil.
<table>
<thead>
<tr>
<th>SN</th>
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<th>Likelihood of occurrence (L)</th>
<th>Spatial Distribution (SD)</th>
<th>Time (duration) of impact Distribution (TD)</th>
<th>Severity of Impact (LxSDxTD)</th>
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CHAPTER 6 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

6.1. THE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

This Environmental and Social Management Plan (ESMP) has been prepared to facilitate the integration of environmental and social management measures in the construction and operation of the EVD Treatment Centre. The ESMP contains:

- Anticipated negative impacts of the proposed project and mitigation measures identified in Chapter 5 of this report;
- Responsible institutions to implement the mitigation measures; and
- Time frame for implementation of the mitigation measures.

The aim of the ESMP is to ensure that the Ministry of Health (MoH) will prevent, reduce, mitigate and compensate for the impacts of the proposed project on the biophysical and socio-economic environment. Key elements of the ESMP are summarised in Table 6.1. As part of the environmental management, the Department of Planning and Policy Development (DPPD) in the MoH must ensure that the ESMP is included as part of the contractor’s contract documents. The MoH and Kamuzu Central Hospital must also ensure that funds are available for implementation of the ESMP.

Several issues with the existing infrastructure and operational sustainability at the hospital have been identified through the development of this ESMP, including the poor condition of the plumbing system and general waste collection. While these are not addressed through this project, it is recommended that KCH take a phased approach, given current budgetary constraints, to correct systemic challenges affecting human health, the natural environment and the general level of hospital performance. Other systemic issues, like those associated with inadequate water and electrical supplies, need to be mitigated as they can directly result in potentially serious environmental health issues during operation of the EVD treatment centres.
<table>
<thead>
<tr>
<th>No.</th>
<th>Potential Environmental or Social Impact</th>
<th>Proposed Mitigation Measure</th>
<th>Institutional Responsibility</th>
<th>Time for Implementation</th>
<th>Source of funds</th>
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<tbody>
<tr>
<td>1.</td>
<td>Construction Phase</td>
<td></td>
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</tbody>
</table>
| 1.1 | Noise and vibration disturbances        | • Workers and visitors should wear ear muffs during loud noise activities;  
     |                                          | • Construction works should be carried out during normal working hours of the day;  
     |                                          | • The contractor must use efficient and low noise making machines; and  
     |                                          | • Noise reduction measures such as insulators should be applied. | Contractor | Throughout the construction phase | Include in the contractor's project bid |
| 1.2 | Utilizing unlicensed quarry sites       | • The Contractor will identify materials from existing licensed quarries with the suitable materials for construction.  
<pre><code> |                                          | • Procurement of construction material only from permitted sites and licensed / authorized quarries. | Contractor | Throughout the construction phase | Include in the project bid for the Contractor |
</code></pre>
<p>| 1.3 | Use of lead-based products              | • The Contractor shall ensure that no paint containing lead or lead products is used. He shall provide facemasks for use to the workers when paint is applied in the form of spray or a surface having lead paint is rubbed and scraped. | Contractor | Throughout the construction phase | Include in the project bid for the Contractor |</p>
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<tr>
<th>No.</th>
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<th>Institutional Responsibility</th>
<th>Time for Implementation</th>
<th>Source of funds</th>
</tr>
</thead>
</table>
| 1.4 | Spread of HIV AIDS                     | • Awareness meetings shall be conducted as a part of all construction employee orientation programs; and  
• Employees shall be provided with condoms for protection from STIs. | Contractor                   | Throughout the construction Phase    | Include in the project bid for the Contractor      |
| 1.5 | Waste generation, defacing and degradation of land | • Properly segregate and separate wastes to encourage reuse of some of the wastes e.g. cartons and paint containers;  
• Provide waste bins in strategic places and empty them in the skip daily;  
• Limit site clearing and excavations to the required space;  
• Store and contain construction materials on lined surfaces, in covered areas;  
• Avoid deposits/piling of loose soils on sloppy ground or near drainage channels or slopping surface;  
• Use some of the excavated materials e.g. stones for backfilling and rehabilitating eroded areas;  
• Enforce procurement of supplies from licensed suppliers through construction contract;  
• Properly landscape the site after construction is completed; and  
• Restore the site to its former condition or to a condition agreed with the client prior to contract completion. | Contractor                   | Throughout the construction phase   | Include in the contractor’s project bid            |
<table>
<thead>
<tr>
<th>No.</th>
<th>Potential Environmental or Social Impact</th>
<th>Proposed Mitigation Measure</th>
<th>Institutional Responsibility</th>
<th>Time for Implementation</th>
<th>Source of funds</th>
</tr>
</thead>
</table>
| 1.6 | Water pollution                        | - Line surfaces where cement, paints and oils will be stored;  
     |                                         | - Line the floor during painting and use of lubricants;  
     |                                         | - Remove contaminated soil or spills immediately they are contaminated so that run-off do not wash the spills to the water bodies;  
     |                                         | - Sensitize the workers to appropriately manage construction supplies and wastes; and  
     |                                         | - Proper supervise the workforce. | Contractor | Throughout the construction phase | Include in the contractor’s project bid |
| 1.7 | Accidents                              | - Provide appropriate protective clothing (boots, Hi Vis vest, helmet and gloves, with ear defenders and breathing masks for particular activities) for staff and ensure they use them safely;  
     |                                         | - Provide appropriate directional and safety signs for staff and public;  
     |                                         | - Restrict hospital staff, the general public and animals from going to the construction site during and outside working hours by placing posters, reflecting tapes and erecting barriers;  
     |                                         | - Provide first aid kit;  
<pre><code> |                                         | - Construction vehicle must not use the main entrance but the entrance to the mortuary. | Contractor | Throughout the construction phase | Include in the contractor’s project bid |
</code></pre>
<table>
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<tr>
<th>No.</th>
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<th>Institutional Responsibility</th>
<th>Time for Implementation</th>
<th>Source of funds</th>
</tr>
</thead>
</table>
| 1.8 | Dust nuisance                          | • Provide and enforce wearing of protective gear (dust masks and dust coats);  
• Erect a barrier around the work sites where constructions is taking place to break or reduce wind and dust movement;  
• Spray water where active construction is taking place;  
• Store and handle sand and cement gently to limit dust generation;  
• Dispose excavated materials and cleared soils properly; and  
• Minimize the amount of time that loose soil spoils remain exposed. | Contractor | Throughout the construction phase | Include in the contractor’s project bid |
| 1.9 | Increased costs of electricity and water | • A proper arrangement for apportioning the costs must be agreed upon between the contractor and the hospital administration; and  
• The contractor should provide a separate electricity generator to be used during construction of the EVD Treatment Centre. | Contractor, Kamuzu Central Hospital | Throughout the construction phase | Include in the contractor’s project bid |

2. Operational and Maintenance phase
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<tr>
<th>No.</th>
<th>Potential Environmental or Social Impact</th>
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<th>Time for Implementation</th>
<th>Source of funds</th>
</tr>
</thead>
</table>
| 2.1 | Fear of being infected                 | • Adequately sensitize staff and people in the district on how the EVD may be contracted and transmitted;  
• Adequately train staff on EVD case management, Occupational Safety and Health and Infection Control;  
• Motivate staff to ensure their availability during an outbreak, after attending appropriate trainings;  
• Inform and demonstrate to the staff and the community how safe burial practices may be conducted for EVD dead bodies;  
• Secure consent to bury EVD corpses, at nearby graveyards, from the chiefs and local leaders;  
• Frequently update the public on the activities in the EVD Treatment Centre. | Kamuzu Central Hospital, Lilongwe District Health Office | Once every month | Include in the project budget |
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<th>Institutional Responsibility</th>
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</table>
| 2.2 | Air pollution and operational risks from incineration of wastes | • Ensure that good international industry practices related to hazardous waste incineration are followed in accordance with the International Finance Corporation’s environmental, health, and safety technical (EHS) guidelines for waste management facilities.  
  • Sort the waste to ensure only combustible waste goes into incinerators;  
  • Train staff on how to operate the incinerators;  
  • Plant trees around in the hospital area to help absorb emissions;  
  • Regularly maintain the incinerator; and  
  • Orienting staff to the Infection Control and Waste Management (ICWM) practices. | Kamuzu Central Hospital; MoH; Lilongwe District Health Office; Lilongwe City Council | Once every month for the other activities | Include in the project budget |
| 2.3 | Increased runoff and erosion | • Carefully design and construct the surface drainage for the EVD treatment centre and the site; and  
  • Rehabilitate the entrance to the mortuary; and upgrade the road to tarmac. | Contractor | During the construction phase | Include in the contractor’s project bid |
| 2.4 | Water pollution | • Construct the septic tank according to the design specifications; | Contractor | Once during the construction phase | Include in KCH development budget |

7 The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice. When a member of the World Bank Group is involved in a project, these EHS Guidelines are applied as required by their respective policies and standards. The World Bank Group’s EHS Guidelines for Health Care Facilities can be found at [http://www.ifc.org/wps/wcm/connect/bc554d80488658b6b6e6f66a6515bb18/Final%2BHealth%2BCare%2BFacilities.pdf?MOD=AJPERES&id=1323161961169](http://www.ifc.org/wps/wcm/connect/bc554d80488658b6b6e6f66a6515bb18/Final%2BHealth%2BCare%2BFacilities.pdf?MOD=AJPERES&id=1323161961169) and the General Environmental Health and Safety Guideline can be found at [http://www.ifc.org/wps/wcm/connect/532ff48048863ab4d8f66a6515bb18/1-1%2BAir%E2%80%99s%2BEmissions%2Band%2BAmbient%2BAir%2BQuality.pdf?MOD=AJPERES](http://www.ifc.org/wps/wcm/connect/532ff48048863ab4d8f66a6515bb18/1-1%2BAir%E2%80%99s%2BEmissions%2Band%2BAmbient%2BAir%2BQuality.pdf?MOD=AJPERES).
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<th>Institutional Responsibility</th>
<th>Time for Implementation</th>
<th>Source of funds</th>
</tr>
</thead>
</table>
|     | • Ensure that wastewater disposal is adequately budgeted to ensure regular cleaning of the septic tank;  
• Only licensed waste collectors shall be employed for this disposal;  
• Ensure wastewater does not spill onto the ground surface;  
• Sensitize people to properly use the sewage system to avoid blockages; and  
• The septic tank should be regularly monitored to ensure early detection of blockages and spillage. | Kamuzu Central Hospital; Lilongwe City Council                                                                                                                                   | Throughout the operation phase                                                               | Include in the hospital’s recurrent budget |
<table>
<thead>
<tr>
<th>No.</th>
<th>Potential Environmental or social Impact</th>
<th>Proposed Mitigation Measure</th>
<th>Institutional Responsibility</th>
<th>Time for Implementation</th>
<th>Source of funds</th>
</tr>
</thead>
</table>
| 2.5 | Occupation safety and health risks     | • KCH shall be responsible for ensuring an adequate and sustainable supply of water and electricity to the EVD treatment centre;  
• The MoH and KCH must continue to train and sensitize its staff in infection control and best practices for managing infectious wastes in accordance with the World Health Organization’s *Safe Management of Wastes from Health-care Activities*\(^8\) handbook and its *Interim Infection Prevention and Control Guidance for Care of Patients with Suspected or Confirmed Filovirus Haemorrhagic Fever in Health-Care Settings*\(^9\). Other relevant infection prevention and control guidelines provided by WHO should further inform operational procedures;  
• Ensure that the project’s Health Care Waste Management Plan has been implemented and followed as planned;  
• Regularly monitor performance of equipment and carry out planned maintenance;  
• Ensure that a fence around the EVD treatment centre is constructed according to WHO guidelines to keep visitors at distance but allowing them to see through;  
• Ensure there is enough supply of PPE;  
• Provide adequate wheelie bins at the waste holding area;  
• Regularly train staff on how to use PPE; and  
• Ensure the EVD Quarantine centre is connected to the hospital electricity generator and the water reservoir. | Kamuzu Central Hospital; Ebola Coordination Unit | Throughout the operation phase | Include in the hospital’s recurrent budget |

\(^8\) [http://apps.who.int/iris/bitstream/10665/185349/1/9789241548564_eng.pdf?ua=1](http://apps.who.int/iris/bitstream/10665/185349/1/9789241548564_eng.pdf?ua=1)  
\(^9\) [http://apps.who.int/iris/bitstream/10665/130596/1/WHO_HIS_SDS_2014.4_eng.pdf?ua=1&ua=1&ua=1](http://apps.who.int/iris/bitstream/10665/130596/1/WHO_HIS_SDS_2014.4_eng.pdf?ua=1&ua=1&ua=1)
<table>
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<th>Source of funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.6</td>
<td>Increased workload</td>
<td>• Recruit staff specifically for the treatment centre</td>
<td>MoH</td>
<td>Once in the operation phase</td>
<td>Include in the MOH budget</td>
</tr>
<tr>
<td>3.</td>
<td>Decommissioning Phases</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.1 Air, land and water contamination</td>
<td>• Dispose wastewater in appropriate and approved drainage systems; and • Incinerate contaminated solid waste and dispose ash in approved landfill sites.</td>
<td>Kamuzu Central Hospital</td>
<td>Throughout the decommissioning phase</td>
<td>Include in the project budget</td>
</tr>
<tr>
<td></td>
<td>3.2 Risk of infection from contaminated equipment</td>
<td>• Provide appropriate PPE for staff for destroying equipment used in the centre; and • Destroy all equipment used in the EVD Treatment Centre.</td>
<td>Kamuzu Central Hospital</td>
<td>Throughout the decommissioning phase</td>
<td>Include in the project budget</td>
</tr>
</tbody>
</table>
6.2. ENVIRONMENTAL AND SOCIAL MONITORING PLAN

Environmental and social monitoring has to be carried out during construction, operation and maintenance and decommissioning of the Ebola Virus Disease Treatment Centre. Table 6.2 provides the proposed monitoring institutions, monitoring indicators, monitoring frequency and the estimated costs for monitoring the ESMP implementation. The contractor (Project Engineer) will also perform monitoring activities as stipulated in the contract.
<table>
<thead>
<tr>
<th>No</th>
<th>Potential Impact</th>
<th>Proposed Mitigation Measure</th>
<th>Monitoring indicator</th>
<th>Institution/person to monitor</th>
<th>Monitoring frequency</th>
<th>Implementation cost</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Construction Phase</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
|  1.1 | Noise and vibration disturbance   | - Workers and visitors should wear ear muffs during loud noise activities;  
  - Construction works should be carried out during normal working hours of the day;  
  - The contractor must use efficient and low noise making machines; and  
  - Noise reduction measures such as insulators should be applied. | - Efficiency of machines  
  - Availability of PPEs  
  - Time for construction activities  
  - Use of noise reduction measures | Contractor, Kamuzu Central Hospital, District Health Office, Local Council, MoH (DPPD) | Once every month during the construction phase | 400 USD for transport and allowance    |
|  1.2 | Utilizing unlicensed quarry sites | - The Contractor will identify materials from existing licensed quarries with the suitable materials for construction.  
  - Procurement of construction material only from permitted sites and licensed / authorized quarries. | - Evidence provided upon request demonstrating source of construction materials | Contractor, DHO, DPPD | As appropriate during the construction phase | Included in 1.1       |
<p>|  1.3 | Use of lead-based products.       | - The Contractor shall ensure that no paint containing lead or lead products is used. He shall provide facemasks for use to the workers when paint is applied in the form of spray or a surface having lead paint is rubbed and scraped. | - Evidence of using non lead-based paint. | Contractor, DHO, DPPD | As appropriate during the construction phase | Included in 1.1       |</p>
<table>
<thead>
<tr>
<th>No</th>
<th>Potential Impact</th>
<th>Proposed Mitigation Measure</th>
<th>Monitoring indicator</th>
<th>Institution/person to monitor</th>
<th>Monitoring frequency</th>
<th>Implementation cost</th>
</tr>
</thead>
</table>
| 1.4 | Waste generation, defacing and land degradation | • Properly segregate and separate wastes to encourage reuse of some of the wastes e.g. cartons and paint containers;  
• Provide waste bins in strategic places and empty them in the skip daily;  
• Limit site clearing and excavations to the required space;  
• Store and contain construction materials on lined surfaces, in covered areas;  
• Avoid deposits/piling of loose soils on sloppy ground or near drainage channels or slopping surface;  
• Use some of the excavated materials e.g. stones for backfilling and rehabilitating eroded areas;  
• Enforce procurement of supplies from licensed suppliers through construction contract;  
• Properly landscape the site after construction is completed; and  
• Restore the site to its former condition or to a condition agreed with the client prior to contract completion. | • Volume of waste segregated and reused  
• Number of waste bins and places where they are placed  
• Size of area cleared and excavated  
• Size of surface lining and cover used to store construction materials  
• Sites where loose soils is deposited  
• Volume of excavated material that is used for backfilling and rehabilitating eroded areas  
• Number of licensed suppliers that are used  
• Perimeter around the construction area with shields  
• Area that is landscaped and restored to its former conditions after construction activities. | Contractor, Kamuzu Central Hospital, District Health Office, MoH (DPPD) | Once every month during construction | Included in 1.1 |
<table>
<thead>
<tr>
<th>No</th>
<th>Potential Impact</th>
<th>Proposed Mitigation Measure</th>
<th>Monitoring indicator</th>
<th>Institution/person to monitor</th>
<th>Monitoring frequency</th>
<th>Implementation cost</th>
</tr>
</thead>
</table>
| 1.5 | Water pollution  | • Line surfaces where cement, paints and oils will be stored;  
• Line the floor during painting and use of lubricants;  
• Remove contaminated soil or spills immediately they are contaminated so that run-off do not wash the spills to the water bodies;  
• Sensitize the workers to appropriately manage construction supplies and wastes; and  
• Proper supervise the workforce.                                                                                                                                                                                                 | • Area lined during application of cement and paints  
• Area lined for storage of paints etc.  
• Total time it takes to remove contaminated soils and spills  
• Records of sensitizations  
• Amount of hours a supervisor is available                                                                                                                                                                                                                                                  | Contractor, Kamuzu Central Hospital, District Health Office, City Council, MoH (DPPD)                                                                                                           | Once every month during the construction phase                                                                                                  | Included in 1.1    |
<table>
<thead>
<tr>
<th>No</th>
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<th>Proposed Mitigation Measure</th>
<th>Monitoring indicator</th>
<th>Institution/Person to monitor</th>
<th>Monitoring Frequency</th>
<th>Implementation cost</th>
</tr>
</thead>
</table>
| 1.6. | Accidents | • Provide appropriate protective clothing for staff (boots, Hi Vis vest, helmet and gloves, with ear defenders, breathing masks available for particular activities) and ensure they use them safely;  
• Provide appropriate directional and safety signs for staff and public;  
• Restrict hospital staff, the general public and animals from going to the construction site during and outside working hours by placing posters, reflecting tapes and erecting barriers;  
• Provide first aid kit; and  
• Construction vehicle must not use the main entrance but the entrance to the mortuary. | • Number of workers provided with and using PPEs  
• Number and visibility of directional signs  
• Perimeter that is fenced  
• Supplies in the first Aid Kit Box  
• Compensation included in the contract for construction workers  
• Entrance that is used by construction vehicles | Contractor, Kamuzu Central Hospital, District Health Office, MoH (DPPD) | Once every month during the construction phase | Included in 1.1 |
| 1.7. | Dust nuisance | • Provide and enforce wearing of protective gear (dust masks and dust coats);  
• Erect a barrier around the work sites where constructions is taking place to break or reduce wind and dust movement;  
• Spray water where active construction is taking place;  
• Store and handle sand and cement gently to limit dust generation;  
• Dispose excavated materials and cleared soils properly; and  
• Minimize the amount of time that loose soil spoils remain exposed. | • Use of mouth and nose masks  
• Presence of a barrier during dust making activities  
• Area sprayed with water | DHO, DPPD | Twice during the landscaping period | Included in 1.1 |
<table>
<thead>
<tr>
<th>No</th>
<th>Potential Impact</th>
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<th>Institution/person to monitor</th>
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</tr>
</thead>
</table>
| 1.8 | Spread of HIV/AIDS               | • Awareness meetings shall be conducted as a part of all construction employee orientation programs; and  
    • Employees shall be provided with condoms for protection from STIs.                                                                                     | • Number of meetings conducted  
    • Number of condoms distributed                                                                                                                         | Contractor, District Health Office, Local Assembly, MoH (DPPD)                                                                                         | Once every month during the construction phase | Included in 1.1      |
| 1.9 | Increased costs of electricity and water | • A proper arrangement for apportioning the costs must be agreed upon between the contractor and the hospital administration; and  
    • The contractor should provide a separate electricity generator to be used during construction of the EVD Treatment Centre. | • A signed agreement on payment of utility bills  
    • Use of a separate water reservoir and generator                                                                                                    | Contractor, Kamuzu Central Hospital, District Health Office, MoH (DPPD)                                                                         | Once every month during the construction phase | Included in 1.1      |

2. Operational and Maintenance phase
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<tr>
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<th>Institution/person to monitor</th>
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<th>Implementation cost</th>
</tr>
</thead>
</table>
| 2.1 | Fear of being infected | - Adequately sensitize staff and all the people in the district on how the EVD may be contracted and transmitted;  
- Adequately train staff on EVD case management, Occupational Safety and Health and Infection Control;  
- Motivate staff to ensure their availability during an outbreak, after attending appropriate trainings;  
- Inform and demonstrate to the staff and the community in Lilongwe district such as community leaders and local assembly staff how safe burial practices may be conducted for EVD dead bodies;  
- Secure consent to bury EVD corpses, at nearby graveyards, from the chiefs and local leaders;  
- Frequently update the public on the activities in the EVD Treatment Centre through community meetings, mass media messages through radio and television. | - Number of times sensitizations meetings are conducted  
- Number of staff and community members people sensitized  
- Number of staff are committed to be available during an outbreak  
- Consent for conducting burial at nearby community graveyard  
- Number of staff trained in occupation safety and health and infection control  
- Records of public notice on activities at the EVD Treatment Centre | Kamuzu Central Hospital, District Health Office, City Council, MoH (Ebola Coordination Unit) | Once every month | 1,000 USD for transport and lunch allowance and 20,000 USD for infectious disease management training and surveillance programs |
<table>
<thead>
<tr>
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<th>Proposed Mitigation Measure</th>
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<th>Implementation cost</th>
</tr>
</thead>
</table>
| 2.2 | Air pollution and operational risks from incineration of wastes | • Ensure that related good international industry practices related to hazardous waste incineration are followed in accordance with the World Bank Group’s environmental, health, and safety technical (EHS) guidelines for health care facilities.10  
• Sort the waste to ensure only combustible waste goes into incinerators;  
• Train staff on how to operate the incinerators;  
• Plant trees around in the hospital area to help absorb emissions;  
• Regularly maintain the incinerator; and  
• Orienting staff to the Infection Control and Waste Management (ICWM) practices. | • Volume of wastes sorted appropriately  
• Volume of waste sorted appropriately  
• Records of training on use of incinerator  
• No. of planted trees  
• Records of maintenance of incinerators  
• Number of staff oriented in ICWM | Kamuzu Central Hospital, City Council, District Health Office, MoH (Ebola Coordination Unit, DPPD) | Once every month | Included in 2.1 |

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10 The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice. When a member of the World Bank Group is involved in a project, these EHS Guidelines are applied as required by their respective policies and standards. The World Bank Group’s EHS Guidelines for Health Care Facilities can be found at: [http://www.ifc.org/wps/wcm/connect/bc554d80488658b6b66e6f66a6515bb18/Final%2B%2BHealth%2BCare%2BFacilities.pdf?MOD=AJPERES&%2Bid=1323161961169](http://www.ifc.org/wps/wcm/connect/bc554d80488658b6b66e6f66a6515bb18/Final%2B%2BHealth%2BCare%2BFacilities.pdf?MOD=AJPERES&%2Bid=1323161961169) and the General Environmental Health and Safety Guideline can be found at [http://www.ifc.org/wps/wcm/connect/532tf4804886583ab4d6f6a6515bb18/1-1%2BAir%2BEmissions%2Band%2BAmbient%2BAir%2BQuality.pdf?MOD=AJPERES](http://www.ifc.org/wps/wcm/connect/532tf4804886583ab4d6f6a6515bb18/1-1%2BAir%2BEmissions%2Band%2BAmbient%2BAir%2BQuality.pdf?MOD=AJPERES)
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<th>Institution/person to monitor</th>
<th>Monitoring frequency</th>
<th>Implementation cost</th>
</tr>
</thead>
</table>
| 2.3 | Increased runoff and erosion | • Carefully design the surface drainage for the EVD Treatment Centre and the site; and  
• Rehabilitate the entrance to the mortuary and regularly maintain the road and drainage. | • Presence of a well designed and constructed drainage system  
• Reports on use of collected rain water  
• Rehabilitated and upgraded entrance road | Kamuzu Central Hospital, City Council, MoH (Ebola Coordination Unit, Planning Department) | Twice during the construction phase | Included in 2.1 |
| 2.4 | Water pollution | • Ensure wastewater does not spill onto the ground surface;  
• Construct the septic tank according to the design specifications;  
• Sensitize people to properly use the sewage system to avoid blockages; and  
• The septic tank should be regularly monitored to ensure early detection of blockages and spillage. | • Reports of spillages  
• Properties of the septic tank  
• Number of people sensitized on proper use of sewage system  
• Records of monitoring and maintenance of the septic tank | District Health Office, Local Assembly, MoH (Ebola Coordination Unit) | Once every month | Included in 2.1 |
<table>
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<th>Institution/person to monitor</th>
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<th>Implementation cost</th>
</tr>
</thead>
</table>
| 2.5| Occupation safety and health risks | - KCH shall be responsible for ensuring an adequate and sustainable supply of water and electricity to the EVD treatment centre;  
- The MoH and KCH must continue to train and sensitize its staff in infection control and best practices for managing infectious wastes in accordance with the World Health Organization’s Safe Management of Wastes from Health-care Activities\(^\text{11}\) handbook and its Interim Infection Prevention and Control Guidance for Care of Patients with Suspected or Confirmed Filovirus Haemorrhagic Fever in Health-Care Settings\(^\text{12}\). Other relevant infection prevention and control guidelines provided by WHO should further inform operational procedures;  
- Ensure that a fence around the EVD treatment centre is constructed according to WHO guidelines to keep visitors out;  
- Ensure that the Project’s Health Care Waste Management Plan and infectious disease management training and surveillance programs targeting district health officials, frontline staff and community members are implemented;  
- Regularly monitor performance of equipment and carry out maintenance;  
- Ensure there is enough supply of PPE;  
- Provide adequate wheelie bins at the waste holding area;  
- Ensure the EVD Quarantine centre is connected to the hospital electricity generator and the water reservoir; and  
- Regularly train staff on how to use PPE. | - Number of times and number of staff are trained in occupational safety, infection control and waste management  
- Number of times equipment is maintained  
- Number of PPE in stock  
- Number of staff trained in use of PPE  
- Number of waste bins available | Kamuzu Central Hospital, District Health Office, MoH (Ebola Coordination Unit, Planning Department) | Once every month | Included in 2.1 |
<table>
<thead>
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<th>Implementation cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.6</td>
<td>Increased work load</td>
<td>• Recruiting staff specifically for the treatment centre</td>
<td>• Number of workers special for the facility</td>
<td>MoH, Kamuzu Central Hospital</td>
<td>Twice</td>
<td>Included in 2.1</td>
</tr>
</tbody>
</table>

3. Decommissioning Phases

| 3.1 | Air, land and water contamination | • Dispose wastewater in appropriate and approved drainage systems; and
• Incinerate contaminated solid waste and dispose ash in approved landfill sites | • Area for disposal of wastewater
• Volume of solid waste incinerated | Kamuzu Central Hospital, District Health Office, MoH (Ebola Coordination Unit and Planning Department) | Twice during decommissioning phase | 200 USD for transport and allowances |

| 3.2 | Risk of infection from contaminated equipment | • Provide appropriate PPE for staff for destroying equipment used in the centre; and
• Destroy all equipment used in the EVD Treatment Centre. | • Reports of use of PPE during cleaning
• Number of equipment destroyed | Kamuzu Central Hospital, District Health Office, MoH (Ebola Coordination Unit, Planning Department) | Twice during decommissioning phase |
6.3. INSTITUTIONAL RESPONSIBILITY AND REPORTING STRUCTURE

For effective implementation of the Environmental Management and Monitoring Plan, there is need for clear roles, responsibility and reporting procedure for the key stakeholder institutions. These roles are presented as follows:

The Ministry of Health through the Department of Planning and Policy Development (DPPD) and the Ebola Coordination Unit will have the overall responsibility to ensure that the ESMP and the monitoring plan is implemented. They must ensure that all stakeholders are familiar with the contents of the ESMP and their roles; resources are available and key staff for implementing the activities are adequately trained. As part of the environmental management, the DPPD must also ensure that ESMP is included as part of the contract documents. Guidelines which the contractor must observe to minimise or mitigate impacts on the biophysical and social economic environment are provided in annex 6.

Since the impacts are mainly localised and moderate, the day to day responsibility for monitoring implementation of the project and the ESMP rests with the stakeholders at district level as follows:

1. **Kamuzu Central Hospital**, as owners of the project, will lead in the implementation of the ESMP. The hospital’s Environmental Health Officer (EHO) will familiarise himself with the ESMP, mobilise resources and stakeholders and ensure that the mitigation measures are implemented. The EHO will however need training in management of wastes from the Ebola Treatment Centre. The EHO will be reporting to the Hospital Administrator who will also report to the MoH.

   The hospital **Maintenance Supervisor** will be responsible for daily supervision of the contractor for implementation of the ESMP during construction, ensuring that the contractor is adhering to the contract agreement with respect to the ESMP recommendations. He will be reporting to the Hospital Administrator and the Projects Engineer from the Department of Planning and Policy Development.

2. **The Contractor** is responsible for ensuring that the construction activities are carried out sustainably. Since the project is small and the contractor may not have an Environmental Officer; the foreman/supervisor/manager must enforce compliance to the ESMP. The contractor will, through the Hospital Administrator, report to the Project Engineer in the DPPD.

3. **The Lilongwe District Health Office**, is responsible for delivering health services including environmental health in the area. The District Health Officer has a well-established network, which should be utilised in the provision of training, awareness and sensitization in Ebola infection control, treatment and waste management. The Environmental Health Officer at the DHO’s office will assist the District Health Officer and in this regard, will require training in EVD case management, infection control and waste management.
4. **The City Council** is the local authority for the city. They are responsible for approving development plans, enforcing environmental standards and community engagement. The City Council’s Environmental Officer and Engineer must assist Lilongwe Central Hospital in implementing the ESMP and monitor the project activities.

5. The **Hospital’s Healthcare Advisory Committee (HAC)**, which represents the communities will also carry monitoring of the ESMP and report to the District Health Office and the City Council.

Apart from the mentioned institutions, there is also need to involve the **Environmental Affairs Department (EAD)** in the Ministry of Natural Resources, Energy and Mining. In accordance with the EMA, 1996, the EAD reviews the ESMPs and certifies the project. They also have inspectors who will inspect the project for compliance to Environmental Standards and the Environmental and Social Management Plan.

### 6.4. SUMMARY OF THE COSTS FOR ENVIRONMENTAL MANAGEMENT

Costs for managing the impacts on the biophysical and socio-economic environment are, in general, included in the project budget. Costs for monitoring the ESMP have also been estimated in dollars at the exchange rate of 1 USD = MK 700.00 and they are as in Table 6.3.

**Table 0.3: Summary of the costs for Managing the Environment**

<table>
<thead>
<tr>
<th>Item/Activity</th>
<th>During construction phase</th>
<th>During operation phase (5 Years)</th>
<th>During decommissioning phase</th>
<th>Total Cost (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport and allowance for monitoring staff from the Ebola Coordination Unit and Planning Department of Ministry of Health</td>
<td>850</td>
<td>5,000</td>
<td>200</td>
<td>6,050</td>
</tr>
<tr>
<td>Infectious disease management training and surveillance programs targeting district health officials, frontline staff and community members</td>
<td></td>
<td>20,000</td>
<td></td>
<td>20,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>850</td>
<td>25,000</td>
<td>200</td>
<td>26,050</td>
</tr>
</tbody>
</table>
CHAPTER 7  CONCLUSION AND REQUIREMENTS

7.1 CONCLUSIONS

The construction and operation activities of the Ebola Virus Diseases Treatment Centre at Kamuzu Central Hospital will have both positive and negative impacts. The negative impacts, in general, are assessed as moderately severe but can be mitigated to low. Hence, this Environmental and Social Management Plan (ESMP) has been prepared. Integration of mitigation measures presented in the ESMP will improve the sustainability and the performance of the EVD Treatment Centre. The ESMP has also proposed a Monitoring Plan to ensure effective implementation of the environmental management activities.

7.2 REQUIREMENTS

The following overall requirements pertaining to the project, are summarized:

- The ESMP is adopted and effectively applied;
- KCH is responsible for ensuring an adequate and sustainable supply of water and electricity to the EVD treatment centre;
- The Ministry of Health (MOH) and Kamuzu Central Hospital (KCH) will ensure that funds are available for implementation of the ESMP;
- The Hospital Administrator will ensure that technical expertise and financial resources are available for mitigating the negative impacts throughout project implementation;
- MoH will include the ESMP in the construction activities contract;
- Kamuzu Central Hospital and Lilongwe District Health Office will adequately sensitize the local people about the project and Ebola Virus Disease;
- Those responsible for implementing the ESMP and monitoring activities, will ensure compliance with all relevant legal provisions outlined in this report and any other provisions that may arise due to implementation of this project;
- The MoH and KCH will continue to train and enforce infection control practices for managing wastes in accordance with standards set by the World Health Organization, including those outlined in the Safe Management of Wastes from Health-care Activities handbook in addition to the Interim Infection Prevention and Control Guidance for Care of Patients with Suspected or Confirmed Filovirus Haemorrhagic Fever in Health-Care Settings.
- During construction, operation and maintenance phases, the MoH and the KCH will implement all the relevant good international industry practices provided in the International Finance Corporation’s environmental, health, and safety technical (EHS) guidelines for health care facilities.
- Addressing issues with pre-existing hospital infrastructure and operational sustainability, including the plumbing system and risk of intermittent power and electrical supply, are not included in this project. There is an expectation that these
issues are addressed by the MoH and KCH in the near future. This can be done through a phased approach in consideration of budgetary constraints.

- The City Council, Communities around the project area and all other stakeholders will be involved in all stages of the project and the implementation of the ESMP.
REFERENCES

12. Lilongwe City Council (2013). *City of Lilongwe Biodiversity Report*. Local Action for Biodiversity
20. UNDP (2014). *Assessing the socio-economic impacts of Ebola Virus Disease in Guinea, Liberia and Sierra Leone - The Road to Recovery*


ANNEXES

ANNEX 1: TERMS OF REFERENCE

Environmental and Social Management Plans for 6 Ebola Sites

Introduction:
Any civil works/constructions being funded under World Bank projects require an Environmental and social due diligence to be undertaken during project conceptualization/preparation and prior to start of works. Such due diligence requires actions to be taken, and the process is documented, consulted and disclosed before project implementation starts. This step was missed out when the AF phase was approved; however, this is a requirement which the Bank has mandated which cannot be bypassed. Recognizing that the project is in active implementation, the Bank would help in any way possible to ensure requirements are adhered to and compliance is met, while also not significantly delaying project implementation. Therefore as a start, site-specific Environmental and Social management plans (ESMPs) must be prepared.

Scope of the ESMP:
1. Include a description of the geographical locale of each site and its environs and the associated social aspects during construction and operation of the Ebola Virus Diseases Quarantine/Treatment Centres;
2. Where the EVD Quarantine/Treatment is being constructed at a hospital include a detailed description of the existing waste management systems including incinerators and conditions of sewage systems;
3. Provide the mode of treatment of infectious waste water, a description what is to be undertaken in the event that a connection has been made to the municipal sewer lines. Likewise the system to be put in place for infectious sharps and waste;
4. Assess impacts of installation of incinerators, wastewater discharges and solid waste management will not have any negative impacts
5. Define any measures required to prevent any longer-term impacts on the environment and the neighbouring community and could also build in such enhancements into the design/infrastructural plan of the units.
6. Propose an EMP in tabular form by which all of the mitigation measures prescribed will be carried out. An environmental monitoring plan should also be prepared.
7. The ESMPs will need to be consulted with the local community and disclosed prior to continuation of works.

Report format:
Considering the project has been stopped prepare a summarised report of 6 – 10 pages.

Assignment Duration: 13 days

13 The ToRs are based on communications with World Bank and meetings between NAC and the Consultant. No official ToRs were provided
ANNEX 2: LIST OF KEY PEOPLE CONSULTED

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation -</th>
<th>Institution</th>
<th>Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Jonathan Ngoma</td>
<td>Hospital Director</td>
<td>Kamuzu Central Hospital</td>
<td>0884135882</td>
</tr>
<tr>
<td>Mrs Gloria Khuzani</td>
<td>Environmental Health Officer</td>
<td>Kamuzu Central Hospital</td>
<td>0882676544</td>
</tr>
<tr>
<td>Mr Mlungu</td>
<td>Maintenance Supervisor</td>
<td>Kamuzu Central Hospital</td>
<td>0888202432</td>
</tr>
<tr>
<td>Faheemal Choonara</td>
<td>Lab Officer</td>
<td>Kamuzu Central Hospital</td>
<td>0999381959</td>
</tr>
<tr>
<td>Mr. Msukwa</td>
<td>Incinerator Operator</td>
<td>Kamuzu Central Hospital</td>
<td>0999062162</td>
</tr>
</tbody>
</table>

A photo of some of the people consulted
ANNEX 3: MAIN ISSUES RAISED BY KEY STAKEHOLDERS

<table>
<thead>
<tr>
<th>Background of the construction project</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The hospital initiated the construction after considering that in the event that there is Ebola in Malawi, Kamuzu Central Hospital (KCH) will be the first place where the cases will be taken to. This is because it is a referral hospital and the biggest hospital in Malawi. In addition Lilongwe is the Capital of Malawi hence a high in-migration area, hence a risk for Ebola outbreak.</td>
</tr>
<tr>
<td>2. The Hospital Director went for Ebola training. After the training he organised a rapid response team to prepare a design and mobilise funds for the construction.</td>
</tr>
<tr>
<td>3. The team came up with the design of the facility based on the World Health Organisation specifications.</td>
</tr>
<tr>
<td>4. Other EVD preparedness activities include training of selected staff (training of trainers) in EVD case management and EVD suit wearing. The hospital has received some PPEs including the suits which they are using for trainings.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>The site was selected because of the following:</td>
</tr>
<tr>
<td>5. Uses of the area and facility – the EVD Treatment Centre would be used for isolation of EVD cases. Hence it was necessary to locate it at an isolated place. The place is an isolation area. It is used to isolate cholera cases.</td>
</tr>
<tr>
<td>6. The hospital initially wanted to build the EVD shelter on an existing Cholera slab.</td>
</tr>
<tr>
<td>7. The site is accessible through the main entrance and the exit gate from the mortuary.</td>
</tr>
<tr>
<td>8. There were no adequate community consultations during the site selection.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site, Design and Construction Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. The EVD Treatment Centre is being constructed near mortuary. During an outbreak communities may feel that the EVD Treatment centre is for killing people.</td>
</tr>
<tr>
<td>10. The EVD treatment centre is small.</td>
</tr>
<tr>
<td>11. Shortage of finances have derailed finishing of the construction works.</td>
</tr>
<tr>
<td>12. The facility will not connect to the sewerage system for the Lilongwe City Council</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. The maintenance supervisor has been monitoring the construction activities.</td>
</tr>
<tr>
<td>14. Monitoring only looked at whether the contractor is following the design specifications.</td>
</tr>
<tr>
<td>15. There were no accidents related to the construction activities.</td>
</tr>
<tr>
<td>16. There were no complaints related to the construction activities from hospital staff, patients or community outside the hospital.</td>
</tr>
<tr>
<td>17. The hospital was not monitoring sources of construction materials.</td>
</tr>
<tr>
<td>18. No workers camp was set inside the hospital fence.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Waste Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>19. The hospital does not have an infection control and waste management plan (ICWMP) or a Health Care Waste Management plan (HCWMP). However it is currently developing a HCWM policy.</td>
</tr>
<tr>
<td>20. There is a new incinerator which is used for managing health care waste. The incinerator was a donation from the referral hospital’s partners (a group of donors).</td>
</tr>
<tr>
<td>21. Wheele bins for storing wastes before they are incinerated are inadequate.</td>
</tr>
<tr>
<td>22. PPEs (mainly heavy duty gloves) and shovels are also inadequate for the incinerator operator.</td>
</tr>
<tr>
<td>23. The sewage system at the hospital is very old. It usually breaks down, every week.</td>
</tr>
<tr>
<td>24. There is a challenge of bin liners for the waste bins. Plastic bags for use as bin liners are stolen by staff.</td>
</tr>
<tr>
<td>25. Waste segregation is inadequate.</td>
</tr>
<tr>
<td>26. Many healthcare workers do not know appropriate infection control and waste management procedures.</td>
</tr>
</tbody>
</table>
27. Kitchen waste and any general waste is disposed in wheelie bins outside the wards. Eating in the wards is not allowed. The wheelie bins are taken to a skip where a private contractor comes every day to pick the waste.

28. The City Council were collecting the skip but they were doing it irregularly.

<table>
<thead>
<tr>
<th>Laboratory Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>29. The laboratory has a safety officer. There has never been any major incident.</td>
</tr>
<tr>
<td>30. The laboratory personnel were trained in Ebola Virus Diseases case management.</td>
</tr>
<tr>
<td>31. The laboratory cannot handle specimen as it does not have a negative air pressure room.</td>
</tr>
<tr>
<td>32. Basic PPEs such as laboratory coats, gloves and mouth masks are adequate. However they do not have the N95 mouth mask recommended for TB or Ebola.</td>
</tr>
<tr>
<td>33. The laboratory observes triple packaging policy i.e. a specimen has to be wrapped in an absorbent material, then a plastic and then a plastic container.</td>
</tr>
<tr>
<td>34. Wastes are properly segregated into sharps, infectious wastes and non-infectious wastes. There is no food wastes in the laboratory as eating is not allowed.</td>
</tr>
<tr>
<td>35. Waste/used chemicals are taken to the pharmacy which disposes them.</td>
</tr>
<tr>
<td>36. Appropriate bin liners are used in the waste bins.</td>
</tr>
<tr>
<td>37. The laboratory gets funding from the Early Infant Diagnosis Fund.</td>
</tr>
</tbody>
</table>
ANNEX 5 ARCHITECTURAL DESIGN OF ASH PIT FOR THE EVD CENTRES

NOTES

1. DO NOT SCALE OFF FROM THE DRAWING. ALL CONSTRUCTORS MUST CHECK OFF SITE ALL DIMENSIONS AND INFORMATION PROVIDED. ANY ERRORS OR OMISSIONS MUST BE REFERRED TO THE PROJECT ARCHITECT BEFORE MATERIALS ARE ORDERED OR WORK PUT IN HAND.

2. THE CONTRACTOR IS RESPONSIBLE FOR THE STRUCTURAL STABILITY AND DURABILITY PERFORMANCE OF THEIR WORK.

REVISIONS

MALAWI GOVERNMENT BUILDINGS DEPARTMENT PO BOX 435
LILONGWE

PROJECT TITLE
CONSTRUCTION OF AN INCINERATOR

CLIENT
SECRETARY FOR HEALTH
P.O. BOX 30377
LILONGWE

DRAWING SHEET
ELEVATIONS

DRAWN

CHECKED
N.C. MABA
K.E. NANDU

SIGNED
H.L.C. CHIRRED

ARCHITECT

PROJECT ARCHITECT

DRAWING NUMBER
FILE No

SCALE

DATE

REFERENCE DATE

FILE No

SERIAL No

REVISION No

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ANNEX 5: ENVIRONMENTAL GUIDELINES FOR CONTRACTORS

1. General Provisions and Precautions
The contractor shall take all necessary measure and precautions to ensure that all the works and associated operations on or off the work sites are carried out in accordance with statutory and regulatory environmental and social requirements of the Malawi. The contractor shall take all measures necessary to implement the requirements of the ESMP and protection measures relevant to the works.

The contractor shall avoid and prevent any nuisance or disturbance associated with execution of work under this project. In the event of any soil, debris or silt from the work sites being deposited on any adjacent land, the contractor shall immediately remove all such spoil debris or silt and restore the affected area to its original state, to the satisfaction of the responsible authorities. Any temporarily acquired land for construction purposes should be restored to its prior condition, to the satisfaction of the client or client’s representative.

The contractor shall include environmental management costs in the bid and shall commit to implementing the environmental management activities as agreed in the contract conditions. The contractor shall be liable to a fine as determined by the Environmental Affairs Department (or Minister of Natural Resources, Energy and Mining) in accordance with the EMA 1996, where his actions contravene environmental compliance.

2. Protection of Water and other Public Services
The Contractor shall ensure that no public services are disrupted as a result of execution of the construction works. In particular, the Contractor shall:

- Not interfere with supply or abstraction of water for public or private use; and shall not pollute any water resources (including groundwater);
- Not disrupt power supply or telephone connections or any other public or private services including footpaths and walkways;
- Not discharge or deposit any waste or any material into any waters or any grounds except with the permission of the appropriate regulatory authorities.
- At all times ensure that all streams, drains and trenches within and adjacent to the work sites are kept safe and free from any debris and any material arising from the works;
- Protect all water courses (including ditches, canals, drains and lakes) from pollution, siltation, flooding or erosion as a result of the execution of the works.
- Assume all responsibility to locate or to confirm the details and location of all utility services on or in the vicinity of the site
- Assume responsibility for any damage and/or interference caused by him or his agents, directly or indirectly, arising from actions taken or a failure to take action to protect public or private utilities.
- Be responsible for full restoration of any damage caused and for restoration of services. Restoration shall be to the satisfaction of the client/client’s representative. The client/client’s representative will ensure that any affected
third party is content before confirming they are content with the restoration enacted by the contractor.

- Ensure that water and waste products shall be collected, removed and disposed of at a site approved by the District Council in a manner that will not cause pollution or nuisance.
- Not dispose of any surplus material on private land unless authorized in writing by the owner(s), authenticated before a notary public, and with previous authorization of the District/City Council.

3. **Control of Air Pollution**
   - Open fires and burning of construction waste shall not be permitted;
   - Dust-generating operations shall not be permitted to affect any residential areas, pedestrians or any public or private property. Where dust generation is inevitable, appropriate measures such as use of water sprays and fencing shields or appropriate covering material shall be employed. All workers shall be protected from dust emissions by providing them with appropriate protective wear.
   - All construction machinery, plant and equipment including all vehicles shall be regularly maintained to ensure that no smoke or obnoxious gas is discharged to pollute the air and affect the public or property.

4. **Acquisition of Construction Material**
   - Only licensed quarrying, sand mining and brick-making operations and sites shall be used as sources of construction materials.

5. **Prevention of Soil Erosion.**
   - The Contractor shall fence off construction sites, provide appropriate drainage and ram or compact soils where necessary to stabilize the soils and reduce erosion.
   - All construction sites shall be backfilled, levelled and re-planted with trees, vegetation and grass to restore them to the original state and to prevent soil erosion to the satisfaction of the client or client’s representative.
   - As far as possible the contractor shall avoid or reduce construction activities and mining of construction material during the peak of rainy seasons.

6. **Control of Social Impacts**
   - The Contractor shall coordinate with all the neighbouring land users and respect their rights to a clean and safe environment. Written agreements with local landowners for temporary use of their sites or property shall be made and sites must be restored to original condition or conditions acceptable to the owner within an agreed time. Camp sites shall be maintained and cleaned up at all times and on completion of the works.
   - Health and safety of workers shall be protected by providing basic emergency health and first aid facilities and awareness meetings aimed at the prevention of sexually transmitted diseases. Awareness meetings shall be conducted as a part of all construction employee orientation programs. Employees shall be provided with condoms for protection from STIs.
• The Contractor shall obtain all necessary written traffic control permissions including for use of flagmen, traffic cones or other devices such as barricades and/or lights which he must use to control traffic for safety of pedestrians, cyclists and all road users, particularly school children.

• The Contractor shall neither stockpile nor store any construction materials; nor park construction plant or vehicles in walk ways, pedestal routes or driveways. Stockpiles of material shall be covered with tarpaulins or sprayed with water where these materials pose risks of dust to the public or people’s property.

7. Noise Control and Regulation
• The Contractor shall take all necessary measures to ensure that the operation of all mechanical equipment and construction processes on and off the site shall not cause any unnecessary or excessive noise to the public. In addition, the Contractor shall operate noisy equipment within government working times unless with prior arrangement and permission from the employer
• Vehicle, plant and equipment exhaust systems shall be maintained in good working order, as recommended by the manufacturers, to ensure that no noise is unnecessarily generated to inconvenience the public.
• Construction works and operations shall be scheduled to coincide with periods when people would least be affected by noise, having due regard for avoiding any noise disturbances to local residents, hospitals, schools or any other public and private places in the work site neighbourhood.
• The contractor shall notify public (likely to be affected by the works) of impending construction operations and specify methods to receive and handle all public complaints.

8. Environmental Monitoring
• The Contractor shall be responsible for monitoring all his activities and ensuring that all environmental requirements and the above conditions are met at all times.
• Contractor shall also facilitate regular environmental, social and health; and safety monitoring by the Client, the Client’s representative or an independent monitor appointed by the Client, or any other national agency with a remit to inspect and monitor construction, environmental, social and health and safety performance.
• The contractor will immediately agree and implement a rectification plan to bring the contractor back into compliance where inspections, audits and monitoring identify issues that are not in compliance with the ESMP as included in the contract.