Construction Industry Environmental Management Strategy for Malawi

National Construction Industry Council of Malawi

NCIC

Eco-friendly and Sustainable Construction

Construction Industry Environmental Management Strategy for Malawi

2015

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FOREWORD

The construction sector is significant in Malawi contributing over 3% of the Gross Domestic Product (GDP) and provides employment for around 1 million workers. The public sector is a major client of the industry and is responsible for directly procuring over half of all construction in the country. The output of the construction industry, be it public buildings, commercial buildings, homes or infrastructure such as roads, railways, airports and water ports has a major impact on Malawi's ability to maintain a sustainable economy overall and has a major impact on Malawi environment.

Malawi cannot meet its declared environmental targets without dramatically reducing the environmental impacts of construction activities. Therefore the nation needs to change the way it designs and builds. This Construction Industry Environmental Management Strategy (CIEMS) is based on a shared recognition, by Government and the industry, of the need to deliver a radical change in the sustainability of the construction industry in Malawi. . The CIEMS lays out specific actions by industry and by Government which will contribute to the achievement of overarching targets within each of the main areas covered by the sustainability agenda.

The CIEMS represents a commitment from the industry to work towards this vision by reducing its environmental impacts and its consumption of natural resources, while creating a safer and stronger industry by training and retaining a skilled and committed workforce. This CIEMS also aims to provide greater clarity about the range of Government commitments and targets which are relevant to the delivery of a sustainable construction industry in Malawi.

PREFACE

Construction firms and Government are realizing that environmental management is a primary key to the success of the industry. They understand that it is imperative to eliminate or minimize harmful environmental impacts from construction activities. This Construction Industry Environmental Management Strategy (CIEMS) complements the National Construction Industry Policy Implementation, Monitoring and Evaluation Strategy published in April 2015.

The development of this CIEMS involved extensive and wide consultations with construction industry stakeholders that gave their time and provided valuable information. The contributions of officials of various government ministries and departments, contractors in various categories, construction consultants and professionals in the built environment were very valuable in shaping this work.

The management and staff of the National Construction Industry Council and its Board of Directors provided managerial, administrative and professional support and contributions in making the development of this strategy possible. A multi-sectoral Technical Committee spearheaded the strategy preparation process that ensured the participation and ownership of the industry and Government stakeholders.

LIST OF ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
CIEMS	Construction Industry Environmental Management Strategy
CO2	Carbon Dioxide
DEA	Directorate of Environmental Affairs
EAD	Environmental Affairs Department
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
ESIA	Environmental and Social Impact Assessment
FSEM	Framework for Sustainable Environmental Management
GDP	Gross Domestic Product
HIV	Human Immune Deficiency Syndrome Virus
MBS	Malawi Bureau of Standards
MCCCI	Malawi Confederation of Chambers of Commerce and Industry
MoLGRD	Ministry of Local Government and Rural Development
MoLH&UD	Ministry of Lands Housing and Urban Development
MoT&PW	Ministry of Transport and Public Works
NCE	National Committee on Environment
NCIC	National Construction Industry Council
NEAP	National Environmental Action Plan
ODPP	Office of the Director of Public Procurement
PCBs	Polychlorinated Biphenyls
RA	Roads Authority
TCE	Technical Committee on Environment
TEVETA	Technical Entrepreneurial, Vocational and Education Training Authority

CHAPTER 1: INTRODUCTION

This document is the Construction Industry Environmental Management Strategy (CIEMS) for Malawi intended to formalize procedures for managing and reducing environmental impact of construction activities. Companies and organisations will implement this strategy to maintain compliance with environmental regulations, lower environmental costs, reduce risks, train employees, develop indicators of impact and improve environmental performance. This CIEMS follows the National Construction Industry Policy launched by the Malawi Government in 2015. The key to future success of this strategy is continuous improvement. As changes occur in construction contractors' services and products, along with changes in environmental regulations, this CIEMS will be revised to reflect those changes.

1.1 Background

Construction activities play a major role in the socio-economic development of Malawi, providing building and infrastructure on which all sectors of the economy depend, which makes construction one of the most strategically important sectors.

Construction projects, particularly in building and civil engineering areas, typically take longer and include more phases than projects in other sectors, and thus involve a large number of subcontractors and personnel with various specializations. There are many types of construction activities and a large number of actors along the whole value chain of the sector to be taken into account, and thus a variety of different organisations in the construction sector.

As at June 2015 the Malawian construction industry constituted over 2,500 registered companies with NCIC in various categories. In general the stakeholders in the construction sector include:

- Consultants, Contractors, Clients and Construction Material Manufacturers and Suppliers.
- The general public is an important recipient of the services and impacts from construction sites.
- The government (local and central) on the other hand has regulatory role and is also a client and a key stakeholder.

1.2 Economic Importance of the construction sector in Malawi

The competitiveness and prosperity of the Malawi economy benefit from the significant contribution of the construction industry. Public sector and private sector companies throughout the Malawi economy are dependent on the performance of built infrastructure such as roads, rail, power stations and telecoms networks to remain competitive, and inward investors will consider the quality of the built infrastructure as one of the key factors when considering location decisions. The construction industry has a major role in delivering the

built infrastructure in an innovative and cost effective way and a modern, efficient infrastructure is a key driver of productivity. The nation's productivity also depends on the efficiency and nature of the built environment. Similarly, the effectiveness, flexibility and mobility of the workforce and the productivity of companies depend on the availability of appropriately configured and located houses and premises. The design, construction and operation of Malawi's built environment have other important economic effects, for example, on the rate at which the country uses material and other resources. Through its impact on the built environment, construction plays a central role in Malawi's drive to promote sustainable growth and development.

In Malawi growth rates in the construction industry have been on the rise in the past 5 years, in some instances exceeded projected figures. This trend is expected to continue in the coming years assuming budget support for government projects and donor funded projects resumes. In 2012 the industry registered a 2.5 percent growth rate. Major construction projects pushed this figure to 5.6 percent for the year ended 2014 and estimated growth rate for 2015 at 6 percent. Since 2012 the construction industry has been benefiting from major projects in the country including the construction work for the VALE Railway Project in the south of the country; construction of the National Stadium in Area 47 Lilongwe, Gorge Dream Town, a major housing project in Area 49 Lilongwe and the refurbishment and expanded infrastructure development at Chileka Airport in Blantyre.

The transport and storage sector, which also has seen much construction activity grew in the past couple of years, from 4.9 percent growth rate in 2012, to a 5.2 percent for 2014. Projected rate for the current year 2015 is estimated at 5.6 percent. The rates are attributed to improvement in the agricultural sector and the growth rates being experienced in the wholesale and retail trade sector.

1.3 Increased environmental awareness and consciousness for sustainable construction in Malawi

As a regulatory body, the National Construction Industry Council (NCIC) realizes that it is important that owners, clients and managers of construction projects are aware of, and are able to control the environmental impacts of their construction activities and processes. Increased awareness and knowledge will enhance environmental consciousness and efforts to intensify the sustainability movement and demand standards compliance in the construction industry in Malawi.

The importance of environmental consciousness is highlighted in many articles written by researchers and practitioners throughout the world. Compared with other industries, construction is a main source of environmental pollution (Shen et al., 2005). Building construction and operations have a massive direct and indirect effect on the environment (Levin, 1997). Pollution sources from the construction process include harmful gases, noise, dust, solid and liquid waste (Chen et al., 2000). This issue has prompted many construction participants to attempt to control the impacts of their activities by adopting environmental management systems (Lam et al., 2011).

The construction industry in Malawi is linked in many ways to public sector through regulation, standardization and environmental aspects, and the public sector is also a major client of construction industry in the country. Accordingly also in the promotion of innovation in construction sector various public policy measures play important roles.

The Malawi government, professional bodies and private construction companies have started several programmes in order to enhance the awareness and knowledge of construction practitioners, and also to promote the application of sustainable principles within construction projects. However, the sustainability movement is a new concept for the construction industry in Malawi and there is no comprehensive reference to inform construction practitioners of the riskiest environmental impacts due to the construction process. With an aim of documenting and prioritizing the most frequent environmental impacts of the construction industry in Malawi, NCIC commissioned the development of this Environmental Management Strategy for the construction industry in Malawi.

The NCIC recognizes that enhancing the identification of the major environmental impacts of construction processes will help to improve the effectiveness of environmental management systems. Furthermore, prediction of the correlated environmental impacts of construction before the construction stage, will lead to improvements in the environmental performance of construction projects and sites. The determination of major environmental impacts will assist to consider a range of on-site measures in order to mitigate them.

As part of the fulfillment of its mandate, the ***NCIC promotes the use of eco-friendly and energy efficient materials and technologies*** for the following reasons:

- Natural resources are depleting while demand for them is increasing
- Resources need to be used effectively and sustainably
- Cost and value of materials are more than their face value
- Cheap designs are not always cheap hence designs and materials specifications need to take into account sustainability

The Government of Malawi has the following construction policy provisions related to the environment:

- Promotion of adherence to ESIA processes of all industry players
- Promotion of the use of energy efficient methodologies and materials
- Promotion of best practices in the use of environmentally friendly materials and construction technologies
- Mainstreaming of environmental protection initiatives in construction and development

CHAPTER 2: DETAILED ANALYSIS OF SELECTED LAWS AND POLICIES RELATED TO THE ENVIRONMENT IN MALAWI.

The Acts, policies, regulations and standards for various sectors have provisions for environmental protection relevant to the activities in those sectors. This section looks at the various pieces of legislation relevant to the construction industry and their provisions for environmental management. Gaps and provisions that may contribute to environmental degradation as a result of construction works will have also been identified.

2.1 Environmental Management Act 1996

The Environmental Management Act (EMA) of 1996 enforces the Framework for Sustainable Environmental Management (FSEM) through the Environment Impact Assessment (EIA) process. The Act defines the powers, functions, and duties of the Directorate of Environmental Affairs (DEA) and the Environmental Affairs Department (EAD) in implementing the EIA process (EMA, 1996).

The EMA gives powers to the minister responsible for Environmental affairs to promote the protection and management of the environment and the conservation and sustainable utilization of natural resources.

The act also gives powers to the Director of environmental affairs to issue environmental protection orders to anyone whose action will have a negative impact on the protection and management or conservation and sustainable utilization of natural resources.

Section 37 of the also provides for the safe disposal of wastes so that they are not disposed of in public places. In trying to ensure that the environment is protected, the act prescribes fines and even imprisonment for anyone who violates the provisions of this act.

The Act provides that environmental impact assessment studies should be carried out for all major projects before implementation. It also outlines the Environmental Impact Assessment (EIA) process to be followed in Malawi, the details of which are provided in the EIA guidelines of 1997 which were recently reviewed.

The issues arising from this act in relation to the construction industry include the following:

- Waste management continues to be an issue in the construction industry because there are no provisions for sites where construction rubble can be dumped. This results in contractors dumping the rubble along the roads and other undesignated places.
- There is the issue of political interference where EAD can issue a stop order to a developer but would receive a directive to allow the developer to proceed regardless of the environmental impacts that may emanate from his project.
- The fines that are prescribed in the act are not significant in comparison with the cost of most projects.

2.2 Town and country Planning Act

The town planning act regulates land use planning and Physical development activities with the aim of achieving sustainable developments. It provides for preparation and enforcement of physical development and land use plans. Assigning of land uses for different parcels of land ensures that each piece of land is put to its best use and fragile and ecologically sensitive parcels are conserved. Enforcement of this provision is a problem because there are policy holders of such areas who have the mandated to protect these areas other than the Planning authority. An example would be the buffer zone for rivers which is supposed to be protected under the Water Resources act. These are areas that are being used for sand and quarry mining an, brick making and dumping of all kinds of wastes.

Section 40 of the act stipulates that environmental and socio economic assessments should be carried out for large scale projects before they can be granted permission under this act. This is meant to ensure that the mitigation measures are prescribed for any negative impacts that may result from the construction activities of these big scale projects. However, enforcement of the same is a problem because the planning authorities have powers to ensure that the construction is being done according to the approved plans and the issue of implementation of the mitigation measures is enforced under a different act which is outside their jurisdiction. The planning authority has no powers to act on environmental offences within their planning areas; instead, they will have to write to the Director of Environmental affairs to address for him to take action on such issues.

2.3 Town planning guidelines and standards

The town planning guidelines and standards provide guidance on the scale, location and site requirements for various land uses in the country. They also provide principles for sustainable management of land to be followed by all physical planning authorities in line with relevant acts and policies. One of the objectives of these standards is to create and maintain an environment which ensures that physical development is orderly, coordinated and of high quality and that environmental negative effects and development conflicts are minimized, mitigated or avoided.

Guidelines for the treatment of waste water and the designs of waste disposal sites are also provided which if used by the local councils will help in containing solid and liquid wastes generated in the construction industry and reduce the negative impacts these have on the environment.

The preparation of physical development and land use plans, detailed layout plans, building plans, road designs are guided by the provisions outlined in these guidelines. The assigning of the right uses for each parcel of land is the starting point in environmental protection as this sees to it that fragile land, rivers catchment areas and reserves forest areas are protected. Buildings that have been designed taking into consideration of these standards will also be constructed in the right places using the recommended building materials.

The problem with the provision of these standards is that the department of physical planning has no control over the areas that are meant to be protected. For example, the catchment areas and river reserves are seen to be no man's land and are being used for brick making, sand and quarry mining which contribute to pollution of water bodies and degradation of rivers banks and catchment areas.

2.4 Malawi Growth and development Strategy II

The MGDS II recognizes the importance of natural resources as a principal source of economic growth and the need to mitigate impacts of human, industrial and development activities on this resource. As such, natural resource and environmental management is one of the key priority areas under the sustainable growth theme.

It has been noted although there has been an improvement in environmental management; the sector still faces challenges in the following areas:

- The institutional capacity for environmental management is not adequate, resulting in failure to enforce legal provisions and monitor compliance.
- The legal framework is weak and the supportive infrastructure is not sufficient and
- Poor land use management practices.

There is need to address these issues to make sure that development activities are contributing to physical and economic development without compromising environmental and natural resource protection.

2.5 Codes of Ethics for the Construction Industry

The general rules of practice in the codes of ethics encourage players to take reasonable care of the environment in carrying out their activities. The players are expected to provide sanitary facilities and waste and rubble disposal facilities on their site. They are also expected to minimize the impacts of their construction works on the environment and rehabilitate their working areas to its original state if disturbed.

Those who breach the codes of conduct may be warned, fined, suspended or deregistered by NCIC if they are found to be in breach of this code of conduct. The provision for waste management only ensures proper management of wastes on the construction site, but these may still be disposed of in unauthorized places due to the absence of designated dumping sites.

2.6 Forest Act

This act provides for the management of forests and the protection of environmentally fragile areas. It gives the department of forestry powers to control, protect and manage the forest

reserves and protected areas in the country. Construction activities result in the cutting down of trees and destruction of forest reserves. In order to ensure that forest are protected, the act under section 44 prohibits the dumping of any kind of wastes within forest reserves, protected areas or village forest.

In the same vein, construction of roads, buildings or any other structures is not permitted within forest reserves under section 46 of the act. Such activities will only be permitted if the developer get permission from the Director of Forestry and is given a license.

Development activities in the construction industry should not take place within forest reserves or protected areas in order to comply with the provisions under this act. Construction rubble should also not be deposited in a manner that will impact negatively on forest reserves.

2.7 Water Resources Act, 2013

This Act regulates the use, protection and conservation of water resources and catchment management in the country through the water resources board. Specifically, the Act controls use of water resources, water rights and pollution of public water. Contractors have to apply to the Water Resources Board for abstraction rights whenever they are implementing their activities.

The Act has put measures and regulations in place to help prevent and control pollution of public water resources. The control of the quality of effluent discharged into surface drainage and public water resources is one of the measures. As such, it is a requirement for contractors to apply for effluent discharge permit from the Water Resources Board which regulates the standard of waste water discharged into surface drainage or water bodies.

It is also important in compliance to this act to ensure that construction works, especially, road and bridge construction activities do not result in the pollution or even drying up of rivers. The water resources board in conjunction with EAD is supposed to monitor these activities closely to avoid such scenarios.

2.8 Local Government Act

The second schedule of the Local Government Act gives powers to Local councils to carry out environmental protection functions within their area of jurisdiction. These include:

- Preparation, of social, economic and environmental development plans in conjunction with relevant government agencies.
- Appropriate management of solid and liquid by collecting, removing and treatment
- Regulation and monitoring of building and construction activities.

However, councils are not adequately carrying out most of these functions. Notably in the construction industry is the haphazard disposal of construction rubble because the council has no arrangements with contractors to collect the rubble and worse still, there are no designated places where these can be dumped.

2.9 Malawi National Land Policy 2002

Section 9 of the land policy provides direction on how to deal with practices that have a bearing on the environmental management of land based resources especially in the following areas:

- Construction of tourism facilities along the lakeshore should be regulated and environmental impact assessment should be carried out before construction of the approved developments can commence.
- It also provides for the preparation and enforcement of an integrated lakeshore development programme.
- Enacting in the laws the provision of a 50 meter easement along the lakeshore. this means this parcel of land remains public land and should not be developed
- Mining rights should only be granted after an ESIA has been conducted to verify the impacts a mine may have on the environment.

Even with these provisions, still problems in these areas may be because:

- Most of the developments along the lakeshore are being implemented without an ESIA study being carried out.
- The integrated lakeshore development programme is not in place.
- Lakeshore developments are being implemented without respecting the 50 metre easements.
- The mining rights are only enforced on large scale miners, yet great damage to the environment result from sand and rock mining by small scale miners.

2.10 World Bank Environmental Policies

World Bank safeguard environmental policies provide a mechanism for addressing environmental issues in the design, implementation and operations of development programmes and projects in order for sustainable development to be achieved. The bank only provides funding for development projects whose designs have incorporated environmental management by carrying out an environmental impact studies and having them approved.

Just like the ESIA guidelines, the World Bank policies provide guidance on how the environmental assessments should be carried out and the format and structure of the ESIA reports.

Implementing agencies of bank funded programmes and projects comply with the ESIA requirements because it is the determining factor for them to be given funding by the bank.

2.11 Other Policies and Regulations with Environmental Management Provisions

a. National Construction Industry Policy (2015)
b. Revised National Environmental Policy (2004)
c. National Forest Policy of Malawi (1996)
d. Atomic Energy Act - Draft Atomic Energy Regulations (2010)

2.12 General observations on the provisions of various pieces of legislation, policies and regulation

An assessment of the environmental impacts of the construction industry in Malawi gave an indication of the issues, challenges and constraints that the industry is faced with. The various gaps in legislation, policy, regulations, guidelines and project implementation processes and activities can be addressed by an environmental management strategy that incorporates specific components and actions. The critical gaps identified that contribute to the poor environmental performance and management by the construction industry in Malawi are presented below:

a. There is no clear direction on how policy holders can enforce the environmental protection provisions within their legislation.
b. The amount of money charged as fines to be paid by offenders is too little.
c. Most of the Acts provide for the imprisonment of offenders but this is not done in most cases.
d. Political interference prevents enforcement and compliance of legal provisions.
e. Contractors and developers have limited knowledge of the legal instruments and implications of non compliance.
f. Weak regulatory framework for environmental performance and management leading to poor environmental standards and quality; and non-compliance in the construction industry in Malawi not penalized enough.
g. Law enforcement is limited because "the technical capacity within the environmental management system is lacking, and morale is very low, with virtually no operating budgets and limited human resources as a result of high vacancy rates in Government.
h. There is no clear law that prevents the use of environmentally unfriendly construction materials in Malawi.
i. NCIC contractor registration requirements do not have checklists for environmental performance and management provisions.
j. NCIC codes of ethics for the various construction industry groups or categories of registered entities do not contain adequate environmental performance and management standards and guidelines.

2.13 Environmental and Social Impact Assessment (ESIA) Institutional Framework

A proper institutional arrangement is crucial to the successful implementation and monitoring of the legal provisions and environmental interventions in Malawi. Coordination among the institutions involved in monitoring the compliance is also of great importance and should be emphasized.

This section is looking at the existing institutional framework relevant to the construction industry and how they coordinate. It will also look at the gaps which exist that may be contributing to failure to monitor the compliance of the various pieces of legislation that are in place.

National environmental authorities were established and are strengthened through an Act of Parliament in recognition of the need for strong and effective coordination and advisory functions required in all environmental issues in Malawi. The Environmental Affairs Department (EAD) was therefore established to be the authority to collaborate with existing institutions and help strengthen and improve their competence in carrying out work that has potential positive or negative impact on the environment in the country.

In the EAD, the Director of Environmental Affairs provides oversight in the ESIA requirements that apply to both public and private sector development projects which are prescribed under section 24 of the Environmental Management Act (EMA) and listed in Appendix B of the ESIA guidelines. *(See Annex 2 and Annex 3 for lists of projects requiring ESIA).*

As provided for in Section 26 of the EMA, a prescribed project cannot receive the required authorization to proceed from the licensing authorities unless and until the Director has issued a certificate stating that an ESIA is not required or, on the basis of an ESIA report he/she has approved the project. Under the EMA, the Director is empowered to require changes to a project to reduce its environmental impact and to reject a project if, in his/her view, it will cause significant and irreparable injury to the environment. Decisions of the Director may be appealed to the Environmental Appeals Tribunal (EAT), established under Section 70 of the EMA.[1]

All formal ESIA submissions are made to the Director with appropriate scrutiny fee accordance with section 29. The preparation of ESIA submissions *(a Project Brief, and an ESIA report)* is the responsibility of the developer. A Project Brief is an information document that focuses on critical issues and is used by the Director to determine whether ESIA is required or not.

The EAD provides procedural and technical advice to developers, as required, on the how best to comply with ESIA requirements. It maintains a directory of local, regional and

[1] Environmental Impact Assessment Guidelines

international consultants capable of carrying out ESIA studies. The EAD also maintains a register of projects being appraised under the ESIA requirements of the EMA.

While the EAD has statutory responsible for ensuring compliance with ESIA requirements it relies substantially upon the expertise and advice of the inter-agency Technical Committee on the Environment (TCE) established under Section 16 of the EMA. The TCE has a role chairperson and the EAD provides secretarial support to it. Through the TCE, member agencies are informed about projects being appraised under the EIA requirements; participate in reviews of Project Briefs, ESIA ToRs and ESIA reports; develop project approval terms and conditions; develop and monitor project auditing programmes; and recommend courses of action to the Director. The Director acts on the advice of the TCE but is not bound by it.

2.14 Shortfalls in the current institutional arrangements

The current set up does not seem to be producing the desired results in protecting the environment and achieving sustainable development. The following areas should therefore be looked into in trying to improve environmental protection efforts:

- The role of Environmental affairs is that of coordination but it is not clear which institution is responsible for implementation, this weakens the stand of the department on some issues, as it will rely on the line Ministries.

- The NCE and TCE only meet to review environmental impact assessment reports which have been submitted for review by EAD and only issues that arise from these reports are dealt with.

- Most of the Environmental monitoring and management activities are coordinated by Environmental Affairs headquarters which is central government. This is the same with the technical bodies whose members are mostly based at headquarters and have to travel to the places where projects are being implemented for monitoring exercises. This arrangement is costly and therefore not effective or efficient.

- The working relationship between environmental affairs and other sectors is not very clear in relation to the role each concerned institution is supposed to play. There is no organogram that shows the linkages in this setup.
- Weak coordination, linkages and required partnerships in the actions required to enhance environmental protection and management in the construction industry in Malawi.
- Inadequate commitment to a planned approach to training people that work in the construction industry.
- Inadequate number of trained and practicing environmental officers in Malawi.
- Lack of data resulting from weak monitoring and evaluation; and lack of related research in the construction industry.
- Inadequate institutional capacities in NCIC and RA.

2.15 Environmental and Social Impact Assessment Guidelines

The Malawi Government has and continues to develop guidelines for the assessment of the impact of projects on the environment. In 1997, the EAD produced a set of general Environmental and Social Impact Assessment (EIA) Guidelines to facilitate compliance with the Environment Management Act. ***A revised version of the EIA guidelines was produced in 2011.*** The guidelines *(under review in 2015 with a draft in place)* are to be used by government, project developers, donors and the general public. The aim of the ESIA Guidelines is to integrate environmental concerns into national development strategies for all types of projects, in both the public and private sectors. The ESIA Guidelines are generic, based on the assumption that sector-specific guidelines would be developed in due course. The ESIA Guidelines provide important background information to the EIA process and should be read in conjunction with any sector specific guidelines.

The ESIA process is summarized in Annex 7.

The following are the ESIA sector specific guidelines that the Government of Malawi has developed:

a. Waste Management Projects EIA Guidelines (2002)
b. Sanitation Projects EIA Guidelines (2002)
c. Irrigation and Drainage Projects EIA Guidelines (2002)
d. Mining Projects EIA Guidelines (2002)

2.16 Gaps in Technical Development and Innovation in the Construction Industry in Malawi

a. Limited or lack of knowledge and awareness about the environmental impacts of the construction industry in Malawi.
b. Poor environmental impact prevention, control and mitigation in the construction industry in Malawi.
c. Poor waste management and disposal in the construction industry in Malawi.
d. The absence of the required plans that construction industry stakeholders should have that would enhance environmental management. The following are commonly lacking:

   - ✓ *Waste management plans,*
   - ✓ *Water resources management plans,*
   - ✓ *Procurement plans,*
   - ✓ *Air pollution control plans,*
   - ✓ *Environmental Management Plans,*
   - ✓ *Health and Safety Plans,*
   - ✓ *Training plans on environmental issues*.

e. Lack of eco-friendly designs *(in relation to environmental issues)* of buildings and infrastructure.
f. Limited technological innovation for eco-friendly construction in Malawi.

g. Poor construction procurement and supply side integration in both public and private sectors *(leads to corruption and financial mismanagement).*

In order to ensure the development of a robust CIEMS for the construction industry in Malawi, the gaps presented above will be addressed. Along with these gaps there are also specific components in the construction process that need strategic actions to be taken by the various construction industry stakeholders in Malawi.

CHAPTER 3: BROAD STRATEGY DIRECTIONS

3.1 Vision for the Construction Industry Environmental Management Strategy (CIEMS)

The vision of the CIEMS is "Eco-friendly and sustainable construction in Malawi". This is inspired by the recognition that construction is a competitive sector which plays a vital role in delivering sustainability and prosperity across the Malawi economy.

3.2 The Goal of the CIEMS

Within the provisions of the Environmental Management Act (1996), the CIEMS for the construction sector will help to deliver the aims set out in the National Strategy for Sustainable Development and the National Environmental Action Plan (NEAP). As a joint industry and Government initiative the CIEMS is intended to promote leadership and behavioural change, as well as delivering substantial benefits to both the construction industry and the wider Malawi economy.

This CIEMS complements the National Construction Industry Policy Implementation, Monitoring and Evaluation Strategy published in April 2015. There is a strong business case for the sustainable construction agenda along which this CIEMS is developed based on enhancing company image and profile in the market place by addressing issues relating to eco-friendly and environmental protection, social and corporate responsibility; companies securing opportunities offered by sustainable products or ways of working and increasing profitability by using resources more efficiently.

3.3 The Purpose of the Strategy

The purpose of this CIEMS is to facilitate full participation of all key construction industry stakeholders in managing environmental impact in the industry through increased knowledge and awareness and supporting members to fully comply with key Environmental and Social related policy[2] requirements.

The strategy provides clarity around the existing legal, regulatory and policy framework and signaling the future direction of Government policy. It aims to realize the shared vision of sustainable construction by:

• Providing clarity to construction stakeholders and businesses on the Government's position by bringing together diverse regulations and initiatives relating to sustainability;

• Setting and committing to higher standards to help achieve sustainability in specific areas;

[2] Drawn from NCIC strategic plan 2011-2017

• Making specific commitments by industry and Government to take the sustainable construction agenda forward.

When properly implemented this CIEMS will help to control environmental impact, improve environmental performance, improve training, improve communication and improve data collection. Another potential for this CIEMS is to save money through process change or construction material or product selection.

3.4 Delivery of the Construction Industry Environmental Management Strategy

To deliver the CIEMS, the Malawi Government and industry have devised a set of overarching strategies related to the 'ends' and 'means' of sustainable construction. The 'ends' relate directly to sustainability issues, such as climate change and biodiversity; the 'means' describe processes to help achieve the 'ends'.

Chapters 4 to 6 set out overarching strategies and central to each is a guide for industry and Government to take specific actions and deliverables which will contribute to the achievement of the overarching strategies.

3.5 Key Stakeholder Participation

This CIEMS addresses issues that affect a spectrum of stakeholders with varied interests. As such the process of developing the strategy ensured broad and active participation of the key stakeholders of the construction industry in Malawi. The interests of architects, clients, building and civil engineering contractors, structural engineers, and project managers operating in the Malawian construction industry were solicited. In addition, the general public (local communities and their local leaders) are important recipients of the services and impacts from construction sites and provide valuable feedback on social issues. The government (local and central) on the other hand has regulatory role and is a key stakeholder whose input into the strategy has been essential. *(See Annex 1 for key stakeholder institutions, their roles and responsibilities).*

3.6 CIEMS Monitoring, Reporting and Review

This strategy will be reviewed and updated once every five years or whenever necessary to reflect progress and any changes that take place. NCIC will collect data through an established team that will lead in the timely delivery of the strategy. During annual reporting the team will be responsible for reporting to NCIC on the implementation of this strategy.

3.7 Communication

Many of the targets and objectives require working in partnership with other teams and a high degree of awareness of issues involved by the construction stakeholders in Malawi. The NCIC and EAD joint team will manage and facilitate this communication in accordance with the institutional framework for construction and environment in Malawi. The NCIC will make deliberate strides to make the construction industry stakeholders aware of this strategy and also make them aware of their roles. NCIC will do this through the leadership of the team called Sustainability Team. NCIC will coordinate the reporting and working relationships between the Sustainability Team and other teams or committees within the industry.

CHAPTER 4: MALAWI'S CONSTRUCTION INDUSTRY CIEMS KEY COMPONENTS AND STRATEGIC ACTIONS

Strategic Objective 1: Achieving overall improvement and strengthening of environmental legal, policy and regulatory framework in Malawi		
Component	**Strategic Action**	**Responsible Stakeholder**
Legislations, Policies and Regulations	✓ Mobilize all pieces of environmental legislation relevant to the construction industry.	✓ EAD
	✓ Simplify, synchronise and summarize all pieces of legislation, policy and regulation related to the construction industry in Malawi. *(Make them easely understandable by all stakeholders)*.	✓ EAD
	✓ Disseminate summarised and simplified pieces of legislation to key stakeholders through workshops and publications.	✓ EAD
	✓ Explore implications of non compliance of such legislations on the industry actors/players.	✓ EAD
	✓ Reduce the administrative burdens of regulations affecting the private and public sector.	✓ EAD, NCIC
	✓ Increase knowledge, awareness and understanding of the legal instruments by stakeholders including government official.	✓ EAD, NCIC
	✓ NCIC contractor registration requirements to include checklists for environmental performance and management provisions.	✓ NCIC
		✓
	✓ Develop regulations for enforcement of compliance of eco-friendly, and sustainable construction practices	✓ NCIC
	✓ Sustainability Index rating of buildings	✓ MoTPW
Enforcing Compliance	✓ Support construction stakeholders in complying with the environmental legislations thereby safeguard business resources and image in accordance NCIC Act and codes of ethics (2009) and other pieces of legislation.	✓ NCIC
	✓ Ensure development and implementation of environmental management institutional policies in line with national environmental legislation.	✓ NCIC, EAD
	✓ NCIC will conduct periodic monitoring of institutional environmental policy implementation	✓ NCIC
	✓ Encourage peer learning on compliance as one way of sharing how to comply by the standards.	✓ NCIC

	✓ Incentivize the implementation of the institutional environmental policies as one way of supporting the compliance by members through trophies.	✓ NCIC, EAD
	✓ Lobby with members of parliament to accord environmental management regulatory bodies adequate resources for proper servicing of construction industry.	✓ EAD, NCIC
Codes of Ethics	✓ NCIC codes of ethics for the various construction industry groups or categories of registered entities to be updated in light of the CIEMS.	✓ NCIC
Strategic Objective 2: Achieving Overall Improvement in the Institutional Framework and Capacity Development Enhancement		
Component	**Strategic Action**	**Responsible Stakeholder**
Coordination, linkages and partnerships	✓ Improve coordination, linkages and required partnerships in the actions required to enhance environmental protection and management in the construction industry in Malawi.	✓ EAD
Institutional Capacity Development and Enhancement	✓ Increase the institutional capacities of the NCIC and RA (by increasing the human resources and material resources required for the operations of the council and authority).	✓ NCIC ✓ Ministry responsible for Statutory Corporations
	✓ Increase technical support from Government to NCIC	✓ MoTPW
	✓ Streamline the procedures and approval requirements and processes for new contractor registrations and annual registration renewals.	✓ NCIC
Research, Monitoring and Evaluation	✓ Develop construction related research for the improvement of the environmental management performance.	✓ NCIC
	✓ Develop a comprehensive monitoring and evaluation framework with critical indicators.	✓ NCIC ✓ EAD
	✓ Develop data collection tools that will generate required data for the construction industry in Malawi	✓ NCIC
Construction Sector Human Resource Development	✓ An increase in the number of environmental officers trained in Malawi and working in the construction industry.	✓
	✓ An increase in organisations committing to a planned approach to training (e.g. TEVETA, Technical Colleges (private and public), Skills Pledges; training plans; Investors in People or other business support tools; Continuous Professional Development (CPD); life-long learning).	✓ NCIC ✓ Ministry of Labour
	✓ Reduce the incidence rate of fatal and major injury accidents.	✓ Contractors

HIV and AIDS prevention and mitigation	✓ Reduce HIV and AIDS infections and impact on the lives of construction workers, their immediate families and nearby communities.	✓ Contractors
	✓ Ensure mainstreaming of comprehensive HIV and AIDS into all ESIAs and screening processes. ✓ Ensure that all EMPs include HIV and AIDS prevention and impact mitigation adequately.	✓ Contractors, NCIC ✓ EAD, NCIC
	✓ Ensure that each contractor develops and implements HIV and wellness workplace programmes guided by clear institutional level HIV policies.	✓ Contractors ✓ NCIC
Strategic Objective 3: Achieve Overall Improvements in Technical and Professional Environmental Management and Performance in the Construction Industry in Malawi.		
Component	**Strategic Action**	**Responsible Stakeholder**
Innovation in construction	✓ To enhance the industry's capacity to innovate and increase the sustainability of both the construction process and its resultant assets. *Innovation is the successful exploitation of new ideas to obtain competitive advantage. It is integral to developing new products for the market and new processes and ways of working. Greater sustainability should be at the heart of policy and standards and procurement to provide the signals to which the construction market can respond in an innovative and flexible manner.*	NCIC
Improvements in Design	✓ The overall objective of good design is to ensure that buildings, infrastructure, public spaces and places are buildable, fit for purpose, resource efficient, sustainable, resilient, adaptable and attractive. Good design is synonymous with sustainable construction. ✓ Aim to achieve greater use of design quality assessment tools relevant to buildings, infrastructure, public spaces and places.	Consultants NCIC Contractors
Tendering and costing	✓ Ensure adequate budgetary allocation of financial resources needed for environmental management issues in construction projects. ✓ Ensure that construction projects tendering documents include all requirements for environmental management performance.	Consultants Contractors Clients
Improvements in Construction Procurement	✓ To achieve improved whole life value through the promotion of best practice construction procurement and supply side integration, by encouraging the adoption of the Construction Commitments in both the public and private sectors and throughout the supply chain. *A successful procurement policy requires ethical sourcing, enables best value to be achieved and encourages the early involvement of the supply chain. An integrated project team works*	ODPP Consultants Contractors

	together to achieve th best possible solution in terms of design, buildability, environmental performance and sustainable development.	Clients
Strategic Objective 4: Enhancing Malawi's Achievement of Climate Change Goals and Objectives Through the Protection of the Natural Environment and Sound Choice of Environmentally Friendly Construction Material Resources.		
Component	**Strategic Action**	**Responsible Stakeholder**
Meaningful Environmental Screening, ESIAs and Audits	✓ Ensure implementation of EMPs and audit processes and support the industry to be professional in environmental management. ✓ Make audit reports prerequisite to getting new assignments. ✓ Liaise with government authorities to ensure that all industry projects are timely and properly audited.	✓ EAD ✓ NCIC
Climate Change Mitigation	✓ Reducing total Malawi carbon dioxide (CO2) emissions. Within this, Government will set out its policy that new homes will be zero carbon and an ambition that new schools, public sector non-domestic buildings and other non-domestic buildings will be zero carbon.	✓ EAD ✓ NCIC ✓ Consultants ✓ Contractors ✓ Clients
Climate Change Adaptation	✓ To develop a robust approach to adaptation to climate change, shared across Government.	✓ EAD
Water use in construction	✓ To reduce consumption of water in construction sites through cost effective measures depending on new technological developments and innovations.	✓ Contractors ✓ Clients
Biodiversity	✓ That the conservation and enhancement of biodiversity within and around construction sites is considered throughout all stages of a development.	✓ Contractors, ✓ Consultants ✓ Clients
Construction Materials	✓ That the materials used in construction have the least environmental and social impact as is feasible both socially and economically.	✓ Construction material manufacturers and suppliers ✓ MBS
	✓ Develop standards that incorporate environmental sustainability	✓ NCIC ✓ MBS
	✓ Waste: reduction of construction, demolition and excavation waste to landfill. ✓ Improved waste management and disposal in the construction industry in Malawi.	✓ Contractors ✓ NCIC

CHAPTER 5: ACHIEVING OVERALL IMPROVEMENTS IN ENVIRONMENTAL MANAGEMENT AND PERFORMANCE AT EACH STAGE OF THE CONSTRUCTION CYCLE AND PROCESSES.

STAGE 1: PLANNING AND SURVEY ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
Climate	Not applicable.	
Geology	Not applicable.	
Soils	Soil erosion or damage due vehicle tracks	• Minimise number of tracks. • Avoid developing parallel tracks.
Surface water resources	Not applicable.	
Surface water quality	Pollution and siltation of rivers from spoils, access roads and tracks.	• Minimise area disturbed. • Rehabilitate on completion.
Groundwater resources	Not applicable.	
Groundwater quality	Not applicable.	
Topography and geomorphology	Not applicable.	
Archaeology/ Paleontology	Disturbance or loss of sites of archeological and/ or paleontological interest due to soils tests.	• Determine importance and sensitivity of site and degree of protection or survey work required.

STAGE 1: PLANNING AND SURVEY ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
Flora	Disturbance or loss of protected and endangered plant species or communities (terrestrial, wetland, aquatic) during survey activities.	• Identify issues and protection measures required *e.g.,* examine need for translocation of specimens to alternative sites. • Minimise vegetation clearance by clearly demarcating work areas. • Provide environmental awareness training to all employees. • Rehabilitate all disturbed areas.
Terrestrial fauna	Disturbance or loss of protected and endangered animal species and communities and their habitat.	• Consider need to Trans-locate species. • Demarcate and close off important habitats. • Minimise vegetation clearance. • Rehabilitate all disturbed areas.
Aquatic fauna	Not applicable.	
Air quality	Fires from bush clearing activities.	• Do not burn cleared vegetation. • Ensure employees are adequately housed and minimise use of open fires.
Noise and vibration	Not applicable.	
Cultural heritage	Disturbance or loss of heritage resources (sites and artifacts).	• Identify significant heritage resources and implement necessary protection and survey measures in consultation with the local community.
Local communities: composition, structure and social functioning	Not applicable.	
Rural livelihoods	Not applicable.	
Future land use options	Not applicable.	
Local economy	Not applicable.	

STAGE 1: PLANNING AND SURVEY ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
Regional and national economy	Not applicable.	
Aesthetic and amenity values	Not applicable.	

STAGE 2: CONSTRUCTION ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
Climate	Not applicable.	
Geology	Loss or modification of geological sites of scientific importance due to excavations.	• Identify and evaluate significance and degree of protection required.
Soils	Soil erosion due to topsoil stripping and stockpiling and vehicle tracks.	• Strip topsoil separately and stockpile for use in rehabilitation. • Minimise number of tracks. • Avoid developing parallel tracks. • Use right angle intersections.
	Soil contamination from oil and diesel spills.	• Provide lined sumps to contain all chemicals. • Provide banding around all diesel tanks, oil drums and generators. • Train all operators in correct fuel transfer techniques to avoid spillage.
	Soil compaction due to heavy equipment and bulk earthworks.	• Remove topsoil prior to earthworks and stockpile for later use in rehabilitation.
Surface water resources	Water consumption by construction personnel and construction activities.	• Use water sparingly. • Repair leaking taps and pipes.

STAGE 2: CONSTRUCTION ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
	Stream flow disruption caused by access roads and tracks.	• Construct stream crossings at right angles. • Minimise number of crossings. • Avoid seasonally marshy areas and dambos. • Do not bulldoze soil into rivers. • Install culverts or construct concrete drifts. • Do not use logs for river crossings.
Surface water quality	Pollution and siltation of rivers from topsoil removal and stockpiles, spoils created from bulk earthworks, access road construction, and quarries.	• Divert 'clean' storm water around large pits and excavations. • Minimise area disturbed. • Rehabilitate on completion. • Construct stream crossings at right angles. • Minimise number of crossings. • Avoid seasonally marshy areas and dambos. • Do not bulldoze soil into rivers. • Install culverts or construct concrete drifts or bridges.
	Water pollution from fuel, oil, chemical spillage and waste disposal.	• Prevent fuel and oil spillage as above. • Provide separate covered, animal-proof skips for refuse and hazardous waste disposal. • Empty bins on a regular basis at an approved disposal site, or develop a proper waste disposal facility on site.
Groundwater resources	Pressure on resources.	• Minimise groundwater use.
Groundwater quality	Pollution due to construction activities, pit latrines and incorrect waste disposal practices.	• Line all dumps, pits, *etc.,* which may contain solids or liquids which could pollute the soil and groundwater. • Do not develop pit latrines close to domestic supply boreholes or rivers. • Dispose of all hazardous waste in an approved disposal site.
Topography and	Local alteration in topography due to bulk	• Select sites carefully to avoid steep slopes where possible. • Balance cut and fills.

STAGE 2: CONSTRUCTION ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
geomorphology	earthworks.	• Rehabilitate all cut-and-fill slopes as soon as possible.
Archaeology/ Paleontology	Disturbance or loss of sites of paleontological interest due to site development.	• Determine importance and sensitivity of site and degree of protection or survey work required.
Flora	Disturbance or loss of protected or endangered plant species or communities (terrestrial, wetland and aquatic), site clearance, route clearance for roads, power lines *etc.* overburdens dumping.	• Identify issues and protection measures required, *e.g.,* examine feasibility and need for translocation of specimens to alternative sites. • Minimise vegetation clearance by clearly demarcating work areas. • Provide environmental awareness training to all employees. • Rehabilitate all disturbed areas. • Position site infrastructure to avoid sensitive plant communities, *e.g.,* hill tops, steep slopes, wetlands *etc.*
	Illegal felling of trees for firewood and the illegal collection of plant specimens.	• Impose penalties for illegal cutting of trees or illegal possession of plant specimens.
Terrestrial fauna	Disturbance or loss of protected and endangered animal species or communities and their habitat due to all construction activities (noise, dust, fumes, pollution, vehicles).	• Consider need to trans-locate species. • Tape off important habitats. • Fence waste disposal sites. • Minimise vegetation clearance. • Protect water resources from pollution. • Protect soils from contamination. • Minimise soil stripping to essential areas only. • Stockpile topsoil separately in small mounds to maintain microbiological viability. • Rehabilitate all disturbed areas.

STAGE 2: CONSTRUCTION ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
	Interference with animal migration routes due to linear infrastructure (*e.g.*, fences, conveyors, roads, pipelines).	• Select routes carefully, based on the results of the EIA.
	Illegal poaching of game and killing of wild animals.	• Impose strict penalties for poaching and unlawful killing.
Aquatic fauna	Pollution of rivers, streams, dams, pans and lakes from organic, hydrocarbon, heavy metals, salts, silt or microbiological sources.	• Ensure that all areas containing hazardous substances are lined, sealed, banded or otherwise engineered to prevent pollution of surface water. • Install erosion protection works to prevent siltation. • Ensure pit latrines *etc.,* are far from surface water resources.
Air quality	Dust from topsoil stripping, bulk earthworks, borrow pits and quarries, vehicle movements, bare areas, stockpiles and overburden dumps.	• Avoid excessive vehicle movements. • Limit vehicle speeds on un-surfaced roads. • Use water to suppress dust on all un-surfaced roads. • Avoid dusty activities *e.g.,* loading and dumping on windy days. • Rehabilitate disturbed areas as soon as possible.
	Fumes from drilling equipment, generators, vehicles.	• Maintain vehicles and equipment in good order.
	Fires from bush clearing activities.	• Do not burn cleared vegetation. • Sell or give firewood away to staff and local communities. • Use brushwood to assist with erosion control and rehabilitation.
	Odours from waste dump and temporary excreta disposal latrines.	• Position waste dump and latrines downwind of site and local communities. • Cover waste daily or weekly. • Ensure that latrines have sufficient capacity for the peak number of construction workers.

STAGE 2: CONSTRUCTION ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
Noise and vibration	Noise generated by construction activities, especially vehicles, earthmoving equipment, excavation of construction materials, contractor's camp, shaft; general construction activities.	• Prescribe noise reduction measures if appropriate *e.g.,* restricted working hours and noise buffering. • Consult with the surrounding community.
Cultural heritage	Disturbance or loss of heritage resources (sites and artifacts) due to site clearance and development.	• Identify significant heritage resources and implement necessary protection/survey measures in consultation with the local community at land purchase stage. • The resettlement site should be chosen carefully, in consultation with the local communities.
Local communities: composition, structure and social functioning	Social impacts of immigration of work force for construction *e.g.,* introduction of disease, increased crime levels, interference with local community structures.	• Undertake social impact assessment, including full consultation with local communities, to determine issues and prescribe appropriate mitigation measures.
	Influx of job seekers.	• Only recruit labour through approved Ministry of Labour centres in the main towns or recruit locals. • Adopt the policy of no 'at-the-gate' casual employment. • Make your recruitment policy well known in the region.
Rural livelihoods	Reduced availability of natural resources traditionally used by local communities *e.g.,* plants used for medicinal and nutritional purposes, fuel wood, water resources *etc.*	• Only fence the minimum area required for sewage plant and security. • Allow the local community to collect any timber that is felled as part of site clearance.
Current land use	Loss of grazing land, agricultural land, access to resources *etc.*	• Evaluate benefits and losses that would result from various land use changes.

STAGE 2: CONSTRUCTION ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
Future land use options	Inadequate rehabilitation could preclude future land uses.	• Rehabilitate to the former, or better, land capability.
Local economy	Impacts on the local economy due to increased employment levels, influx of people to the area, land use changes, increased purchasing.	• Maximize local spending and employment. • Outsource to local subcontractors where possible *e.g.,* road construction, waste disposal, scrap metal sales.
Regional and national economy	Increased national spending and employment.	• Maximize regional and national spending and employment.
Local infrastructure and services	Increased pressure.	• Minimize disruption and use.
Health and safety	Risk of accidents and ill health as a result of the development.	• Ensure that appropriate health and safety measures are applied in all activities. • Fence the entire construction site and institute access control and security. • Place warning signs. • Educate the workforce regarding AIDS. • Consult with the local community and health workers. • Enforce maximum traffic speeds through residential areas. • Drain excavated areas of any water to minimise risk.

STAGE 2: CONSTRUCTION ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
Public nuisance	General nuisance such as noise, odours, dust.	• Undertake all construction activities in a manner that is sensitive to the life of the local community and construction staff. • Hold regular meetings to discuss issues with local community representatives. • Monitor noise and dust fall-out at sensitive receptor points *e.g.,* schools, and clinics.
Aesthetic and amenity values	Visual impacts of construction on scenic views, tourist routes and destinations, sense of place.	• Rehabilitate all areas disturbed by construction and landscape with trees, grass and shrubs. • Consult with the local community and tourist industry. • Consider changing building design, colour and height to reduce the visual impact. • Use appropriate lighting at night to minimise the impacts.
	Litter from construction camp and waste dump.	• Fence waste dump. • Environmental awareness and training. • Organise weekly clean-ups.

STAGE 3: OPERATIONAL ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
Climate	Possible impact of CH_4 & CO_2 gas emissions causing greenhouse effect.	• Utilize biogas as source of energy for local community. • Install scrubbers for incinerators.
Geology	Not applicable.	

STAGE 3: OPERATIONAL ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
Soils	Soil erosion or damage by garbage tracks and movements of compactors.	• Plant a green belt and make contours around disposal site to retard soil loss.
	Contamination from fallout from incinerators. Contamination by heavy metals and toxic organic compounds from leachate.	• Install electrostatic precipitators or scrubbers. • Install geo-synthetic lining to prevent leaching of heavy metals. • Enforce industrial punitive measures for not separating hazardous waste to prevent toxic substances from mixing with ordinary waste and provide incentives for hazardous waste separation.
Surface water resources	Contamination of surface water resources by fallout from incinerators and through ground water contamination.	• Use scrubbers for incinerators and lining landfill.
Surface water quality	Pollution due to fallout from incinerator.	• Prevent particulate matter from escaping from incinerator.
	Leaching of toxic heavy metals and organics and through groundwater-surface water interactions.	• Enforce onsite separation and treatment of toxic industrial waste, monitor regularly relevant chemical parameters.
	Treatment and disposal of effluent from quenching at incinerators.	• Using minimal recycled water and store waste for eventual treatment and possible recovery of useful material, monitor toxic heavy metal and bio-indicators in surface water.
	Runoff from landfill site	• Ensure all waste is covered and compacted immediately after disposal.
Groundwater resources	Rising water table due to discharge of semi-solid waste.	• Drill monitoring boreholes around landfill site and monitor groundwater levels. Monitor yields in surrounding farmers and community boreholes. • Monitor changes in vegetation covers and type.

STAGE 3: OPERATIONAL ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
Groundwater quality	Contamination by leachate from landfill site. Disposal of contaminated water used for reducing dust and ash (quenching) at incinerator.	• Geo-synthetic lining of landfill to prevent leachate from escaping and contaminating groundwater. Carry out periodic groundwater quality monitoring to assess pH, conductivity pH and heavy metals. • Advise local community of levels of contamination as soon as they reach unacceptable levels. Provide alternative piped water sources. • Treat wastewater from quenching/ wetting process and reuse for future quenching.
Topography and geomorphology	Not applicable.	
Paleontology	Disturbance or loss of sites of paleontological interest due to site development	• Determine importance and sensitivity of site and degree of protection and survey work required.
Flora	Disturbance or loss of protected and endangered plant species or communities (terrestrial, wetland, aquatic) due to soil, water and air contamination.	• Identify issues and protection measures required *e.g.,* examine feasibility and need for translocation of specimens to alternative sites. • Minimise vegetation clearance by clearly demarcating work areas and only clear small areas at a time. • Provide environmental awareness training to all employees.
Terrestrial fauna	Disturbance or loss of protected and endangered animal species or communities and their habitat due to the presence of the sewage treatment plant (pollution, vehicles, noise).	• Consider need to trans-locate species. • Fence off important habitats. • Prevent entry to the site of large herbivores and problem animals. • Fence off waste disposal sites. • Minimise vegetation clearance. • Protect water resources from pollution. • Protect soils from contamination.

STAGE 3: OPERATIONAL ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
Aquatic fauna	Pollution of rivers, streams, dams, pans and lakes from persistent organic compounds, nutrients and heavy metals.	• Pump out and treat leachate to prevent poisoning of aquatic fauna by toxic heavy metals. • Carry out awareness campaign on impacts of surface water pollution. • Monitor water quality weekly.
Air quality	Odours, dust, soot from landfill. Odours, particulate matter and soot from incinerator.	• Avoid uncontrolled fires. • Quench area before digging trenches and burying waste. • Use scrubbers to minimise odours, particulate matter and soot. • Plant trees and shrubs to act as screens and minimise odours.
Noise and vibration	Waste collection trucks and compactors.	• Consult with surrounding community regarding noise levels. • Use separate access roads for garbage trucks away from residential buildings
Cultural heritage	Deteriorating air quality may affect buildings, paintings and stone carvings.	• Consult with local community and tourism authority.
Local communities: composition, structure and social functioning	Social impacts of the landfill and incinerators informal waste collectors, *e.g.,* introduction of disease, increased crime levels, interference with local community structures.	• Undertake social impact assessment, including full consultation with local communities, to determine issues. Prescribe appropriate mitigation measures. • Consider offering security guards for local community against theft and harassment by informal waste collectors. • Employ informal waste collectors as waste sorters.
Rural livelihoods	Reduced availability of natural resources traditionally used by local communities, *e.g.,* plants used for medicinal and nutritional purposes, fuel wood, water resources *etc.*	• Undertake survey of important plant, animal and other resources in the surrounding area. • Monitor periodically the disappearance of important herbal and animal species with the help of local community.

STAGE 3: OPERATIONAL ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
Current land use	Impacts on land use such as schools, residential dwellings commercial centers and recreational facilities.	• Ensure proper siting away from other activities. • Consult with local community with regard to siting. • Screen area from surrounding land uses with fence, wall or trees. • Compensate local people for the loss of land and income.
Future land use options	Lack of adequate management and rehabilitation of sites may preclude future land uses.	• Develop a future land use plan for closure in consultation with the local community and authorities, and rehabilitate the site accordingly. • Remove and treat contaminated top soils prior to new developments. • Ensure safety and stability of soils and structure.
Local economy	Impacts on the local economy due to agricultural activities. Influx of people to the area, land use changes, negative attitude associated with landfills and incinerators.	• Consider relocation or compensation for affected parties.
Regional and national economy	Not applicable.	
Local infrastructure and services	Not applicable.	
Health and safety	Risk of accidents and ill health. Spontaneous fires from the release of methane and heat, and deliberate burning.	• Ensure that appropriate health and safety measures are adhered to. • Fence off the entire incinerator or landfill area and ensure strict access control. • Inform surrounding communities about the dangers of using surface and groundwater due to contamination by fallout from incinerators and leachate from landfill. Erect appropriate warning signs. • Consult with the local community and health workers. • Install appropriate odour control devices.

STAGE 3: OPERATIONAL ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
		• Monitor environmental health (air quality, soil quality, water quality, and vegetation) at all main receptor points around the incinerator or landfill.
Public nuisance	General nuisance especially odours, noise and particulate matter.	• Ensure appropriate odour control devices are in place and working. • Bury and cover all waste disposed daily. • Quench/ water dust and ash to minimize nuisance. • Conduct regular meetings to discuss issues with local community representatives. • Monitor environmental health.
Aesthetic and amenity values	Visual impacts of the incinerator stacks and smoke on scenic views, tourist routes and destinations.	• Ongoing rehabilitation with trees, grass and shrubs where possible. • Consult with the local community and tourist industry. • Ensure that all smoke stacks are painted to reduce visual impact. • Minimise incineration during the day. • Install scrubbers.

STAGE 4: DECOMMISSIONING AND CLOSURE ACTIVITIES

STAGE 4 DECOMMISSIONING AND CLOSURE ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
Climate	Continued release of greenhouse gases, methane and carbon dioxide from spontaneous combustion.	• Install appropriate gas collection devices and seal off landfill.
Geology	Not applicable.	
Soils	Off- site and onsite soil disturbance during rehabilitation.	• Minimise the number un-surfaced road tracks. • Plant trees on all disturbed areas before abandoning site.
	Continued and residual soil contamination from heavy metals and organics leaching.	• Take soil samples from the entire site to determine the extent and significance of the soil contamination. • Formulate and implement a plan to collect and remove all contaminated soil to an approved disposal site. • Continue to monitor extent of contamination and movement and direction of pollution plume.
Surface water resources	Not applicable.	
Surface water quality	Improvement in surface water quality due cessation of fallout from incinerator. Continued pollution from underground water as a result of leachate from landfill.	• Divert runoff away from river and minimise soil loss from site by planting grass and trees. • Monitor bio-indicators and water quality. • Advise interested and affected parties when river water is safe for recreational purposes such as swimming, bathing and fishing.

STAGE 4 DECOMMISSIONING AND CLOSURE ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
Groundwater resources	Not applicable.	
Groundwater quality	Leachate from landfill may persist following closure.	• Monitor ground water quality (especially heavy metals and nitrates) on a regular basis until a consistent and acceptable quality has been attained.
Topography and geomorphology	Reinstate the topographic profile to as close to the original prior landfill or incinerator construction as possible.	• Backfill all voids, surface cracks and ground subsidence. • Contour and landscape dumps to blend into the landscape. • Demolish smoke stacks and other structures that affect the aesthetics.
Paleontology	Not applicable.	
Flora	Disturbance or loss of protected and endangered plant species or communities that may have adapted to conditions during operation phase.	• Relocate and important plant species to similar environmental conditions.
Terrestrial fauna	Injury or loss of protected and endangered and domestic animal species or communities and their habitat due to the lack of rehabilitation of contaminated land, *etc.*	• Fence off waste disposal sites to prevent and animal access until site has been issued with clearance certificate. • Advise local communities of any danger posed by unstable soils, toxic substances, release of methane gas and spontaneous fires. • Rehabilitate and stabilise all dumps using indigenous vegetation where possible. • Collect and dispose of all contaminated soils in an approved dump.
Aquatic fauna	Continued contamination of water resources	• Monitor changes in aquatic fauna, species and numbers. • Advise local community of the health risks associated with eating fish from nearby waters.
Air quality	Dust from demolition of structures and rehabilitation of landfill site.	• Try to avoid dusty activities *e.g.,* loading and dumping on windy days. • Water the site before demolition to minimise dust.

STAGE 4 DECOMMISSIONING AND CLOSURE ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
	Odours from abandoned landfill site.	• Ensure proper rehabilitation before abandoning the site. • Ensure that no waste is dumped at site after decommissioning.
Noise and vibration	Noise generated by demolition equipment and earthmoving equipment.	• Prescribe noise reduction measures if appropriate *e.g.,* restricted working and transport hours and noise buffering.
Cultural heritage	Not applicable.	
Local communities: composition, structure and social functioning	Movement of people (especially informal waste collectors) away from the area where the landfill or incinerator was located (this may be a positive impact).	• Publicize the closure of the landfill or incinerator to enhance public perception of the area.
Rural livelihoods	Not applicable.	
Current land use	Major land use change with closure of the landfill or incinerators.	• Enhance the current land use by creating parks or other recreational amenities • Monitor soil quality, air and water quality on a regular basis.
Future land use options	Lack of rehabilitation could preclude future land uses	• Rehabilitate the site according to the agreed closure plan and discuss with the local community and authorities. • Allow the community access to the site after official site hand-over, but ensure that all voids and dangerous areas are fenced and warning signs are erected. • Inform and educate the local community about the risks and hazards that may remain on site. • Leave buildings, workshops, clinic, housing and other amenities for use by the local community.
Local economy	If part of the local community relied on scavenging or waste sorting, incomes would be	• Inform the community so they can make alternative arrangements. • Publicize the closure of the landfill or incinerator to enhance a positive

STAGE 4 DECOMMISSIONING AND CLOSURE ACTIVITIES		
ENVIRONMENTAL COMPONENT	**ENVIRONMENTAL IMPACT**	**RECOMMENDED MITIGATION AND MONITORING MEASURES**
	adversely affected. Improved property values.	public perception of the area.
Regional and national economy	Not applicable.	
Local infrastructure and services	Not applicable.	
Health and safety	Risk of accidents and ill health.	• Fence off all unsafe and dangerous areas such as voids, polluted water *etc*, and place warning signs. • Warn the public of the risk of spontaneous fires from methane release at former landfill sites. • Cover all pits and trenches. • Rehabilitate site to prevent risk from vectors, mosquitoes, unstable soils and pond water. • Continue to monitor environmental health (air quality, water quality and vegetation) at all main receptor points around the site.
Public nuisance	General nuisance such odours, dust and soot.	• Ensure proper closure, by covering site and planting grass and trees • Liaise periodically with community to assess any residual impacts.
Aesthetic and amenity values	Improvement of the visual impact of the former landfill or incinerator sites scenic views, tourist routes and destinations.	• Rehabilitate and landscape - plant trees, grass and shrubs where possible, create recreational parks after de-contamination of top soils. • Consult with the local community and tourist industry.

CHAPTER 6: AN EMP FOR A WASTE MANAGEMENT PROJECT – ISSUES GENERIC TO LANDFILLS

Activity	Impact	Mitigation, Monitoring And/ Or Management Measure	Target/ Goals/ Dates	Responsibility For Implementation	Responsibility For Checking/ Controlling
Planning Activities					
• Land clearing. • Vehicle Movements.	• Loss of flora and/or fauna and habitats. • Soil erosion.	• Minimise cleared area and number of vehicle tracks.	• From start of the planning and survey.	Consulting Engineer.	Client/ Environmental Affairs Department.
Construction Activities					
• Land Clearing. • Excavation and Blasting. • Transportation of material.	• Loss of flora and/or fauna and habitats. • Soil erosion. • Dust, Noise. • Traffic congestion.	• Clear only the minimum area required for construction. • Minimise number of tracks to reduce soil loss. • Water area to reduce dust. • Operate only during daytime hours or install noise barriers. Monitor noise levels at nearest dwelling. • Carry out traffic counts and plan vehicle movements and times. Monitor and control traffic movements.	• Implement measures at the start of construction.	Contractor.	• Project Manager/ Client. • Environmental Affairs Department. • Roads and Transport Authority. • City or Town Assembly Traffic Department.

Activity	Impact	Mitigation, Monitoring And/ Or Management Measure	Target/ Goals/ Dates	Responsibility For Implementation	Responsibility For Checking/ Controlling
Operational Activities					
• Disposal of wastes. • Covering of wastes. • Burning of wastes.	• Informal collectors. • Traffic. • Odours, dust, smoke and soot.	• Control entry of people and vehicles to site. • Screen area with fences, trees, shrubs. • Screen area from residential and commercial areas. • Minimise burning or carry out burning at night. • Monitor air quality for particulate matter and odours.	• At commissioning of landfill site. • At commissioning of site or within three months from determination of the impact.	Landfill Management.	• City Assemblies. • Environmental Affairs Department.
Decommissioning Activities					
• Covering of Landfill. • Planting of vegetation & Landscaping.	Waste transfer through wind.	Screening of the area (fences, trees).	• Plan to implement screening prior to decommissioning. • Control the number of people working on the landscaping.	Plant management.	• City Assemblies. • Town/City or Ministry of Health and Population. • Environmental Affairs Department.

ANNEX 1: Institutional Roles and Responsibilities on Issues of the Environment in Malawi.

Environmental management and performance activities involve a multiplicity of stakeholders that carry out different roles and varying responsibilities. The table below presents Malawi Government institutions and their mandates:

	Institution	Roles and responsibilities
1.	Environmental Affairs Department	• Facilitating the ESIA process • Ensuring compliance with ESIA provisions in the EMA • Managing the production and updating of guidelines on ESIA practice and procedures. • Assisting line agencies in the preparation of sector-specific guidelines on EIA practice and procedures. • Updating the list of prescribed projects. • Secretariat to the TCE. • Maintaining a register of projects being appraised under the ESIA process. • Maintaining a central library of ESIA reports. • Maintaining a directory of local, regional and international consultants capable of carrying out ESIA studies. Criteria used in selecting the consultants will be outlined at the beginning of the directory.
2.	Technical Committee on the Environment (TCE)	• Evaluating Project Briefs, ESIA terms-of-reference and ESIA reports. • Developing project approval terms and conditions. • Reviewing and monitoring project auditing programmes. • Recommending courses of action to the Director. • Reporting to NCE.
3.	National Economic Council (NEC)	• Determining if public-sector projects are prescribed under the EMA and referring PSDs to the Director of Environmental Affairs. • Assisting the EAD and TCE in updating the list of prescribed projects (e.g. adding or deleting project types, establishing size thresholds for project referral to the Director) • Participating on the TCE. • Working with the EAD and TCE to develop and streamline their working relationship on ESIA activities.
4.	Sectoral / Line Ministries	• Ensuring that their own projects prescribed under the EMA adhere to the ESIA requirements. • Ensuring that private-sector project over which they have jurisdiction adhere to the ESIA requirements. • Participating on the TCE. • Providing information and advice to project developers. • Advising project developers on regulations and monitoring requirements related to licensing their projects. • Incorporating DEA approval terms and conditions in project licenses. • Ensuring that project licensing terms and conditions are met, including those specified by the Director of Environmental Affairs.

	Institution	Roles and responsibilities
5.	Malawi Investment and Trade Centre, MCCCI and Local Councils	• Review project briefs from the private sector. • Make recommendations to the DEA • Monitoring compliance by investors
6.	Local Training Institutions	• Developing and executing short term training programmes on ESIA • Institutionalize environmental education
7.	Non Governmental Organisations	• Monitoring compliance with ESIAs • Identifying projects with potential adverse environmental effects • Participating on the TCE
8.	Project Developers	• Preparing Project Briefs ESIA terms-of-reference and statements and where they are not able to do so, they should seek the services of the DEA. • Implementing terms and conditions attached to DEA project approvals • Reporting on compliance with terms and conditions of DEA approval to the DEA/TCE and licensing authorities.
9.	Environmental Appeals Tribunal	• Special interest groups • Sensitize public on benefits of ESIA • Lobby for compliance of ESIA • Provide information to the affected communities
10.	The General Public	• Contributing information and advice to ESIA studies • Commenting on the content of ESIA reports. • Advising project developers and the DEA/TCE on practical approaches for avoiding, minimizing or compensating for adverse environmental impacts
11.	National Council on the Environment (NCE)	Functions are provided in appendix A of the ESIA guidelines.
12.	The National Construction Industry Council (NCIC)	• Regulation of the construction industry under an Act of Parliament of 1996 (NCIC, 1996). • Register and deregister contractors and consultants • Receive annual subscription fees from contractors and consultants • Collect any Government mandated levies in the construction industry • Through the codes of conduct that were put in place for contractors, the council promotes sustainable development by monitoring the activities of contractors. The contractors are required to manage construction wastes by providing disposal facilities on the site. They are also expected to minimize the impacts of their construction works on the environment and rehabilitate their working areas to its original state if disturbed. • Their mandate ends at the construction site, and the construction rubble, which is the major concern in the construction industry, may still contribute to environmental degradation elsewhere. The council is also meant to promote the use of local construction materials and carry our research on appropriate materials to be

	Institution	Roles and responsibilities
		used. The environmental aspect of this role is not clear but it is more on the promotion of the use of local materials instead of imported ones.
13.	**Project implementers**	• Responsible for the construction, rehabilitation and maintenance of all designated projects. • Enforcing internal environmental compliance

ANNEX 2: List of Prescribed Projects for ESIA

As prescribed under Section 24(1) of the Environmental Management Act, table 10 below describes the types of projects for which an environmental impact assessment may be required:

Type of Projects	Description
Infrastructure Projects	**a.** Construction of new sanitary sewerage works or expansion of existing sanitation sewerage works, to serve a population of more than 5,000 people. **b.** Construction of new storm sewerage works or expansion of existing storm sewerage works, to drain an area of greater than 10 ha. **c.** Any new sewerage outfall to a receiving water body or location of sewerage systems or septic tanks within 1 km of a water body. **d.** Construction or expansion of septic tanks servicing more that 100 people 20 homes or which receive more than 100 cubic metres per day of waste water. **e.** Construction of new highways and feeder roads or expansion of an existing highways and feeder roads. **f.** Construction of new airport and airstrips or expansion of existing and airstrip and their ancillary facilities. **g.** Construction of hospitals with a bed capacity of greater than 200 beds, or expansions of existing hospitals to a capacity of greater than beds. **h.** Construction of new, or expansions to existing, railway lines. **i.** Construction of new, or expansions to existing port or harbor facilities. **j.** Establishment or expansion of industrial estates.
Agriculture/Aquaculture Projects	**a.** Agricultural drainage projects of more than 1 ha. **b.** Irrigation schemes designed to serve more than 10 ha. **c.** Land development for the purposes of agriculture on greater than a 20 ha land holding. **d.** Agricultural projects necessitating their resettlement of 20 or more families. Any change form one agricultural land use to another on greater than a 20 ha land holding. **e.** Use of more than 1 tone of fertilizer per hectare per annum on greater than a 20 ha landholding except for lime applications **f.** Use of the following concentrations of pesticides on greater than a 5 ha holding more than 51/ha of ultra low volume pesticides application; or more than 1 1/ha of aerial application of pesticides; or more than 20kg/ha for each application of granular pesticides. **g.** Construction of fish-farming or ornamental pond(s) where the capacity is greater than 100 cubic metres or where there is any direct discharge from a fish pond to receiving water body. **h.** Any proposal to introduce fish species in an area where they do not presently exist.
Water Resources Development	**a.** Construction, or expansion of, ground water utilization projects where the utilization will be greater than 151/s or where the will is 60m or deeper. **b.** Construction of new water pipelines or canals longer than 1 km, or expansion to existing water pipelines or canals by longer than 1 km, where the cross-sectional area is greater than 20 square metres and the volume of water to be carried will

Type of Projects	Description
	be greater than 50 cubic metres per second. **c.** Water pumping stations adjacent to lakes, rivers, and reservoirs which withdraw more than 2 cubic metres per second. **d.** Drinking water supply schemes to serve a population of greater than 10000 people, or expansions of existing schemes to serve a population water reticulation networks with more than 10 kilometers of pipeline. **e.** Area of greater than 100 ha, or expansion of existing reservoirs by greater than 500000 1 or greater than 100 ha. **f.** Construction or expansion of dams with a height of 4.5 m or higher.
Projects In The Food And Beverage Production Industry	**a.** Construction of new abattoirs or slaughtering houses with a capacity of greater than 100 animals/day and expansions to existing abattoirs or slaughtering houses to a capacity of greater than 100 animals/day. **b.** Construction of new canning and bottling operation with work space of greater than 5000 square metres or expansion to an existing canning or bottling operation to a work of greater than 5000 square metres. **c.** Construction of new breweries and distilleries with a production capacity of greater than 25000 litres per day, or expansions to existing breweries or distilleries to a production capacity of greater than 25000 litres per day. **d.** Construction of new sugar production operations or expansions to existing sugar production operations by greater than 10%. **e.** Construction or expansions to, tea or coffee processing industries.
Waste Management Projects	**a.** Establishment, or expansion, of any of the following hazardous waste management facilities: ✓ Incineration pant ✓ Off-site recovery plant ✓ Off-site waste disposal plant ✓ Off-site storage facility ✓ Landfill site **b.** Establishment, or expansion, of any of the following municipal solid waste management facilities serving a population greater than 1,000 people: ✓ Landfill site ✓ Incineration facility ✓ Composting facility ✓ Recovery/recycling facility ✓ Waste depots/transfer stations **c.** Establishment or expansion of, one-site waste treatment facilities.
Energy Generation, Transmission And Storage Projects	**a.** Construction or expansion of electrical generating facilities designed to operate at greater than 4MW or, in the case of hydro-electric generating facilities, where the total head is greater than 20 m or where there is a firm flow of 100 cubic metres per second. **b.** Construction of electrical transmission facilities operating at a voltage of 132 KV or greater **c.** Construction or expansion of oil and gas pipelines longer than 1 km **d.** Construction or expansion of storage facilities (excluding services station) for oil, gas, petrol or diesel located within 3 kilometers of commercial, industrial or residential areas and with a storage capacity of 500,000 litres or more. **e.** All activities associated with nuclear power development.

Type of Projects	Description
Industrial Projects	**a.** Construction of, and expansion to, industries involving the use, manufacturing handling storage, transport or disposal of hazardous or toxic chemicals as regulated under the hazardous chemicals regulation under the Environment Management Act. **b.** Construction of, or expansion to, any of the following industrial operations: ✓ Tanneries ✓ Pulp and paper mills ✓ Lime plants ✓ Cement plants ✓ All types of smelters ✓ Soap and detergent plants ✓ Fertiliser manufacturing operations **c.** Construction of textile manufacturing operations (including carpet-making which consume greater than 5,000 square metres of surface area, of expansions to existing textile manufacturing operations to a capacity of more than 5,000 square metres
Mining and Quarrying Projects	**a.** All mining of minerals, expansions to mines, mining exploration activity, minerals prospecting activity, gravel pits and removal of sand or gravel from shore lines, except for those activities which have received a project specific exemption under subsection 26 (3) of the Environment management Act signed by the Director for Environmental Affairs and co-signed by the Director of Mines. **b.** Explosives manufacturing **c.** Extraction of top soil or the expansion of such an operation, when the operation or the expansion is greater than 0.5 ha or when the depth of a pit to burn bricks from the top soil is deeper than 3 m.
Forestry Projects	**a.** Establishment or expansion of logging operations covering an area of greater than 50 ha. **b.** Establishment of, or expansions to existing, logging operations on hill sides with a slope of greater than 10% covering an area of greater than 10 ha or any conversion of forested land with a slope of greater than 10% to another land use on greater than 10 ha. **c.** Establishment of logging or conversion of forested land to another land use within the catchment area of reservoirs. **d.** Establishment of forest plantations of greater than 50 ha.
Land Development, Housing And Human Settlement Projects	**a.** Establishment of or expansion of an existing housing development of a size greater than 5 ha or where more than 500 people are intended to be housed. **b.** Resettlement programmes for 500 or more people or the creation of refugee camps intended to shelter 500 or more people. **c.** Filling in water bodies for the purposes of land development where the surface area of gross fill deposit is greater than 50 ha. **d.** Land reclamation projects greater than 100 ha.
Remedial Flood And Erosion Control Projects	**a.** Construction of breakwaters, seawalls, jetties, dikes and groynes of greater than 2 metres in height or 1 km in length to remedy shoreline erosion or flooding. **b.** Construction of dams or weirs with a height of greater than 2 metres, or which divert more than 20 cubic metres per second, or an bypass channels or channel realignments to remedy reverine erosion or flooding.

Type of Projects	Description
	c. Shoreline stabilization projects where the shoreline involved is greater than 50m.
Tourism Development Projects	**a.** Construction of resort facilities and hotels with a capacity of more than 50 people, or expansions to existing facilities by a factor of greater than 50 people. **b.** Construction of safari lodges and operations with a capacity of more than 50 people, or expansions to existing facilities by factor of greater than 50 people. **c.** Construction of marine facilities with more than 10 boat slips, or expansion of existing marine facilities by more than 10 boat slips. **d.** Development of tourism master plans which have several projects associated with them.
Projects In Proximity To Or Which Have The Potential To Affect Important Areas	**a.** Area of unique historical, cultural, scientific or geographical significance or which have received some king of world heritage designation. **b.** National parks, game reserves and protected areas. **c.** Wetlands **d.** Water bodies **e.** Flood zones **f.** Major sources of drinking water, including communal wells **g.** Cemeteries or ancestral shrines **h.** Residential, school and hospital areas, as designed in local planning documents.
Major Policy Reforms	For example: ✓ Degazettement of Forestry Reserves ✓ Changes to Zoning Plans ✓ Proposed introduction of exotic species

ANNEX 3: List of projects for which EIA may be required

Type of Projects	Description
Drainage and irrigation	Large-scale irrigation or drainage schemes Drainage of wetland or wildlife habitat
Industry	**a.** Large-scale industrial plants **b.** Industries involving the use, manufacture, Handling, storage, transport or disposal of hazardous or toxic materials **c.** Breweries **d.** Tanneries **e.** Agro-industries **f.** Pulp and paper mills **g.** Lime plants **h.** Cement plants **i.** Smelters other than iron and steel **j.** Iron and steel smelters **k.** Petrochemical plants **l.** Chemical plants
Infrastructure	**a.** Industrial estates **b.** Major roads and highways **c.** Major railway lines **d.** Ports, harbors and lake structures **e.** Airports and airport facilities
Land development	**a.** Reclamation and new land development **b.** Refugee and resettlement schemes **c.** Housing developments (large-scale) **d.** Dams and man-made lakes **e.** Urbanization
Mining	**a.** Mineral prospecting **b.** Mineral mining **c.** Ore processing and concentrating **d.** Brick-making
Energy generation, transmission and use	**a.** Thermal power stations **b.** Hydropower schemes **c.** High voltage transmission lines **d.** Major oil and gas pipelines **e.** Biomass burning
Tourism	**a.** Major resort facilities and hotels **b.** Marinas **c.** Safari lodges and operations
Waste treatment and disposal	Municipal sewage: waste treatment plants, outfalls into aquatic systems, effluent water irrigation schemes. Municipal solid waste: landfill and incineration facilities, composting and recycling plants. Toxic and hazardous waste: incineration plants, recovery plants (off-site), waste water treatment plants (off-site), landfill facilities, storage facilities (off-site).
Water Supply	**a.** Ground water development for industrial, agricultural or urban water supply

Type of Projects	Description
	b. Water withdrawals from rivers, lakes or reservoirs **c.** Major water pipelines and canals **d.** Cross-drainage water transfers
Areas protected under legislation	**a.** Forest reserves, game reserves **b.** National parks **c.** Monuments and declared historical sites
Tribal habitats	**a.** Cemeteries **b.** Ancestral shrines
Areas containing rare or endangered flora and fauna	
Areas containing unique or outstanding scenery	

ANNEX 4: Summary of Construction Industry Environmental Impact Prevention, Control and Mitigation Strategies

No.	Impact	Control and mitigation strategies
1.	**Noise and Vibration** During construction and decommissioning activities, noise and vibration may be caused by the operation of pile drivers, earth moving and excavation equipment, concrete mixers, cranes and the transportation of equipment, materials and people.	Some recommended noise reduction and control strategies to consider in areas close to community areas include: ✓ Planning activities in consultation with local communities so that activities with the greatest potential to generate noise are planned during periods of the day that will result in least disturbance. ✓ Using noise control devices, such as temporary noise barriers and deflectors for impact and blasting activities, and exhaust muffling devices for combustion engines. ✓ Avoiding or minimizing project transportation through community areas.
2.	**Soil Erosion** Soil erosion may be caused by exposure of soil surfaces to rain and wind during site clearing, earth moving, and excavation activities. The mobilization and transport of soil particles may, in turn, result in sedimentation of surface drainage networks, which may result in impacts to the quality of natural water systems and ultimately the biological systems that use these waters.	Recommended soil erosion and water system management approaches include: Reducing or preventing erosion by: ✓ Scheduling to avoid heavy rainfall periods (i.e., during the dry season) to the extent practical. ✓ Contouring and minimizing length and steepness of slopes. ✓ Mulching to stabilize exposed areas. ✓ Re-vegetating areas promptly. ✓ Designing channels and ditches for post-construction flows. ✓ Lining steep channel and slopes (e.g. use jute matting). *Sediment mobilization and transport* ✓ Reducing or preventing off-site sediment transport through use of settlement ponds, silt fences, and water treatment, and modifying or suspending activities during extreme rainfall and high winds to the extent practical. *Clean runoff management* ✓ Segregating or diverting clean water runoff to prevent it mixing with water containing a high solid content, to minimize the volume of water to be treated prior to release.

No.	Impact	Control and mitigation strategies
		Road design ✓ Limiting access road gradients to reduce runoff-induced erosion. ✓ Providing adequate road drainage based on road width, surface material, compaction, and maintenance. *Disturbance to water bodies* ✓ Depending on the potential for adverse impacts, installing free-spanning structures (e.g., single span bridges) for road watercourse crossings. ✓ Restricting the duration and timing of in-stream activities to lower low periods, and avoiding periods critical to biological cycles of valued flora and fauna (e.g., migration, spawning, etc.) ✓ For in-stream works, using isolation techniques such as berming or diversion during construction to limit the exposure of disturbed sediments to moving water. ✓ Consider using trenchless technology for pipeline crossings (e.g., suspended crossings) or installation by directional drilling. *Structural (slope) stability* ✓ Providing effective short term measures for slope stabilization, sediment control and subsidence control until long term measures for the operational phase can be implemented. ✓ Providing adequate drainage systems to minimize and control infiltration.
3.	**Air Quality** Construction and decommissioning activities may generate emission of fugitive dust caused by a combination of on-site excavation and movement of earth materials, contact of construction machinery with bare soil, and exposure of bare soil and soil piles to wind. A secondary source of emissions may include exhaust from diesel engines of earth moving equipment, as well as from open burning of solid waste on-site.	Techniques to consider for the reduction and control of air emissions from construction and decommissioning sites include: ✓ Minimizing dust from material handling sources, such as conveyors and bins, by using covers and/or control equipment (water suppression, bag house, or cyclone). ✓ Minimizing dust from open area sources, including storage piles, by using control measures such as installing enclosures and covers, and increasing the moisture content. ✓ Dust suppression techniques should be implemented, such as applying water or non-toxic chemicals to minimize dust from vehicle movements. ✓ Selectively removing potential hazardous air pollutants, such as asbestos, from existing infrastructure prior to demolition. ✓ Managing emissions from mobile sources. ✓ Avoiding open burning of solid waste.
4.	**Solid Waste**	Techniques for preventing and controlling non- hazardous and hazardous construction site solid waste include the ones below:

No.	Impact	Control and mitigation strategies
	Non-hazardous solid waste generated at construction and decommissioning sites includes excess fill materials from grading and excavation activities, scrap wood and metals, and small concrete spills. Other non-hazardous solid wastes include office, kitchen, and dormitory wastes when these types of operations are part of construction project activities. Hazardous solid waste includes contaminated soils, which could potentially be encountered on-site due to previous land use activities, or small amounts of machinery maintenance materials, such as oily rags, used oil filters, and used oil, as well as spill cleanup materials from oil and fuel spills.	• Designing out waste ➢ Waste management plan ✓ Focus on specific wastes for waste prevention (e.g. Inert waste). ✓ Develop a waste management plan. ✓ Communicate the waste management plan in meetings and promote the results. • Construction and working site methods ✓ Use prefabricated elements. ✓ Central cutting areas for wood and other materials. ✓ Rent and reuse scaffolds, formworks, e.g. choose reusable wood, metal or fibre glass forms. ✓ Clearly mark areas for material storage, central cutting and recycling stations. ✓ Prevent loss or damage by practical material storage and handling. • Procurement ✓ Natural, recycled or recycled-content materials and equipment. ✓ Optimize amount of material delivered to site. ✓ Up-to-date material ordering and delivery schedule: minimize the materials on- site and reduce the chance of damage. ✓ Replace toxic materials with less toxic or non-toxic products to reduce packaging for safety reasons. ✓ Choose products with minimal or no packaging. ✓ Choose suppliers using and picking-up returnable pallets and containers. ✓ Require suppliers to take back or buy-back old or unused items.
5.	**Hazardous Materials** Construction and decommissioning activities may pose the potential for release of petroleum based products, such as lubricants, hydraulic fluids, or fuels during their storage, transfer, or use in equipment. These materials may also be encountered during decommissioning activities in building components or industrial process equipment.	Techniques for prevention, minimization, and control of these impacts include: ✓ Providing adequate secondary containment for fuel storage tanks and for the temporary storage of other fluids such as lubricating oils and hydraulic fluids. ✓ Using impervious surfaces for refueling areas and other fluid transfer areas. ✓ Training workers on the correct transfer and handling of fuels and chemicals and the response to spills. ✓ Providing portable spill containment and cleanup equipment on site and training in the equipment deployment. ✓ Assessing the contents of hazardous materials and petroleum-based products in building systems (e.g. PCB containing electrical equipment, asbestos-containing building materials) and

No.	Impact	Control and mitigation strategies
		process equipment and removing them prior to initiation of decommissioning activities, and managing their treatment and disposal. ✓ Assessing the presence of hazardous substances in or on building materials (e.g., polychlorinated biphenyls, asbestos- containing flooring or insulation) and decontaminating or properly managing contaminated building materials
6.	**Wastewater Discharges** Construction and decommissioning activities may include the generation of sanitary wastewater discharges in varying quantities depending on the number of workers involved. Adequate portable or permanent sanitation facilities serving all workers should be provided at all construction sites	Sanitary wastewater in construction and other sites should be managed by:
7.	**Contaminated Land** Land contamination may be encountered in sites under construction or decommissioning due to known or unknown historical releases of hazardous materials or oil or due to the presence of abandoned infrastructure formerly used to store or handle these materials, including underground storage tanks.	Actions necessary to manage the risk from contaminated land will depend on factors such as the level and location of contamination, the type and risks of the contaminated media, and the intended land use. However, a basic management strategy should include: ✓ Managing contaminated media with the objective of protecting the safety and health of occupants of the site, the surrounding community, and the environment post construction or post decommissioning. ✓ Understanding the historical use of the land with regard to the potential presence of hazardous materials or oil prior to initiation of construction or decommissioning activities. ✓ Preparing plans and procedures to respond to the discovery of contaminated media to minimize or reduce the risk to health, safety, and the environment consistent with the approach for Contaminated Land. ✓ Preparation of a management plan to manage obsolete, abandoned, hazardous materials or oil consistent with the approach to hazardous waste management.

Note: Successful implementation of any management strategy may require identification and cooperation with whoever is responsible and liable for the contamination.

ANNEX 5: Prevention and Control of Occupational Health and Safety Hazards in Construction Industry in Malawi

No.	Impact	Prevention and Control Strategy
1.	**Over-exertion** Over-exertion, and ergonomic injuries and illnesses, such as repetitive motion, over-exertion, and manual handling, are among the most common causes of injuries in construction and decommissioning sites.	Recommendations for their prevention and control include: ✓ Training of workers in lifting and materials handling techniques in construction and decommissioning projects, including the placement of weight limits above which mechanical assists or two-person lifts are necessary. ✓ Planning work site layout to minimize the need for manual transfer of heavy loads. ✓ Selecting tools and designing work stations that reduce force requirements and holding times, and which promote improved postures, including, where applicable, user adjustable work stations. ✓ Implementing administrative controls into work processes, such as job rotations and rest or stretch breaks.
2.	**Slips and Falls** Slips and falls on the same elevation associated with poor housekeeping, such as excessive waste debris, loose construction materials, liquid spills, and uncontrolled use of electrical cords and ropes on the ground, are also among the most frequent cause of lost time accidents at construction and decommissioning sites.	Recommended methods for the prevention of slips and falls from, or on, the same elevation include: ✓ Implementing good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths. ✓ Cleaning up excessive waste debris and liquid spills regularly. ✓ Locating electrical cords and ropes in common areas and marked corridors ✓ Use of slip retardant footwear.
3.	**Work in Heights** Falls from elevation associated with working with ladders, scaffolding, and partially built or demolished structures are among the most common cause of fatal or permanent disabling injury at construction or decommissioning sites.	If fall hazards exist, a fall protection plan should be in place which includes one or more of the following aspects, depending on the nature of the fall hazard: ✓ Training and use of temporary fall prevention devices, such as rails or other barriers able to support a weight of 150 kg, when working at heights equal or greater than two meters or at any height if the risk includes falling into operating machinery, into water or other liquid, into hazardous substances, or through an opening in a work surface ✓ Training and use of personal fall arrest systems, such as full body harnesses and energy absorbing lanyards able to support 3,000 kg, as well as fall rescue procedures to deal with workers whose fall has been successfully arrested. The tie in point of the fall arresting system

No.	Impact	Prevention and Control Strategy
		should also be able to support 3,000 kg. ✓ Use of control zones and safety monitoring systems to warn workers of their proximity to fall hazard zones, as well as securing, marking, and labeling covers for openings in floors, roofs, or walking surfaces.
4.	**Struck By Objects** Construction and demolition activities may pose significant hazards related to the potential fall of materials or tools, as well as ejection of solid particles from abrasive or other types of power tools which can result in injury to the head, eyes, and extremities.	Techniques for the prevention and control of these hazards include: ✓ Using a designated and restricted waste drop or discharge zones, and/or a chute for safe movement of wastes from upper to lower levels. ✓ Conducting sawing, cutting, grinding, sanding, chipping or chiseling with proper guards and anchoring as applicable. ✓ Maintaining clear traffic ways to avoid driving of heavy equipment over loose scrap. ✓ Use of temporary fall protection measures in scaffolds and out edges of elevated work surfaces, such as hand rails and toe boards to prevent materials from being dislodged. ✓ Evacuating work areas during blasting operations, and using blast mats or other means of deflection to minimize fly rock or ejection of demolition debris if work is conducted in proximity to people or structures. ✓ Wearing appropriate PPE, such as safety glasses with side shields, face shields, hard hats, and safety shoes.
5.	**Moving Machinery** Vehicle traffic and use of lifting equipment in the movement of machinery and materials on a construction site may pose temporary hazards, such as physical contact, spills, dust, emissions, and noise. Heavy equipment operators have limited fields of view close to their equipment and may not see pedestrians close to the vehicle. Center-articulated vehicles create a significant impact or crush hazard zone on the outboard side of a turn while moving.	Techniques for the prevention and control of these impacts include: ✓ Planning and segregating the location of vehicle traffic, machine operation, and walking areas, and controlling vehicle traffic through the use of one-way traffic routes, establishment of speed limits, and on-site trained flag-people wearing high-visibility vests or outer clothing covering to direct traffic. ✓ Ensuring the visibility of personnel through their use of high visibility vests when working in or walking through heavy equipment operating areas, and training of workers to verify eye contact with equipment operators before approaching the operating vehicle. ✓ Ensuring moving equipment is outfitted with audible back-up alarms. ✓ Using inspected and well-maintained lifting devices that are appropriate for the load, such as cranes, and securing loads when lifting them to higher job-site elevations.
6.	**Dust**	✓ Dust suppression techniques should be implemented, such as applying water or non-toxic chemicals to minimize dust from vehicle movements. ✓ PPE, such as dusk masks, should be used where dust levels are excessive.
7.	**Confined Spaces and Excavations**	Occupational hazards associated with confined spaces and excavations in construction and decommissioning sites should be prevented according to the following recommendations:

No.	Impact	Prevention and Control Strategy
	Examples of confined spaces that may be present in construction or demolition sites include: silos, vats, hoppers, utility vaults, tanks, sewers, pipes, and access shafts. Ditches and trenches may also be considered a confined space when access or egress is limited.	✓ Controlling site-specific factors which may contribute to excavation slope instability including, for example, the use of excavation dewatering, side-walls support, and slope gradient adjustments that eliminate or minimize the risk of collapse, entrapment, or drowning. ✓ Providing safe means of access and egress from excavations, such as graded slopes, graded access route, or stairs and ladders. ✓ Avoiding the operation of combustion equipment for prolonged periods inside excavations areas where other workers are required to enter unless the area is actively ventilated.
	Other Site Hazards Construction and decommissioning sites may pose a risk of exposure to dust, chemicals, hazardous or flammable materials, and wastes in a combination of liquid, solid, or gaseous forms.	Prevented can be through the implementation of project- specific plans and other applicable management practices, including: ✓ Use of specially trained personnel to identify and remove waste materials from tanks, vessels, processing equipment or contaminated land as a first step in decommissioning activities to allow for safe excavation, construction, dismantling or demolition. ✓ Use of specially trained personnel to identify and selectively remove potentially hazardous materials in building elements prior to dismantling or demolition including, for example, insulation or structural elements containing asbestos and Polychlorinated Biphenyls (PCBs), electrical components containing mercury. ✓ Use of waste-specific PPE based on the results of an occupational health and safety assessment, including respirators, clothing/protective suits, gloves and eye protection.
8.	**General Site Hazards** Projects should implement risk management strategies to protect the community from physical, chemical, or other hazards associated with sites under construction and decommissioning. Risks may arise from inadvertent or intentional trespassing, including potential contact with hazardous materials, contaminated soils and other environmental media, buildings that are vacant or under construction, or excavations and structures which may pose falling and entrapment hazards.	Risk management strategies may include: ✓ Restricting access to the site, through a combination of institutional and administrative controls, with a focus on high risk structures or areas depending on site-specific situations, including fencing, signage, and communication of risks to the local community. ✓ Removing hazardous conditions on construction sites that cannot be controlled affectively with site access restrictions, such as covering openings to small confined spaces, ensuring means of escape for larger openings such as trenches or excavations, or locked storage of hazardous materials.
9.	**Disease Prevention** Increased incidence of communicable and	Recommendations for the prevention and control of communicable and vector-borne diseases also applicable to construction phase activities include:

No.	Impact	Prevention and Control Strategy
	vector-borne diseases attributable to construction activities represents a potentially serious health threat to project personnel and residents of local communities.	
10.	**Traffic Safety** Construction activities may result in a significant increase in movement of heavy vehicles for the transport of construction materials and equipment increasing the risk of traffic-related accidents and injuries to workers and local communities.	The incidence of road accidents involving project vehicles during construction should be minimized through a combination of education and awareness-raising, and the adoption of procedures including:

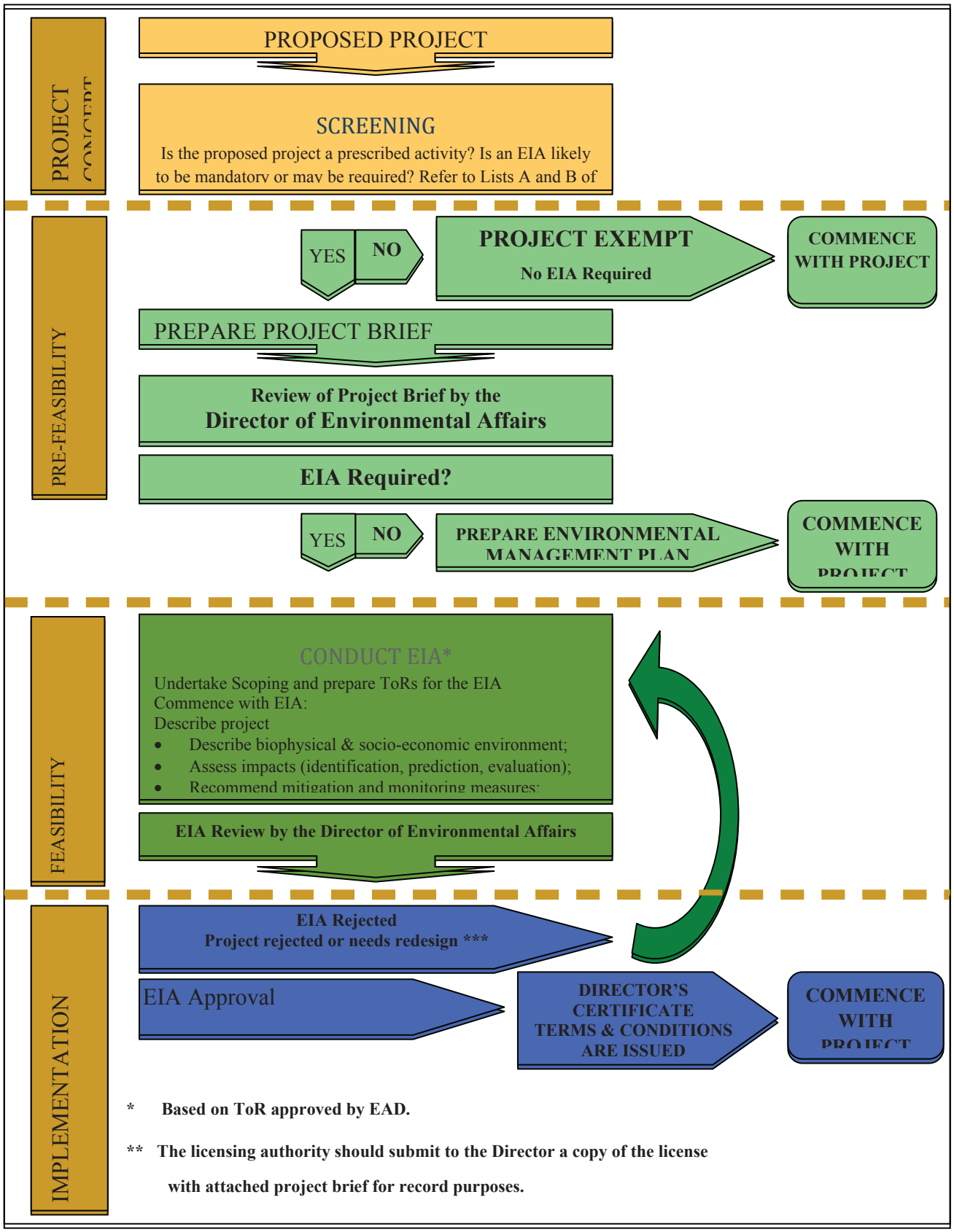
ANNEX 6: Summary of Recommended components for the CIEMS for the construction industry in Malawi

	Component	Strategy Actions
1.	Construction-related prerequisites	• Incorporate environmental issues at project design, tendering, implementation and monitoring stages
2.	Construction activity pollution prevention	• Controlling soil erosion • Controlling waterway sedimentation • Controlling airborne dust generation • Controlling noise pollution
	Construction-Related Materials and Resources	
3.	Construction waste management	• Divert construction, demolition and land-clearing debris from disposal in landfills and incinerators • Direct recyclable recovered resources back to the manufacturing process • Direct reusable materials to appropriate sites
	Indoor environmental quality	
4.	Construction Indoor Air Quality (IAQ) Management plan, during construction	• Reduce indoor air quality problems resulting from the construction/renovation process in order to help sustain the comfort and well-being of construction workers and building occupants.
5.	Construction IAQ Management plan, before occupancy	• Reduce indoor air quality problems resulting from the construction/renovation process in order to help sustain the comfort and well-being of construction workers and building occupants.
	Possibly Construction-Related Sustainable Sites	
6.	Storm water Design, Quantity Control	• Limit disruption of natural water hydrology by reducing impervious cover, increasing on-site infiltration, reducing or eliminating pollution from storm water runoff, and eliminating contaminants. • Limit disruption and pollution of natural water flows by managing storm water runoff.
7.	Site Development, Protect or Restore Habitat	• Conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.
8.	Materials and Resources	• Building Reuse • Maintenance of existing walls, floors and roofs

	Component	Strategy Actions
		• Extend the life cycle of existing building stock • Conserve resources • Retain cultural resources • Reduce waste • Reduce environmental impacts of new buildings as they relate to materials manufacturing and transport • Reuse building materials and products in order to reduce demand for virgin materials and to reduce waste, thereby reducing impacts associated with the extraction and processing of virgin resources
9.	Recycled Content, (post-consumer and pre- consumer)	• Increase demand for building products that incorporate recycled content materials, thereby reducing impacts resulting from extraction and processing of virgin materials.
10.	Materials: Extracted, Processed and Manufactured Nationally and Regionally	• Increase demand for building materials and products that are extracted and manufactured within the region and within Malawi thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.
11.	Rapidly Renewable Materials (total value of materials and products)	• Reduce the use and depletion of finite raw materials and long-cycle renewable materials by replacing them with rapidly renewable materials.
12.	Certified Wood, wood-based materials and products	• Encourage environmentally responsible forest management • Impose ban on wood harvesting and timber cutting from protected forest reserves and sites.
	Indoor Environmental Quality	
13.	Low-Emitting Materials, Adhesives and Sealants	• Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.
14.	Low-Emitting Materials, Paints and Coatings	• Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.
15.	Low-Emitting Materials, Carpet Systems	• Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.
16.	Low-Emitting Materials, Composite Wood & Agri-fiber Products	• Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.
17.	Buildings of historical importance	• Restrict clearing and destruction of sites where buildings of historic importance

	Component	Strategy Actions
		exist • Declare heritage sites as protected areas
18.	Sustainable energy	• Encourage passive light construction design in order to encourage less use of unsustainable energies once buildings are in use

ANNEX 7: Figure 1: The General ESIA Process (Adopted From ESIA Guidelines, EAD, 1997)



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