Environmental and Social Impact Assessment

Kapichira Dam Rehabilitation Project

Volume II: Environmental and Social Management Plan

EGENCO
Chayamba Building, No. 7 Victoria Avenue, Blantyre
MALAWI

Restricted

September 14, 2026

FINAL DRAFT REPORT
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LIST OF ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
AP	African Parks
BBOP	Business and Biodiversity Offsets Programme
CCA	Community Conservation Area
C-ESMP	Contractor Environmental and Social Management Plan
CHA	Critical Habitat Assessment
CR	Critically Endangered species regarding the IUCN Red lists
dBa	A-weighted decibels
DESC	District Environmental Subcommittee
DNPW	Department of National Parks and Wildlife
E-ESMP	Employer Environmental and Social Management Plan
E-Flow	Environmental Flow
EGENCO	Electricity Generation Company (Malawi) Limited
EHS	Environmental, Health, and Safety
EN	Endangered species regarding the IUCN Red Lists
EPRP	Emergency Power Restoration Project
ESHS	Environmental, Social, Health, and Safety
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standard
GBV	Gender Base Violence
GRM	Grievance Redress Mechanism
HIV	Human Immunodeficiency Virus
HPP	Hydropower Plant

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HSS	Health, Security, Safety
IUCN	International Union for Conservation of Nature
LED	Light-Emitting Diode
MOU	Memorandum Of Understanding
MWR	Majete Wildlife Reserve
NT	Near – Threatened species regarding the IUCN Red lists
OE	Owners' Engineer
OHS	Occupational Health and Safety
PAP	Project Affected Person
PM	Particulate Matter
PMU	Project Management Unit
PPE	Personal Protective Equipment
PS	Performance Standards
SEA	Sexual Exploitation and Abuse
SEP	Stakeholder Engagement Plan
SH	Sexual Harassment
STI	Sexual Transmitted Infection
SVTP	Shire Valley Transformation Program
TSP	Total Suspended Particles
USD	United States Dollar
VBG	Violence Based on Gender
VU	Vulnerable species regarding the IUCN Red Lists
WB	World Bank

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EXECUTIVE SUMMARY

This report constitutes the Environmental and Social Management Plan (ESMP) for the Kapichira Dam Rehabilitation Project. It forms the second volume of the Environmental and Social Impact Assessment (ESIA) report. The purpose of the ESMP is to guide the implementation of the mitigation measures and monitoring requirements identified as part of the ESIA process.

The ESMP sets out a set of Environmental, Social, Health and Safety (ESHS) specifications which have been developed on the basis of the ESIA findings and which are consistent with the World Bank's environmental and social policies and standards (ESS1-ESS10) and the World Bank Group's relevant environmental, health, and safety guidelines, as well as with the Government of Malawi's environmental laws and regulations, such as the Environment Management Act, 2017.

The ESHS requirements imposed on the Contractor, which form an integral part of the tender documents, will guide the contractor in drawing up a site-specific environmental and social management plan. The Contractor's Environmental and Social Management Plan (C-ESMP) is organised into sub-plans as follows.

- **Labour Management Plan**: The aim of this plan is to set out the key measures designed to address issues relating to human rights, forced labour, gender awareness, and child labour, as well as the mechanisms for handling complaints from project workers. The requirements set out in this plan apply to the Contractor, subcontractors, partners and supervising companies.
- **Waste Management Plan**: The waste management plan outlines all the measures the Contractor must implement during the works in order to identify, collect, transport and treat all waste generated on site.
- **Hazardous Substances Management Plan**: This plan is closely linked to the Waste Management Plan. It sets out the procedures for the handling, storage and transport of hazardous substances, including explosives.
- **Resource Efficiency and Pollution Prevention Management Plan**: This plan sets out measures to draw up a management plan for resource efficiency and pollution prevention, with a view to promoting the sustainable use of resources, including energy, water and raw materials. It sets out the ways in which the project will minimise adverse impacts on human health and the environment, as well as how the project will prevent and minimise pollution. The project will result in various types of pollution, such as air and water pollution, increased noise levels and the consumption of a certain quantity of limited resources, such as water.
- **Sedimentation Control Plan**: This plan aims to prevent excessive bank erosion and excessive sedimentation in the Kapichira reservoir and downstream. Its objective is to manage rainwater runoff and prevent the movement of sediment from the site by protecting the riverbanks.

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- **Construction Biodiversity Management Plan**: The measures proposed in this plan have been designed to incorporate and address concerns regarding critical habitats and threatened species, particularly with regard to the following three key impacts: disturbance of wildlife and the risk of mortality, risk of human-wildlife conflict, and the risk of increased poaching and wildlife related crime. These measures include an emergency safety plan in the event of interactions with wildlife, adjustments to the works schedule to avoid periods of high wildlife activity, measures to minimise lighting, a zero-tolerance policy towards poaching, collaboration with African Parks to strengthen anti-poaching patrols, restrictions on land clearing, efforts to combat the spread of invasive alien species, and a training programme.
- **Traffic and Road Safety Management Plan**: This plan takes into account the location of sensitive socio-economic infrastructure, such as schools, as well as the safety of local communities should they be at risk from construction vehicles travelling to and from the site. This plan also covers speed limits and nuisances caused by dust and emissions generated by site-related traffic.
- **Community Health and Safety Plan**: this Plan must ensure that construction works do not pose any risks to the safety of the general public. It includes general safety measures on site and a system for the public to report incidents, general community health and safety measures, support for the employer's community health and safety plan, and the management of population movements caused by the project.
- **Cultural Heritage Management Plan**: this plan sets out a procedure for dealing with chance finds, the protection of all cultural heritage sites, and the organisation of a community ceremony at the start of construction work.
- **Workplace Occupational Health, Safety and Security Management Plan**: This plan sets out the health, safety and security requirements for staff, particularly regarding work in muddy conditions, on scaffolding, at height, and in the presence of wildlife near the construction site. It also provides for emergency measures in the event of an accident.
- **Construction site Emergency Preparedness Plan**: The purpose of this plan is to st out a procedure for site workers and direct operational staff (staff responsible for operating the dam) in the event of an emergency or unusual incident, such as extreme weather conditions or flooding, occurring during construction. The aim is to ensure safety, reduce the risk of loss of life loss and minimise material damage in the event of an emergency at the Kapichira site during construction works.
- **Restoration of temporary facilities**: The aim of this plan is to restore the vegetation cover and ecological functionality of the affected areas, in order to minimise long-term loss of biodiversity. Restoration will include the dismantling of temporary infrastructure, the rehabilitation and stabilisation of soils where necessary, the replanting of native plant species suited to the local environment, and protection against grazing or other disturbances during the regeneration phase.

The ESHS requirements for EGENCO, as the employer, are organised in sub-plans as follows.

- **Community Health, Security and Safety Plan:** The aim of this plan is to prevent and/or mitigate any impacts on the health and safety of communities that may arise during the project, in addition to the plan drawn up by the contractor. These measures include community participation in health and safety matters, support for healthcare facilities, public safety, the establishment of a complaints-handling mechanism for communities, as well as measures to ensure gender equality and social inclusion.

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- **Sediment Management Plan:** This plan comprises a set of measures aimed at reducing problems associated with sedimentation in connection with the construction of Mpatamanga project. It provides for the installation of discharge systems, a rigorous programme to monitor dredging operations, the revegetation of stockpiled sediments, the remobilisation of dredged sediments and the reuse of sediments.
- **Environmental Flow Management Plan:** This plan confirms the existing requirements regarding ecological flows (E-Flow) applicable to the Kapichira HPP. These flows depend on the operation of Kapichira and the operation of upstream projects.
- **Biodiversity Management Plan:** In addition to the contractor's biodiversity plan, the employer must implement a set of biodiversity management measures, such as biodiversity measures prior to construction work, preventing wildlife from becoming trapped between weirs, the management of invasive species during operation, the programme to mitigate conflicts between humans and wildlife, mitigation measures concerning critical habitats, and the net-gain programme.
- **Land acquisition, restrictions on land use and the involuntary resettlement plan:** The operation of the quarry and borrow sites, as well as the establishment of a temporary contractor campsite will require the acquisition of approximately 8 hectares of land during construction phase. It also involves a change of land use for the temporary facilities required for the construction, such as the temporary construction campsite. The acquisition of land for the project requires the implementation of a Resettlement Action Plan, set out in a separate report. It should be noted that, as this land is primarily used for agricultural and livestock, with no building or equipment, no physical displacement will occur as a result of the loss of these areas. The plan sets out a strategic and methodical process aimed at ensuring appropriate compensation in the event of land acquisition, resettlement, loss of assets and impacts on livelihoods within the project area, taking into account poverty reduction.
- **Dam Emergency Preparedness Plan:** The purpose of this plan is to set out a procedure for the frontline operational staff (staff responsible for dam operations and appointed agencies) in the event of an emergency or exceptional incident. The aim is to ensure safety, minimise the risk of loss of life and limit material damage as much as possible in the event of an emergency at Kapichira site whilst construction works are in progress. This plan is consistent with the flood risk assessment carried out by the project Owner's Engineers. It takes into account the flood risks associated with the implementation of the project, whilst considering the effects of climate change on flooding scenarios.
- **Occupational health, safety and security management Plan:** The aim of this plan is to ensure that all operations and maintenance activities at the Kapichira Dam are carried out under safe and secure conditions, in order to protect the health and safety of employees, contractors, and maintenance teams. It includes key measures and diving safety procedures.

These sub-plans will be subject to appropriate monitoring in order to provide the project proponent with the necessary feedback on the implementation of the ESMP. Monitoring activities include the following:

- Monitoring of noise levels in sensitive areas;
- Air quality monitoring;
- Water quality monitoring,
- Monitoring of erosion and stability of riverbanks
- Monitoring of sediment transport and deposition

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- Monitoring of aquatic ecology and ichthyofauna
- Monitoring of invasive plant species
- Monitoring of the terrestrial fauna
- Monitoring of the occupational health and safety
- Monitoring of the community health and safety
- Monitoring of Sexual Exploitation and Abuse and Sexual Harassment Action Plan
- Monitoring of cultural heritage
- Monitoring of revegetated areas in the dam construction site
- Monitoring of offset plan.

The Employer, EGENCO, has overall responsibility for the environmental and social management of all project activities. However, EGENCO will delegate to the Contractor the implementation of the Environmental, Social, Health, and Safety specifications relating to construction activities. EGENCO will delegate responsibility for monitoring, advising and verifying compliance to the Owner's/Supervising engineer.

The implementation period for the ESMP for the Kapichira rehabilitation project is estimated at approximately 8 years, comprising one year of pre-construction activities, 3,5 years of construction works, plus 2 months of demobilisation, as well as 3 years for monitoring the implementation of mitigation measures.

The estimated cost of the ESMP is approximately 4.2 million US dollars, bearing in mind that the cost of contractor's ESMP is included in the construction costs.

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1. INTRODUCTION

1.1. Preamble

The expected results of the environmental and social impact assessment (ESIA) are to identify all the potential impacts and risks of the project (physical, biological and socio-economic), to identify and analyse options likely to avoid or minimise potential negative impacts (volume 1) and to provide elements for an effective environmental and social management plan (Volume 2) to deal with the residual impacts and risks in the preparation, construction and operation activities relating to the Kapichira Hydropower Dam Rehabilitation and Strengthening

This report is the Environmental and Social Management Plan (ESMP) for the Kapichira Dam Rehabilitation Project. It forms the second volume of the ESIA report. The purpose of the ESMP is to guide the implementation of mitigation measures and monitoring requirements identified through the ESIA process. The acquisition of land for the project required to draw a Resettlement Action Plan, which is part of a separate report and summarized in the chapter 5.7 of this report.

Feedback on the ESIA and ESMP during the public disclosure process in January 2026[1] was considered in this ESMP.

This chapter summarises the characteristics of Kapichira hydropower project and presents the project. The context of the report is then explained.

1.2. Main characteristics of Kapichira hydropower project

1.2.1. Main characteristics of Kapichira hydropower plant

Kapichira Hydropower Plant (HPP) is located in Chikwawa District, 70km to the south-west of Blantyre.

It has an installed capacity of 129.6 MW and is the largest contributor to the National Grid whereby it contributes 30% to EGENCO's installed generation capacity accounting for 23% of Malawi's total installed capacity.

It is the most downstream HPP in the Shire River HPP cascade and located within the Majete Wildlife Reserve.

1.2.2. Kapichira components to be rehabilitated

The project aims to enhance resilient operation of the 129.6 MW Kapichira hydropower plant through the rehabilitation of the Kapichira dam and the upgrade of spillway. It should be noticed that the hydropower plant is not concerned by this rehabilitation.

[1] See chapter 8.7 about the summary of final consultations in the volume 1 of the ESIA. The volume 1 is dedicated to the baseline description and impact assessment.

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Kapichira dam rehabilitation – phase 2 requires the works on the associated components of the dam: The main spillway gates, the embankment dam, the emergency spillway, the right embankment and the training dyke.

Because it is partly integrated into the Kapichira dam, the project will also rehabilitate the permanent intake for the Shire Valley Transformation Program project (SVTP).

At the end of the rehabilitation activities, part of the current embankment material, between the existing training dyke and the dam embankment, will be removed, both to restore the function of the training dyke and to allow the water in the reservoir to feed the permanent SVTP irrigation intake. The presence of a training dyke in the reservoir, on average, allows to reduce the deposition into the reservoir in a range of 10-15%.

The construction activities will require the following facilities (see the following map as well as in the Appendix C), based on the detailed design report provided in May 2025 by Studio Pietrangeli:

- a quarry site for embankment materials,
- a borrow site for impervious core construction,
- a disposal area for surplus excavated material,
- a batching plant for concrete production,
- a temporary contractor campsite, and,
- a permanent camp for EGENCO staff.

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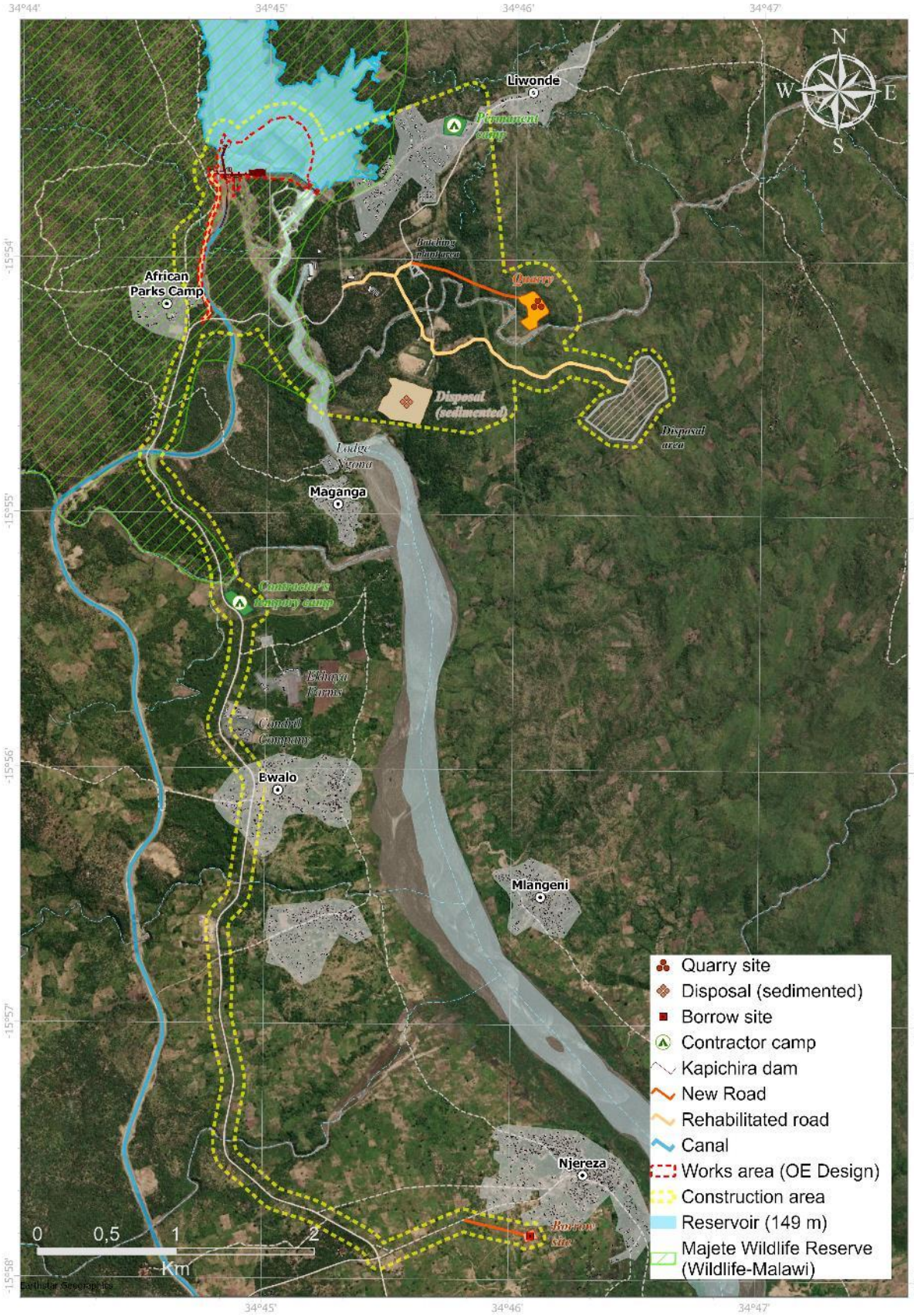


Figure 1-1: Construction influence area for Kapichira dam rehabilitation project

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1.3. Project presentation

As stated in the chapter 1.2.1, Kapichira hydropower plant is a strategic asset at the heart of Malawi's electricity supply, providing a significant share of the country's hydropower generation. However, its exposure to extreme floods and other climate-related risks has revealed critical vulnerabilities. The Emergency Power Restoration Project aims to restore Kapichira's generating capacity while enhancing its resilience to future climate change impacts, thereby strengthening Malawi's long-term energy security.

The January 2022 floods caused by the tropical storm Ana resulted in overtopping of a river training dike, failure of the 160m long fuse plug, and overtopping part of the dam wall on the right bank, as well as erosion of the main dam slopes and crest, and damage to steel structures on the spillway bridge of the station. Following the fuse plug failure, the reservoir emptied, and electricity generation stopped.

The tropical Storm Ana, which extensively damaged Kapichira HPP's dam and fuse plug, also damaged the under-construction irrigation intake and part of the main canal.

Following this event, the Emergency Power Restoration Project (EPRP) was decided through the Government of Malawi – Ministry of Finance and Economic Affairs. The Emergency Power Restoration Project aims to restore and enhance the resilience of the Kapichira Hydropower Scheme and associated power infrastructure damaged by Tropical Storm Ana, ensuring reliable and sustainable electricity supply in Malawi. The EPRP has two components: (1) Kapichira Hydropower Dam Rehabilitation and Strengthening and (2) Transmission and Distribution Network Restoration[2].

Electricity Generation Company (Malawi) Limited (EGENCO) is the implementing entity for the component (1) Kapichira Hydropower Dam Rehabilitation and Strengthening. This component includes two phases:

- The phase 1 is for "Energy restoration", to be implemented through raising water levels back to operational levels and by developing a temporary coffer dam upstream of the damaged infrastructure.
- The phase 2 is to "Build-back better", which includes rehabilitating the damaged infrastructure based on a revised design, and to improve Kapichira HPP sediment management.

1.3.1. Phase 1: Energy restoration

Energy restoration was achieved by raising water levels back to operational levels and developing a temporary coffer dam upstream of the damaged infrastructure. Initiation of sediment removal from the reservoir is also included in the phase 1.

The phase 1 works included the construction of cofferdam sections, including cement-soil cofferdam, constructed by the Shire Valley Transformation Program (SVTP) in the area where the fuse plug failure occurred. These works were not funded by the World Bank.

Other phase 1 works were the repair of spillway gates, the desilting of the left bank[3] channel of the reservoir, and the temporary reinstatement of a bridge on the access road. Phase 1 works lasted from December 2022 to May 2023.

2 Component (2) Transmission and Distribution Network Restoration is implemented by ESCOM.
3 Which was used in the EGENCO dyke, so not actually removed from the storage area.

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1.3.2. Phase 2: Build-back better

The Phase 2, goal of this current phase of the project, includes the rehabilitation of the damaged infrastructure based on a revised design of the dam with the improvement of Kapichira HPP sediment management.

In order to build back better, resilience of Kapichira scheme to more extreme events than those forecasted with climate change was assessed. As a result, the capacity of the new emergency spillway took these sensitivity analyses into account.

Based on a revised design that would address key technical and operational features that contributed to the failure, this component will (i) rehabilitate damaged infrastructure (mainly the dam), (ii) upgrade the Kapichira scheme to enhance the resilience of the hydropower scheme (especially the main and emergency spillways), and (iii) support companion actions on operation and maintenance and sediment management.

The estimated duration of the main construction activities for the rehabilitation of the damaged infrastructure is estimated for approximately 44 months.

1.4. Context of this report

The Environmental and Social Management Plan is an operational document linked to the Environmental and Social Impact Assessment report (Volume 1) for the Kapichira Dam Rehabilitation Project.

The ESMP specifies the environmental management (mitigation and enhancement) measures to consider during the construction and operation of the Kapichira dam rehabilitation project. The measures developed under this assignment inform the Contractor and the Employer (EGENCO) about ways to mitigate the identified impacts and enhance the positive effects of the Project.

The ESMP provides guidance on each of the applicable sub-plans that will be developed by the Contractor during the construction phase as well as the measures to be implemented in parallel by EGENCO during the construction and operation phase, including measures to improve dam safety.

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2. SUMMARY OF ENVIRONMENTAL AND SOCIAL IMPACTS

2.1. Introduction

This chapter summarises the impacts identified in the volume 1 of the ESIA dedicated to the baseline description and impact assessment. It provides the corresponding plan where the measures are developed in order to mitigate them.

2.2. Environmental and social impacts with corresponding measures

The following table summarises the impacts identified in the volume 1 of the ESIA with the corresponding plan where the measures are developed in order to mitigate them.

Table 2-1: Summary of positive impacts for the dam rehabilitation project with corresponding enhancement measures

N° of impact	Impact	Name of plan where enhancement measures are addressed	N° of plan	Responsibility
Construction Phase				
1	Employment opportunities	Labour Management Plan	CP1	District labour Office, Contractor
Operation Phase				
2	Reduced disaster risk due to the presence of emergency spillway	Dam Emergency Preparedness Plan	EP6	DESC, Employer

Table 2-2: Summary of negative impacts for the dam rehabilitation project with corresponding mitigation measures

N° of impact	Impact	Name of plan where mitigation measures are addressed	N° of plan	Responsibility
Construction Phase				
1	Dust and gas emission - deterioration in air quality	Resource Efficiency and Pollution Prevention Management Plan	CP4	Contractor
2	Increase in noise level	Resource Efficiency and Pollution Prevention Management Plan	CP4	Contractor
3	Soil and water pollution by liquid or solid waste	Waste Management Plan Hazardous Substances Management Plan Resource Efficiency and Pollution Prevention Management Plan	CP2 CP3 CP4	DESC, Contractor
4	Risk of erosion and modification of the physicochemical properties of the soil	Sedimentation Control Plan	CP5	Contractor
5	Pressure on water resources	Resource Efficiency and Pollution Prevention Management Plan	CP4	NWRA, District Water Office, Contractor
6	Risk of modification of flow conditions on the Shire River	Environmental Flow Management Plan	EP3	Employer
7	Disaster risk due to flooding	Construction Emergency Preparedness Plan	CP11	Contractor

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N° of impact	Impact	Name of plan where mitigation measures are addressed	N° of plan	Responsibility
8	Increase of sediments in the reservoir	Sedimentation Control Plan Sediment Management Plan	CP5 EP2	Contractor / Employer
9	Risk of loss, fragmentation and degradation of natural habitats and flora	Construction Biodiversity Management Plan Restoration of temporary facilities	CP6 CP12	DESC, Contractor
10	Disturbance of wildlife and risk of mortality	Waste Management Plan Hazardous Substances Management Plan Construction Biodiversity Management Plan Traffic and Road Safety Management Plan	CP2 CP3 CP6 CP7	African Parks, Contractor
11	Spread of flora invasive species	Construction Biodiversity Management Plan	CP6	Contractor
12	Risk of human - wildlife conflict	Construction Biodiversity Management Plan Traffic and Road Safety Management Plan	CP6 CP7	African Parks, Contractor
13	Risk of increased poaching	Construction Biodiversity Management Plan	CP6	African Parks, Contractor
14	Risk of aquatic mortality and loss of aquatic habitats	Waste Management Plan Construction Biodiversity Management Plan	CP2 CP6	Contractor
15	Impacts on Critical Habitat	Construction Biodiversity Management Plan	CP6	DESC, Contractor
16	Spontaneous migration	Labour Management Plan Community Health and Safety Plan Community Health, Safety and Security Plan	CP1 CP8 EP1	District labour Office, Contractor, Employer
17	Disturbance of local communities	Labour Management Plan Traffic and Road Safety Management Plan Community Health and Safety Plan Community Health, Safety and Security Plan	CP1 CP7 CP8 EP1	DESC, Contractor, Employer
18	Health and safety risks for workers	Waste Management Plan Hazardous Substances Management Plan Traffic and Road Safety Management Plan Workplace Occupational Health, Safety and Security Management Plan Construction emergency preparedness plan	CP2 CP3 CP7 CP10 CP11	DESC, Contractor
19	Risk of violence based on gender	Labour Management Plan Community Health and Safety Plan Workplace Occupational Health, Safety and Security Management Plan Community Health, Safety and Security Plan	CP1 CP8 CP10 EP1	District Gender Office, Contractor, Employer
20	Risk of damage on the cultural heritage	Cultural Heritage Management Plan	CP9	DESC, Contractor
21	Loss of land due to the construction facilities (such as temporary campsite), quarry site...	Restoration of temporary facilities Land acquisition, Restrictions on land use and Involuntary resettlement	EP5 CP12	Employer, District Lands Office, Contractor
22	Change in land use due to the construction facilities	Restoration of temporary facilities Land acquisition, Restrictions on land use and Involuntary resettlement	CP12 EP5	District Lands Office, Contractor, Employer
Operation Phase				
23	Disturbance of sediment balance and erosion of the Shire River	Sediment management plan	EP2	DESC, Employer
24	Siltation of the Shire River downstream of the dam	Sediment management plan	EP2	DESC, Employer
25	Risk of trapped fauna in the island between the main spillway and emergency spillway	Biodiversity Management Plan	EP4	DESC, Employer
26	Risk of disturbance of aquatic wildlife	Sediment management plan Environmental Flow Management Plan Biodiversity Management Plan	EP2 EP3 EP4	Employer
27	Risk of human - wildlife conflict	Biodiversity Management Plan	EP4	African Parks, Employer
28	Risk of invasion of the site by invasive exotic species	Biodiversity Management Plan	EP4	Employer
29	Reduction of downstream nutrient load	Sediment Management Plan	EP2	Employer
30	Impacts on Critical Habitat	Biodiversity Management Plan	EP4	African Parks, Employer

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N° of impact	Impact	Name of plan where mitigation measures are addressed	N° of plan	Responsibility
31	Impacts on Critical Habitat: reduction of downstream nutrient load for Elephant Marsh primarily associated species	Biodiversity Management Plan	EP4	African Parks, DESC, Employer
32	Health and safety risks for the employees	Dam Emergency Preparedness plan	EP6	District Labour Office, District Health Office, Employer
33	Health and safety risks for divers	Occupational Health, Safety and Security during Operation	EP7	Employer
34	Health and safety risks for the communities	Occupational Health, Safety and Security during Operation Emergency preparedness plan	EP7 EP6	District Labour Office, District Health Office, Employer

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3. OBJECTIVES AND APPROACH OF THE ESMP

3.1. Introduction

This chapter presents the objectives of the Environmental and Social Management Plan and its approach to comply with the national and international requirements.

3.2. Objectives of the ESMP

The environmental and social management plan of a proposed activity is a fundamental tool to safeguard the project's overall performance in minimizing its environmental and social risks. This ESMP sets out the framework for best practices in managing the environmental and social dimensions of the Project. It provides clear guidance on the actions and procedures to be implemented throughout the project development.

The following principles underpin the development and implementation of the ESMP and all associated socio-environmental measures:

- To guarantee compliance with national regulatory authority stipulations (such as MEPA requirements), national laws (such as the Environment Management Act, No. 19 of 2017), and guidelines (such as the 2025 Guidelines for environmental assessment), as well as with the World Bank's environmental and social policies and standards (ESS1-ESS10) and relevant World Bank Group Environmental, Health, and Safety (EHS) Guidelines.
- To describe the practical requirements in sufficient detail that resources can be easily assessed and allocated.
- To state the agreed environmental and social objectives for the Project and verify environmental and social performance with SMART[4] indicators through information on impacts as they occur.
- To respond to changes in Project implementation not considered in the impact assessment process thus far or to respond to unforeseen events.

3.3. Approach of the ESMP

3.3.1. Main principles

The ESMP comprises the environmental and social management measures that have been identified, in accordance with the hierarchy of mitigation measures.

The ESMP describes a set of Environmental, Social, Health and Safety (ESHS) specifications that have been originated following the outcomes of the ESIA (as described in the volume 1) and are consistent with national laws (such as the Environment Management Act, No. 19 of 2017) as well as the World Bank's

[4] Specific, Measurable, Achievable (or Attainable), Relevant, and Time-bound

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environmental and social policies and standards (ESS1-ESS10) and relevant World Bank Group Environmental, Health, and Safety guidelines.

EGENCO, also named as the Employer in this report, will take the full responsibility of the environmental and social management of the project's construction. However, EGENCO will delegate to the Contractor the implementation of the ESHS specifications relating to the construction activities. Thus, the ESHS requirements for the Contractor are described in a specific chapter.

The following section describes how these ESHS requirements are organised in sub-plans as follows.

- The Contractor's Environmental and Social Management Plan (C-ESMP) which will entail the following specific sub-plans:
  - Labour Management plan
  - Waste Management plan
  - Hazardous Substances Management Plan
  - Resource Efficiency and Pollution Prevention Management Plan
  - Sedimentation Control Plan
  - Construction Biodiversity Management Plan
  - Traffic and Road Safety Management Plan
  - Community health and safety plan
  - Cultural Heritage Management Plan including chance findings procedure
  - Workplace Occupational Health, Safety and security Management Plan
  - Construction Emergency Preparedness Plan
  - Restoration of temporary facilities
- The Employer Environmental and Social Management Plan (E-ESMP) which will entail the following specific plans:
  - Community Health, Security and Safety Plan
  - Sediment Management Plan
  - Environmental Flow Management Plan
  - Biodiversity Management Plan
  - Land acquisition, Restrictions on land use and involuntary resettlement
  - Dam Emergency Preparedness Plan for Project Implementation
  - Occupational health, safety and security management Plan

3.3.2. Adaptive management strategy

The ESMP are considered living documents and shall be reviewed and updated on a routine basis to maintain their continued adequacy and effectiveness throughout the construction period. This adaptive management approach allows that new risks, changes in design, and lessons learned from implementation are continuously integrated into environmental and social management.

The Employer and the Contractor shall update their respective ESMPs under the following circumstances:

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- Whenever construction methods, work sequencing, or execution procedures change.
- Whenever engineering designs, technical specifications, or material choices are modified.
- When new equipment, machinery, or construction technologies are introduced on site (such as the tops gate).
- Following any incident, accident, dangerous occurrence, near-miss, or non-conformity that reveals shortcomings in current measures.
- When new environmental, social, health, safety, security, or community risks emerge.
- Following significant stakeholder feedback or grievances revealing gaps in existing management measures.

Before the beginning of new construction activity (such as the start of works on new component of the project – main spillway, emergency spillway, intake, embankment dam, dyke…) or before the start of works on a new construction area – borrow site, quarry site, disposal area….), the Contractor will verify the corresponding measures/sub-plan considering the progress of the project and the area development, and update the measures/sub-plan if necessary.

The Contractor shall submit updated versions of each C-ESMP sub-plan for review and approval by the Employer and the Owner's Engineer whenever one or more of the above triggers occur. No updated C-ESMP shall be applied in the field until formal approval is granted.

The Employer and Contractor shall establish feedback loops (internal audits, site inspections, monitoring results, incident investigations) to continually identify opportunities for improvement and integrate them into subsequent ESMP updates. This iterative approach guarantees that environmental and social management remains proactive, responsive, and aligned with best practices throughout the project lifecycle.

3.3.3. World Bank's Environmental and Social Standards compliance matrix

The following matrix highlights the compliance of the ESMP with the World Bank's Environmental and Social Standards (ESS). The World Bank's ESS relate well with the legal and policy frameworks guiding the implementation of the environmental and social safeguards in Malawi.

Table 3-1: ESS compliance matrix

N° of ESS	ESS	Name of plan where measures are addressed	N° of plan	N° of chapter
ESS1	Assessment and Management of Environmental and Social Risks and Impacts	ESIA (volume 1 of the ESIA) ESMP (volume 2 of the ESIA) Stakeholder Engagement Plan SEA/SH Action Plan		Volume 1 Volume 2 Appendix A Appendix B
ESS2	Labour and Working Conditions	Labour Management Plan Occupational Health, Safety, Security Management Plan SEA/SH Action Plan	CP1 CP10 / EP7	4.2 4.11 / 5.8 Appendix B
ESS3	Resource Efficiency and Pollution Prevention and Management	Waste Management Plan Hazardous Substances Management Plan	CP2 CP3 CP4	4.3 4.4 4.5

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N° of ESS	ESS	Name of plan where measures are addressed	N° of plan	N° of chapter
		Resource Efficiency and Pollution Prevention management Plan	CP5	4.6
		Sedimentation Control Plan	EP2	5.3
		Sediment Management Plan		
ESS4	Community Health and Safety	Traffic and road safety management Plan	CP6	4.8
		Community Health, Safety and security Plan	CP8 / EP1	4.9 / 5.2
		Construction Emergency Preparedness Plan	CP11	4.12
		Dam Emergency Preparedness Plan	EP6	5.7
		SEA/SH Action Plan		Appendix B
ESS5	Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Land acquisition, restrictions on land use and Involuntary resettlement plan	EP5	5.6
ESS6	Biodiversity Conservation and Sustainable Management of Living Natural Resources	Biodiversity Management Plan	CP6 / EP4	4.7 / 5.5
		Restoration Plan for temporary affected areas	CP12	4.13
		Environmental Flow Management Plan	EP3	5.4
ESS7	Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	This standard does not apply to the project as there are no groups that meet the criteria for ESS7 in Malawi.	-	-
ESS8	Cultural Heritage	Cultural Heritage Management Plan	CP9	4.10
ESS9	Financial Intermediaries	This standard does not apply to the project as no financial intermediaries will be used.	-	-
ESS10	Stakeholder Engagement and Information Disclosure	Stakeholder Engagement Plan		Appendix A
		SEA/SH Action Plan		Appendix B

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4. CONTRACTOR'S ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

4.1. Introduction

This chapter describes the measures and the actions that must be taken by the Contractor during the construction activities in order to prevent and mitigate the construction nuisances and impacts identified in the ESIA. These measures must be described and approved in the Contractor's Environmental and Social Management Plan (C-ESMP) before starting the work.

4.2. Description and objectives of the C-ESMP

Based on this plan, the contractor will describe further all the actions, management plans and measures taken to limit those impacts. This includes the management of different types of waste, hazardous materials, noise nuisances, soil contamination, etc. It must also provide measures to guarantee health and safety on the construction site.

Once approved by MEPA and the Owner's Engineer, the C-ESMP becomes a legally binding environmental management document forming part of the Contract Documents.

The Contractor is responsible for implementing this plan throughout the period extending from the signing of the contract to the final acceptance of the works by the Employer or its representative. The Contractor shall implement the C-ESMP considering that all actions to be done by the contractor and its sub-contractors shall bear the liability of the Contractor.

Contractually, the Contractor must follow the C-ESMP, which is why it is important that the C-ESMP build upon the findings and proposed measures identified in this project ESIA and ESMP. The contractor cannot carry out any works, including mobilization and/or pre-construction activities unless the Owner's Engineer is satisfied that appropriate measures are in place to address impacts through the C-ESMP.

The C-ESMP must follow the adaptative management strategy as described in the chapter 3.3.2.

This plan comprises the following sub-plans:

- Labour management plan
- Waste Management plan
- Hazardous Substances Management Plan
- Resource Efficiency and Pollution Prevention Management Plan
- Sedimentation Control Plan
- Construction Biodiversity Management Plan
- Traffic and Road Safety Management Plan
- Cultural Heritage Management Plan

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- Workplace occupational Health, Safety and Security Management Plan
- Construction Emergency preparedness and response plan
- Restoration of temporary facilities.

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4.3. CP1 – Labour Management Plan

4.3.1. Justification and objectives

The Contractor must prepare and implement a labour management plan based on the measures described in this section. This plan will help frame the working conditions on the Kapichira site and the commitments of the contractor in order to limit inequalities of any kind and to guarantee respectful employment conditions for workers. The Labour Management Plan should enhance project benefits by prioritizing local employment and women's participation (≥20% of total workforce). It should also provide transparent recruitment and regular reporting on local hiring rates.

The objective of this plan is to define the main measures (the list is not exhaustive) to address forced labour, gender awareness, and child labour as well as grievance arrangements for Project workers. The requirements defined in this plan applies to the Contractor, Subcontractor, Partners and Supervising firms.

The Labour Management Plan must comply with EGENCO labour management plan, Malawi policy and legislation (such as the last Employment Act), the World Bank ESS2 about Labor and Working Conditions and the World Bank Group Environmental, Health, and Safety Guidelines.

This plan aims to mitigate the following impacts:

Impact	Type of environment	Importance before mitigation measures
Employment opportunities	Human	Minor
Spontaneous migration	Human	Minor
Disturbance of local communities	Human	Minor
Risk of violence based on gender	Human	**Moderate**

4.3.2. Measures description

4.3.2.1. CONTENT OF THE CONTRACTOR'S LABOUR MANAGEMENT PLAN

The Contractor will prepare and implement a Labour management plan outlining labour and human resources management.

The plan will cover:

- Awareness-raising on labour rights
- Management of foreign personnel
- Languages in labour relationships and management of illiterate personnel
- Prohibition of child labour
- Prohibition of forced labour
- Non-discrimination and equality

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- Right of association and collective bargaining
- Employment contract
- Employees record management
- Working time and working hours monitoring
- Working time arrangements and prevention of overtime
- Remuneration
- Leaves and paid leaves
- Housing, food and transportation of employees
- Work injury and entitlements
- Health security
- Internal regulation, disciplinary and termination procedures and rights
- Prevention and management of gender-based violence, sexual exploitation and abuse and sexual harassment (GBV/SEA/SH)
- Personnel training plan
- Data protection and confidentiality
- Employees internal request and complaint management mechanism
- Demobilization
- Labour and human resources audit

The Labour management plan must comply with EGENCO labour management plan, Malawi legislation (in particular the Employment Act, 2000), the international guidelines such as the World Bank ESS2 about Labor and Working Conditions and the present requirements.

The plan shall be submitted to the Employer prior to mobilization to the site for non-objection by the Employer.

The Contractor shall require their Subcontractors to adhere to their Labour management plan via the use of contractual clauses.

4.3.2.2. SPECIFIC MEASURES TO ADDRESS IN THE CONTRACTOR'S LABOUR MANAGEMENT PLAN

Gender awareness

To prohibit any form of discrimination as gender base violence (GBV) on the construction site and to facilitate the full participation of women in the Kapichira dam rehabilitation, the Contractor must:

- Comply with EGENCO social and gender inclusion.
- Provide at least 20 % of direct employment of women in Kapichira dam rehabilitation works to comply with the World Bank gender strategy (2024-2030). However, considering EGENCO social and gender inclusion & anti-sexual harassment policy, the contractor is encouraged to implement concrete strategies aimed at creating employment opportunities for local men and women in order to achieve a participation rate of at least 30% for women.
- Avoid any discriminatory practices that limit women's participation in construction activities.

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- Apply the principle of equal opportunity by promoting diversity and do not practice ethnical, racial, religious or gender discrimination, including in recruitment.
- Provide gender-based Personal Protective Equipment with properly designed and fitted PPE to all women workers.
- Provide gender-separate accommodations in the temporary campsite and gender-separate lockable latrines and wash facilities that are well-lit, conveniently located and easily accessible.
- Provide equal pay for equal work, that means the same remuneration to men and women performing the same roles and responsibilities.
- Provide gender-based training for workers.
- Encourage respect for local customs within the temporary construction camp as well during construction activities.
- Inform all workers on the existence and functioning of the EGENCO GBV/SEA/SH Grievance Redress Mechanism, including the access points to the mechanism.

GBV/SEA/SH action plan

To prohibit any form of discrimination as gender base violence (GBV) on the construction site, the Contractor must provide and implement a GBV/SEA/SH action plan to fight against GBV aligned with EGENCO social and gender inclusion and anti–sexual harassment policy (see Appendix B). This plan will include the followings measures:

- Launch awareness enhancement campaign on HIV/AIDS and GBV among the workers before the start of the works.
- Provide 100% mandatory GBV/SEA/SH training/induction and workers execution of the approved GBV/SEA codes of conduct that explicitly prohibits SEA/GBV actions.
- Check all workers with a physical presence at the construction project site sign and understand the code of conduct at work.
- Employ a person in the Contractor team specifically to oversee gender, gender-based violence, sexual exploitation, abuse and harassment, who will work closely with the stakeholder engagement specialist.
- Define a clear procedure in case of harassment. This procedure implies an identification phase with the verification of facts, testimony, etc. Then a phase of resolution when decisions must be taken to sanction the harasser and change the way of working for the victim (reorganization of the work).
- Provide a survivor-centred and confidential reporting system with safe, anonymous and specialized SEA/SH pathways.
- Assure every case of SEA/SH is notified, correctly registered and treated.
- Assure the identity of the victim as well as the details of the harassment remain confidential.
- Establish and train a work place grievance redress mechanism committee.
- Define a clear governance structure with defined responsibilities and accountability mechanisms.
- Establish a formal agreement with qualified GBV/SEA/SH service providers in place before construction begins.
- Define clear procedures for rapid and appropriate response to SEA/SH allegations.

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This policy will be clearly communicated to all workers during onboarding and fully integrated into the project's Code of Conduct, which will outline specific disciplinary actions for violations, ranging from immediate dismissal to legal prosecution.

Biodiversity awareness

The anticipated influx of workers and associated activities during the construction phase poses a significant risk of increased poaching and wildlife crime in the project area. The site lies near the Majete Wildlife Reserve (MWR), a well-established conservation area known to support a variety of threatened and ecologically important species. In addition, the project footprint itself includes potential habitats for large herbivores, hippopotamuses, reptiles, and other species that may attract illegal hunting or collection.

The presence of a non-resident workforce, combined with the increased movement of people, vehicles, and equipment, can lead to greater human-wildlife interactions and opportunities for illicit activities such as bushmeat hunting.

To avoid that construction activities contribute directly or indirectly to the decline of local wildlife populations (linked to the construction biodiversity management plan), the Contractor must:

- implement a strict zero-tolerance policy toward poaching and all forms of wildlife crime and enforce for all personnel involved in construction and associated activities, to safeguard biodiversity within and around the project area.
- Prohibit formally all hunting and fishing activities by employees within the project's area of influence.
- Ban on carrying, storing, or using weapons in the workers' camps and construction areas.
- Ban on the consumption of bushmeat or wild-caught fish by all personnel.
- Provide a regular supply of alternative protein sources (e.g., poultry, beef, or fish from certified suppliers) in the workers' canteens to support compliance and reduce reliance on illegal wildlife products.
- Include explicitly these prohibitions in the Code of Conduct, with all staff required to acknowledge and adhere to them.
- Provide the relevant training (see chapter 4.7.2.10) to the project employees, including the management staff.

Working time

The Contractor shall define working times on the Site that are aligned with the needs of the construction and the present requirements.

- Define working hours that would respect workers (it is recommended to follow EGENCO working hours), including their need for rest (including lunch break and breaks during the day): The employment Act, 2000, sets a maximum of 48 hours of work per week. In addition, every 7 days of work, the workers must have a 24 consecutive hours rest.
- Avoid night-time construction works (where possible), specifically including heavy goods vehicle traffic and blasting (from 8pm to 6am, according to EGENCO requirements), to avoid sleep disturbances for the local residents as well as to prevent the harmful effects of artificial lighting and night-time noise, which can disorient nocturnal species such as bats, owls, and amphibians, and interfere with natural predator-prey dynamics and disturb tourism experiences.
- Respect the local days of rests, customs and festive days.

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- Track and monitor employee working hours, including regular shifts, overtime, breaks and leaves.

Respect of workers' rights

To make sure that the workers' rights are respected and to manage employment opportunities and spontaneous migration, the Contractor must:

- Provide an employment contract for each worker (including daily workers).
- Establish a Code of Conduct that underlines basic rules governing expected behaviour and safety to be respected by all the Contractor's personnel and Subcontractor's personnel.
- Verify that all personnel of the Contractor and Subcontractors, including management and supervisory staff, are informed of their responsibility to promptly address any ESHS issues. In cases where there is a risk of serious injury to people or animals, significant property or asset damage, imminent threat to life, or major environmental impact, the personnel must be empowered to immediately halt the works. Monitor employment contracts for subcontractors and suppliers.
- Inform the workers about their working conditions and their rights, taking into account the illiterate personnel and the workers' languages.
- Detect and report non-compliances such as child labor, forced labor, bribe and non-respect of workers' rights.
- Provide a mechanism of grievances available for all workers.
- Monitor and report on working conditions on site, especially for women. Every unconformity must be reported and treated based on a specific procedure defined by the Contractor.
- Provide human resources management having the local context knowledge.
- Provide adequate and appropriate accommodation at the temporary construction site for all non-local workers.

Boosting the local job market

To encourage the employment of local people and to minimize the disturbance on local community as well as the spontaneous migration, the Contractor must provide a Labor Influx and Community Interaction Management Sub-Plan taking into account the following requirements:

- Give priority to employing local people from the Chikwawa district, and particularly people from villages around Kapichira HPP, such as Bwalo, Njerez, Maganga 1 & 2, Sekela, Mlangeni, Liwonde and Kandeu, especially for the non-skilled employment. Considering EGENCO social and gender inclusion & anti-sexual harassment policy, the contractor is encouraged to implement concrete strategies aimed at creating employment opportunities for local men and women in order to achieve a participation rate of at least 30% for women.
- Work in close collaboration with the District Labor Office to access their database of jobseekers.

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- Support local job demand at the district level by actively involving the youth in the recruitment process and assisting with applications. Align the local recruitment policy with national and Lender's requirements:
  - Define local employment objectives and targets.
  - Maximize the accommodation of the workforce on the temporary campsite.
  - Develop pick-up points and a transport service for local staff.
  - Communicate this procedure widely.
- Inform local communities through local means of communication about the real job opportunities on the construction site:
  - Put up posters in villages in English and Chichewa languages.
  - Involve the village chiefs.
- Guide migrants to a designated competent recruitment office.
- Organize regular information meetings with focal points designated by the concerned communities (village chiefs / customary authority / administrative authority): work schedule, job opportunities, various events.

4.3.3. Implementation modalities and budget

This sub-plan must be detailed in the contractor's environmental management plan before the start of the work.

Sub-plan	Activities	Responsible for the execution	Period of execution	Cost
CP1	Labor Management Plan	Contractor	During the entire construction period	Included in the contractor's cost

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4.4. CP2 – Waste Management Plan

4.4.1. Justification and objectives of the plan

The waste management plan summarizes all the measures implemented by the Contractor during works in order to identify, collect, transport and treat all waste produced on site. The Hazardous Substances are treated separately in a different management plan, but their disposal is included in the waste management plan.

The Waste Management Plan must comply with EGENCO Environmental Management Policy, Malawi policy and legislation (such as the Environment Protection Act (2024), the last Waste Management and Sanitation Regulations), the World Bank ESS3 about Resource Efficiency and Pollution Prevention and Management as well as the World Bank Group Environmental, Health, and Safety Guidelines.

This plan aims to mitigate the following impacts:

Impact	Type of environment	Importance before mitigation measures
Soil and water pollution by liquid or solid waste	Physical, Human	Minor
Disturbance of wildlife and risk of mortality	Biological	**Moderate**
Risk of aquatic mortality and loss of aquatic habitats	Biological	**Moderate**
Health and safety risks for workers	Human	Minor

To provide effective waste management, the Contractor must implement the following measures.

4.4.2. Measures description

4.4.2.1. GENERAL MITIGATION MEASURES

The Contractor shall prepare and implement a Site Waste Management Plan as part of the C-ESMP as contract mobilisation. The plan shall detail all site-specific measures the Contractor will implement during the Works to identify, collect, transport, and manage all waste generated on Site. As part of the Site Waste Management Plan included in the C-ESMP, the Contractor should identify authorised disposal sites approved by relevant authorities for general waste, construction debris, hazardous waste and recyclable materials.

The Contractor must:

- Anticipate and communicate the volume of non-hazardous waste that will probably be produced.
- Prohibit the burning of waste.
- Promote waste recycling and reuse.
- Provide waste bins in the workers camps.
- Conduct training sessions to inform the workers about domestic waste pollution and the importance of waste treatment.

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- Verify that all personnel receive induction and periodic training on chemical handling, spill response, and waste segregation and management.
- Protect and delimit a buffer zone around the riverbank south of the quarry as well as along the riverbank on the north of the temporary campsite.
- Include measures to prevent wildlife from accessing or being attracted to waste, especially food scraps and organic matter.
- Use only MEPA-licensed waste transporters and MEPA-licensed waste treatment or disposal facilities for the evacuation of all regulated waste streams.

4.4.2.2. DEVELOPMENT OF WASTE MANAGEMENT FOR DIFFERENT WASTE CATEGORIES

The Contractor must identify the different categories of waste and install appropriate facilities for each type, including solid and liquid waste with signage in English and local languages where appropriate. This includes organic waste (e.g., compostable materials), inorganic waste (e.g., plastics, paper), metal waste, and sewage. The category of each container must be easily identifiable by everyone, for example by means of a colour-coding system corresponding to the different types of waste (green – organic waste, blue – recyclable waste, yellow – plastic waste, grey – non-recyclable waste and red – hazardous waste).

The Contractor must install a waste separation system (plastic, metal, glass, wood, paper, etc.) and the non-hazardous waste must be evacuated to a waste treatment and/or landfill center.

The Contractor must maintain the waste facilities correctly and regularly cleaned, with the waste regularly removed and transported to the nearest recycling, treatment and waste management facilities (to be identified).

The Contractor shall also maintain waste tracking manifests/lists to document the movement, quantities, and disposal of all waste streams, including signatures at each transfer stage (generation, storage, transport, disposal).

4.4.2.3. DEVELOPMENT OF A WASTE TEMPORARY STORAGE MANAGEMENT

The Contractor must define the waste temporary storage management with the following requirements:

- Categorize and store the waste separately depending on the type and danger of the waste.
- Store the waste in appropriate containers of enough size.
- Locate the waste storage areas over 100 m from any sensitive natural areas such as the Shire River or the Majete Wildlife Reserve. It must be in a secure and centralized waste area.
- Verify that temporary waste storage areas are properly managed to prevent overflow, unpleasant odors, insect infestations, and any emissions that could pose a risk to workers' health.
- Install septic tanks for workers' sewage. These septic tanks must be emptied correctly and frequently.
- Store the hazardous waste separately.
- Equip the liquid waste facilities with a secondary containment system capable of holding a volume equal to the total volume of stored waste.

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- Maintain a specific spill Emergency Response Plan at all chemical, fuel, and liquid waste storage and transfer points, supported by spill kits and trained personnel.
- Protect the waste storage areas from animals, to avoid dispersion of waste in and around the construction site.

4.4.2.4. WASTE REGISTER

The Contractor must establish a waste register, maintain waste tracking manifests/ lists and a monitoring of waste on the construction site. The register must be at the disposal of EGENCO and include the following aspects:

- The quantity of waste produced and the repartition between the types of waste produced.
- The planned and actual treatment for the waste on site.
- The duration of storage for each type of waste must be monitored and followed in the waste register.
- The name and address of the waste management facilities collecting the waste from the construction site.
- A cross-reference to the waste tracking manifests for each waste transfer to guarantee full traceability.

4.4.3. Implementation modalities and budget

This program must be detailed in the contractor's environmental management plan before the start of the work.

Plan	Activities	Responsible for the execution	Period of execution	Cost
CP2	Waste management plan	Contractor	During the entire construction period	Included in the contractor's cost

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4.5. CP3 – Hazardous Substances Management Plan

4.5.1. Justification and objectives of the plan

This plan is closely aligned with the Waste Management Plan. This plan outlines the procedures for handling, storing, and transporting hazardous substances, including explosives.

It must be implemented in full compliance with Malawian regulations (such as the Environmental Management Act), with EGENCO Environmental Management Policy, the World Bank ESS3 about Resource Efficiency and Pollution Prevention and Management as well as the World Bank Group Environmental, Health, and Safety Guideline. The disposal of hazardous waste will also take into account the provisions of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal. This program aims to mitigate the following impacts:

Impact	Type of environment	Importance before mitigation measures
Soil and water pollution by liquid or solid waste	Physical, Human	Minor
Disturbance of wildlife and risk of mortality	Biological	Moderate
Risk of aquatic mortality and loss of aquatic habitats	Biological	Moderate
Health and safety risks for workers	Human	Minor

4.5.2. Measures description

4.5.2.1. PROVIDE THE LIST OF EXPECTED HAZARDOUS MATERIALS

The Contractor must provide a specific list of expected hazardous materials for the project. The list has to be exhaustive with the justification of its use. Hazardous products should be segregated in compliance with United Nations classification or the equivalent.

4.5.2.2. PROVID A SAFE STORAGE OF HAZARDOUS SUBSTANCES

To provide safe storage of hazardous substances, the Contractor must:

- Define a security distance from storage areas and high-traffic areas to limit the safety risks in case of explosion.
- Verify the presence of a register of hazardous substances (including chemical inventory register) on site, keep track of the storage and include the quantities and the locations of those substances.
- For hazardous liquids and chemical products, provide a secondary containment system of at least 110% of the total stored volume.
- Maintain an up-to-date inventory of all hazardous materials stored on site, including Safety Data Sheets for each substance, available at storage locations and accessible to workers.

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- Provide secure storage systems for potentially polluting or hazardous products (explosives, hydrocarbons, oils), and establish areas for unloading chemicals.
- Store the powdery materials in closed containers (bags, temporary containers) and apply procedures that limit their handling.
- Verify that the storage and handling of chemicals follow safety regulations (storage compatibility rules, containment trays, ventilation without sources of heat, light, or humidity, etc.).
- Establish an emergency pollution management procedure which consists of the presence of anti-pollution kits, use of absorbent booms, training of the workers etc.

4.5.2.3. PROVIDE A SAFELY TRANSPORT OF HAZARDOUS MATERIALS

The transport of hazardous substances shall follow the requirements of Malawi regulations and World Bank General Environmental, Health and Safety Guidelines, including the following requirements:

- Obtain a license to transport hazardous materials from MEPA.
- The vehicles used for transport of hazardous substances must be in good condition (no obvious defects, leaks…).
- Verify that the vehicle load is known and complies with applicable weight and safety regulations. The transport vehicles must have hazard labels visible.

EGENCO reserves the right not to authorize the transport, if it is judged that the transport unit or the driver does not meet the regulatory conditions (documents presented are invalid, transport unit does not conform...).

4.5.3. Implementation modalities and budget

This sub-plan must be detailed in the contractor's environmental management plan before the start of the work.

sub-plan	Activities	Responsible for the execution	Period of execution	Cost
CP3	Hazardous substances Management Plan	Contractor	During the entire construction period	Included in the contractor's cost

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4.6. CP4 – Resource Efficiency and Pollution Prevention Management Plan

4.6.1. Justification and objectives of the plan

The Contractor must develop a resource efficiency and pollution prevention and management plan in order to promote sustainable use of resources, including energy, water and raw materials. The plan will include means by which the project will minimize adverse impacts on human health and the environment as well as how the project will avoid and minimize pollution. The sustainable use of finite resources must also be included in the management plan. The project will involve different types of pollution like pollution to air and water, increase of noise level, potential vibrations and consumption of a certain amount of finite resources such as water.

The Resource Efficiency and Pollution Prevention Management Plan must comply with EGENCO Environmental Management Policy, Malawi policy and legislation, the World Bank ESS3 about Resource Efficiency and Pollution Prevention and Management as well as the World Bank Group Environmental, Health, and Safety Guidelines.

This program aims to mitigate the following impacts:

Impact	Type of environment	Importance before mitigation measures
Dust and gas emission - deterioration in air quality	Physical, Human	Minor
Increase in noise and vibration level	Physical, Biological, Human	Minor
Soil and water pollution by liquid or solid waste	Physical, Human	Minor
Pressure on water resources	Physical, Biological, Human	Minor

4.6.2. Measures description

4.6.2.1. LIMIT THE POLLUTION COMING FROM MACHINERY, CONSTRUCTION MATERIALS, WASTEWATER

To limit the pollution coming from the machinery, the Contractor must:

- Provide new or well-maintained machinery in order to minimize CO2 emissions from exhaust gases and the potential leaks of hydrocarbons.
- Provide instructions for turning off the vehicles' motors when parked and not in use to prevent useless air pollution.
- Provide tarp to the vehicles and check that the material is covered up by a tarp to avoid the dispersion of the materiel when the vehicles transport construction materials. Special attention should be given during windy periods.
- Apply measures for water spraying of the areas if the vehicle passage on non-paved roads implies a lot of sand dispersion, in order to minimize the dust dispersion.

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- Establish areas for parking, and maintenance of machinery.
- Carry out refueling activities away from any water body (at least 100m) as required as well by the SVTP.
- Limit the noise level coming from construction machinery:
  - Using manufacturer standards.
  - Prohibit working at night when and where possible.
  - Undertake a blasting risk assessment at the quarry site to design the blast to minimise the blast area, prevent building from cracks, and schedule the blast (e.g. delaying the blast under unfavourable wind conditions - greater than 10m/s).
- Monitor and register the noise and vibration levels on the construction site
- Monitor and register the air quality on the construction site.

4.6.2.2. PREVENT POLLUTION COMING FROM CONSTRUCTION MATERIALS

To prevent the pollution coming from construction materials, the Contractor must:

- Select recyclable and repairable products when possible.
- Prioritize a manufacturing process that minimizes greenhouse gas emissions.

4.6.2.3. PREVENT POLLUTION COMING FROM WASTEWATER

To prevent pollution coming from the wastewater and water, the Contractor must:

- Install a sewerage system with wastewater treatment on the temporary campsite.
- Store industrial water in tanks.
- Do not release used water into the environment or in the Shire River.

4.6.2.4. PROVIDE A RATIONAL USE OF WATER RESOURCES

To provide a rational use of water resources, the Contractor must:

- Choose and implement the most appropriate water supply solution, based on efficiency, sustainability, and minimal environmental impact, and clearly communicate the selected approach to relevant stakeholders.
- Raise awareness among workers about the importance of water conservation and promote responsible water use through training and signage.
- Monitor water consumption regularly to identify inefficiencies and opportunities for reduction.
- Implement water-saving technologies and practices, such as recycling systems and leak detection mechanisms.
- Avoid contamination of water sources by providing proper handling and disposal of hazardous materials and wastewater.
- Comply with national regulations and international best practices regarding water use and discharge.
- Report on water usage and conservation measures as part of environmental monitoring and performance reporting.

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4.6.2.5. SUPPORT EFFICIENT USE OF RAW MATERIALS

The Contractor shall prepare and implement a Quarry and Borrow Area Management Plan for the two identified areas (quarry site and clay borrow site) in order to support efficient use of raw materials, to the extent technically and financially feasible:

- Provide detailed plan for the two areas to be exploited for rockfill material as well as for the clay borrow area that details all the environmental and social measures to be implemented for the operation of these sites.
- For the quarry site and the clay borrow site, the respective Management Plan shall include the following considerations:
  - A plan showing the extent to the area to be developed.
  - A method statement defining the proposed working methods.
  - The detailed proposed access routes between the quarry/borrow area and the destination for the extracted material.
  - A justification for the quantities of material to be extracted, an estimate of the waste materials to be generated and disposal details for such waste materials.
  - Details of the measures taken to minimise the area and its visual impact on the surrounding area.
  - Details of the measures to be taken for the long-term reinstatement of the clay borrow site as well as the quarry site (see chapter 4.13 about restoration plan). These shall include re-establishment of vegetation, restoration of natural water courses, avoidance of flooding of the excavated areas, achievement of stable slopes, and avoidance of features which would otherwise constitute a risk to health and safety or a source of environmental pollution.
  - Implement the practice of top-soil salvage during all construction activities, in full compliance with the IFC Performance Standards (PS3 and PS6) on resource efficiency, biodiversity conservation, and habitat restoration: The topsoil should be handled and stored in conditions that preserve its biological integrity (avoiding compaction, excessive drying, or contamination).
  - Remove buildings, plants, equipment, debris, and miscellaneous stockpiles of material from these areas.
  - Contour and level quarry surfaces to prevent water ponding, reducing the risk of drowning and water-borne disease.
  - Used the materials, other than waste materials, extracted from quarrying operations under the Project exclusively for the Works.

4.6.3. Implementation modalities and budget

This sub-plan must be detailed in the contractor's environmental management plan before the start of the work.

sub-plan	Activities	Responsible for the execution	Period of execution	Cost
CP4	Resource Efficiency and Pollution Prevention Management Plan	Contractor	During the entire construction period	Included in the contractor's cost

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4.7. CP5 – Sedimentation Control Plan

4.7.1. Justification and objectives of the plan

The construction activities can generate excessive erosion of riverbanks and excessive sedimentation in the Kapichira reservoir as well as downstream.

The Sedimentation Control Plan must comply with EGENCO Environmental Management Policy, Malawi Policy and legislation, the World Bank ESS 1, 3 and 6 as well as the World Bank Group Environmental, Health, and Safety Guidelines.

The Contractor must apply adequate measures to limit the following impacts:

Impact	Type of environment	Importance before mitigation measures
Increase of sediments in the reservoir	Physical	Minor
Risk of erosion and modification of the physicochemical properties of the soil	Physical	Moderate

4.7.2. Measures description

4.7.2.1. INTRODUCTION

These following measures focus on the identified impacts linked to the construction activities, in particular to all construction spoil management activities and the operations of quarry site and borrow area, which represent significant sources of potential erosion and sediment release.

4.7.2.2. CONDUCT FURTHER INVESTIGATIONS DOWNSTREAM OF KAPICHIRA DAM

Before the construction phase, the Contractor shall conduct further investigations concerning the downstream area of Kapichira dam. The existing studies carried out by the Owner's Engineer only focuses on the upstream and the reservoir of Kapichira. These studies lack information on the erosion and sedimentation downstream on Kapichira.

These new investigations will give further information about the actual and the probable future sedimentation downstream of Kapichira. They are of great importance for a better understanding of the erosion and risks downstream of Kapichira dam caused by the disruption of the natural sediment balance.

These investigations should be oriented around the following axes:

- A geotechnical investigation on riverbank and riverbed geomorphology, as well as the change in the bed level downstream to Elephant Marsh. This could imply a bathymetric survey.
- Investigations to determine the downstream sediment load (until Elephant Marsh).
- Investigations to determine downstream riverbed incision (until Elephant Marsh).

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- Investigations to determine the downstream riverbank erosion (until Elephant Marsh).
- Erosion rate forecasts and prediction of the change in the river morphology as well as the bed level after 10 years, 30 years and 50 years, including modelling.
- Comparing the results obtained to the predictions from the Mpatamanga ESIA.

These predictions must give estimation of the changes for different scenarios: minimum changes, average and maximum.

4.7.2.3. DRAINAGE OF RAINWATER RUNOFF AND RETENTION BARRIERS

Before construction begins, the Contractor must implement effective measures to manage rainwater runoff and prevent sediment displacement from the site. These measures aim to protect surrounding environments, particularly water bodies, from sediment accumulation. Key requirements include:

- Runoff Prevention:

The Contractor must assess the construction site and install appropriate systems to manage rainwater runoff. These systems should prevent sediment from being carried off-site during rainfall. These requirements also apply to spoil disposal area, quarry site, and borrow area that may generate high sediment loads.

- Drainage Implementation:

All working areas—including the main construction footprint, quarry site, and temporary camp—must be equipped with proper drainage systems. These systems must be designed to prevent water stagnation and should direct runoff to sediment traps before any discharge into the environment.

- Sediment Control Measures:

The Contractor must install sediment control structures such as silt traps and sediment barriers around areas prone to soil erosion. These structures will capture sediment-laden runoff, preventing it from entering nearby rivers and protecting aquatic habitats and water quality.

Sediment controls must equally be installed around spoil mounds, material stockpiles, quarry faces, and borrow pits.

- Maintenance and Monitoring:

Regular inspections and maintenance of all drainage and sediment control systems must be conducted to maintain their continued effectiveness throughout the construction phase. This includes monitoring all spoil deposits, quarry benches, and borrow pits for signs of erosion.

- Sediment Reuse Plan:

The Contractor must develop a sediment valorization plan, outlining how collected sediments will be reused or disposed of in an environmentally responsible manner.

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4.7.2.4. PROTECTION OF RIVERBANKS

Erosion control is a prerequisite to guarantee the stability of the slopes, the implementation of site revegetation work and the quality of runoff water discharge from the land exposed for the needs of the construction site.

Before the construction phase, the Contractor must protect the riverbanks close to the construction site to prevent excessive erosion and enhance water turbidity, by using stabilizers such as sandbags, plastic liners and coarse rock.

These will include the installation of silt traps and sediment barriers (approved by the Employer) around construction areas that are at risk of soil erosion, in particular at the quarry site area. These measures will capture sediment runoff and prevent it from entering the river, thereby preserving water quality and avoiding the smothering of aquatic plants and fish habitats.

Regular inspections (once a week) and maintenance of these control structures will verify their effectiveness throughout the construction phase.

The same inspection and maintenance requirements apply to spoil disposal areas and borrow pits, which must be stabilized and protected from erosion.

4.7.2.5. VALORIZATION OF EXCAVATED MATERIAL

The Contractor must prioritize the reuse of excavated materials from work areas, provided that their chemical and geotechnical properties meet the required standards. These materials may be reused for purposes such as concrete production, backfilling, and foundation works. Before any utilization, the Contractor must verify that this construction material meets the relevant requirements concerning the chemical and geotechnical properties. The valorization of this material must not cause any harm to human health or the environment. The absence of notable pollution, radioactive elements or invasive species must also be verified.

This measure will minimize the disposal of materials volume from the construction activities.

Where reuse is not possible, spoil must be managed in designated spoil disposal areas with proper drainage, erosion control, and stabilization systems. Spoil disposal mounds, quarry overburden, and borrow pit excess materials must not be left in unstable or erodible conditions.

4.7.3. Implementation modalities and budget

This sub-plan must be detailed in the contractor's environmental management plan before the start of the work.

sub-plan	Activities	Responsible for the execution	Period of execution	Cost
CP5	Sedimentation control plan	Contractor	During the entire construction period	Included in the contractor's cost

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4.8. CP6 – Construction Biodiversity Management Plan

4.8.1. Justification and objectives of the plan

This part of the program focuses on protecting the biological environment and avoiding or reducing any impact on biodiversity during the construction phase within the construction influence area.

The Construction Biodiversity Management Plan must comply with EGENCO Environmental Management Policy, Malawi policy and legislation (such as Environmental management Act, Forest Act, National Parks and Wildlife Act), the World Bank ESS6 about Biodiversity Conservation and Sustainable Management of Living Natural Resources as well as the World Bank Group Environmental, Health, and Safety Guidelines.

This plan aims to mitigate the following impacts:

Impact	Type of environment	Importance before mitigation measures
Risk of habitat loss, degradation and fragmentation	Biological	**Moderate**
Wildlife disturbance and risk of mortality	Biological	**Moderate**
Spread of invasive species	Biological	**Moderate**
Risk of human-wildlife conflict	Biological, Human	**Moderate**
Risk of increased activities poaching	Biological	**Moderate**
Risk of aquatic mortality and loss of aquatic habitats	Biological	**Moderate**
Impacts on critical habitat triggering species	Biological	**Moderate**

4.8.2. Measures description

The Contractor will develop and implement a Construction Biodiversity Management Plan that includes at least the measures detailed below. The plan will be submitted at least 60 days before mobilization to the Site.

4.8.2.1. GENERAL MITIGATION MEASURES

Context

The proposed measures in this plan have been designed to integrate and address critical habitat concerns and species of conservation concern, particularly in relation to the following three key impacts: wildlife disturbance and risk of mortality, risk of human-wildlife conflict, and risk of increased poaching and wildlife crime.

The proposed measures must give particular attention to species that trigger critical habitat status, with a strong focus on these species during awareness and capacity-building trainings.

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Specific measures - including wildlife conservation training, general mitigation measures, wildlife disturbance and mortality minimization, and prevention of poaching and wildlife crime - must consider species that could trigger critical habitat. These include species confined to the Majete Wildlife Reserve (MWR) but potentially moving into surrounding areas: the Black Rhino, African Wild Dog, and vulture species such as the White-backed Vulture and White-headed Vulture.

The presence of these species requires strict adherence to mitigation and monitoring measures, given the high conservation stakes and the potential for irreversible impacts.

No viable populations or suitable habitats for The Black Heron, the African Openbill, the African Skimmer, the Whiskered Tern, the Collared Pratincole and the Basra Reed-warbler have been identified in the construction influence area. Impacts during construction are not expected to be significant.

In addition, the measures must consider all other species of conservation concern found within the Construction Influence area, even if not directly within the project footprint, verifying that any direct or indirect impacts—such as increased human activity, noise, pollution or access—are minimized (e.g. Hippopotamus, Leopard, Lion, African savannah elephant, Temminck's pangolin, monkeys, other birds of preys, Nile crocodile, fishes…).

Content

The Contractor shall apply the following mitigation measures:

- If any nests or conservation-concern habitats are identified during the pre-surveys carried out by the Employer (Section 5.5.2.2 – Pre-survey biodiversity measures), especially within the construction dam area, the following actions must be implemented.

  Based on the findings, species-specific buffer zones will be established to minimize disturbance.

  - For example, a minimum buffer of 500 meters will be maintained around nests of large raptors and vultures to protect their breeding and nesting activities.
  - For ground-nesting birds such as waterfowl and waders, particularly in riverbank and wetland habitats, a 300-meter buffer will be implemented.
  - Bat colonies and mammals' dens will be protected by establishing a minimum 200-meter exclusion zone.
- An adaptive management approach will be adopted to respond to any new findings. If nesting sites or other sensitive features are discovered after construction has started, construction schedules and site layouts will be revised accordingly to avoid disturbance and maintain continued protection of biodiversity.
- Speed limit enforcement on access roads:
  - Strict speed limits must be enforced on all project access roads to minimize the risk of collisions with wildlife, especially species from the nearby Majete Wildlife Reserve.
  - Any wildlife collision (regardless of damage) must be reported and logged in a dedicated Wildlife Tracker.
- Develop and maintain a Wildlife Tracker to record all wildlife-related incidents (rescues, drownings, roadkill, community encounters) with detailed incident data including GPS and photos.
- Morning wildlife inspections:

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- Prior to daily construction activities, conduct inspections of roads and sandy areas to check for reptiles basking in the sun.
- Record all the sightings in the wildlife tracker.
- Reptiles, including snakes, should be safely relocated according to a standardized snake-handling protocol. All occurrences must be recorded.

- Daily inspection of trenches and excavations:
  - Trenches and open excavations must be checked every morning for trapped animals.
  - Any fauna found must be rescued and safely relocated. Log all incidents in the Wildlife Tracker.
- Fauna escape measures for excavations:
  - Excavated areas must be either fenced, covered, or equipped with escape ramps to allow trapped animals to exit safely when not in use.
- Prohibition of burning
  - Burning of any material is prohibited unless explicitly authorized by the Employer and restricted to designated areas, to avoid attracting or harming wildlife.
- Practice of storing and reusing topsoil:
  - The practice of top-soil salvage must be strictly implemented during all construction activities, in full compliance with the IFC Performance Standards (PS3 and PS6) on resource efficiency, biodiversity conservation, and habitat restoration.
  - The topsoil should be handled and stored in conditions that preserve its biological integrity (avoiding compaction, excessive drying, or contamination).

4.8.2.2. EMERGENCY SAFETY PLAN AND WILDLIFE INTERACTIONS

Context

This measure aims to reduce conflict between humans and wildlife. The implementation of the measure is essential due to the proximity of the Majete Wildlife Reserve to the construction area.

As the direct footprint area is fenced off separately from the Majete Wildlife Reserve, there should be no species from the reserve present. Nevertheless, indirect sightings of large mammals (Nyala, Impala and Zebra) have been observed during inventories in the direct footprint area. The presence and risk of introducing any species during worksite activities has been considered.

Content

- The Contractor shall be responsible for animal rescue operations for animals that would be threatened by the work, trapped on the working areas or that would threaten the safety of the worksite.
- The Contractor shall establish a clear procedure for both capture and release, in partnership with the Employer, adequate stakeholders involving the Majete Wildlife Reserve and the Department of National Park and Wildlife.

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- The Contractor shall immediately contact the Employer in case of the presence of a large animal (rhinoceros, hippopotamus, crocodiles, elephants, giraffes, lions, zebra, *etc.*) within the construction influence area (especially in the direct footprint area).
- If required, the work will be stopped, and the employees will evacuate from the area until the animal rescue operation is complete. In no case, the Contractor is allowed to manipulate or try to displace the animal with its own means.
- The Contractor will check that its personnel is aware of the animal rescue procedure through the biodiversity awareness actions (section Trainings program.).
- The Contractor will be in charge of developing and implementing measures to respond to wildlife interaction, especially large mammals and crocodiles.

4.8.2.3. WORK SCHEDULE ADJUSTMENTS TO AVOID PEAK WILDLIFE ACTIVITY PERIODS

Context

This measure aims to minimize the disturbance to wildlife and the associated risk of mortality. The implementation of the measure is essential due to the proximity of the Majete Wildlife Reserve to the construction area.

Considering noises, dust, vibrations, especially in sensitive habitats such as the Majete Wildlife Reserve and the Shire River, the project has considered time-based restrictions on disruptive activities.

Content

This measure seeks to schedule construction activities to avoid periods of peak wildlife sensitivity. Two key periods should be considered: the daily activity peaks at dawn and dusk, and seasonal peaks during breeding and migration.

Indeed, between November and March, wildlife activity reaches a critical peak. This period corresponds to the breeding season for many resident species, including large herbivores and predators.

It also marks the arrival of numerous migratory birds, some of which stop temporarily in the reserve, while others settle for several months to breed. During this time, many species are especially vulnerable: excessive noise and disturbance can lead to breeding failure, nest abandonment, or displacement outside of protected areas.

The work schedule must consider the following considerations:

- High-noise activities—such as blasting, excavation, and operation of heavy machinery—should be restricted to midday hours, specifically between 11:00 AM and 2:00 PM. Concentrating on these activities during this period helps reduce disturbance to key wildlife species, which are typically more active during early morning and late afternoon.
- Very noisy construction activities should be avoided during the rainy season, as this coincides with the peak breeding period for many species, increasing their sensitivity to disturbance.

A strict no-nightwork policy will also be enforced except for activities essential to construction works, such as concrete work, approved by EGENCO and the owner's engineer. This measure is designed to prevent the harmful effects of artificial lighting and night-time noise, which can disorient nocturnal species such as bats, owls, and

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amphibians, and interfere with natural predator-prey dynamics and disturb tourism experiences.

These time-sensitive mitigation measures will be included in contractor obligations, monitored through daily activity logs and environmental inspections, and adjusted as needed based on observations from wildlife monitoring programs.

4.8.2.4. LIGHTING MINIMIZATION MEASURES

Context

This measure aims to minimize the disturbance to wildlife and the associated risk of mortality, as well as reducing conflict between humans and wildlife. The implementation of the measure is essential due to the proximity of the Majete Wildlife Reserve to the construction area.

Considering lighting especially in sensitive habitats such as the Majete Wildlife Reserve and the Shire River, these measures aim to consider some lighting restrictions on disruptive activities.

Content

Key measures will help reduce direct lights toward Majete and minimize sky glow effects. The proposed measures are consistent with the existing ESMP mitigation measures for Mpatamanga project.

A lighting strategy shall be implemented by the Contractor in the construction influence area (direct footprint area, camp and quarry sites, access roads) as follows.

- Minimize the number of light fixtures to the bare minimum.
- Avoid using lighting continuously for 24 hours where not necessary, and check lights are switched off whenever possible to minimize energy consumption.
- Limit the lighting in the construction area and in the quarry site with limited and non-permanent lighting to reduce light ‘spillage’ if feasible and acceptable from a security standpoint.
- Install lighting systems that provide targeted illumination and use non-permanent fixtures to reduce light pollution, particularly sky glow, beyond the immediate vicinity of the operational areas such as work zones, camps, and quarry sites.
- Check that high pole top lighting at these locations is shielded from the south, i.e. aimed towards the north and specifically away from the sensitive viewpoint sites especially for Majete.
- Limit light intensity and duration (i.e. only keep them on when necessary and at specific workstations/areas).
- Implement motion sensors and/or timers in areas where lighting is not required permanently, i.e. along pedestrian pathways in the campsite.
- Contain light within the intended areas and minimize sky-glow by maintaining direct light downward.
- Utilize warm-colored LED lights with a color temperature below 3000k wherever possible, as they are less disruptive than cooler-colored lights.
- Conduct routine monitoring of lighting to modify and adapt lights to minimize light spill to the minimum necessary.

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- Use lights with reduced or filtered blue, violet and ultraviolet wavelengths (i.e. light with short wavelengths, 400 nm to 500 nm) at night.
  - Outdoor lighting with strong blue content is likely to worsen sky glow because it has a significantly larger geographic reach than lighting consisting of less blue.
  - Blue-rich white light sources are also known to increase glare. These lights create potential road safety problems for motorists and pedestrians.
  - Warm-appearing light sources are recommended, including low-pressure sodium, high-pressure sodium and low-Correlated Colour Temperature LEDs.
  - Warm toned or filtered LEDs, with a correlated colour temperature = 3000K or lower, should be used to minimize blue emissions.

4.8.2.5. IMPLEMENTATION OF A ZERO-TOLERANCE POLICY FOR POACHING AMONG WORKERS

Context

The anticipated influx of workers and associated activities during the construction phase poses a significant risk of increased poaching and wildlife crime in the project area. The site lies in close proximity to the Majete Wildlife Reserve (MWR), a well-established conservation area known to support a variety of threatened and ecologically important species. In addition, the project footprint itself includes potential habitats for large herbivores, hippopotamuses, reptiles, and other species that may attract illegal hunting or collection.

The presence of a non-resident workforce, combined with the increased movement of people, vehicles, and equipment, can lead to greater human-wildlife interactions and opportunities for illicit activities such as bushmeat hunting.

The proposed measure aims to create a protective buffer around the construction influence area, making sure that construction activities do not contribute, directly or indirectly, to the decline of local wildlife populations.

Content

To safeguard biodiversity within and around the project area, a strict zero-tolerance policy toward poaching and all forms of wildlife crime will be implemented and enforced for all personnel involved in construction and associated activities (in accordance with the labour management plan).

This policy will be clearly communicated to all workers during onboarding and fully integrated into the project's Code of Conduct, which will outline specific disciplinary actions for violations, ranging from immediate dismissal to legal prosecution.

Key measures include:

- A formal prohibition on all hunting and fishing activities by employees within the project’s area of influence.
- A ban on carrying, storing, or using weapons in the workers' camps and construction areas.
- A ban on the consumption of bushmeat or wild-caught fish by all personnel.

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- To support compliance and reduce reliance on illegal wildlife products, the project will provide a regular supply of alternative protein sources (e.g., poultry, beef, or fish from certified suppliers) in the workers' canteens.
- The explicit inclusion of these prohibitions in the Code of Conduct, with all staff required to acknowledge and adhere to them.

4.8.2.6. COLLABORATION WITH AFRICAN PARKS TO INCREASE SURVEILLANCE AND SET UP ANTI-POACHING PATROLS

Context

The anticipated influx of workers and associated activities during the construction phase poses a significant risk of increased poaching and wildlife crime in the project area. The site lies in close proximity to the Majete Wildlife Reserve (MWR), a well-established conservation area known to support a variety of threatened and ecologically important species. In addition, the project footprint itself includes potential habitats for large herbivores, hippopotamuses, reptiles, and other species that may attract illegal hunting or collection.

The presence of a non-resident workforce, combined with the increased movement of people, vehicles, and equipment, can lead to greater human-wildlife interactions and opportunities for illicit activities such as bushmeat hunting.

The proposed measure aims to create a protective buffer around the construction influence area, making sure that construction activities do not contribute, directly or indirectly, to the decline of local wildlife populations.

Content

To strengthen enforcement, the contractor will coordinate closely with the Department of National Parks and Wildlife (DNPW) and conservation partners such as African Parks, which manages the Majete Wildlife Reserve. This collaboration will involve joint planning of surveillance operations and the establishment of anti-poaching patrols in strategic areas, especially along riparian corridors and access roads where risks of illegal wildlife trafficking may be higher.

The ESMP for the SVTP proposed additional DNPW personnel during construction to increase patrol and law enforcement efforts during the construction phase, as well as training for workers. The Contractor will maintain this measure for the Kapichira rehabilitation works considering the following:

- Regular patrols must be conducted in drainage lines and surrounding woodlands near camps and work zones to detect signs of illegal wildlife trapping or snaring.
- Regular monitoring and disciplinary controls should be implemented to prevent staff from engaging in hunting or purchasing bushmeat.
- All incidents and findings must be documented in Wildlife Tracker for follow-up actions.
- A confidential reporting mechanism will be set up, allowing workers or community members to report suspected wildlife crime without fear of retaliation. A strict non-retaliation policy will be enforced. Any attempt to intimidate or retaliate against a whistleblower will lead to disciplinary action.

African Parks will be involved in implementing this measure. To enable regular patrols during construction activities, the Employer will hire two additional rangers to join the Majete staff.

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4.8.2.7. RESTRICTION OF IN-WATER CONSTRUCTION ACTIVITIES

In-water construction activities, such as the works on the training dyke, will be restricted to low-flow seasons, typically during dry periods when river levels are stable, and fish are less likely to be spawning. This will help minimize the disturbance to aquatic life, particularly fish species that rely on the river's ecosystem for reproduction. By scheduling high-impact activities during these less-sensitive periods, the risk of disrupting critical fish spawning habitats and migration routes will be significantly reduced.

4.8.2.8. MINIMIZATION OF LAND CLEARING

Context

The area required for dam construction activities has already been cleared up for the SVTP construction activities. The construction area for the Kapichira dam rehabilitation will not exceed the perimeter used for the SVTP in order to avoid habitat loss.

According to the preliminary design, activities of land clearing are planned at the campsite and the quarry site:

- In the quarry site, the natural vegetation cover is composed of open deciduous forest. Along the Mimvunza River, some mature trees are standing and encourage natural regeneration to go on.
- In the camp site, habitats are highly anthropized due to charcoal and timber activities.

Content

The contractor must implement the following restrictions:

- No land clearing and habitat loss will be allowed within the dam construction area.
- To prevent any land clearing, “No land clearing” warning signs must be installed at the dam construction area.
- In all the construction areas, the Contractor must avoid any destruction of ecologically sensitive areas such as wetlands (including marshes and both natural or artificial water bodies). These wetlands are limited to seasonal tributaries and temporary pools near the embankment dam. The filling of all or part of such areas is strictly prohibited, unless explicitly required by the Contract or instructed by the Employer.

Specific measures to protect the trees in the quarry and its access road as well in the temporary campsite areas

The contractor must defend areas or plants that are identified in the 2025 ESIA. These areas will be strictly prohibited from access, cutting or destruction.

The construction schedule will be staggered in ecologically critical zones to allow gradual adaptation by local wildlife. Land clearing in quarry and camp sites will be conducted in phased segments rather than across large continuous areas. This phased approach gives wildlife time to move away from active work zones and reduces the likelihood of sudden habitat loss or entrapment.

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Quarry site

In this case, the aim of the measure is to reduce unnecessary cutting down of trees, especially along the Mimvunza River. A tree protection system will be implemented during the construction phase to forbid any land clearing of pre identified mature trees along the river.

A tree protection system is a fence that is set up near trees during construction to prevent the ground from becoming compacted and to protect the trees from potential mechanical damage. The system must include the structural root zone.

➔ *In theory, the distance between the fence and the tree should be equal to the diameter of the tree at breast height multiplied by 12.*

The Contractor will engage an ecologist to determine the exact location of the tree protection system and estimate the required distance and length for the fence. This will be determined during the pre-construction surveys at the quarry site. This survey is described in section 5.5.2.2. about surveys program. If a felled tree is suspected of hosting a bat roost, the tree must remain in place overnight before any removal. This allows time for bats to disperse naturally.

- The measure must be implemented before any other materials and machinery present onsite.
- The fence can't be removed or altered throughout the entire construction phase.
- No vehicular and pedestrian access, no excavation activities are allowed in the protection area.
- No storage or dumping of tools, equipment, or waste are allowed in the protection area.
- A signage must be implemented stating "Protection tree area – No Entry".
- The fence has to be permeable for the small fauna (amphibians, small mammals) as presented on the following figure.
- Before installing fencing, conduct a pre-clearance check that no threatened or large wildlife species are at risk of becoming trapped.
- Log any notable wildlife presence or interventions.



Figure 4-1: Example of a tree protection system

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Camp site and quarry site

Following the surveys described in Section 5.5.2.2, the conservation priority plant species will be identified and mapped.

In response, the contractor must mark physically and protect the species on site.

Regarding the need to clear land for worksite activities, the plants will be under integral protection, either through transplantation or storage in a nursery.

The nurseries will be identified with the Forestry Research Institute of Malawi.

Access road to quarry site

During the planning of the access road, the contractor will be required to adapt the design in order to minimize tree cutting (including the bridge area and the road to the quarry site). Given that the habitats along the proposed alignment are well conserved, the road layout must be carefully reviewed in collaboration with an ecologist with a strong knowledge of Malawi's habitats.

This approach will make sure that habitat losses are reduced to the greatest extent possible and that the ecological integrity of the area is maintained.

N.B.: The contractor must optimize the road layout to minimize biodiversity impacts, particularly by avoiding fragmentation of natural habitats. The road alignment remains flexible and may be significantly adjusted during detailed design to maintain ecological compatibility.

4.8.2.9. CONTROL OF INVASIVE ALIEN SPECIES SPREAD

Context

The project area along the Shire River - including the riparian thickets, gallery forests, and associated floodplain habitats - faces significant pressure from Invasive Alien Species, both terrestrial and aquatic.

In the dam area, on both the eastern and western banks, several invasive terrestrial plant species have been recorded, with a high presence of *Xanthium strumarium*, *Lantana camara*, and *Calotropis procera*. These species are known for their ability to rapidly colonize disturbed environments, particularly construction zones, to the detriment of native flora. *Lantana camara* has already been observed on the direct footprint area itself, indicating a risk of early spread from the initial phases of the project. Although no aquatic invasive species have been reported in the immediate vicinity of the dam, their presence upstream/ downstream highlights the need for targeted preventive measures.

The management of these species should be integrated from the outset of the works to prevent their proliferation and safeguard the integrity of local ecosystems.

Content

In response, the contractor will implement a comprehensive invasive species management strategy built around prevention, early detection, and rapid response. The approach will include regular ecological monitoring, strict biosecurity protocols, and targeted habitat restoration. These measures will be supported by flexible, on-site management practices. The goal is to establish a strong and adaptable system for controlling invasive species throughout the project.

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- **Biosecurity protocols**

To prevent the unintentional introduction and spread of Invasive Arien Species, strict biosecurity protocols will be implemented at all entry points to the construction area. These protocols will apply to all vehicles, machinery, tools, and construction materials entering or exiting the site.

Sections 4.7.2.10 and 5.5.2.2 describe the training and surveys needed for this measure.

The Constructor will be responsible for developing detailed biosecurity protocols. These will include routine inspections and verification of compliance, as well as proper record-keeping of all vehicle and equipment washdowns.

- Cleaning and disinfection procedures: Mandatory cleaning and disinfection will be required for all vehicles and equipment at the following stages:
  - Before export from the country of origin (if so).
  - Upon arrival in Malawi.
  - Upon arrival at the construction influence area.
- Wash bay infrastructure and procedures:
  - A dedicated wash bay will be constructed at the site, draining into a controlled collection pond to contain contaminants.
  - All construction machinery must be thoroughly cleaned, both internally and externally, at this wash bay prior to site entry.
  - Vehicles and equipment must be free from soil, mud, plant material, and any visible dirt that could harbour invasive plant seeds or aquatic propagules.
- Specific measures for earthworks and intra-site movement:
  - Vehicles used for earthworks will be washed upon arrival at the site and again before being moved between different work areas, to avoid cross-contamination.
- Material control
  - All materials used for construction, especially soil, gravel, and embankment reinforcement, must be certified weed-free to minimize the risk of introducing invasive plant species.

- **Removal program**

Where alien invasive plant species are identified (as outlined in Section 4.7.2.10 on training programs), a targeted removal strategy will be promptly implemented. This may include manual uprooting or mechanical extraction, with particular attention to aquatic invasive species such as *Eichhornia crassipes* (water hyacinth), which can block water channels and disrupt turbine operation if left unmanaged.

The approach will be guided by internationally and nationally recognized invasive species frameworks, including the *Global Register of Introduced and Invasive Species* and the *2021 Guide to the Naturalized and Invasive Plants of Malawi and Zambia*.

In addition, coordination with African Parks, the managing authority of the nearby Majete Wildlife Reserve, will make sure alignment with ongoing conservation priorities and support integrated landscape-level management.

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Any presence of invasive plant species must be addressed within 24 hours. Control measures include hand-pulling, digging, slashing, mulching, mowing, or other environmentally responsible techniques. All removed plant material shall be immediately bagged or transported in enclosed or covered vehicles to prevent the dispersal of seeds and must be disposed of at an approved waste site or incinerated where feasible.

Control methods must not result in secondary environmental or social impacts. The use of herbicides is strictly prohibited unless expressly authorized by the Employer.

The removal program will be performed in the direct footprint area, in the camp site and in the quarry site.

4.8.2.10. TRAININGS PROGRAM

Context

This program is related to awareness campaigns needed to prevent and reduce the risk of impact during the construction phase. The Contractor must implement the training for all workers and staff present on-site in the construction influence area.

This program aims to guarantee that the contractor provides environmental education and awareness training for workers and visitors within the construction area.

These sessions will be tailored to different staff categories, including drivers, machine operators and subcontractors, and will provide practical guidance. EGENCO residential staff could be included in this training program

Content of the program

The training must be conducted using a Sensitive Species Handbook for identifying the species at stake. This handbook will provide photographs of species of conservation concern or interest and information on what to do if such an animal or plant is found.

The training will be conducted by the Environmental Officer or any relevant African Parks staff expert's supervision with the following frequency:

- Mandatory initial session for all staff at the start of their contract (once at the start of the project).
- Quarterly refresher sessions for existing staff (four per year for two years).
- Monthly induction sessions for new workers (at least once per month).
- Ad hoc specific sessions in case of incidents or emerging risks (approx. one per semester).

The target audience will include all the workers, including new arrivals (staff rotation) and personnel from subcontractors.

The estimated total of training is 35 to 40 sessions during the construction phase.

Habitat Management training

Targeted awareness programs must be implemented to promote responsible behavior and support the conservation of natural habitats in and around the construction sites.

These training sessions must focus on raising awareness of the following themes:

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- Responsible interaction with surrounding natural environments:
  - No disturbance to natural habitats outside the working areas, including the direct footprint area, the areas near the MWR, and the trees in the quarry site that are part of the protection system.
  - No collecting of flora species is allowed while working on the construction influence area
  - Protect excavations with temporary fencing
- Reducing human pressures on remaining vegetation patches:
  - Do not engage in or support charcoal production or use, including collecting or purchasing charcoal
  - Strictly prohibit activities that may lead to forest fires, such as open burning

Wildlife Conservation training

Visit tour of the Majete Wildlife Reserve

The Contractor will organise and finance the entrance fee for the Contractor's employees on site in coordination with African Parks. It will be an opportunity for African Parks to raise awareness about the conservation of habitats and species during the tour.

Targeted awareness programs must be implemented to promote responsible behavior and support the conservation of Wildlife fauna in the construction influence area, especially given the proximity of the MWR and the presence of wildlife in the direct footprint area.

These training sessions must focus on raising awareness of wildlife protection and the associated risks of disturbance, mortality and conflict relating to the following themes:

- Focus on national wildlife protection laws.
- Focus on the ecological value of the species found in the construction influence area, especially those from the nearby Majete Wildlife Reserve (species of conservation concern) and critical habitat triggering species.
- Prioritize conservation efforts during peak periods of species activity in the wet season (according to breeding periods and migratory phases for birds).Focus on prohibited activities:
  - No fishing in rivers, streams or ponds.
  - No collecting or keeping wild animal products for personal use or sale.
  - No approaching, injuring, hunting, capturing, possessing, feeding, transporting, rearing or trading wild animals and/or collecting any eggs while working in the construction influence area.
- Focus on the legal and ethical consequences of wildlife crime.
- Focus on how to recognize and report illegal activities.
- Focus on how to report any wildlife conflicts:
  - Sightings or findings of dead wildlife to the employer.
  - Observations of injured animals, including those injured by the Contractor's personnel or subcontractors, must be reported to the employer.
- Focus on how to use the Wildlife tracker.
- Focus on using designated roads or paths and respecting speed limits.

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- Focus on the animal rescue procedure (this includes alerting the animal rescue team).

Training about the risk of loss of aquatic habitat and mortality

Targeted training sessions will be provided to construction workers and site supervisors, to raise awareness of the potential impacts of project activities on aquatic ecosystems and good practice guidelines to follow.

These sessions will focus on:

- How activities such as sediment runoff, accidental pollution, and in-stream construction can lead to the degradation of aquatic habitats and the direct mortality of fish and other aquatic fauna.
- Guidance on preventive measures, such as sediment control structures, emergency spill response, and best practices for working near water bodies.
- Emphasis will be placed on the importance of protecting sensitive species and maintaining the ecological integrity of the Shire River and its tributaries throughout the construction phase.

Training about the risk of invasive alien species spreading

Targeted training sessions will be provided to construction workers and site supervisors, to raise awareness of the potential impacts of invasive exotic species on ecosystems and good practice guidelines to follow.

- Awareness on Invasive Alien Species identification and management: Targeted training sessions will be conducted to raise awareness among workers about the identification, monitoring, and eradication of invasive alien species.
- These sessions will include visual documentation to support recognition in the field, and the materials will be compiled in the Sensitive Species Handbook provided to all relevant personnel.
- Specialized training for vegetation clearing teams: The vegetation management team will receive dedicated training focused on
    - Recognizing common invasive species in the area; appropriate control methods, including the selection, safe handling, application, and storage of herbicides.
    - Cleaning and decontamination procedures for tools and machinery to prevent the spread of Invasive Alien Species.
    - Accurate and consistent record keeping related to Invasive Alien Species management activities.

4.8.3. Implementation modalities and budget

The Contractor will recruit one (or more) full-time on-site Environmental Officer(s) with relevant ecological experience, including in wildlife management, for the duration of the Works.

- The environmental officer shall be trained to identify local sensitive species as well as alien invasive species.
- The environmental officer should be able to train designated personnel on specific topics.

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- The environmental officer will be included in the design of road access to the quarry site, as well as the design of the minimization measures needed in the temporary sites to avoid or reduce the number of trees cut down.
- The environmental officer should collaborate with African Parks to implement anti-poaching measures, control invasive species, and develop a training program.

A steering committee involving the Contractor(s) and the Majete WR management will be established and will meet regularly to engage and resolve wildlife and biodiversity related issues. The Contractor shall designate one of its E&S Team members, preferably the Environmental Manager, to participate to this steering committee.

The costs should be included in the contractor's cost.

sub-plan	Activities	Responsible for the execution	Period of execution	Cost
CP6	Construction Biodiversity Management Plan	Contractor	During the entire construction period	Included in the contractor's cost

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4.9. CP7 – Traffic and Road Safety Management Plan

4.9.1. Justification and objectives of the plan

The objective of this plan is to allow the safe movement and interaction of construction vehicles along transport routes, pedestrians, bicycles, motorcycles and other traffic. The area to consider is all the road used for the construction activities until the main district tarmac road (M1 at Chikwawa).

The potential presence of wildlife will be taken as well into consideration.

The Traffic and Road Safety Management Plan must comply with EGENCO traffic safety management plan for project, operations and maintenance works at power stations, Malawi policy and legislation, the World Bank ESS4 about Community Health and Safety and the World Bank Group Environmental, Health, and Safety Guidelines.

This plan aims to mitigate the following impacts:

Impact	Type of environment	Importance before mitigation measures
Disturbance of wildlife and risk of mortality	Biological	**Moderate**
Risk of human - wildlife conflict	Biological, Human	**Moderate**
Disturbance of local communities	Human	Minor
Health and safety risks for workers	Human	Minor

4.9.2. Measures description

The Contractor must implement a traffic and road safety management plan considering the location of sensitive socio-economic infrastructures like schools and the safety of communities if they are threatened by the movement of machinery to the construction site.

This plan also concerns the speed limits and dust/emission disturbance by construction traffic.

4.9.2.1. DEVELOP SAFE DRIVING BEHAVIORS

To develop traffic and road safety during transportation activities, the Contractor must implement measures related to safe driving practices, including the following:

- Training and raising awareness of every driver on driving behaviours and safety on the road, especially considering the presence of local communities on the project roads and tracks. The training should focus on hazard anticipation, safe speed, safe overtaking, and driver awareness of pedestrians, cyclists, and wildlife.
- Implementation of a vehicle tracking system such as In-vehicle Monitoring System on the Contractor's vehicles to monitor driver' driving safety behavior in order to identify hazardous driver activities and implement corrective actions.

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- Check all drivers and operators involved in project transportation activities possess a valid license or certification from an approved authority and are competent and adequately trained in driving the vehicle for which they are responsible.
- No transport of people except the relevant workers due to their work activities for the project and with the approval of the supervisor.
- Implement fatigue management measures, avoidance of driving at night, maximum allowed driving hours, and rest periods.
- Implement Zero Tolerance for Alcohol or Drug Use while driving, including regular testing of drivers to verify compliance.
- Prohibit the use of project vehicles or trucks to pick up and transport workers, unless that vehicle has been specifically tasked for the transport of workers and is provided with seats and safety belts for all riders.
- Implement periodic community road-safety campaigns near schools and populated areas in coordination with the Employer.

4.9.2.2. RESTRICTIVE MEASURES ON ROADS

To assure the traffic and road safety, the Contractor must apply restrictive measures concerning the machinery such as:

- Check that the access roads for the construction works do not represent any safety risks for the general public.
- Set up the speed limit and adapt it depending on the vehicles. Mostly, the speed limit of the vehicles must be limited to:
  - 15 km/h in the dam construction site and the quarry site area.
  - 30 km/h through and close to the villages or sensitive infrastructures.
  - 40 km/h on unpaved surfaces.
  - 60 km/h on concrete roads.
- Take preventive actions to address hazardous weather conditions such as temporary driving restrictions in extreme weather conditions or hazardous situations, guided by weather forecasts.
- Install signage and implement speed control and law enforcement measures for road safety and to reduce collision risks to wildlife, especially along T416 road and on the road between the dam construction site and the quarry site.
  - speed bumps must be installed along the access road, at least two (2) in the road to the quarry site and five (5) along the road to the entry of the direct footprint area.
  - check the presence or install at least four (4) traffic signs along the road: two (2) traffic signs along the road to the construction site and two (2) traffic signs to the access road to the quarry site.
  - check the presence or install 'Beware of Wildlife' warning signs at several points along the fence with the Majete Wildlife Reserve to raise workers' awareness of wildlife disturbance, including at least three (3) warning signs at the entry of the dam construction site; along the fence near the training dyke and along the road access et the dam construction site.
- Maintain all vehicles in accordance with manufacturers requirements and verify the safe operating condition. Vehicles shall be fitted with flashing beacons and reversing alarms.

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- Set up a checking system: Before operation, all vehicles and mobile equipment must undergo pre-operational safety checks by the driver or operator. These checks will assure that all safety features - including headlights - are functioning properly, especially when work is scheduled during early hours of darkness.
- Report all transport-related incidents to the Employer.
- Maintain signage and speed-calming measures to sustain safety improvements beyond construction.

4.9.2.3. CONTROL THE MOVEMENT OF WORKERS

As implemented in the ESMP for the SVTP Phase I, the displacement of workers will be managed during the Kapichira rehabilitation works as follows.

- Ban for workers to spend the night in the dam construction area and at rangers' compounds.
- Set up an identification badge of workers as mandatory at entrance and exit of the dam construction site area, quarry site area and temporary campsite (including daily workers). Workers without a badge will be forbidden to enter the restricted area.
- Ban construction activities, vehicular movement and worker access in the Majete Wildlife Reserve
- Limit the operating hours from 9am to 5pm.

Security personnel will be deployed to guarantee full compliance with access restrictions. Indeed, the Contractor private security services will be deployed at the main road entrance in the direct footprint area and must be aware of the Code of Conduct of the Contractor.

4.9.3. Implementation modalities and budget

This plan must be detailed in the contractor's environmental management plan before the start of the work.

Plan	Activities	Responsible for the execution	Period of execution	Cost
CP7	Traffic and road Safety Management Plan	Contractor	During the entire construction period	Included in the contractor's cost

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4.10. CP8 – Community health and safety management plan

4.10.1. Justification and objectives of the plan

The Contractor must implement a Community Health and Safety Plan to avoid any safety risks for the general public.

The Community Health, Safety and Security Management Plan must comply with EGENCO policy, Malawi legislation, the World Bank ESS4 about Community Health and Safety and the World Bank Group Environmental, Health, and Safety Guidelines.

This plan aims to mitigate the following impacts:

Impact	Type of environment	Importance before mitigation measures
Spontaneous migration	Human	Minor
Disturbance of local communities	Human	Minor
Risk of violence based on gender	Human	**Moderate**

4.10.2. Measures description

4.10.2.1. GENERAL SITE SAFETY AND PUBLIC INCIDENT REPORTING

The Contractor shall demarcate the working areas (including borrow pits) by warning signs, and control the access, to avoid any accident. A specific attention should be taken on the access roads access in order to avoid blocking accesses to any public infrastructures or equipment.

The Contractor must inform the Employer within one hour of any accident involving serious bodily injury to any third party, caused by the execution of the works or the behaviour of the personnel of the Contractor.

The Contractor must inform the Employer as soon as possible of any near accident relating to the execution of the works which, in slightly different conditions, could have led to bodily injury to people, or damage to private property or the environment.

During the construction phase, public access to the dam construction area will be forbidden including the river reach where the works are performed for safety reasons. This access restriction will be enforced by the Contractor through a permanent security control.

4.10.2.2. GENERAL COMMUNITY HEALTH AND SAFETY

The contractor should avoid any disturbance to the communities by the following measures:

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- Identify and manage the source of air emissions and dust production resulting from the construction activities, including traffic along the access roads, to avoid any disturbances to the local communities (considering public infrastructures such as schools).
- Check consistency between the blasting risk assessment and the blast design and loading that will be implemented and check that no households are located at a distance that could expose them to safety issues and dust.
- Review the vegetation clearing plan and check on site that the temporary campsite, borrow site, batching plan area, quarry site and disposal area or any construction worksites are physically demarcated on the ground. Local communities are used to walk in the area and collect timber for charcoal.
- Respect local customs.
- High-noise activities, such as blasting, excavation, and operation of heavy machinery, should be avoided during the night to respect the community's rest.
- Prevent and avoid any case of gender-based violence, sexual exploitation and abuse and sexual harassment amount the communities due to the presence of workers.

4.10.2.3. SUPPORT TO EMPLOYER'S COMMUNITY HEALTH AND SAFETY PLAN

The Contractor will be requested to participate to the implementation of some of the Employer's activities linked to health and safety, in particular the awareness campaign with local communities.

Any initiative the Contractor will want to take on the topic of Community health and safety that is not covered by the Employer Community health and safety plan (see EP1 plan in the following chapter 5.2) shall be submitted to the Employer for approval before being organized.

4.10.2.4. MANAGEMENT OF STAKEHOLDER ENGAGEMENT PLAN INCLUDING GRIEVANCE REDRESS MECHANISM

As a general principle, the Contractor shall not disturb or interfere with the inhabitants of local communities close to or in the construction influence area, and shall respect their houses, crops, animals, properties, customs and cultural practices.

The Contractor shall maintain good community relations and make sure that its workforce is committed to respect those principles through the integration of requirements in the Code of Conduct and Rules of Procedures (see CP1 – Labour Management Plan).

A Stakeholder Engagement Plan was developed for the project Malawi Emergency Power Restoration Project" in May 2022, in compliance with both local regulatory requirements, the Bank's ESSs and international best practices.

In addition to the SEP implemented by EGENCO (See Appendix A), the Contractor shall prepare and implement its own Stakeholder Engagement Plan, fully aligned with the Client's SEP, to maintain continuous, structured and proactive engagement with project stakeholders throughout the construction period.

The Contractor's SEP must include a stand-alone Grievance Redress Mechanism considering the one already used in the construction influence area.

The Contractor's GRM shall meet the following requirements:

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- Free of charge for all users.
- Accessible to all stakeholders without discrimination.
- Culturally appropriate and sensitive to gender, disabilities, literacy levels and local languages.
- Provide multiple entry points (phone, SMS/WhatsApp, in-person boxes, focal points, community liaison officers, email).
- Transparent, with a verifiable recordkeeping system.
- Provide timely acknowledgment, assessment, and resolution of complaints.
- Guarantee confidentiality and protect complainants from retaliation at all times.

4.10.2.5. MANAGEMENT OF PROJECT-INDUCED IN-MIGRATION

The Contractor must prevent social influxes through local recruitment and workers' rotation practices. To do so, the Contractor must apply the measures defined in the labour management plan and must liaise with the Employer and local authorities to limit the development and installation of a population resulting from spontaneous migration around the Project area.

4.10.3. Implementation modalities and budget

This sub-plan must be detailed in the contractor's environmental management plan before the start of the work.

Program	Activities	Responsible for the execution	Period of execution	Cost
CP8	Community health, safety and security Plan	Contractor	During the entire construction period	Included in the contractor's cost

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4.11. CP9 – Cultural heritage management plan

4.11.1. Justification and objectives of the plan

An archaeological and paleontological assessment was carried out by the Department of Museums and Monuments for the Kapichira Dam rehabilitation project in 2022. The conclusions of the paleontological study revealed that the direct footprint area is endowed with paleontological fossils from the Jurassic period (fossils in form of fossilized wood, fossilized snails and bones). Consequently, the contractor must be aware of the possibility of finding fossils in the construction area during excavation.

The construction phase can cause a risk of damage to the cultural heritage by uncovering archaeological artefacts such as graves, cultural objects, fossils and other paleontological artefacts. This risk is mainly due to the excavation work on the quarry site for example. Consequently, the cultural heritage management plan will include a chance finds procedure.

Moreover, construction activities can cause a risk of damage to cultural heritage by damaging cultural sites (historical site at Maganga 1, community church at the vicinity of the quarry site). Consequently, the cultural heritage management plan will include all the measures required to consider any cultural site in the construction area and its vicinity.

The Cultural Heritage Management Plan must comply with EGENCO policy (such as the Chance Find and Cultural Heritage Management Plan), Malawi policy and legislation (such as the Monuments and Relics Act), the World Bank ESS8 about Cultural Heritage and the World Bank Group Environmental, Health, and Safety Guidelines.

This plan aims to mitigate the following impacts:

Impact	Type of environment	Importance before mitigation measures
Risk of damage on the cultural heritage	Human	**Moderate**

4.11.2. Measures description

The Contractor is required to implement a Cultural Heritage Management Plan which includes detailed chance find procedures based on the below requirements.

The plan should be compliant with national law as well as the World Bank ESS 8 - "Cultural Heritage". The chance finds procedure must be compliant with the Department of Museums and Monuments requirements.

4.11.2.1. CHANCE FINDS PROCEDURE

Due to the paleontological heritage context, the Contractor will provide training in paleontological/archeological heritage management by the department of museums and monuments to the pertinent employees, especially people in charge of excavation or site clearance. The training will train the Contractor's personnel on the Chance Finds Procedure for reporting the discovery to supervisory personnel. A sensibilization to the contractor's personnel will be provided on the importance of preserving the cultural

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heritage of Malawi, and on the procedure to follow in the event of accidental discovery of an element of cultural heritage. The training will make it clear that any artifacts discovered are the property of Malawi, and after recording, analysis, and cataloguing that they will be prepared for curation at a national institution.

The chance finds procedures must outline the steps to be taken if cultural or archaeological materials are discovered unexpectedly. This includes:

- Immediate cessation of work in the vicinity of the finds.
- Notification to the supervising staff. The finds should be treated as a cultural heritage incident and reported.
- Protection of the finds site until proper evaluation and documentation are completed. The Contractor shall be responsible of the protection of the artefacts from thefts and will place security personnel on the discovery site.
- Notify the employer and the experts in the Malawi Department of Museums and Monuments in the case of any archaeological or paleontological finds.
- Not touch or move the findings before the expertise evaluation. The results of the archaeologist investigation will be communicated to the Contractor and the Employer. The Malawi Department of Museums and Monuments will then give instructions on how to proceed with this archeological find.

4.11.2.2. PROTECTION OF ANY CULTURAL HERITAGE SITE

A special attention will be taken to avoid damage or loss to any cultural heritage site of importance for the communities in the vicinity of the construction activities such as sacred sites, cemeteries, cultural sites (see chapter 5.4.4.5 of the volume I).

In particular, the Richard Thornton grave at Maganga 1 and the community church at the vicinity of the road access to the quarry site should be taken into consideration to avoid any damage. The contractor will provide the necessary protection measures.

Consequently, the cultural heritage management plan will include all the measures required to consider any cultural site in the construction area and its vicinity.

4.11.2.3. INCEPTION CEREMONY AT THE START OF THE CONSTRUCTION ACTIVITIES

In order to consider the cultural behaviour of the communities, the Contractor will support a community's cultural ceremony at the start of the works. The Contractor will require the assistance of the employee to organise such ceremony with the communities' representatives.

The Contractor will sensitize all project personnel (especially employees who do not come from the Project area) to respect the culture, traditions and lifestyle of the local populations, through information sessions. The code of conduct that applies to all employees must also encourage respect for local customs within the temporary construction camp as well during construction activities.

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4.11.3. Implementation modalities and budget

This sub-plan must be detailed in the contractor's environmental management plan before the start of the work.

Program	Activities	Responsible for the execution	Period of execution	Cost
CP9	Cultural Heritage Management Plan	Contractor	During the entire construction period	Included in the contractor's cost

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4.12. CP10 – Workplace Occupational Health, Safety and Security Management Plan

4.12.1. Justification and objectives of the plan

All workers could be exposed to accidents at the worksite or during travel. However, implementation of suitable health and safety procedures should help prevent or reduce the probability of accidents from occurring.

The Workplace Occupational Health, Safety and Security Management Plan must comply with EGENCO Occupational Health, Safety and Welfare policy, Malawi policy and legislation (such as the last.Occupational Safety, Health and Welfare Act), the World Bank ESS2 about labor and Working Conditions and the World Bank Group Environmental, Health, and Safety Guidelines.

This plan aims to mitigate the following impacts:

Impact	Type of environment	Importance before mitigation measures
Health and safety risks for workers	Human	Minor
Risk of violence based on gender	Human	**Moderate**

4.12.2. Measures description

4.12.2.1. GENERAL REQUIREMENTS

The Contractor must provide and apply a workplace occupational Health, Safety and Security (HSS) management plan before starting any activity on site. The plan includes inter alia, emergency preparedness and response measures, working in mud, scaffolding, working at heights and explosives management as well as the presence of wildlife in the vicinity of the construction area.

Some specific activities, such as the removal of the cemented soil dam, the rehabilitation of the intake area and the construction area rehabilitation activities, must be detailed about the consideration of HSS aspects by the Contractor before starting the task.

The Workplace Occupational Health, Safety and Security Management Plan will comply with the national requirements as well as with the World Bank Environmental and Social Standards ESS2, which is related to labor and working conditions. It will consider the following requirements.

4.12.2.2. WORKFORCE HEALTH REQUIREMENTS

The Contractor is responsible for implementing systems and protocols to maintain appropriate levels of occupational health on the Project. Work areas must be kept free from health hazards. The Contractor shall guarantee the continuous welfare of its employees by implementing the following provisions.

To mitigate any health issues for workers, the Contractor must at least:

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- Implement systems and protocols to maintain appropriate levels of occupational health on the Project. Work areas must be kept free from health hazards.
- Establish and maintain a culture of health and hygiene through continuous training and education, empowering workers to recognize early symptoms and practice safe work habits. Both the physical and psychological aspects of the work environment shall be addressed to minimize the risk of work-related illnesses.
- Develop health service capacity before any construction activities at site, providing for routine care of employees at the site and for emergency care of any person involved in an accident on site, considering that referral into the local public health sector is limited for work related conditions as well as for primary health conditions for the non-local workforce.
- Coordinate with approved hospitals and clinics in Blantyre to handle cases requiring advanced treatments, including surgeries, and other specialized medical services. Patients will be transferred to regional or international hospitals after initial treatment or stabilization at the constructor health service.
- Allocate or procure appropriate means of transportation (road and/or air) for first aid purposes. Assure the presence of an ambulance on site (with the properly stocked necessary emergency equipment), first aid kits / facilities and that a trained first aider is in place.
- Take a proactive approach to prevent work-related illnesses by identifying and mitigating workplace hazards. This includes conducting regular risk assessments, providing appropriate personal protective equipment (PPE), and checking that workspaces meet all health and safety standards.
- Provide a sufficient quantity and quality of water for the workers with protection of supply sources. If possible, provide the campsite with separate water tanks, transport facilities and other social and workshop amenities.
- Arrange different types of meals to consider the cultural differences of the workers. The food should also be prepared according to cultural values.
- Enforce an alcohol and drug free policy in the workplace.
- Provide hygienic living conditions for workers, including clean and well-maintained accommodations, dining and kitchen facilities, and ablution and sanitation facilities.
- Arrange a medical examination for each employee to assess their physical fitness.
- Provide a HIV/AIDS and Infectious/Communicable Diseases Prevention Plan including:
  - the implementation of comprehensive measures to prevent the spread of diseases, such as malaria, cholera, COVID and HIV/Aids. This includes mosquito control programs, the provision of insecticide-treated bed nets, and checking clean water and sanitation practices to prevent cholera outbreaks as well as sensibilization program.
  - The development and implementation of workplace measures that specifically target HIV/AIDS and STI and include: (i) Awareness and education campaigns, (ii) Condom distribution programs, (iii) Screening, diagnosis and treatment, (iv) HIV/AIDS and STI policy, (v) Outbreak preparedness and response, and (vi) Surveillance and monitoring.
- Develop and implement an effective snake management procedure including awareness of risks with the clearing of bush in construction, including appropriate protective clothing. Procedures will include training and provision of equipment for the handling of snakes (for safe removal/relocation as required), immediate first aid measures in the field and medical protocols in the workplace medical service on the initial management and referral for snake bites.

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- Include extreme weather protocols in the Contractor's HSS plan, designed to protect personnel, equipment, and operations during severe weather conditions such as storms, extreme heat or cold, heavy rain, or high winds.

4.12.2.3. WORKFORCE SAFETY REQUIREMENTS

To assure the safety of the workers on the construction site, the Contractor must at least:

- Provide adequate personal protective equipment (PPE) adapted to each worker (women and men / size) according to their work activity. An adequate stock of PPE must be maintained at all times to guarantee availability for all workers.
- Assure equal safety conditions for both men and women.
- Implement working at height and fall protection requirements, mechanical handling, lifting, and rigging protocols, excavation and earth-movement safety requirements, fire prevention and hot work activities procedures.
- Check that pre-work risk assessments, such as Job Safety Analysis, are performed by competent personnel before commencing work activities. After this analysis, implement a robust "Permit to Work" system to control general site activities and hazardous tasks considering as well the works within Majete Wildlife Reserve. Each permit must clearly outline the scope of work, identify potential hazards, and specify the necessary control measures and PPE requirements. Hazardous work activities include, but may not be limited to:
  - Working at height
  - Working with hazardous energy (lock-out-tag-out), temporary and permanent electrical installations and safe interventions
  - Work on systems containing flammable liquid or gas under pressure
  - Hot work, blasting or working with explosives (such as at the quarry site)
  - Work in or close to waterbodies
  - Work in the Majete Wildlife Reserve area
  - Working in confined spaces
  - Work exposed to geological hazards (e.g. unstable slopes, rock falls),
  - Lifting and rigging operations
  - Excavation activities
  - Demolition activities
  - Simultaneous operations of multiple subcontractor activities
  - System testing
  - Commissioning activities.
- Prepare an emergency plan in case of accidents (fire, security, medical, environmental) and assure that all accidents are reported to the employee.
- Implement a code of conduct for all individuals involved in this project (workers, contractors, security services, etc.) that they must sign and understand.
- Undertake workplace inspections.

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4.12.2.4. WORKFORCE SECURITY REQUIREMENTS

For the security of the workers on the construction site including the temporary camp, the Contractor must provide a Security Management Plan considering the below requirements:

- Implement relevant security measures based on the risk assessment, the scope of work and the Employer's project security requirements.
- Provide a secured environment for all areas under the responsibility of the Contractor, including the temporary campsite which must be fenced off.
- Employ the services from an Employer approved Private Security Company to secure the Contractor's responsible areas, equipment, and workforce.
- Assure that security personnel are familiar with the project site layout, receive applicable training such as human rights training and wildlife awareness and are competent in the Project emergency protocols.
- Assure that security personnel are aware about the role and responsibility of African Parks for all the aspects relative to wildlife.
- Request each security worker to sign a Code of Conduct which underlines its obligations, the respect due to local communities and the conditions in which they will be exposed to sanctions.
- Assure security guards will not be armed.
- Provide the security of the construction site 24/7 to prevent residents' circulation, animal staying and potential malicious acts (e.g. by always having the gates manned).
- Set up coordination with the local police to manage security issues and criminality resulting from the project.

4.12.2.5. WORKER CAMP MANAGEMENT PLAN REQUIREMENTS

The Contractor shall provide a worker camp management on the temporary camp site acquired by EGENCO and located 4 km from Kapichira dam along the main T416 road, 1km from Maganga 1 village.

The Contractor should consider the following requirements to set up the camp:

- The temporary camp site must be fenced off, considering the above security requirements;
- Protect and delimit a buffer zone along the riverbank on the north of the temporary campsite;
- The land must be adequately drained, taking into account the topography of the site and the rainy season to prevent water accumulation (where mosquitoes can breed);
- Potable water may be produced by dedicated catchment and treatment facilities;
- Design, build and manage accommodation, camp facilities to prevent rodents and other pests such as snakes from gaining access to accommodation, kitchens and food/water storage areas. Include measures to prevent wildlife from accessing or being attracted to waste, especially food scraps and organic matter.
- Provide waste bins and prohibit the burning of waste.
- The use of any chemical fertilizer is forbidden.

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- Include the installation and maintenance of fire equipment such as alarm, extinguishers, sand deposit.

The following general requirements must be applied for the housing:

- A separate bed for each worker, not arranged in rows of more than two, with bedding materials reasonably comfortable including mosquito nets for all sleeping areas;
- Suitable inside dimensions for sleeping space;
- Separate accommodation of the sexes;
- Adequate furniture for each worker to secure his or her belongings, such as a ventilated clothes locker which can be locked by the occupant to assure privacy;
- Adequate natural light during the daytime and adequate artificial light;
- Adequate ventilation to provide sufficient movement of air in all conditions of weather and climate;
- Adequate supply of safe potable water: To prevent dehydration, water poisoning and diseases resulting from lack of hygiene, workers should always have easy access to a source of clean water. An ample supply of potable water must be available in the same buildings where bedrooms or dormitories are provided. Drinking water must meet WHO drinking water standards and water quality must be monitored regularly;
- Adequate sanitary facilities including toilets and showers, providing regular maintenance and cleanliness as well as considering the gender aspects:
  - including at least one toilet, one wash basin, and one tub or shower for every 15 persons, conveniently located to prevent nuisances.
  - Separate facilities must be provided for men and women, with independent ventilation to the open air.
- Common dining rooms or canteens, located away from the sleeping areas;
- Appropriately situated and furnished laundry facilities;
- Rest and recreation facilities;
- As far as practicable, sleeping rooms should be arranged so that shifts are separated and that no workers working during the day share a room with workers on night shifts.
- As part of the health measures:
  - Remove standing water where mosquitoes can breed, such as in buckets, puddles, and containers;
  - Conduct regular inspections to identify and eliminate potential mosquito breeding sites;
  - Encourage the use of repellents, especially during peak mosquito activity times;
  - Use safe and approved insecticides to treat areas with high mosquito activity.
- As part of the safety measures:
  - Workers must be trained in fire procedures.
  - Bedding must not contain flammable materials.
  - Safety exits must be marked, with adequate means of escape provided and properly maintained.

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- As part of the SEA/SH measures (see Appendix B):
  - Provide gender-separate accommodations in the temporary campsite and gender-separate lockable latrines and wash facilities that are well-lit, conveniently located and easily accessible.
  - Visibly display signs at the temporary camp site that signal to workers and the community that the project site is an area where GBV is prohibited.

4.12.3. Implementation modalities and budget

This sub-plan must be detailed in the contractor's environmental management plan before the start of the work.

Program	Activities	Responsible for the execution	Period of execution	Cost
CP10	Workplace occupational Health, Safety and Security Management Plan	Contractor	During the entire construction period	Included in the contractor's cost

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4.13. CP11 – Construction Emergency Preparedness Plan

4.13.1. Justification and objectives of the plan

The Construction Emergency Preparedness Plan must address all emergency situations that may arise during construction works, including medical emergencies, fire emergencies related to construction activities, forest or park fires, kitchen and camp-site fires, security incidents and civil unrest, as well as environmental emergencies such as massive fuel or chemical spills, hazardous material releases, and significant pollution events within or near the Majete Wildlife Reserve.

This plan should also address flood risk associated with cofferdams/diversions during construction activities and interfaces with EP6 for operation.

The objective is to assure the security, reduce the risk of human life loss and minimize property damage during an emergency at Kapichira during the construction activities.

The Construction Emergency Preparedness Plan must comply with EGENCO policy, Malawi policy and legislation, the World Bank ESS4 about Community Health and Safety as well as the World Bank Group Environmental, Health, and Safety Guidelines.

This plan aims to mitigate the following impacts:

Impact	Type of environment	Importance before mitigation measures
Disaster risk due to flooding	Physical, biological, human	Moderate
Health and safety risks for workers	Human	Minor

4.13.2. Measures description

The contractor must develop a detailed Emergency Preparedness Plan, that shall be aligned with the Employer's emergency preparedness and response system and clarify areas of responsibility and notification lines in an emergency.

This plan should also address flood risk associated with cofferdams/diversions during construction activities. The aim is to define a procedure for the project construction workers and the direct operating personnel (dam operating personnel) during an emergency or unusual occurrence such as extreme weather and flood events during construction.

The disaster risk during construction phase could be linked due to the events of the spillway gate malfunction or a dam break in case of breach / failure on temporary cofferdam / training dyke. In these cases, the impact will lead to uncontrolled complete or partial emptying of the reservoir. This risk will be greater during the rainy season (period January – March) when the monthly flow is the highest. It should be noticed that the construction area (quarries, contractor camp, access roads) are located outside the identified flood hazard zones (see the following figure) and are therefore not directly exposed to inundation risk under the considered assumptions.

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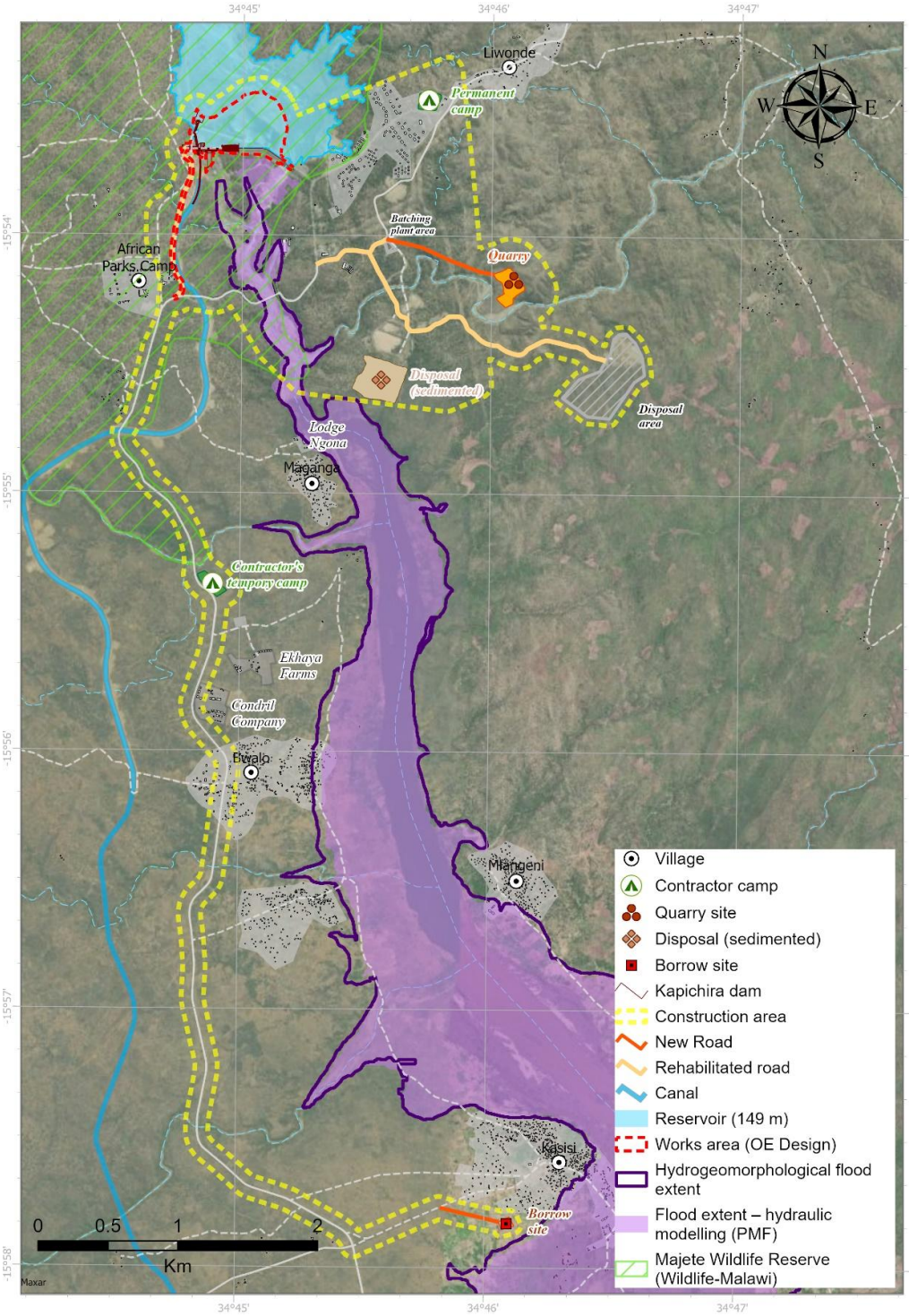


Figure 4-2: Flood hazard area in the event of a major flood

The Contractor's Emergency Preparedness Plan shall define:

- Emergency preparedness requirements,
- Emergency response organization and responsibilities,
- Emergency response and evacuation resources, equipment and requirements,
- Notification protocols and action plans,
- Medical service providers and associated coordination measures,

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- Recovery measures to establish normal conditions after emergencies.

The Contractor shall provide sufficient resources to deal with possible emergencies during the execution of the scope of work, considering the following measures:

- Maintain suitable and fully stocked first aid kits at all work areas, vehicles and strategic locations as per EGENCO standards.
- Identifies assembly areas at each works site (at least dam site, quarry site, clay borrow site, batching plant, camp sites) considering flood risks.
- Provide sufficient first aiders to administer first aid, and stabilizing purposes prior arrival of trained medical professionals. First aiders shall be appointed at a ratio of 1:25 and be available at all work fronts.
- Assure suitably trained fire wardens among the workforce to effectively deal with fire emergencies. Fire wardens shall be certified by an approved third-party service provider.
- Maintain a specific spill Emergency Response Plan at all chemical, fuel, and liquid waste storage and transfer points, supported by spill kits and trained personnel.
- Enter into contractual agreements with Project-approved medical service providers to provide rapid and effective treatment, including transportation and specialised healthcare facilities or hospitals.
- Maintain an emergency arrangement for effective mobilisation outside normal working hours for emergencies at the Project. The Contractor shall at all times keep the Employer updated with a list of responsible staff for emergencies and their contact details.
- Set up sufficient and available emergency evacuation means for injured or ill-health employees.
- Schedule emergency drill exercises in coordination with EGENCO.

4.13.3. Implementation modalities and budget

The Emergency preparedness plan should be provided by the Contractor before starting the works.

Program	Activities	Responsible for the execution	Period of execution	Cost
CP 11	Construction Emergency preparedness plan	Contractor	Before starting the construction activities	Included in the contractor's cost

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4.14. CP12 – Restoration Plan for temporary affected areas

4.14.1. Justification and objective of the plan

As part of the mitigation hierarchy and in accordance with international standards (including World Bank ESS6), areas temporarily cleared for project infrastructure such as borrow pit, quarry, or temporary campsite will undergo ecological restoration upon completion of construction activities.

The Restoration Plan for temporary affected areas must comply with EGENCO Environmental Management Policy, Malawi policy and legislation (such as Environmental management Act), the World Bank ESS6 about Biodiversity Conservation and Sustainable Management of Living Natural Resources as well as the World Bank Group Environmental, Health, and Safety Guidelines

These measures aim to mitigate the following impacts:

Impact	Type of environment	Importance before mitigation measures	Importance after mitigation measures
Risk of loss, fragmentation and degradation of natural habitats and flora	B	Moderate	**Moderate**
Change in land use due to the construction facilities	P, B, H	Moderate	**Moderate**

4.14.2. Measures description

4.14.2.1. OBJECTIVE

The objective of this restoration is to re-establish the vegetation cover and ecological functionality of the affected areas, thereby minimizing long-term biodiversity loss. Restoration will include:

- Removal of temporary infrastructure,
- Soil rehabilitation and stabilization where needed,
- Replanting with native and locally appropriate plant species,
- Protection from grazing or other disturbances during the recovery phase,
- Restoration of access to Kapichira falls for the dam site area.

This measure is considered on-site ecological restoration and forms an integral part of the project's environmental mitigation strategy. It must not be confused with biodiversity offsetting, which applies only in cases where significant residual impacts remain after all avoidance, minimization, and restoration efforts.

The total area to be restored is estimated at 22 hectares.

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4.14.2.2. GENERAL TECHNICAL REQUIREMENTS

Restoration must be based on native, non-invasive species, and ideally match surrounding vegetation. Indeed, before any land clearing operations, a preliminary phase of research and protection of local flora must be included in the project planning. This crucial step allows for the identification of plant species at risk, particularly those listed as endangered on the IUCN Red List or those with limited distribution. A detailed inventory of the original vegetation is therefore necessary to guide conservation and restoration efforts. This requirement is included in the EP4 – Biodiversity Management Plan Pre-survey biodiversity measures before construction activities (see chapter 5.5.2.2).

The dominant species of each habitat type must be specified and, in addition to species of conservation concern, will be the primary objective of natural habitat restoration.

The steps involved are as follows:

- Site clean-up: Remove waste, construction debris, and hazardous materials.
  - Dismantle all temporary structures.
  - Outline clear procedures on how borrow pits will be covered after the project.
  - Remove hazardous materials (fuel, oils, chemicals).
  - Collect all solid waste (plastics, metal scraps, etc.) and dispose of according to the Waste management plan.
  - Remove concrete or compacted material that may block vegetation growth.
- Grading & soil preparation: Soil preparation is a key step to increase the success rate of planting.
  - The soil will be dug with square holes to trap rainwater and minimize related erosion. Digging of shallow slices (2 x 2 x 2) along sections of degraded areas will be considered to reduce runoff erosion and enable better water infiltration.
  - De-compact soil using hand tools or light machinery (ripping or tilling to 30–50 cm depth).
  - Add topsoil if lost or degraded, preferably from pre-clearing stockpiles.
  - During site preparation, if invasive plants are present, they should be removed (uprooted).
- Revegetation strategy: the species planted will be the species impacted onsite during construction activities.
  - The seeds will first be grown in a nursery before being planted as young plants or seedlings. Local seeds can also be purchased. The plant spacing will be respected according to ecological conditions (e.g., 2m x 2m for trees)

Note: All activities being undertaken at the nurseries will not be under the responsibility of the Contractor, but of the nursery's owner. The contractor must liaise with nurseries, particularly those of the Malawi Forestry Research Institute and Majete Wildlife Reserve.

  - The seedlings will be planted in the previously dug and fertilized holes.
  - The area should be fenced off to prevent grazing by herbivores and livestock, allowing natural regeneration through the seed bank.
  - Fertilizers will be added to enrich the soil with nutrients and to promote the growth of the plant. The choice of fertilizers will depend on what is needed for the soil and the plant. Fertilizers should be added when plants are young. The use of any chemical fertilizer is forbidden.

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- Water supply: Water is considered as the major constraint (followed by infestation by termites). Strategic construction of pans can be considered to trap rainwater. A system of swales is recommended along the terrain for erosion control and improve water use by plants.
- To provide water beyond the rainy season, the Contractor will drill a bore hole and install a pump.
- Watering seedlings in plots should be done once per month during two years after each planting phase.

- Maintenance: the contractor will implement watering, fertilization, pest and herbivory management if necessary. A provision must be considered over 2 years.
  - Seedlings and young trees should be kept away from domestic livestock.
  - Watering should be regular and used judiciously.
  - Protective fences should be repaired regularly according to their level of degradation.
  - Proper application of fertilizer is necessary.
  - Individuals that do not survive must be replaced.
- Monitoring: the Contractor will determine indicators of good seedling health (vital signs) and will monitor their evolution from the first year of planting.

  Communities will be trained in mapping and be involved in monitoring, in order to adopt a citizen science approach.

  Gradually, the intensive monitoring will be reduced, and the grazing restrictions are removed.
- Decommissioning: at the end of the decommissioning period, check the plants are sufficiently developed with an acceptable survival rate, and allow the plantation to regenerate spontaneously.
  - The seedlings have reached a height of about 1 m.
  - The target diameter of the seedlings has been reached.
  - The foliar development of individuals is sufficient.

If some of the plants remain unsuccessful, a replacement will be proposed, together with a proposal for an addition/funding to bring about new related monitoring.

Monitoring is suggested to be very intense following the first-year planting, to have a reliable trend before the next phases. The first year should be closely monitored and frequent field visits made by an ecological expert.

Note: The aim is to reach the planting targets for year 1 in order to minimize failure.

At this stage, the topsoil excavate for the construction of the road access to the quarry site can be reuse for the restoration of the direct footprint area.

The Contractor shall provide a detailed restoration plan before the demobilization considering the above specifications as well as the specific constraints of each area as follows.

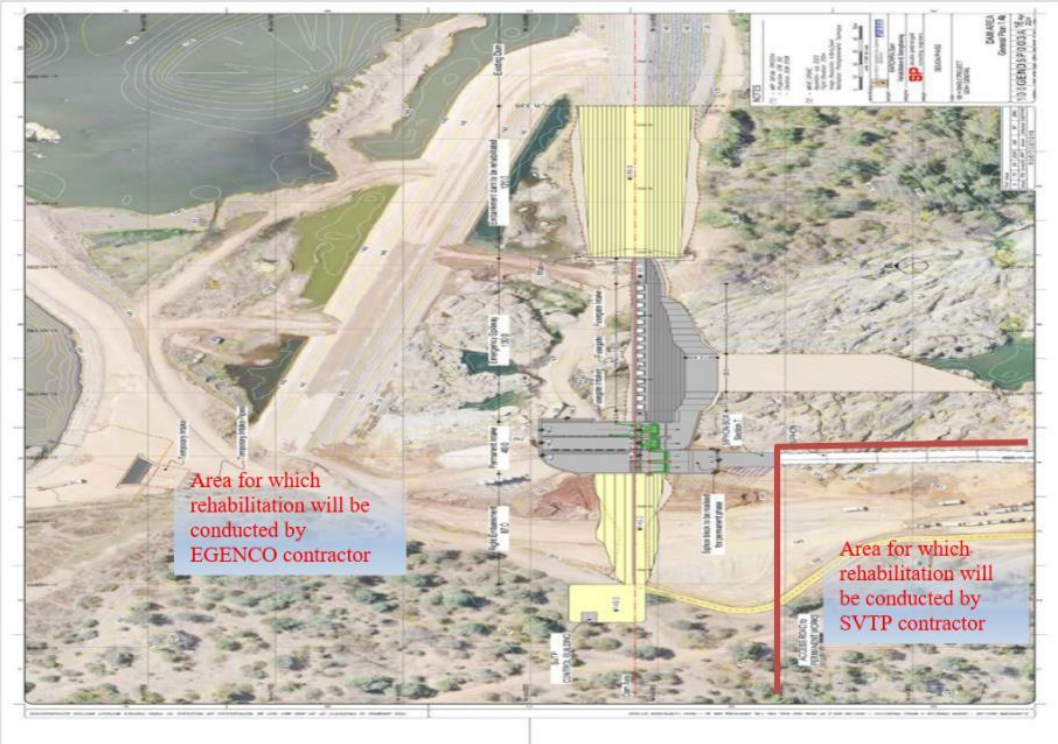
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4.14.2.3. DAM SITE AREA

The restoration of the dam site area should consider the following background.

Background

Based on the agreement between SVTP and EGENCO (*Malawi Emergency Power Restoration Project, Implementation Support Mission Aide Mémoire, September 30 to October 11, 2024*), site rehabilitation for all areas in Majete Wildlife Reserve downstream of the connection of the temporary irrigation conveyance with the siphon will be fully finalized by the SVTP contractor as part of SVTP. After the construction of the Kapichira Dam and decommissioning of the temporary irrigation conveyance by the Contractor for the Kapichira rehabilitation project, the Contractor will rehabilitate the remaining land upstream of the line as defined in the following figure.

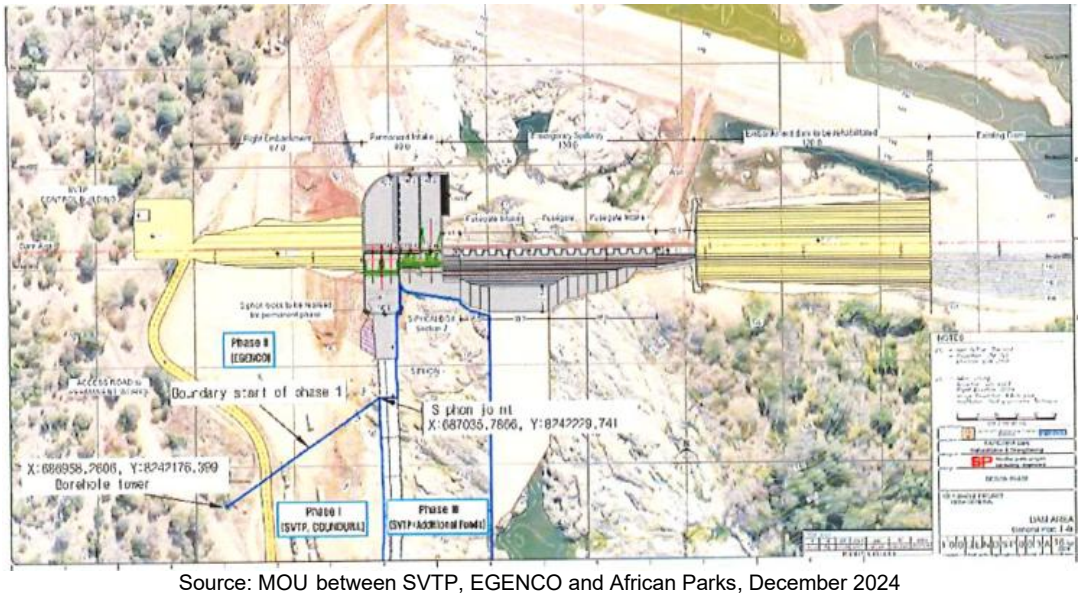


Source: Malawi Emergency Power Restoration Project, Implementation Support Mission Aide Mémoire, September 30 to October 11, 2024

Figure 4-3: Delineation of responsibilities for final rehabilitation of right abutment area

A memorandum of Understanding dated December 2024 was signed between SVTP, EGENCO and African Parks. It is stated that SVTP shall rehabilitate siphon borrow pit and work areas no longer usable by project according the following map.

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Source: MOU between SVTP, EGENCO and African Parks, December 2024

Figure 4-4: Agreed demarcation of SVTP rehabilitation

The Contractor must rehabilitate this area as per the agreement with the African Parks and its approval.

Specific technical specifications

The dominant species of each habitat type must be specified and, in addition to species of conservation concern, will be the primary objective of natural habitat restoration. The habitats to be restored must be low-lying deciduous savanna forest including native plant communities such as *Karomia tettensis* and *Dalbergia melanoxylon.*

The habitats will be restored in zones where topsoil remains present and ecological recovery is feasible. Indeed, some areas have been completely cleared and, in addition, disrupt the visual sensitivity within the MWR (figure below).



Figure 4-5: View from the Majete of the areas that need to be restored within the direct footprint area

A restoration measure will be implemented to support the development of a non-concreted observation point overlooking the Kapichira Falls, which will be accessible via

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the new access road during the operational phase. This measure will be carried out with the approval and guidance of African Parks as a new source of tourist appeal.



Figure 4-6: Retoration of the access road to Kapichira falls

4.14.2.4. TEMPORAY CAMP SITE

As this area will stay in the property of EGENCO, the restoration plan will take into account the use of this area by EGENCO in the future. At this stage, it is planned to retain any buildings that have been constructed for the Contractor's needs. The rest of the area will be planted with native, non-invasive species, corresponding to the surrounding vegetation.

4.14.2.5. QUARRY SITE

The dominant species of each habitat type must be specified and, in addition to species of conservation concern, will be the primary objective of natural habitat restoration. The habitats to be restored must be open deciduous forest type composed of mixed species with Terminalia, Bauhinia and Acacia species as the dominant tree species. The vegetation type found on the slopes of the quarry hill comprises of abundant patches of hardy plant species (grasses and shrubs) covering the rocky surfaces.

4.14.2.6. DISPOSAL AREA

The habitats to be restored must be mixed Acacia–Combretum woodland dominated by tall grass species and shows extensive signs of degradation due to human activities.

4.14.2.7. CLAY BORROW SITE AND ACCESS ROUTE TO THE CLAY SITE:

The habitats to be restored must be dominated by herbs and grasses with isolated pockets of tree/shrubs largely of *Diospyros* squarrosa. The common and preponderant herb layers are *Neojeflera deccumbens* and *Indigofera homblei*.

The restoration of the clay borrow site and the access route will be carried out in coordination with the employee for the approval of owner (N'jezera village).

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4.14.3. Implementation modalities and budget

The restoration plan with the planting sub-plan will be developed by the Contractor and will have to be approved by the employee.

A preliminary planting plan will be developed as part of the proposal of the Contractor. The planting plan should specify a strategic zoning of the area to assure the services provided by the site to the community (zoning particularly affects grazing).

After contractor demobilization, EGENCO will be responsible for restoration success including the corresponding long term funding mechanisms. For some areas such as the dam site area, an handover from EGENCO to African Parks could be planned after contractor demobilization for restoration success with the corresponding funding.

The monitoring activities after year one will be under the responsibility of the Employee Kapichira project unit.

This restoration plan must be provided in the contractor's environmental management plan before the start of the work. The detailed plan must be provided and approved before the demobilisation phase.

Program	Activities	Responsible for the execution	Period of execution	Cost
CP12	Restoration of temporary facilities	Contractor	At the end of the construction period and during operation	Included in the contractor's cost

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5. EMPLOYER'S ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

5.1. Introduction

This chapter describes the measures and actions that EGENCO must implement in order to prevent and mitigate the risks and impacts associated with construction and operation, as identified in the ESIA. These measures supplement those detailed in Chapter 4 above, which the Contractor must implement.

5.2. Description and objective of the E-ESMP

The Project Management Unit (PMU) within EGENCO will be responsible for implementing the project Employer's Environmental and Social Management Plan.

This plan aims to mitigate the impacts described in the chapter 2 of this document for which the Employer is responsible.

This plan comprises the following sub-plans:

- Community Health and Management Plan
- Sediment Management Plan
- Environmental flow Management Plan
- Biodiversity Management Plan
- Land acquisition, restrictions on land use and Involuntary resettlement plan
- Dam Emergency Preparedness Plan
- Occupational Health, Safety and Security Plan.

5.3. EP1 – Community Health, Safety and Security Plan

5.3.1. Justification and objectives of the plan

It should be noticed that EGENCO has developed a Community Health and Management Plan (which was draft to be submitted to the Owner's Engineer for review at the time of this ESIA) for the Malawi Emergency Power Restoration Project. This plan must comply, if not revised to take into account the following measures.

This plan must comply with the World Bank ESS4 about Community Health and Safety and the World Bank Group Environmental, Health, and Safety Guidelines.

This plan aims to mitigate the following impacts:

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Impact	Type of environment	Importance before mitigation measures
Spontaneous migration	Human	Minor
Disturbance of local communities	Human	Minor
Risk of violence based on gender	Human	**Moderate**

5.3.2. Measures description

5.3.2.1. ENGAGEMENT OF COMMUNITIES ON HEALTH AND SAFETY

To minimize the perturbation of the community during construction and operation phase, as well as to enhance the relationship between the Employer and the community, the Employer should implement the project SEP (see Appendix A) and establish awareness sessions, as described hereinafter:

- Awareness of the community leaders in villages before construction starts on the risks associated with the employment opportunities, and the location of the construction areas (including temporary facilities and access roads). Provide information and raise awareness of how far downstream the anticipated impacts of the dam rehabilitation are expected to reach.
- Take into account gender considerations in the ongoing consultation process with local communities (women must have adequate information at all stages of the project implementation process, regardless of their status, whether affected or not). Women will engage in public decision-making.
- Engage concertation with the local community to agree on the most appropriate strategy to best convey safety messages: how, when, where and to who. This concertation should be repeated during the final year of the construction phase, to confirm with the local community that the process is still relevant and appropriate for them.
- Educate communities on the dangers of unauthorized entry to dams and construction sites, potentially dangerous equipment and why access restrictions must be respected. This could be carried out with an awareness campaign with local communities, including educational awareness sessions in local schools, to confirm they are aware of construction traffic related risks and how to use the road safety features, traffic rules, road signs, pedestrian and bicycle safety behavior.
- Check the community awareness for human wildlife conflict.
- Regular community meetings on safety and construction hazards during the construction works.
- Develop awareness-training sessions on GBV for the community, especially in school with relevant specialists, considering the sensitizations on GBV risks provided for SVTP.
- Develop awareness-training sessions on communicable diseases (AIDS/HIV, COVID) for the community with relevant specialists, considering the sensitizations provided for SVTP.
- Provide information education and communication materials accessible to the illiterate, especially women.
- Carrying out prevention and awareness actions for health, environmental and personal hygiene, including discarding of waste in the villages in the project's area of influence due to the migratory flows that the construction site might generate.

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- Provide and improve information to the Fisheries Officer and community downstream so that they receive notification when the dam gates open during 'flashing' or when the top gate discharge the floods.
- Encourage the communities to report any safety concerns, through the Grievances Mechanism.
- Provide all the information to the communities about the availability of an effective grievance redress mechanism (considering the one implemented for SVTP) with multiple channels to initiate a complaint including GBV related ones.

5.3.2.2. SUPPORT HEALTH FACILITIES

To minimize the perturbation of the community to the health facilities access (equipment and personal) during construction and operation phase, as well as to enhance the relationship between the Employer and the community, the Employer should establish awareness sessions, as described below.

- Undertake a capacity needs assessment of the local health facilities to define the priority support action plan, to complement the existing strategy, during the construction activities.
- Encourage health support initiatives in the Chikwawa District.

5.3.2.3. ASSURE THE SECURITY OF THE POPULATION

To minimize security risks of the population, the Employer shall:

- Building strong collaboration with local law enforcement agencies.
- Engage with local communities and government authorities regarding the security measures implemented, the results of monitoring and follow-up activities, and verify this information is shared with relevant stakeholders.
- Check the security measures taken by the Contractor.
- Check all police force and security guards on appropriate conduct, engagement and appropriate use of force, human rights and the Voluntary Principles on Security and Human Rights.
- Engage local traditional structures to discuss how to enforce security and avoid theft during the construction works and Project's operating life. To do so, provide a grievance mechanism for the Chikwawa/TA Kasisi Communities to express concerns about the security arrangements and acts of security personnel.
- Implement specific protocols involving multiple external stakeholders (community representatives, council authorities, contractor) to assure that roles, responsibilities and communication channels are fully aligned and can be activated immediately if a security incident escalates into an emergency.

5.3.2.4. IMPLEMENT THE GRIEVANCE REDRESS MECHANISM FOR COMMUNITIES

Considering Malawi Emergency Power Restoration Project Stakeholder Engagement plan dated on May 2022, the Employer will implement a Grievance Redress Mechanism for communities considering the measures that are being successfully implemented as part of SVTP. A Project-level grievance redress mechanism (GRM) was developed as part of the Project Stakeholder Engagement Plan (Appendix A) to receive and address concerns and complaints related to the Project, considering the existing grievance redress mechanism.

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The Employer must:

- Collect and categorize grievances.
- provide timely acknowledgment of complaints and track their progress.
- Assess the validity of grievances and investigate their relevance.
- If a grievance is raised related to dust, noise, traffic, or other safety or security concerns, the Contractor must propose adjustments to construction methods and, where feasible, implement appropriate mitigation measures.

5.3.2.5. IMPLEMENT GENDER AND SOCIAL INCLUSION

EGENCO has already put a “social and gender inclusion and anti-sexual harassment policy” in place. This policy must be implemented for the project.

To minimize GBV during the project, EGENCO shall, in addition with the measures that must be carried out by the Contractor (see CP8 in the chapter 4.9), :

- Raise awareness among competent authorities, neighbouring communities, and customary authorities about GBV, SEA/SH, different forms of sexual exploitation and sex trafficking. These prevention and resolution resources should be mobilized from the start of construction and throughout the construction and operation phase.
- Provide educational awareness sessions in the 5 villages (considering the awareness program already implement by SVTP) within the construction influence area.
- Implement measures to support and collaborate with local Victims Support units (survivor-centered, confidential and specialized process for GBV and SEA/SH cases). This process shall be managed by a qualified GBV service provider perceived as trustworthy and unbiased by survivors.

5.3.3. Implementation modalities and budget

It is understood that the Employer will delegate the implementation of measures to relevant authorities or specialists when required.

The implementation will consider the duration of all the construction activities including pre-studies as well as demobilization and commissioning activities.

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Table 5-1: Community health, safety and security sub-plan estimated costs

Program	Activities	Responsible for the execution	Period of execution	Cost estimate
Community Health, Safety and Security Plan	Awareness measures on safety and security	EGENCO (social specialist with support from District Social Welfare Office and Police)	During the construction period	Cost of preparing and delivering community awareness sessions over a 4-year period with 2 sensitizations per year at USD25,000 per year: USD100,000. Cost of developing materials and sensitizing local communities over a 4-year period, based on 2 sensitisations per year at USD25,000 per year: USD100,000. **TOTAL: USD200,000.**
	Awareness measures on health	EGENCO with the support of District Health Office from the District Council		Cost of preparing and delivering community awareness sessions over a 4-year period at USD5,000/activity for 2 sensitizations per year: USD40,000. Cost of delivering awareness including prevention materials over a 4-year period, based on 2 sensitisations per year at USD5,000 / activity: USD40,000. **TOTAL: USD80,000**
	Awareness measures on communicable diseases	EGENCO with the support of District Health Office from the District Council		Cost of preparing and delivering community, district awareness sessions over a 4-year period at USD7,500 / year for 2 sensitizations per year: USD60,000. Support to health responsible for 4 years at USD7,500 / year for 2 sensitizations per year: USD60,000. **TOTAL: USD120,000**
	Awareness measures on GBV	EGENCO with the support of District Gender Office from Chikwawa District Council		Cost of preparing and delivering community, district and school awareness sessions over a 4-year period at USD7,500 / year for 2 sensitizations per year: USD60,000. Support to GBV responsible for 4 years at USD7,500 / year for 2 sensitizations per year: USD60,000. **TOTAL: USD120,000**
	Support health facilities	EGENCO with the support of District Health Office from the District Council		Provision of equipment and personal support per year: USD50,000 for a 4-year period **TOTAL: USD 200,000**
	Implement a GRM	EGENCO with the support of District Environmental Subcommittee (DESC)		As part of the EGENCO costs
				TOTAL: USD 720,000

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5.4. EP2 – Sediment Management Plan

5.4.1. Justification and objectives of the plan

Sedimentation is a major issue for Kapichira dam. The report about "investigation of sediment management options of Kapichira Reservoir during the rehabilitation phase of the dam"[5], has provided model scenarios. However, at this stage, the chosen option is not yet decided. Nonetheless, the report estimates that without any sediment management measures, the Kapichira reservoir's operational lifespan could be reduced to just five years.

The operation and maintenance plan will develop operating rules for the sustainable operation of Kapichira dam and for the sustainability of Elephant marsh Ramsar wetland and Chikwawa flood plain.

Based on the detailed design, the Owner's engineer recommends that, until Mpatamanga dam will be constructed upstream, activity of flushing or dredging are required to preserve the live volume as well as the normal functioning of gates. However, the detailed activities are not available at this stage.

This plan will give preliminary measures considering these two activities.

This plan aims to treat the following impacts:

Impact	Type of environment	Importance before mitigation measures
Increase of sediments in the reservoir	Physical	Minor
Disturbance of sediment balance and erosion of the Shire River	Physical	**Moderate**
Siltation of the Shire River downstream of the dam	Physical	**Moderate**
Reduction of downstream nutrient load	Biological	**Moderate**

5.4.2. Measures description

5.4.2.1. UNDERTAKE SLUICING

Based on the findings from the sediment management options, the sluicing option with longer duration low level operation during the wet season, seems to be a more efficient solution for sediment management than flushing. The reservoir Long-Term Capacity could reach 94 % of the pre-impoundment capacity if the sluicing is done with the reservoir water level at 144 masl during the wet season. The results indicate clearly that the reservoir should be operated between 144.0 (minimum design pool level) to 145.5 masl as maximum water level during the flood season for the best sluicing results.

[5] Investigation of sediment management options of Kapichira Reservoir during the rehabilitation phase of the dam, ASP TECH, April 2023

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Reservoir sluicing aims at passing sediment through the dam without allowing deposition. In contrast to flushing which aims to remove deposited sediments, reservoir sluicing focuses on incoming sediments that are not deposited in the reservoir.

Most notably from the environmental standpoint, sluicing does not generate the high peak values of sediment concentration that are characteristic of flushing. Consequently, there are less downstream impacts with sluicing than with flushing.

The operation rules for Kapichira must favour sluicing.

5.4.2.2. DESIGN ROBUST MONITORING PROGRAM FOR DREDGING

It should be noticed that a risk-focused monitoring of bed levels downstream of Kapichira Reservoir (referenced measures M8-026) and a risk-based monitoring of bank erosion / lateral migration (referenced measures M8-027) will be undertaken by the Mpatamanga Project (SLR, Mpatamanga ESMMP, July 2024). Therefore, it could be considered that the Kapichira project does not need to include complementary monitoring on this aspect.

The Owner's engineer states that the training dyke will *"keep the area upstream the outlet works free from significant deposition" and "the deposition occurs mainly in a confined area of the reservoir upstream the training dyke, which facilitate the dredging operation".*

At this stage, no specific information is available regarding the dredging techniques that could be applied to the Kapichira reservoir. Any proposed dredging methods must be assessed for their environmental impacts to assure they align with sustainability and ecological protection standards.

When the option is chosen, a robust monitoring program should be implemented by the Employer. Environmental monitoring is crucial to check that the effects of dredging operation are minimized, and, where possible, eradicated. To guarantee that environmental factors are incorporated into project design and execution, these analyses must be carried out early in the planning phase.

5.4.2.3. REVEGETATION OF STORED SEDIMENTS

Dredging operations imply sediment storage. Based on the findings on the previous dredging operations before Ana storm, the revegetation of stored sediments will prevent erosion and the uncontrolled dispersion of particles in the storage area.

Before the implementation of this measure, the following studies must be conducted:

- A detailed one-week survey of the sediment deposit area will be conducted by a botanist and a hydraulic specialist. The survey aims to understand the topography of the site, the sediment type and erosion risks.
- The survey will identify and map priority zones for stabilization based on slope, exposure to runoff or wind.
- A revegetation plan will be proposed and developed using native species suited to local soil and climate conditions.

  The selection of species will be discussed with the Forestry Research Institute of Malawi (seeds collection and conservation efforts).
- A monitoring protocol by one botanist will be established to assess plant survival and soil stabilization for a duration of one week each survey.

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5.4.2.4. REMOBILIZATION OF DREDGED SEDIMENTS

Context

Regarding the potential lack of sediment load downstream, a remobilization of dredged sediments downstream should be implemented. Indeed, if the sediment load downstream is too low, it can cause erosion of riverbanks and degradation of wetlands like the Elephant Marsh.

As the baseline is not recorded in terms of the sediment balance downstream, especially in the Elephant Marsh, this measure will require further investigation, especially on the quality of the sediments.

Several measures are proposed in the Mpatamanga ESMP that are relevant to Kapichira needs and study area. These measures address the following risks:

- Potential disruption of downstream floodplain activation due to changes in river morphology caused by accumulation of sediment in the main reservoir.
- Impacts on downstream irrigation and water supply caused by change in downstream river flows and sediment load.
- Potential risks to river-dependent fauna (crocodiles, hippo and wetland birds) present in the wetland habitats in the northern portion of Elephant Marsh, due to river channel erosion caused by reduced sediment load.

The Mpatamanga ESMP subplan addresses these risk impacts. This sub-plan outlines a downstream strategy to minimize long-term impacts such as riverbed incision, riverbank erosion, and effects on floodplain farming and fisheries below Kapichira Dam. It includes the development of a monitoring and mitigation plan based on technical studies (geotechnical, ecological, socio-economic, and hydrological), detailed hydraulic modeling, stakeholder consultation, and a preparedness and response plan for potentially affected areas.

Three components are part of the downstream floodplain subplan in the Mpatamanga ESMP:

- DOWN 1 - Floodplain Investigations
  - Timely execution of geotechnical, groundwater, soil moisture, land use, water use and habitat investigations, as well as revised lateral erosion prediction and interactions between groundwater and surface water in the Shire River floodplain between Kapichira and the confluence with the Mwanza River.
  - Updated predictions on the extent and location of (i) riverbank erosion, (ii) lowering of groundwater level and soil moisture content related to incision, (iii) change in hydraulic connectivity between the main channel and the floodplain
- DOWN 2.- Monitoring and Independent Review Panel
  - Downstream floodplain monitoring program for hydrology, geomorphology, land use, groundwater and soil moisture content developed and implemented in a transparent and participatory manner.
  - Results of the floodplain monitoring programme shared with key stakeholders and used by the Project to adjust intervention strategies.
  - Project's grievance redress mechanism operational for the downstream communities.

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- DOWN 3 – Management and Response Planning
  - A strategy for mitigating impacts on floodplain agriculture and fisheries is developed in which potential measures are screened, defined and prioritized, such as (but not exclusively): floodplain small-scale irrigation and lower water demand crops initiatives, Floodplain Fishery Intensification initiatives, and Chikwawa Bridge foundations Monitoring or Protection measures.
  - Selected initiatives planned for priority reaches (exposed to erosion consequences in first 10 years) through a Preparedness and Response Plan.

The Mpatamanga ESMP measures include additional ecological investigations in Lower Shire on downstream floodplain habitats and ecosystem services aligned with examination of hydrological and sediment parameters to inform development of a monitoring plan and mitigation strategy.

Content of the measure

The proposed mitigation measures for Kapichira could be part of the downstream floodplain measures in Mpatamanga ESMP. The mitigation measures required for Kapichira are as follows:

- Assessment of sediment balance and ecological sensitivity of downstream areas (including sediment transport modelling to the Elephant Marsh).
- Perform field surveys and historical data analysis on sediment loads and deposition from the reservoir to Elephant Marsh.
- Develop a sediment transport model will be developed and mapped from the reservoir to the Elephant Marsh.

The following measures are already included in the Mpatamanga ESMP:

- Downstream floodplain DOWN 1 and DOWN2 components: Ecologically sensitive areas reliant on sediment inputs will be identified to assess how vulnerable aquatic and floodplains ecosystems are to changes in sediment supply. This includes: dependency of vegetation and fauna habitats on sediment deposition; changes in turbidity, water depth or sediment grain affect biodiversity; capacity of the marsh to recover if sediment inputs decline or change in quality.
- OC-158: A sediment quality of the dredged material will be assessed: particle size distribution, organic matter content, and potential contaminants (e.g., heavy metals).

It is proposed to add the assessment of the sediment quality of the dredged sediment as additional measures proposed for Mpatamanga, as follows:

- Based on the findings of the Downstream Floodplain Sub-Plan and the sediment quality assessment, a phased sediment remobilization or valorisation strategy will be developed.
- This strategy will prioritize implementation during high-flow periods to promote wider dispersion and minimize localized accumulation of sediments. Where possible, remobilization efforts will be aligned with natural geomorphological processes to enhance effectiveness and sustainability.

In line with the outcomes of activities DOWN 1 and DOWN 2, the sediment remobilization plan for the dredge area will be incorporated into activity DOWN 3 of the Mpatamanga Downstream Sub-Plan.

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5.4.2.5. SEDIMENT VALORIZATION

Given the regular dredging activities planned for Kapichira dam rehabilitation, the valorization of sediments presents a valuable offset measure. It helps prevent excessive sediment accumulation, which could otherwise lead to uncontrolled sediment dispersal and environmental degradation.

Pre-valorization requirements

Before any reuse or valorization of dredged sediments, the Employer must:

- Conduct thorough sediment analysis to determine contamination levels and control sediments are not contaminated before proceeding with any reuse.
- Isolate and manage contaminated sediments by:
  - Storing them under protective tarpaulins.
  - Transporting them to the nearest certified contaminated soil treatment facility.

Valorization options for non-contaminated sediments

If sediments are confirmed to be clean, they may be reused in the following ways:

- Agricultural use: As a soil amendment or fertilizer for agricultural lands, subject to agronomic suitability.
- Construction materials: In the production of concrete, for backfilling, or as foundation material.
- Riverbank reinforcement: For stabilizing riverbanks both upstream and downstream of the dam.
- Nature-Based Solutions: To prevent erosion and reduce particulate dispersion through ecological restoration techniques.
- Sediment remobilization: Controlled release of sediments downstream to mimic natural sediment flow, helping restore sediment balance and reduce downstream riverbank erosion.

The Employer must assess the technical and environmental feasibility of each valorization option. Regular monitoring and documentation of sediment quality, reuse practices, and environmental impacts must be maintained.

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5.4.3. Implementation modalities and budget

The responsible entity of this plan is the Employer.

The implementation of this plan will consider the duration of all the construction and operation activities as follows.

Table 5-2: Sedimentation management sub-plan estimated costs

Program	Activities	Responsible for the execution	Period of execution	Cost estimate
EP2	Sluicing	EGENCO	During construction and operation phases	Included in operation costs
	Monitoring program for dredging	Mpatamanga Project/EGENCO	During the operation phase	Included in operation costs
	Revegetation of stored sediments	EGENCO	During the construction phase	On week inventory survey x 2experts **USD 7,000**
			During the operation phase	One week Monitoring survey x 15 **USD 85,000**
	Remobilization of dredged sediments	EGENCO	During operation	Sediment quality assessment **USD 2,000**
	Technical and environmental feasibility for sediment valorisation	EGENCO	During operation	Feasibility study **USD 50,000**
			TOTAL	**USD 144,000**

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5.5. EP3 – Environmental flow management plan

5.5.1. Justification and objectives of the plan

The flow in the Shire River is regulated by the water level in the lake Malawi and by the artificial influence of the Kamuzu dam. The Kamuzu barrage at Liwonde was built to stabilize the flow in the Shire River. It retains the water when the water level is high in the Malawi lake and release it when the flow would be too low. The objective of the dam was to maintain a minimum flow of at least 170 m³/sec to maintain the hydropower production at the plants in middle reach of Shire River.

This section confirms the existing environmental flow (E-Flow) requirements to be applied to Kapichira HPP. This flow depends on the Kapichira operation and the functioning of projects upstream.

This plan aims to mitigate the following impact:

Impact	Type of environment	Importance before mitigation measures
Modification of flow conditions on the Shire River	Physical, Biological, Human	Minor

5.5.2. Measures description

5.5.2.1. ENVIRONMENTAL FLOW REQUIREMENTS

To verify the existing environmental flow requirements, the following steps were applied:

- Review of existing environmental flows requirements.
- Considerations of the Kapichira HPP hydrological data.
- Define the downstream factors for the estimation of the E-flows
- Estimation of E-flow requirement

Review of existing environmental flows requirements

Based on the IFC Guideline, "*E-flows are defined as the quantity, frequency, timing and quality of water and sediment flows necessary to sustain freshwater and estuarine ecosystems and the human livelihoods and well-being that depend on these ecosystems"* In other terms, the definition of an environmental flow helps to maintain each section of the river in its present ecological condition.

This section does not use any modeling or calculation to justify the environmental flow. It uses mostly the results of existing E-Flow requirements and how they apply to the operation mode of Kapichira HPP. A percentage of the natural flow of the Shire River roughly defines the Environmental Flow.

Based on the review of available documents to find information on existing Environmental flow requirements at Kapichira Dam, the findings were summarized as follows:

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- The OE's Preliminary Design Report and Hydrological Report do not mention environmental flows for Kapichira dam. EGENCO is not aware of any formalized obligation to release water over the falls.
- The SVTP's ESIA [Updated Environmental and Social Impact Assessment (ESIA) for the Shire Valley Irrigation Project; 2017] notes in section 4.1: […] "*An informal environmental flow of 30-50m3/s is currently released from the [Kapichira] dam spillway, which helps to maintain a strong flow over the Kapichira Falls during the rainy season. Although not a primary reason for visitors to come to the Majete Wildlife Reserve, the Kapichira Falls serve as a seasonally valuable tourist attraction. During much of the dry season, this environmental flow is not guaranteed, and the Kapichira Falls sometimes dwindle to a trickle*."
- In the past, given the small regulating capacity of Kapichira reservoir, daily inflows of more than about 270 m³/s were spilled over the falls. This will change when SVTP goes into operation.

Therefore, it is considered that the existing environmental flow of 30-50m^3/s is currently integrated in the operational rules.

Considerations of Kapichira HPP hydrological data

The natural variation of the flow throughout the year was considered at first as well as the operation needs. In Kapichira, the minimum values of flow are between September and November with an average flow ranging between 230 and 238 m^3/s. The operation of Kapichira HPP's all four turbines requires the diversion of approximately 270 m³/s to the powerhouse.

The following figure shows the simulated monthly flow throughout the year, between 1967-1991, 1967- 2022 and 1992-2022. The series between 1992 and 2022 shows a decrease in the monthly inflows and a smoother tendance. The seasonal variations are diminished because of the existing dam on the Shire River like the Liwonde dam. This series of simulated flows will be used to estimate the Environmental Flow for Kapichira HPP.

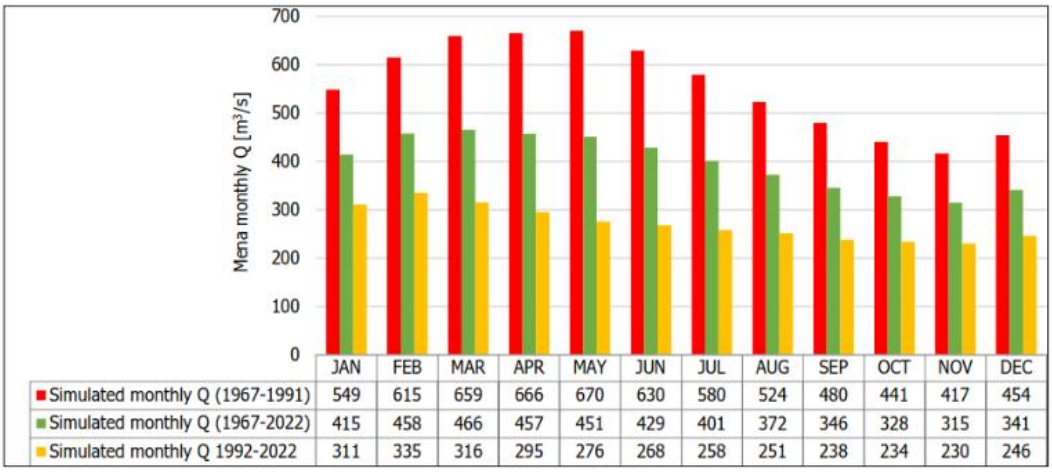


Figure 5-1: Average monthly flow simulated at Kapichira dam site considering before and after the new flow regulation

Ecological factors for the estimation of the e-flows

The analysis of ecological factors is as follows:

- Present ecological status:

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The Shire River is largely modified, with more than three dams situated upstream and the Mpatamanga dam in project. The flow on the Shire River is entirely regulated, which is confirmed by the homogeneous flows on Shire River throughout the year ranging between 230 and 335 m^3/s. The construction of the Mpatamanga dam will certainly smooth further the flow.

Therefore, the operation of Kapichira HPP will not drastically modify the ecological status of the river, especially because it is a run of river and an existing project.

- Key species of the Shire River:

As Kapichira HPP is an existing dam and the project is a rehabilitation, the ecosystem and the aquatic fauna and flora are already modified and very disturbed. The project should not change further the ecosystem.

Nevertheless, the ecosystem connected to the Shire River is deteriorating. The cascade of dams is worsening the situation, because the seasonality of the flow, which is crucial for biodiversity, is becoming less and less apparent. The flora that was once present on the shores of the Kapichira reservoir can no longer develop due to erosion.

The Environmental Flow should reproduce as much as possible the natural variation of the flow. This is why the E-Flow must be a percentage of each monthly natural flow, and not a fixed flow to apply throughout the year.

- Flow alteration and loss of connectivity:

The construction of the Kapichira dam poses an issue concerning the longitudinal connectivity of the Shire River. It also disturbs the natural sediment load by trapping the sediments into the Reservoir. This factor must be considered when defining the E-Flow.

The loss of connectivity is also an inevitable issue that is mitigated by the application of an E-flow which will allow a flow that will always come out of the spillway. The flow alteration will be limited because the inflow to the Kapichira dam is rather stable and there is not a lot of variation throughout the year. The Mpatamanga dam in study will also minimize this flow alteration by releasing nearly the same flow from the regulating dam.

- Sediment load:

The definition of E-Flow has considered the sediment load due to the rehabilitation of Kapichira HPP. Excessive sedimentation is a major issue at Kapichira dam.

It must be noted that the Mpatamanga dam in study will also face issues concerning sediment and much of the sediment load could be trapped in its reservoir. Mpatamanga could practice flushing that have to be considered by Kapichira operation.

- Socio-economic response:

The definition of the E-Flow has considered the needs in terms of socio-economic activity downstream of Kapichira. Because Kapichira HPP is a run-of-river dam, the outflow will be nearly equivalent to the E-Flow. Therefore, there will not be drastic rise and fall of the water level that could have impacted the safety of the local populations. The fisheries activities will not be disturbed by the Environmental Flow.

<u>Estimation of the E-Flow at Kapichira HPP</u>

For the estimate of the E-Flow, no modelling was used. The E-Flow is estimated by applying a percentage to the mean natural flow.

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Since the flows are smoothed, it is pertinent to apply the same percentage to each month's naturalized flow. It is probable that with Mpatamanga, the E-Flow will be even more constant.

On a daily basis, because the dam is a run-of-river, there will not be retained water, and the inflow will be approximately equal to the outflow.

In Europe and in United States of America, a percentage of the natural flow is recommended for the E-Flow based on the ecological condition of the river. For a highly modified river, the recommended percentage is around 30%. Nevertheless, it is not possible to blindly apply these percentage to the project because African countries do not define ecological conditions as in Europe and in United States of America. The recommended percentage in Africa is a little lower, with values around 20%. [6]

It was considered therefore to apply a percentage of 20% considering that the river is very modified and supposing that this flow was never recorded in the previous six decades, except for the time when the flow was interrupted for the construction of the Kamuzu barrage.

The following table shows the E-flow calculated for a percentage of 20% of the natural flow. The E-flow ranges between 46 and 67 m^3/s. The value is coherent with the informal Environmental Flow that is currently released from the dam spillway.

Months	Natural flow (m3/s) at Kapichira between (1992-2022)	Flow (m3/s) for very dry condition at Mpatamanga (1991-2020)	EFlow (m3/s)	Percentage of the natural flow
JAN	311	153,9	62	0,2
FEV	335	191,4	67	
MAR	316	171,8	63	
APR	295	163,5	59	
MAY	276	157,5	55	
JUN	268	153,3	54	
JULY	258	152,8	52	
AUG	251	146,8	50	
SEPT	238	139,6	48	
OCT	234	127,4	47	
NOV	230	116,9	46	
DEC	246	121,1	49	

Figure 5-2: E-flow calculation for Kapichira dam

As a comparison to the E-Flow and to estimate the threat to fall beyond the defined value, the historical data for very dry conditions was used. This study used the flows for very dry condition recorded at Mpatamanga. These flows are exceeded 95% of the time. In November, for 95 % of the time, the flow recorded is superior to 116 m^3/s, which is far more than the defined E-flow.

The Environmental Flow must reproduce as much as possible the natural variation of the flow. This is why the E-Flow must be a percentage of each month's natural flow and not a fixed flow to apply throughout the year.

In conclusion, the operation of Kapichira should consider the monthly calculated E-flow ranging between 46 to 67 m^3/s.

Months	JAN	FEV	MAR	AVR	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC
E-flows (m3/s)	62	67	63	59	55	54	52	50	48	47	46	49

Figure 5-3: E-flow for Kapichira dam

[6] GFA/B5/2013 Determination of « Holding » Environmental Flow Requirements for the Upper and Middle Kafue River January 2014 by Dr Jackie King and Dr Cate Brown

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It should be noted that this E-flow is calculated based on the actual natural flow coming to Kapichira. The Environmental flow must be updated when the Mpatamanga dam will be operational.

5.5.2.2. UPDATE THE E-FLOW REGIME WHEN MPATAMANGA HPP IS BUILT

In this study, the E-Flow for Kapichira dam is determined based on the current baseline and actual flow conditions. A defined percentage of the natural flow is allocated as the E-Flow, which must be maintained at all times to support downstream ecosystems and water users.

However, with the potential development of the Mpatamanga HPP, it is likely that the natural flow regime will become more regulated and consistent. As a result, the current E-Flow values may no longer be appropriate under the new hydrological conditions.

Therefore, if the Mpatamanga HPP is implemented, the E-Flow assessment must be reviewed and updated to reflect the altered flow dynamics. This update will make sure that environmental and social needs downstream of Kapichira continue to be met effectively.

5.5.3. Implementation modalities and budget

The owner's engineer should consider the calculated E-flow for each month in the operation rules of Kapichira dam.

The Employer must implement the calculated E-flow during the operation stage in order to maintain the ecological status of the Shire River and verify to maintain appropriate environmental flow when Mpatamanga is built.

Table 5-3: Environmental flow management sub-plan estimated costs

Program	Activities	Responsible for the execution	Period of execution	Cost estimate
EP3	Environmental flow management plan	EGENCO	During operation	Included in the operation costs of the employer

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5.6. EP4 – Biodiversity Management Plan

5.6.1. Justification and objectives of the plan

The prevention and mitigation program for risk of conflict, perturbation and Invasive Alien Species management primarily consists of mitigation measures to be implemented during the operation phase.

The Biodiversity Management Plan complies with EGENCO Environmental Management Policy, Malawi policy and legislation (such as Environmental management Act, Forest Act, National Parks and Wildlife Act), the World Bank ESS6 about Biodiversity Conservation and Sustainable Management of Living Natural Resources as well as the World Bank Group Environmental, Health, and Safety Guidelines.

This program aims to prevent and reduce the following impacts:

Impact	Type of environment	Importance before mitigation measures
Risk of aquatic mortality and loss of aquatic habitats	Biological	**Moderate**
Risk of habitat loss, degradation and fragmentation;	Biological	**Moderate**
Wildlife disturbance and risk of mortality	Biological	**Moderate**
Risk of spread of invasive species	Biological	**Moderate**
Risk of increased activities poaching;	Biological	**Moderate**
Impacts on Critical Habitat: reduction of downstream nutrient load for Elephant Marsh primarily associated species	Biological	**Moderate**
Impacts on Critical Habitat triggering species	Biological	**Moderate**

5.6.2. Measures description

5.6.2.1. INTRODUCTION

The Employer will be responsible for the biodiversity management and monitoring on site during the construction and operation phase. To do so, the requirements should be as follows:

- Appointment and roles of biodiversity staff
  - Engage qualified Biodiversity Specialist(s) to oversee contractor compliance with biodiversity management and monitoring requirements.
  - Manage external biodiversity consultants and liaise with government conservation stakeholders.
  - Participate in biodiversity steering committee meetings.

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- Check contractors comply with environmental induction, code of conduct, inspections for prohibited items, invasive species control, limited vegetation clearance, buffer zone protection, top-soil management, restoration, and vehicle speed limits.
- Independently validate contractor biodiversity monitoring data and verify corrective actions if needed.
- Develop and deliver biodiversity training for EGENCO and contractors.
- Manage biodiversity data, mapping, reporting, and tracking with employer GIS and document control teams.

- Biodiversity Steering Committee
  - Establish a multi-stakeholder biodiversity steering committee including the employer, Department of National Parks and Wildlife, and others to oversee biodiversity monitoring, protection measures, security patrols, and wildlife incident management.
  - Hold regular meetings with documented minutes shared for review.
- Wildlife incident reporting and monitoring
  - Develop and maintain a Wildlife Tracker to record all wildlife-related incidents (rescues, drownings, roadkill, community encounters) with detailed incident data including GPS and photos.
- Wildlife monitoring during fence installation
  - Coordinate fence alignment with Majete WR to facilitate animal rescue and security patrols.
  - Deploy rangers during fence installation to monitor and assist wildlife, recording observations in the Wildlife Tracker.
- Community awareness and conflict mitigation
  - Raise awareness among local communities on human-wildlife conflicts (e.g., snakes, hippos, crocodiles), provide assistance contacts, and appoint trained snake handlers on site.
  - Record wildlife-human conflict incidents in the Wildlife Tracker.
- Environmental surveillance and mitigation
  - Appoint an Environmental Officer to inspect for snares, illegal hunting activities, and report via the Wildlife Tracker.
  - Incorporate woodland conservation and mitigation in resettlement planning to encourage community protection of natural habitats.
- Additional ecological investigations
  - Conduct further studies of downstream floodplain habitats and ecosystem services to inform monitoring and mitigation plans.
- Management with African Parks
  - A MoU will be established between EGENCO and African Parks regarding the implication of both in the implementation of the ESMP
  - Two rangers will be hired during the first five years of the project, including the construction phase and the beginning of operations:
    - They will be involved in the CP6 regarding the surveillance and anti-poaching patrols.

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  - They will be involved in the CP5 regarding the prevention of fauna trapping between spillways; the deployment of the fence; the human wildlife conflict mitigation program.
  - They will be involved in monitoring terrestrial fauna species and revegetated areas.
- The recruitment will include housing, training in patrol techniques and the use of Earth Ranger software, as well as adequate equipment, including clothing, communication devices and geolocation tools.

5.6.2.2. PRE-SURVEY BIODIVERSITY MEASURES BEFORE THE CONSTRUCTION ACTIVITIES

These following measures are related to (pre-)surveys needed to prevent and reduce the risk of impact during the construction phase.

Pre-construction surveys for species and buffer zone implementation in the dam construction area

Pre-construction and construction-phase biodiversity surveys are essential to assess and monitor the presence of wildlife / Invasive Alien Species within and around the direct footprint area.

Given the project's proximity to MWR, there is a high likelihood of wildlife presence within the direct impact zone. Indirect signs of species such as Nyala, Zebra, Hippopotamus, Waterbuck, and Warthog have already been observed in the footprint area, highlighting the risk of disturbance or harm during construction.

These surveys must be designed to anticipate and minimize any potential disturbance or mortality, considering the ecological context and species sensitivity. The results will inform site-specific mitigation measures, including activity scheduling, exclusion zones, and adaptive management during construction (as part of the Contractor ESMP).

These surveys must be carefully planned and carried out by qualified ecologists (an ornithologist, a mammalogist and a herpetofauna specialist) to assure comprehensive coverage of all areas likely to be affected by construction activities.

Prior to any construction activities, the qualified ecologists will undertake comprehensive one-week biodiversity surveys to identify ecologically sensitive features, including any sign of presence of fauna species onsite specially for large mammals' species.

Pre-construction surveys will also identify the potential presence of active nesting sites for key bird species, mammal denning sites and bat roosts.

Following these surveys, a detailed report will be prepared to document key findings and highlight any ecological risks or constraints identified on site, providing guidance for appropriate mitigation measures including:

- Mapped records of both direct and indirect sightings of species of conservation concern.
- Identification and detailed documentation of breeding habitats, such as nests, roosts, and dens.
- Identification of the need for rescue protocols.
- Methodology for implementing buffer requirements.

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Pre-construction surveys at the quarry and temporary campsite

Before the start of any land clearance activities, qualified ecologists (a botanist, an ornithologist, a mammalogist, a herpetofauna specialist) will conduct comprehensive biodiversity surveys to identify ecologically sensitive areas. This includes looking for signs of species of conservation concern and marking trees to be protected from clearance as part of the tree protection system at the quarry site on the Mimvunza River.

The botanist will determine the exact location of the tree protection system and estimate the required distance and length for the fence. Any occurrences will be logged in the Wildlife Tracker. The day before the clearing of vegetation, carry out a pre-clearance survey to check no nesting birds, pangolins, or other sensitive species are present.

If sensitive fauna is found, it will trigger appropriate wildlife rescue protocols.

Following these surveys, a detailed report will be prepared to document key findings and highlight any ecological risks or constraints identified on site, providing guidance for appropriate mitigation measures. This will include:

- Records of both direct and indirect sightings of species of conservation concern.
- Identification and documentation of any breeding habitats, including nests.
- Precise mapping of the tree protection system at the quarry site and its road access, with an estimate of the required fencing length and setback distance.
- Description and mapping of other priority plant species of conservation interest.
- Assessment of the need to protect, transplant, or temporarily store these species in a nursery.

Invasive species surveys in the construction influence area

The project will deploy a regular monitoring program during and after construction to track the emergence or spread of invasive species. Monitoring will be conducted through visual surveys and comparison with pre-construction baseline data, focusing on known hotspots such as the dam area (eastern and western sides).

Before any vegetation clearance begins, the Contractor will perform an initial drive-through or walk over of all Working Areas to identify and map the locations of AIS, recording precise coordinates. Any AIS detected during this survey must be removed immediately to minimize the risk of spread and reduce the need for ongoing control measures. A weekly monitoring program will then be implemented to track the status of AIS—recording presence, abundance, and reproductive condition (e.g., maturity, seeding, flowering)—across all relevant sites, including:

Any AIS detected during this survey must be removed immediately to minimize the risk of spread and reduce the need for ongoing control measures.

- Direct footprint area
- Access roads (especially newly established routes)
- Quarry and campsite areas and batching plant.

All observations and corrective actions will be logged in the AIS Management Register, capturing date, site name, GPS coordinates, responsible personnel, and the measures applied. Follow up inspections will be carried out as needed to detect and address any regrowth in cleared areas.

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Upon completion of construction, the Contractor will continue site monitoring for one year. This post-construction phase will assure that invasive species are kept in check and that the reinstated vegetation establishes successfully.

Pre-construction surveys for the topsoil study

This measure is linked to the offset plan, which is described in Section 5.5.2.8. It must be implemented prior to any construction activities.

5.6.2.3. MANAGING PERMANENT LIGHTING DURING DAM OPERATION

The objective is to have African Parks feedbacks after the implementation of this measure. The MWR is indeed affected by the current dam operation, so integrating feedback into the dam's environmental management system is essential for continuous improvement.

5.6.2.4. CONTROL ACCESS AND AWARENESS FOR ROAD CROSSING THROUGH MAJETE WILDLIFE RESERVE

Following the completion of construction works, the access road to the dam will pass through the MWR to reach the dam site. This situation creates potential risks for biodiversity, visitor experience, and overall reserve integrity. To mitigate these risks, a comprehensive awareness and control measure will be implemented.

- Awareness signage:

  Informative and clearly visible panels will be installed along the access road within the reserve. These signs will highlight key rules and risks, including speed limits, prohibition of wildlife disturbance, prevention of littering, and respect for sensitive habitats. African Paks will be involved in the design of the awareness panels.
- Training and awareness programs: The trainings are explained in section 5.5.2.7.
- Governance of road use:

  The frequency and conditions of road use must be subject to mandatory consultation between the reserve management authority (African Parks) and project operators. African Parks reserves the right to restrict or prohibit access during critical ecological periods.
- Mandatory ranger escort:

  Every crossing of the reserve by project staff or maintenance teams will be conducted under the supervision of a designated ranger. This measure assures compliance with reserve rules, provides immediate monitoring of behaviour, and reduces risks of disturbance to wildlife.

5.6.2.5. PREVENTION OF FAUNA TRAPPING BETWEEN SPILLWAYS

This part of the measure focuses on protecting the biological environment and avoiding or reducing any impact on biodiversity during operation of the dam when both spillways are functioning.

The dam construction area will return to the management of African Parks in the Majete Wildlife Reserve during the operational phase, as well as after the implementation of the SVTP program. Fauna will recolonize the site.

Fauna trapped in spillways during high-flow conditions can face significant risks, including injury or drowning. For the safety of local wildlife, the project will implement

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several mitigation strategies designed to prevent animals from becoming trapped and to facilitate their safe escape if they are. Regular monitoring will be conducted to detect any fauna that may have become trapped within the spillway area.

Monitoring should be conducted during both seasons. In the rainy season, weekly observations are recommended, particularly after heavy rainfall events. In the dry season, monthly monitoring is advised, especially in the months preceding rain, to detect early signs of wildlife presence or colonization.The surveys should be conducted by foot patrols and drone flyovers. Any direct and indirect sightings will be reported on a logbook. Any species will be monitored (small to medium terrestrial mammals; reptiles; ground-nesting birds; larger fauna).

If any animals are found to be trapped, a detailed rescue protocol will be carried out as follows:

- The protocol will be composed by a team of trained rangers including veterinary (from African Parks) equipped with the necessary tools and expertise to rescue and relocate animals without causing harm.
- If any animal is spotted trapped on the island or in a flood-prone area, the observer will immediately contact the wildlife rescue team. The animal is identified (species, size, behavior, signs of distress…) and the GPS location is recorded.
- A risk assessment will be carried out on site to determine whether it is possible to access the animal safely; whether there is a risk of drowning; the state of the animal (e.g. stressed, injured, aggressive or juvenile); and the type of capture required (e.g. manual, net or chemical).
- The rescue team will implement a safe capture using low-stress, non-injurious capture methods.
- A health check will be conducted on the species (breathing, visible injuries and signs of stress) to determine whether the species should be placed in a crate, carried on a stretcher, transported to a temporary holding center or entrusted to a vet.

The protocol will be developed in collaboration with African Parks (including veterinary professionals) and Department of National Parks and Wildlife experts for the well-being of the animals.

5.6.2.6. INVASIVE SPECIES MANAGEMENT DURING OPERATION

This part of the measure focuses on protecting the environment from the spread of Invasive Alien Species during the operation of the dam.

During the construction phase, a survey to identify Invasive Alien Species and a removal program have been planned to eliminate all species on site. Due to the invasive nature of Invasive Alien Species, a targeting survey should be implemented during the operation phase to observe any outbreaks of Invasive Alien Species .

Invasive species management should be part of an adaptive management plan that is regularly updated based on the results of monitoring efforts. This approach allows for flexibility in response to changing conditions or emerging threats from new Invasive Alien Species. The measure will be developed in the Environmental and social monitoring plan.

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5.6.2.7. HUMAN WILDLIFE CONFLICT MITIGATION PROGRAM

This program aims to minimize wildlife conflict in the area around the hydropower plant. During the operation of the dam, the direct footprint area will be returned to the Majete Wildlife Reserve. Species will be able to recolonize the site, which is very close to the hydropower plant. Given this rewilding process, it is essential to prevent potential interactions that could compromise both staff safety and wildlife conservation objectives.

To mitigate this risk, a three-pronged strategy will be implemented, combining physical deterrence, awareness-building among personnel, and ongoing wildlife surveillance.

The program will be lasting for the early 5 years during the operation. The early years are critical to monitor post-restoration dynamics in wildlife (return of species, corridor shifts, new behavioural patterns). Institutional memory is vulnerable to staff turnover; therefore, long-term efforts are needed to embed best practices and maintain continuity.

- Years 1–3: 3 to 4 sessions per year (for new recruits, refresher sessions, seasonal or incident-related events)
- Years 4–5: 1 to 2 sessions per year (during the stabilization phase)
- Ad hoc sessions: in response to specific incidents or field observations.

The targeted audience will include: the permanent staff, the maintenance teams, the security or guarding personnel, the community partners (in case of local involvement, e.g., participatory management)

The estimated total of trainings are 15 sessions after the construction phase.

Implementation of a non-intrusive barrier

A non-intrusive physical barrier (such as a low-impact electric fence, natural vegetation buffer, or stone boundary) will be installed along the periphery of the hydropower facility, in coordination with the Majete Wildlife Reserve. The barrier will serve to:

- Discourage wildlife from entering operational areas, without fragmenting the habitat or altering animal movement patterns beyond the plant zone.
- Avoid accidental contact between staff and large mammals (e.g., elephants, buffalos, or predators) that may roam near the site.
- Verify compliance with best practices in conservation fencing, which minimize negative effects on fauna and preserve landscape connectivity.

The design and location of the barrier will be validated through consultations with MWR's conservation team to verify compatibility with conservation objectives.

Awareness programs for the Employer's hydropower plan staff

A dedicated awareness and training program will be conducted for all staff working at the hydropower plant. The sessions will focus on:

- Basic knowledge of local wildlife species and behaviours.
- Do's and don'ts in case of wildlife sightings or encounters.
- Reporting protocols for wildlife presence or conflict situations.
- Promoting a conservation-oriented culture within the workforce.

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- Requirements regarding the use of the road through the reserve: All personnel authorized to use the access road will receive training sessions covering the ecological sensitivity of the reserve, risks associated with road crossings (wildlife collisions, noise, pollution), and the importance of compliance with reserve regulations.

Refresher training sessions will be scheduled periodically and especially when new staff are recruited. African Parks will be involved in the content of the awareness programs.

5.6.2.8. OFFSET PLAN

Context of the measure

Of the 25 hectares affected by temporary construction sites, 22 hectares can be restored. The temporary camp site and the access road to the quarry site, however, represents a permanent impact that cannot be restored as part of the mitigation strategy and therefore requires the implementation of compensatory measures (BBOP principles, Figure 5-4). The objective of biodiversity offsets is to achieve, on the ground, no net loss and preferably a net gain in biodiversity, with respect to species composition, habitat structure, ecosystem functions and human use, as well as the cultural values associated with biodiversity[7].

The construction of an access road will result in a residual loss of almost 1 hectare and the temporary camp site of 2 ha of vegetative cover composed of:

- The access road to the quarry site comprises open dry deciduous forest type of mixed species with *Terminalia sericea, Bauhinia petersiana* and Acacia species as dominant species.
- The proposed camp site comprises disturbed open deciduous forest and partly dense thickets of dry savanna woodland vegetation type. The open deciduous forest thickets are dominated by *Vachelia karoo* species and *Dichrostachys cenerea*. Grasses and herbs cover approximately 60-70% of the open areas.

The proposed compensation strategy will be implemented within the direct footprint area (dam area), which has been heavily degraded by successive phases of construction activities. This area, formerly included within the Majete reserve and temporarily allocated for project works, now shows significant ecological damage, particularly the complete loss of topsoil.

According to BBOP principles, offsets must be designed to achieve “like-for-like” or “in-kind” compensation whenever possible, checking that residual impacts are balanced by gains in habitats of equivalent ecological value.

The proposed compensation site, located within the dam area, is classified as low-lying deciduous savanna forest. This habitat belongs to the same biogeographic context as the impacted sites, sharing similar ecological processes, vegetation structure, and species composition. Functionally, it provides comparable ecosystem services, including soil stabilization, habitat for savanna fauna, and maintenance of woodland connectivity.

[7]Business and Biodiversity Offsets Programme (BBOP). Standard sur les offsets de biodiversité, BBOP, Washington, D.C., 2012.

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To address the permanent loss of habitat, the strategy will prioritize the rehabilitation of the site through topsoil restoration as a prerequisite to any planting activity. Once soil conditions are re-established, a structured plantation plan will be undertaken to restore vegetation diversity, stabilize soils, and re-establish the ecological functions that were originally present in the dam area. This approach enables that compensation is both ecologically meaningful and directly linked to the landscape-level impacts of the project.

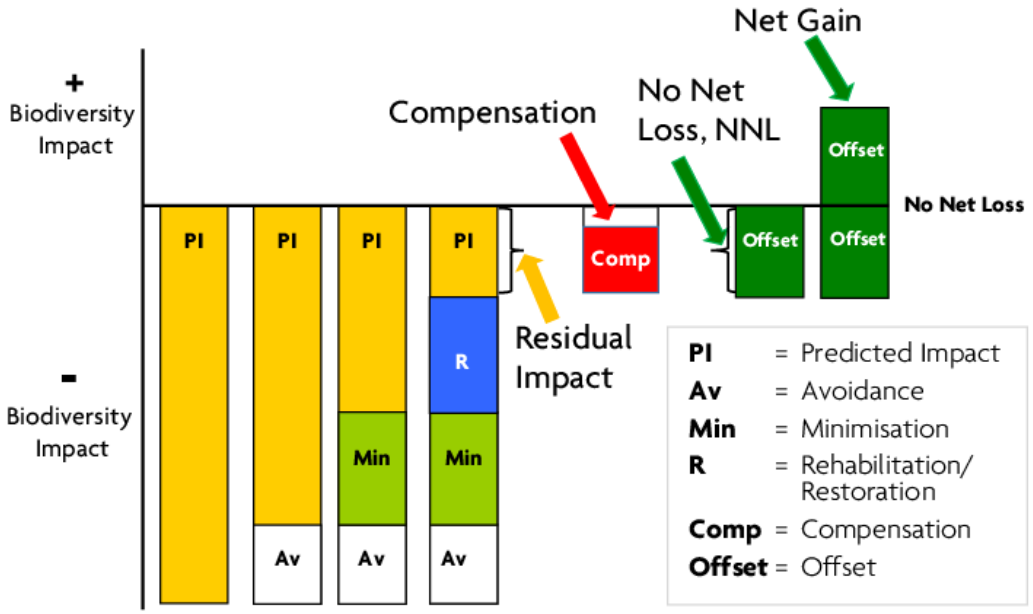


Figure 5-4: Mitigation hierarchy (source: BBOP adapted from Rio Tinto)

Content of the measure

The offset strategy will be implemented across the entire site of more than 5 hectares, with a clear objective for ecological equivalence and measurable biodiversity gains.

- Topsoil will be rehabilitated throughout the footprint – in most degraded areas – to restore fertility, improve infiltration, and create favourable conditions for natural regeneration.
- Within this framework, at 5 hectares will be actively replanted in the form of islands located in the most degraded patches, using native and priority species arranged in mixed patterns to mimic natural woodland composition.
- In addition, restoration activities are planned as part of the construction process itself (see section 4.13. CP12), taking into account that rehabilitation is not treated as an isolated measure but integrated into the broader project operations.

By combining site-wide topsoil recovery, island replanting, and construction-linked restoration, the measure secures soil stability, re-establishes vegetation cover, and facilitates the long-term recolonization of fauna from Majete, thereby delivering proportional and functional compensation consistent with BBOP principles.

Study about topsoil

The proposed measure will begin with a dedicated study to assess the compatibility of the excavated topsoil for reuse in the direct footprint area. Both impacted areas and offset site (dam area) will be surveyed.

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This study will be carried out with appropriate experts to verify soil quality, ecological suitability, and the absence of pollutants or contaminants.

- The translocation of this material must follow specific requirements to verify ecological compatibility.
- Prior to transport, soil studies should be conducted to verify the absence of pollutants and contaminants, given the sensitivity of the receiving habitats.
- Its composition must be assessed to confirm that it is a priori compatible with the historical habitats present in the direct footprint area.

Based on the results, the restoration strategy must include a detailed identification of the areas most degraded in terms of topsoil condition. These priority zones will be rehabilitated first to verify soil fertility and stability before any planting activities are undertaken.

Once the topsoil has been restored and stabilized, a plantation plan will be implemented using seedlings sourced from the Majete nurseries. This approach makes it possible that native and conservation-priority species are reintroduced under controlled conditions, thereby restoring vegetation diversity, stabilizing soils, and compensating for the permanent loss of forest cover.

If the excavated topsoil proves to be incompatible, it should not be reused on the footprint area. In such a case, the strategy would shift toward sourcing clean and ecologically suitable soil from nearby sites or reconstituting a fertile substrate using sand, compost, and organic amendments. This reconstructed soil would then be stabilized through the introduction of pioneer cover crops, which help fix the soil and enrich it with organic matter. Once the substrate has regained sufficient fertility and stability, the plantation plan with conservation species can be implemented.

The top-soil survey will be conducted during *Pre-survey biodiversity measures before the construction activities* (section 5.5.2.1.).

Plantation strategy

Based on the findings of this survey, a detailed compensation plan will be developed. This plan will focus on ecological restoration through reseeding and replanting of species of conservation concern, notably *Dalbergia melanoxylon*, *Terminalia sericea*, *Afzelia quanzensis*, and *Pterocarpus angolensis*.

- Site preparation:
  - Clearing degraded patches of invasive alien species.
  - Soil decompaction and enrichment where necessary to improve germination and root establishment.
- Reseeding and replanting:
  - Direct sowing of native seeds in open areas to accelerate natural regeneration.
  - Planting nursery-raised seedlings of the four priority species to make it possible survival and growth.
  - Establishing mixed planting patterns to mimic natural woodland composition.
- Management of invasive alien species:
  - Systematic removal of Invasive Alien Species through manual uprooting or controlled cutting.
  - Regular monitoring to prevent recolonization.

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  - Community-based patrols to maintain continuity of Invasive Alien Species control.
- Participatory ecological monitoring:
  - Training local communities to monitor seedling survival, canopy cover, and wildlife presence.
  - Setting up simple indicators (e.g., percentage of seedling survival after 1, 3, and 5 years).
  - Involving community members in maintenance activities such as watering, mulching, and protection against grazing.
- Wildlife and habitat monitoring:
  - Recording the return of key fauna species as indicators of habitat recovery.
  - Observing ecological connectivity between rehabilitated sites and surrounding woodlands.

The monitoring is described in section 6.3.14. *Monitoring of the offset plan.*

The employer must liaise with nurseries, particularly those of the Majete Wildlife Reserve and Malawi Forestry Research Institute.

Ecological Equivalence and Net gain

The compensation measure provides ecological equivalence by targeting the same components (species, habitats, functions, and ecosystem services) that were impacted. It is not limited to quantitative replacement but also addresses functional quality, such as soil stabilization, biodiversity support, and ecological connectivity. By restoring topsoil, reintroducing native species from Majete nurseries, and monitoring fauna return, the measure provides adequate and proportional compensation for biodiversity losses. This approach is fully consistent with BBOP principles.

Tableau 5-1: Qualitative assessment of ecological equivalence

Affected components	Losses on impacted site	Gains on compensation site	Ecological equivalence
Species	Presence of *Terminalia sericea*, *Bauhinia petersiana*, *Acacia spp.*, *Vachelia karoo*, *Dichrostachys cinerea*	Plantation of native species (*Dalbergia melanoxylon*, *Terminalia sericea*, *Afzelia quanzensis*, *Pterocarpus angolensis*) and direct sowing of local seeds	**YES** – same biogeographic context, restoration of native diversity
Habitats	Dry deciduous forest and savanna woodland degraded by construction	Restoration of low-lying deciduous savanna forest in the footprint area	**YES** – "like-for-like" habitat compensation

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Affected components	Losses on impacted site	Gains on compensation site	Ecological equivalence
Functions – Connectivity	Local fragmentation of forest patches	Reconstitution of continuous cover, linking rehabilitated site with surrounding woodlands within de Majete	**YES** – ecological connectivity restored within the Majete **NO** – Loss of some continuity around the cleared land.
Functions – Biological	Loss of soil stabilization, regeneration potential, fauna habitat	Topsoil rehabilitation, mixed planting, gradual return of fauna	**YES** – biological functions re-established
Ecosystem services	Reduced vegetation cover, loss of erosion control, microclimate regulation, and resource provision	Soil stabilization, canopy recovery, provision of resources, regulation services restored	**YES** – ecosystem services compensated proportionally

The proposed compensation measure will generate significant biodiversity benefits. It will restore vegetation cover within a habitat considered critical for the dry deciduous savanna ecosystem, thereby reinforcing ecological resilience.

The intervention will rehabilitate areas that have been heavily degraded by successive construction activities over the past decade, re-establishing soil stability and vegetation diversity. In the long term, the restored habitat will provide suitable conditions for the recolonization of fauna from the Majete reserve. This approach makes it possible that compensation is not only quantitative but also functional, contributing to the recovery of biodiversity integrity and associated ecosystem services.

5.6.2.9. CRITICAL HABITAT MITIGATION MEASURES

The mitigation measures proposed for the operation phase have been specifically designed to address critical habitat concerns and species of conservation importance. These measures focus on three key impacts: the risk of fauna becoming trapped on the island between the main and emergency spillways, the risk of human-wildlife conflict, and the reduction of downstream nutrient loads.

Particular attention must be given to species that trigger critical habitat status. These species should be a central focus during awareness campaigns and capacity-building training.

Specific actions should include the prevention of fauna trapping between spillways, the implementation of a human-wildlife conflict mitigation program, and the development of a sediment management and environmental flow plan. Each of these measures must take into account the needs of species that could trigger critical habitat designation. These include species confined to the Majete Wildlife Reserve but potentially moving into surrounding areas and species primarily associated with Elephant Marsh: the Black Rhino, African Wild Dog, and vulture species such as the White-backed Vulture and White-headed Vulture, The Black Heron, the African Openbill, the African Skimmer, the

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Whiskered Tern, the Collared Pratincole and the Basra Reed-warbler and the Zambezi flapshell turtle.

The presence of these species requires strict adherence to mitigation and monitoring measures, given the high conservation stakes and the potential for irreversible impacts.

In addition, the measures must consider all other species of conservation concern found within the Area of Influence, even if not directly within the project footprint, considering that any direct or indirect impacts, such as increased human activity, noise, pollution or access, are minimized (e.g. Hippopotamus, Leopard, Lion, African savannah elephant, Temminck's pangolin, monkeys, other birds of preys, Nile crocodile, fishes…).

5.6.2.10. NET-GAIN PROGRAM

According to the mitigation strategy, all residual impacts on critical habitat species are non-significant, except for the reduction in downstream nutrient loads, which affects species primarily associated with the Elephant Marsh. To address this issue, net gain measures will be implemented for these species.

Due to the proximity of the Majete Wildlife Reserve (MWR) and the high risk of impacts on critical habitat-triggering species, a precautionary approach has been adopted, and additional net gain measures have been proposed for species within the MWR.

Proposed measures for the MWR are framed within a logic of recognizing and addressing the historical impacts associated with past construction activities. Indeed, during the lease of the *direct footprint area* to projects undertaken by EGENCO and the Shire Valley Transformation Programme (SVTP), several damages accumulated in the immediate vicinity of the reserve, including:

- Increased noise, visual, and atmospheric disturbances (dust),
- Irreversible loss of natural habitats,
- Soil degradation and loss of topsoil,
- Deterioration of the landscape quality and the overall tourism appeal of the reserve.

These impacts, some of which are difficult to reverse, have contributed to impacts in both the ecological and tourism value of the MWR. In this context, the proposed measures aim to integrate corrective and compensatory actions, thereby responding to current challenges while also addressing the ecological legacy of past activities.

- Implement a restoration strategy along the Shire River to address the current degradation of the watercourse, primarily caused by riverbank erosion, sediment accumulation, and fluctuating water levels resulting from dam operations.
- Undertake habitat restoration measures on the former construction site, specifically to (see CP12):
  - Mitigate the visual impacts of the disturbed area on visitor tours within the reserve,
  - Restore topsoil in the direct footprint area
- Provide targeted support for conservation measures, including:
  - Actions focused on two key species within the reserve that trigger critical habitat requirements,
  - Strengthening community awareness and engagement initiatives to reinforce local conservation efforts.

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African Parks will receive the fund to carry out the implementation of the MWR net gain program.

Measures related to Elephant Marsh

Context of the measure

The Critical Habitat Assessment (CHA) has identified that several wetland-dependent species primarily associated with the Elephant Marsh trigger Critical Habitat under World Bank ESS6. These include the Zambezi Flapshell Turtle (*Cycloderma frenatum*) and key migratory bird species, namely the Black Heron, African Openbill, African Skimmer, Whiskered Tern, Collared Pratincole, and Basra Reed-warbler.

The Elephant Marsh is currently the focus of several ongoing conservation and management initiatives, notably:

- The development of Malawi's first Community Conservation Wetland Area, aiming to balance biodiversity conservation with community livelihoods.
- The Mpatamanga ESMP and Offset Strategy, which supports the setup of a Community Conservation Area (CCA) within the marsh, along with biodiversity monitoring and restoration measures.
- The Shire Valley Transformation Program also includes monitoring of the Elephant Marsh under its Natural Resources Management component.

A draft management plan for Elephant Marsh (Government of Malawi, 2024) was expected to be validated in July 2024. It outlines a phased approach to CCA implementation, including biodiversity monitoring and baseline data collection.

Content of the measure

In line with the mitigation hierarchy and the aim of achieving biodiversity net gain, targeted monitoring measures on those specific measures will be implemented to reinforce the ongoing baseline and management actions described below.

Monitoring will be included in the "Create a CCA and develop a CCA management plan" measure of the Mpatamanga project.

Species Conservation Actions

Context of the measure

These actions will be aligned with the finalization of the Elephant Marsh Management Plan and will verify that species of conservation concern receive focused attention during the establishment and operationalization of the Community Conservation Areas. It will also contribute to the long-term monitoring of biodiversity gains, in support of the net gain objective for wetland ecosystems and species.

Content of the measure

To strengthen the alignment with the mitigation hierarchy and support the net gain objective for critical habitat, the project will implement a targeted monitoring measure focused on the species identified above. Rather than duplication efforts, this measure will:

- Check that critical habitat-triggering species are specifically integrated into the biodiversity monitoring protocols developed for the Elephant Marsh Community Conservation Wetland Area.

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- Support the development and refinement of baseline data on population status, breeding activity, and seasonal movements for the listed species.
- Provide technical and capacity-building support to local partners and conservation authorities, verifying species-specific indicators are integrated into CCA performance monitoring.
- Contribute to species-specific data into the ongoing ecological monitoring being established as part of the CCA Offset implementation phase under the Mpatamanga Offset Strategy (2024–2027).

As this measure builds upon established frameworks and partner commitments (Government of Malawi, African Parks, SVTP, Mpatamanga Project), no significant additional financial or operational costs are anticipated.

This measure will be implemented during the setup and early implementation phases of the Elephant Marsh CCA, supporting the validation of conservation outcomes in biodiversity-rich wetland areas. It builds on existing institutional commitments and funding, and as such, is not expected to incur significant additional financial costs.

Measures related to the Majete Wildlife Reserve

In alignment with the mitigation hierarchy and the objective of achieving biodiversity net gain, a comprehensive package of measures is being proposed and discussed with African Parks, the managing authority of the Majete Wildlife Reserve (MWR). These actions were built on existing strategic frameworks, including the Majete Wildlife Reserve 5-Year Business Plan (2023–2027) and the measures proposed regarding the ESMP of SVTP and Biodiversity Action Plan of Mpatamanga.

The proposed Net Gain Measures aim to enhance ecological integrity; support threatened species and restore degraded ecosystems within Majete Wildlife Reserve.

No measures were proposed regarding the Black rhino as it was mentioned by African parks that: "*The rhino population in Majete is progressing well, with sustainable growth and a stable demographic structure. Continued protection efforts have been effective in ensuring their long-term viability, and there have been no major conservation threats disrupting this positive trajectory. While poaching remains a concern in many regions, the reserve's intensive monitoring and security measures have so far helped maintain a safe environment for the species.*"

The proposed net gain is proposed for habitat suitability and species triggering the critical habitat (CH).

- Habitat suitability: Majete is considered a critical habitat due to its importance for several endangered species, such as the big five and critically endangered vultures. The MWR serves as a crucial refuge for these populations, particularly in light of pressure from surrounding human activities, and the conservation of its habitats is therefore crucial for species conservation.
- Species triggering the critical habitat:
  - Two species that trigger the CH are confined to the MWR, the Black rhino and the African wild dog.

  Three species are found in the MWR but can move between areas:

  - Two vulture species, including the White-headed and White-backed vulture (known movement between Liwonde, MWR and Lengwe National Park).
  - A reptile species primarily associated with lakes and floodplains (e.g. Elephant Marsh), which has recently been surveyed in MWR (2023).

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Targeted recovery and riverbank stabilization: site-specific strategy

Context of the measure

A riparian restoration and aquatic habitat recovery strategy is proposed to address the degraded ecological condition of the Shire River within the Majete Reserve. These areas show significantly reduced fish and macroinvertebrate diversity, indicating a severely altered ecological state.

Macroinvertebrate inventories have been conducted across various projects in the study area, including the Mpatamanga ESIA. As part of these assessments, the Zambian Invertebrate Scoring System was applied to evaluate the conservation status of the Shire River. The results from the aquatic macroinvertebrate inventories conducted in September 2023 revealed significant habitat degradation in the Majete Reserve, Kapichira Reservoir, and downstream of the Mpatamanga dam.

These areas show reduced biodiversity, primarily due to riverbank erosion, sediment accumulation, and fluctuating water levels, with the latter being further exacerbated by the operations of the Kamuzu Dam. The reduced diversity of fish species and macroinvertebrates indicates that the ecological state has been severely altered.

Discussions with African Parks (AP) have confirmed several key concerns:

- Riparian habitats are heavily degraded due to the impacts of past cyclones and ongoing erosion.
- While natural regeneration is occurring in some areas, physical barriers and high herbivore densities present challenges to full recovery. African Parks is actively considering strategies such as targeted reforestation, erosion control, and monitoring of aquatic biodiversity.
- Some areas are dominated by non-native species, which threatens biodiversity recovery.

Given the specific environmental challenges posed by physical and biological factors, this strategy primarily aims to enhance riparian vegetation in order to control erosion and restore aquatic biodiversity.

Riparian restoration will also provide a suitable habitat for establishing a viable population of aquatic fauna, including the critically endangered *Oreochromis karongae* species, which was inventoried in the dam reservoir but for which no viable population has been observed.

Content of the measure

- **Comprehensive inventory of riverbanks**

A detailed inventory of riverbanks will be conducted to identify the most degraded and vulnerable areas to erosion, considering the following factors:

- Vegetation degradation: Identify areas where natural regeneration is insufficient due to herbivore pressure, erosion, sediment accumulation or presence of invasive species.
- Physical characteristics of soils and riverbanks: Focus on areas with highly unstable soils or steep riverbanks that require targeted interventions.

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- Herbivore pressure: Map areas where herbivore activity is having a significant impact on vegetation regeneration. These zones will be prioritized for protective measures, such as temporary exclusion fences to prevent trampling.

The inventory will use a network of photographic transects and vegetation surveys. The state of vegetation and soils will be assessed using stability indicators, and herbivore pressure will be mapped.

The inventory will be conducted during the construction phase during the early mid-wet season (between November to April).

- **Targeted Recovery of riverbanks degraded areas**

Targeted recovery will be focused on the most degraded and vulnerable areas. The areas for recovery will be prioritized regarding:

- Areas where natural regeneration is insufficient due to high herbivore pressure.
- Areas where invasive species have become a significant problem.

Two strategies of recovery will be implemented:

- Natural recovery of degraded areas:
  - Protection of saplings: Temporary exclusion fences will be installed in selected riparian zones to prevent herbivores from damaging plants. This will enable the vegetation in sensitive areas adjacent to the river to recover from constant browsing pressure. This measure will be particularly important in areas with high herbivore density.
- Invasive species control and reforestation of degraded areas:
  - Conduct targeted clearance in areas dominated by Invasive Alien Species (*AP: "especially along the East Bank, as well as on the western side near the southern intake"*).

    A manual removal will be implemented on the outbreak of Invasive Alien Species involving physical pulling, digging or cutting of plants to prevent further growth and spread. Removal efforts will be followed by ecological restoration using native plant species.

    To protect the local biodiversity and water quality, it is key to avoid using harmful chemicals or herbicides that could inadvertently impact non-target species.
  - Reforestation strategy: Targeted reforestation must be implemented in areas where Invasive Alien Species has been cleared, or in areas of high degradation. These plants can outcompete invasive species by occupying space, improving soil stability, and providing habitat for native wildlife.

    Use native riparian species that are adapted to local ecological conditions and are resilient to erosion and trampling (e.g., *Acacia xanthophloea, Ficus*). These species should also provide habitat for aquatic fauna.

    The selection of species will be discussed with the Forestry Research Institute of Malawi (seeds collection and conservation efforts).

A collaboration with African Parks is crucial for the successful management of invasive species / replantation activities. Authorities can provide valuable insights into local ecosystems, offer resources for monitoring, and assist with the management of invasive species through community-based programs.

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Local conservation staff should be trained in identifying invasive species and using appropriate control methods. This builds local capacity for ongoing surveillance and intervention.

The strategy of revegetation should also be implemented during the construction phase between November to April. A monitoring program will be set up at the end of the construction phase and maintained for the first ten years of operation.

- **Erosion Control**

Riverbank stabilization through vegetative engineering and the reintroduction of natural structures will be implemented in highly eroded areas. Specific actions include:

- Living fascines: Installing living fascines along the riverbanks to stabilize the soil and reduce erosion. These structures will be particularly beneficial in areas prone to flooding. Wood and rocks: The reintroduction of dead wood and rocks into eroded areas will help to create habitats for macroinvertebrates and fish while reducing further erosion.

Species Conservation Actions

Context of the measure

The aim of these actions is to propose to enhance the conservation strategy of species which are triggering critical habitat:

- The African Wild Dog – *Lycaon pictus;*
- The White-headed vulture – *Trigonoceps occipitalis;*
- The White-backed vulture – *Gyps africanus,*
- The Zambezi Flapshell Turtle – *Cycloderma frenatum*

Regarding the African Wild Dog and vultures, these actions will be part of the predator-prey dynamics of the MWR.

Vultures, although not active predators, are considered indirect indicators of predator–prey dynamics. Their presence and activity reflect the availability of carcasses.

Content of the measure

- **GPS tagging and regional conservation frameworks of Vultures**
  - A targeted vulture monitoring program will be implemented to improve understanding of vulture spatial ecology, particularly their movement corridors. The aim is to strengthen conservation outcomes at the landscape level. Vultures often congregate around predator kills, making them valuable indicators of the upper trophic network. Implementation of a vulture GPS tagging program: GPS telemetry units will be deployed on a sample of individuals (including White-headed and White-backed vultures) in collaboration with the Endangered Wildlife Trust and African Parks.
  - Mapping of vulture movement corridors:
    - The GPS data will be used to analyze vulture movements and identify key flight and foraging corridors across the landscape.
    - Movement maps will be developed to support long-term conservation planning at the landscape level.

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- Integration of findings into regional conservation strategies:
  - The movement data and identified corridors will be shared with relevant conservation stakeholders through coordination meetings.
  - The findings will be used to inform and strengthen regional conservation strategies, verifying that vulture needs are integrated into broader landscape management.

- **Data-sharing, capacity, and financial support for the African Wild Dog**

  A strengthened approach will be applied to support monitoring efforts for African wild dogs. This includes improving data collection, coordination, and analysis to better understand population dynamics, habitat use, and threats, thereby contributing to more effective conservation planning.

- **Awareness programs for local communities:**

The objective is to reduce human-wildlife conflict and prevent vulture poisoning by engaging local communities in practical, culturally appropriate awareness activities during the construction phase. The program will be coordinated with African Parks to align with ongoing conservation efforts. This awareness program contains:

- Coordination with African Parks: Joint planning of awareness messages and community engagement tools, to align with their conservation priorities (particularly on vulture conservation and conflict reduction). Regular information-sharing and participation in their community outreach events when feasible.
- Community Awareness Sessions: At least 4 structured awareness sessions per year during construction, organized in key villages identified in coordination with African Parks and local authorities. Sessions will focus on:
  - The role of vultures in ecosystem health and why their protection matters.
  - The risks of poisoning (e.g., use of poisoned carcasses) for people, livestock, and wildlife.
  - Best practices to reduce human-wildlife conflicts (e.g., securing livestock, managing waste).
  - How to report wildlife incidents or dead birds safely and effectively.
- Locally adapted materials: Simple, illustrated posters and flyers in local languages developed jointly with African Parks and local educators, to reinforce messages shared during sessions.
- Community focal points: Identification and informal training of community representatives (including youth and women leaders) who will help relay key messages, monitor perceptions, and maintain communication between project teams and communities.

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5.6.3. Implementation modalities and budget

It is understood that the Employer will delegate the implementation of measures to relevant authorities or specialists when required, in particular to African Parks.

Table 5-4: Biodiversity management sub-plan estimated costs

Program	Activities	Responsible for the execution	Period of execution	Cost estimate
	Recruitment of two rangers in the Majete	EGENCO, African Parks	During construction and operation phase	Two rangers for 5 years **USD 69,000**
EP4	Pre-surveys measures	EGENCO, Consultant	- Before the construction activities during the mobilization phase. - During construction phase	One-week survey x 5 x3-4 experts: **USD 40,000**
	Managing permanent lighting during dam operation	EGENCO	During the operation phase	**USD 40,000**
	Control access and awareness for road crossing through MWR	EGENCO, African Parks	During the operation phase	Awareness panels: **USD 10,000**
	Prevention of fauna trapping between spillways	EGENCO, African Parks	During construction phase	15 vet interventions (rescue team) per year for 3 years **USD 210,000**
			During the operation phase	30 surveys per year **USD 560,000**
	Invasive species management	EGENCO	During construction and operation phase	Included in monitoring cost.
	Human Wildlife Conflict mitigation program	EGENCO, African Parks	During operation phase for 5 years	Non-intrusive fence + 15 trainings **USD 10,000**
	Offset Plan	EGENCO, African Parks	Before construction	Topsoil study **USD 37,000**
			During operation	Fences + reforestation program: **USD 330,000**
	Net-gain program/ Species Conservation Actions	EGENCO	Same schedule as Mpatamanga ESMP	Included in the Mpatamanga ESMP cost
	Net-gain program/ Targeted recovery and riverbank stabilisation	EGENCO, Consultant & Africa Parks	Before construction	One-week survey for one botanist x2: **USD 5,000**
			During operation	Fences + reforestation program: **USD 315,000**
	Net-gain program/ Species Conservation Actions	EGENCO, African Parks	During construction	10 GPS telemetry units+ awareness program: **USD 450,000**
			TOTAL	**USD 2,076,000**

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5.7. EP5 – Land acquisition, restrictions on land use and Involuntary resettlement plan

5.7.1. Justification and objectives of the plan

The construction phase requires the acquisition of approximately 8 hectares of land:

- 3 ha for the exploitation of quarry site at Maganga 2,
- 3 ha for the exploitation of a borrow site at Njezera,
- 2 ha for the establishment of a temporary contractor campsite at Maganga 1.

This phase also involves a change in land use to accommodate temporary facilities needed for construction activities, including the quarry site, borrow site area, and construction campsite.

The acquisition of land for the project required to draw a Resettlement Action Plan (RAP). It should be considered that as the land is mainly for agricultural use without building and equipment, no physical displacement will occur due to the loss of these land areas.

The objective of the Resettlement Action Plan is to clarify resettlement measures, organizational arrangements to be applied during implementation in a manner that is consistent with the requirements of national law and the World Bank ESS5. It presents a strategic and methodical process to allow that there is appropriate compensation upon land acquisition, relocation, loss of assets and impact on livelihood in the Project area considering poverty reduction.

The Resettlement Action Plan complies with EGENCO Environmental Management Policy, Malawi policy and legislation (such as the Land Act), the World Bank ESS5 about Land Acquisition, Restrictions on Land Use and Involuntary Resettlement.

The RAP is prepared in a separate report (referenced W00248-RAP-0006).

This program aims to prevent and reduce the following impacts:

Impact	Type of environment	Importance before mitigation measures
Loss of land due to the construction facilities (such as temporary campsite), quarry site...	Human	Moderate
Change in land use due to the construction facilities	Human	**Moderate**

5.7.2. Description of the measures

The avoidance measures prevented any physical displacement of people and loss of buildings.

The following mitigation measures are described in the RAP and implemented to minimize negatives impacts on the Project Affected Persons (PAPs) and the community:

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- Minimization measures:
  - The size of the area is defined according to the needs.
  - The access road is defined as using as much as possible the existing road.
  - The loss of crops was minimised by avoiding cultivated land;
  - Engaging with the community leaders to identity sites according to the needs.
- The compensation measures described in the RAP are as follows:
  - Compensation for the corresponding loss of land: 8 hectares for the cumulative loss of quarry site, borrow site, temporary camp site and the corresponding access road.
  - Compensation for the corresponding loss of livelihoods.
- Assistance programme is provided for vulnerable persons.
- A livelihood restoration plan is planned focusing on strengthening household resilience through complementary livelihood support measures as follows:
  - Crop production improvement with provision of agricultural input packages;
  - Collective support for agricultural practices with support to basic agricultural training;
  - Support to income diversification with selection of livelihood activities;
  - Transportation improvement with a new bicycle by affected household.

5.7.3. Implementation modalities and budget

EGENCO, with the support of the District land department, will be in charge of the implementation of the Resettlement action plan.

The estimate of the RAP budget is as follows.

Table 5-5: Resettlement Action Plan estimated costs

Program	Activities	Responsible for the execution	Period of execution	Cost Estimate (USD)
EP5	Compensation for the corresponding loss of land and trees	EGENCO with support of Chikwawa District Lands Office	Before the construction	**45 000**
	Livelihood restoration program	EGENCO	During construction	**60 000**
	Assistance program			**1 000**
	RAP implementation			**29 000**
	Contingency			**13 000**
			TOTAL	**USD 148,000**

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5.8. EP6 – Dam Emergency Preparedness Plan

5.8.1. Justification and objectives of the plan

The Dam Emergency Preparedness Plan (EPP) is a key component of the Kapichira dam safety program.

The Dam Emergency Preparedness Plan must comply with EGENCO policy, Malawi policy and legislation, the World Bank ESS4 about Community Health and Safety (in particular its Annex 1 about safety of dams) and the World Bank Group Environmental, Health, and Safety Guidelines.

The aim of this plan is to define a procedure for the direct operating personnel (dam operating personnel and appointed agencies) during an emergency or unusual occurrence. The objective is to assure the security, reduce the risk of human life loss and minimize property damage during an emergency at Kapichira during the construction activities.

This plan is in accordance with the flood assessment carried out by the Owner's Engineers. It considers the flood risks on project implementation considering climate change effects on flooding scenarios.

The main emergencies or unusual conditions that were identified as occur are:

- Failure or impending – overtopping
- Abnormal dam behaviour
- Earthquake
- Landslide
- Severe storms
- Piping
- Malfunction of the mechanical and ancillary works

This plan enhances the positive impact of reduced disaster risk associated with the presence of the emergency spillway by introducing an emergency preparedness strategy in case such a risk materializes. It should be complemented by an Emergency Action Plan, which will outline the specific measures to be implemented in the event of an emergency. It aims as well to mitigate the following impacts:

Impact	Type of environment	Importance before mitigation measures
Disaster risk due to flooding	Physical, biological, human	**Moderate**
Health and Safety risks for the employees	Human	**Minor**

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5.8.2. Measures description

5.8.2.1. INTRODUCTION

The following chapter is a summary of the preliminary Emergency Preparedness Plan (EPP) prepared by Studio Pietrangeli in June 2025 as part of the Good practice note on dam safety issued by the World Bank in March 2021. The lessons learned from the Ana storm should be considered during the detailed EPP.

5.8.2.2. ROLES AND RESPONSIBILITIES OF RELEVANT PERSONNEL

The general organization for dam operation and safety in emergency conditions is divided into two main levels:

- The dam management unit, which works at the dam's local level and is responsible for all the operation and maintenance activities of the dam, including the dam monitoring and the activities aimed at reducing the risk in case of an emergency event. Here, this is EGENCO as dam owner.
- The emergency management institutions that are responsible for reducing the risk associated with a dam break or exceptional floods by adequate preparedness and emergency planning in the areas that are potentially affected by critical events. In Malawi, the Department of Disaster Management Affairs has the leading coordination role in the management of an emergency.

5.8.2.3. DAM EPP GENERAL RESPONSE PROCESS

The general response process is described in the following sections and is separated in the different steps :

- STEP 1: Emergency Detection and Evaluation
- STEP 2: Emergency Level Determination/Alarm phase classification
- STEP 3: Notification and Communication
- STEP 4: Emergency Action
- STEP 5: Termination and Follow Up

The following diagram is a scheme of the general response process.

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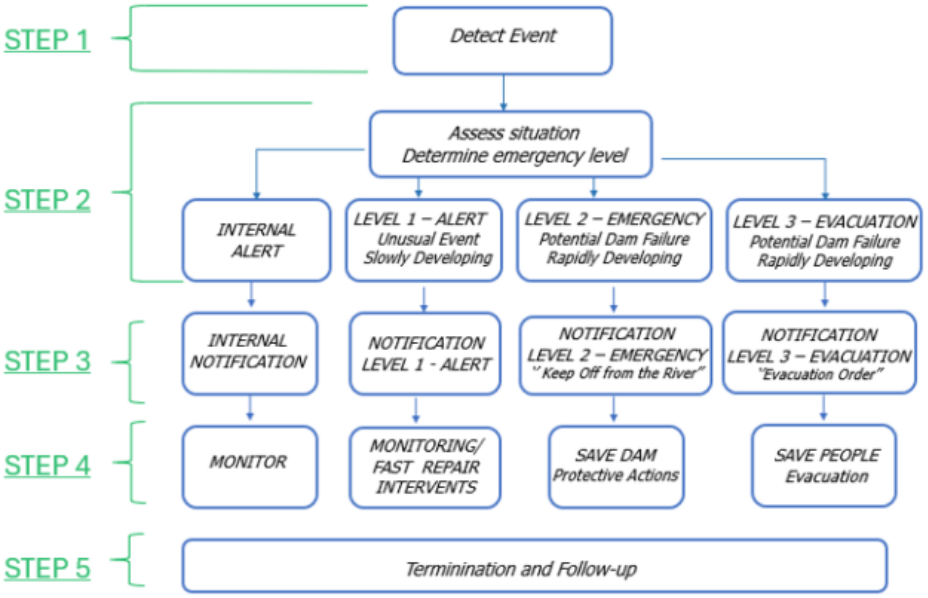


Figure 5-5: EPP General Response Process - scheme

STEP 1 Emergency Detection and Evaluation

A quick and effective detection of any unusual event in the behaviors of the dam is very important to limit its consequences and guarantee the safety of the dam.

Depending on the level of danger and the consequent action to be taken, the threats and potential threats to the dam are classified as:

- **Situation of an emergency** is a serious event, which develops suddenly and unexpectedly and will endanger the structural integrity of the dam. In case a dam failure cannot be avoided, then the downstream population has to be evacuated.
- **Unusual occurrence** is defined as an event that takes place or a condition which develops that is not normally encountered in the routine operation of the dam and reservoir and which may endanger the dam. The threat may probably be “mastered” as long as a higher degree of threat is not reached.

STEP 2 - Alarm phase classification

This section classifies the levels of emergencies according to their severity and urgency. After an unusual or emergency event is detected, the Dam Owner (or his alternate) is responsible for classifying the event into one of the following emergency levels:

- **Internal alert** - This level does not imply a real threat.
- **Alarm level 1** – EMERGENCY– Nonemergency, unusual event, slowly developing
- **Alarm level 2** - EMERGENCY – Potential dam failure situation, rapidly developing
- **Alarm level 3** – EVACUATION – Urgent, dam failure appears imminent or is in progress

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STEP 3 – Notification and communication

The general alarm notification procedure in emergency events are as follows:

- **Internal Alarm:**

In a situation of "internal alert", the Dam Manager will communicate the unusual condition to the Dam Owner. The dam owner will then follow up monitoring and observations.

- **Alarm phase 1**:

The Dam Manager will advise immediately the Dam Owner. The Dam Owner shall forward immediately the notification to: Dam Safety Engineer /Technical Expert, EGENCO, Districts Government and the Emergency Action Unit (EAU) Manager.

All stakeholders shall provide feedback to the Dam Owner and the dam owner shall keep the stakeholders informed at an interval of not more than one day as long as the Alarm phase 1 persists.

- **Alarm phase 2 and phase 3:**

The Dam Manager will advise the same people as for a phase 1 alarm plus the department of Disaster Management Affaires and Department of Climate Change and Meteorological Services.

The Dam Owner shall keep these Stakeholders informed at an interval of not more than 12 hours as long as the Alarm Phase 2 or Phase 3 persists.

The EAU Manager shall forward immediately the Alarm 2 and 3 Notification to Malawi Police Service, Malawi Red Cross Society, Fire Services, Malawi Defence Force, Emergency Medical Services, United Nations Agencies, Non-Governmental Authorities, Media, Designed Emergency Shelter Owner/Manager, Local Radio.

Because of the vital importance of communications during emergency situations, it is mandatory to provide a primary as well as a backup communication system for communications between the Dam Owner, EAU and Local Agencies. An auxiliary power supply for the communication system should also be implemented.

The primary radio communications system will be provided (with a base station and one or more mobile units at the dam). Telephone communications will be used as a backup communications system.

The Emergency Action Plan will provide information on phone numbers and the radio communications system for all people involved in the EPP, together with all software and phone, eventually developed for this purpose.

STEP 4 – Emergency actions

For all the possible events, the operating personnel shall report immediately the occurrence to the Dam Owner through the notification of the Dam Manager. The Dam Owner receives the periodic reports from the Dam Manager.

In general, initial reports should include briefly the following information and be documented:

- Subject: What happened and type of incident
- Time and Date: Daylight or standard
- Location: Where the incident occurred

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- Summary of incident: Briefly describe the incident
- Names and Titles: Person involved
- Status of incident: Completed and pending actions/decisions

Normal procedures to be undertaken in case of a general emergency are represented in the diagram below.

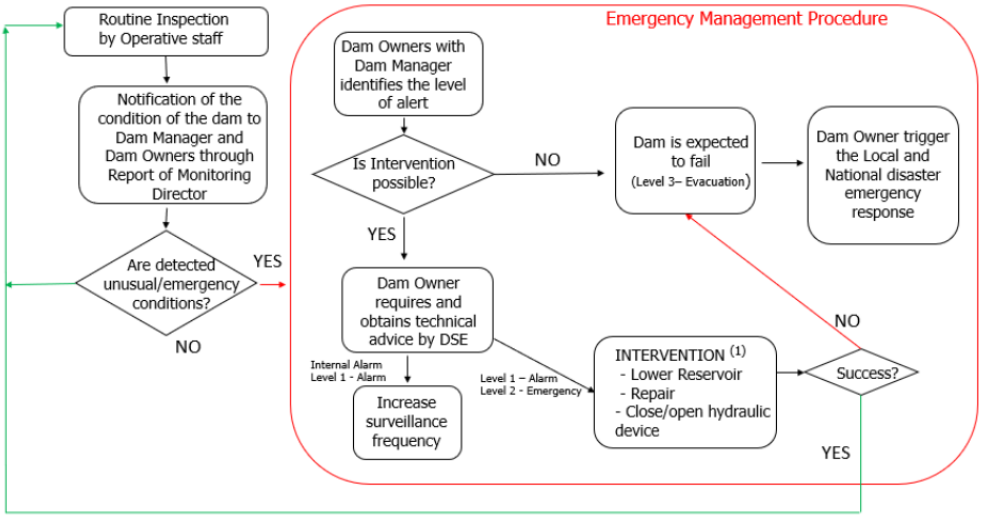


Figure 5-6: Actions undertaken in case of emergency/unusual condition diagram

STEP 5 – Termination and follow-up

When the emergency at the dam will be marginalized and the all-emergency actions will be concluded, termination of the emergency communication shall be given by the Dam Owner.

The dam owner / operator, or the dam safety expert, is responsible for notifying the authorities that the condition of the dam has been stabilized. At this stage, the local authorities may declare an end to the public emergency response. Following the termination of an incident, the dam owner / operator, in coordination with disaster management authorities, should conduct an evaluation that includes all affected participants.

At a minimum, the following should be discussed and evaluated in an after-action review:

- Events or conditions leading up to, during, and following the incident
- Significant actions taken by each participant and improvements for future emergencies
- All strengths and deficiencies found in the incident management process, materials, equipment, staffing levels, and leadership
- Corrective actions identified and a planned course of action to implement recommendations

The Dam Owner will take note of all the actions undertaken during the emergency event in the detailed Dam Emergency Situation Report. This document will be used as a basis for discussion. All observations discussed during this meeting, at which also the Dam

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Owner shall participate, will be used for updating and improving the EPP and/ or Emergency Action Plan.

5.8.2.4. PREPAREDNESS

The preparedness activities, as far as the dam is concerned, include basically all actions taken before the development of the incident or unusual events which could cause the failure of the dam.

These activities have the aim to facilitate response actions and prevent, moderate or alleviate the effect of the incident.

The main preparedness activities shall include:

- Surveillance and Monitoring: The operative personnel are responsible for carrying out the surveillance and monitoring of the dam. All collected data will be provided to the Dam Manager.
- Response during the weekend and holidays: It is necessary that the technical personnel at the dam site work on a rotating basis to provide a 24/hour site surveillance and identify a deputy of the Dam Manager in case of a holiday
- Response during adverse conditions (periods of darkness, adverse weather)
- Alternative sources of power. The standby generator will provide an electricity supply to operational equipment in case the external supply has failed.
- Warning alarm System: emergency warning devices such as sirens will be set up in the areas that are likely to be submerged in case of large water release and dam failure.
- Training and Exercising: The population living in the downstream area of the dam should be acquainted with the evacuation plans. Permanent information boards will be installed in the main villages and municipalities.

5.8.3. Implementation modalities and budget

The Emergency Preparedness Plan will need to be complemented by an Emergency Action Plan (estimated to be prepared in 6 months) considering the environmental and social context of the area and will need for independent assessment every five years.

Program	Activities	Responsible for the execution	Period of execution	Cost Estimate
EP6	Emergency Preparedness Plan	EGENCO	During the operation	As part of the operation rules of EGENCO

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5.9. EP7 – Occupational Health, Safety and Security Plan

5.9.1. Justification and objectives of the plan

This aim of this plan is that all operations and maintenance activities at the Kapichira Dam are carried out in safe and secure conditions, protecting the health and safety of employees, contractors, and maintenance teams.

This plan addresses routine occupational hazards not related to flooding or dam failure, which are covered under the Emergency Preparedness Plan (EP6).

EGENCO has produced the following documents about health, safety and environmental aspects such as:

- "Social and gender inclusion" dated from May 2018, provided social and gender inclusion policy as well as anti-sexual harassment policy and procedure.
- "Handbook about Occupational Health, Safety and Welfare" dated from October 2019, in line with the Occupational Health, Safety and Welfare Policy, Safety Rules Guidelines and the Occupational Health, Safety and Welfare Act 1997 of the Government of Malawi.
- "Environmental management policy", issued in September 2022
- "Electrical and mechanical safety handbook", issued in 2022, with specific forms requested for each activity at risk (excavation works , working at height, hot works, isolation, electrical work, mechanical work…).
- "Traffic safety management plan for project, operations and maintenance works at power stations" issued in January 2024.

EP7 is introduced to specifically mitigate the following impacts:

- Health and safety risks for employees; and
- Health and safety risks for divers.

5.9.2. Measures description

The existing policies and handbook must be applied during the dam operation. Following the construction phase, the employee should revise the existing health, safety and security documents considering the new design and equipment.

This plan applies to all operation and maintenance staff, including those performing inspections, repairs, mechanical and electrical maintenance, and specialized underwater activities such as diving. It also covers security arrangements and coordination between the Employer and the facility operator.

The main measures and procedures linked to the dam rehabilitation are summarized hereafter.

Key Measures

- Conduct periodic risk assessments for all operational tasks, including confined-space entry, work at height, electrical operations, and lifting activities.

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- Maintain up-to-date Occupational Health and Safety (OHS) procedures and deliver task-specific training and toolbox meetings.
- Check that all personnel use appropriate personal protective equipment, maintained and replaced regularly.
- Maintain an incident and near-miss reporting system and review outcomes during monthly safety meetings.
- Provide accessible first-aid kits, on-site medical support, and up-to-date emergency contact lists.

Diving Safety Procedures

Diving operations shall comply with international diving safety standards. Only certified divers shall be engaged. Each dive shall follow an approved dive plan with constant surface communication and a buddy system. Emergency retrieval equipment, decompression and medical support must be prepared in advance. Exclusion zones shall be established during diving operations, and a detailed record of dives, incidents, and near misses shall be maintained.

5.9.3. Implementation modalities and budget

The Employer (through the Operator) shall monitor the implementation of this plan and maintain an Occupational Health and Safety Management System

Program	Activities	Responsible for the execution	Period of execution	Cost Estimate
EP7	Occupational Health, Safety and Security during Operation	EGENCO with support from District Labour and Health Office	During the operation	As part of the operation rules of EGENCO

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6. ENVIRONMENTAL AND SOCIAL MONITORING PLAN

6.1. Introduction

This chapter sets out the monitoring plan for the environmental and social measures to be implemented as part of this project. It includes:

- The justification and objectives of the monitoring plan,
- The description of internal monitoring activities,
- The monitoring indicators and performance levels,
- The audits,
- The organisation and responsibilities of the monitoring plan,
- The cost estimate for the monitoring plan.

6.2. Justification and objectives of the monitoring plan

The purpose of monitoring is to provide the project proponent with the necessary feedback on the implementation of the ESMP and to identify as early as possible what is problematic and what is working well, so that adjustments can be made to the implementation mechanism in a timely manner. For these reasons, it is important that the monitoring and evaluation activities of the ESMP are adequately funded, undertaken by qualified specialists and integrated into the overall project management process.

The monitoring plan has three main components:

- Monitoring the implementation of management measures and specific management plans recommended during the construction phase:
  - Continuously verify that the ESMP work programme and budget are being implemented as planned. If not, rectify or analyse any discrepancies;
  - Continuously verify that the expected results are being achieved in terms of quality and quantity within the prescribed timeframes;
  - Identify any unforeseen factors and developments that could influence the organisation of the ESMP, the definition of its measures, reduce its effectiveness or present opportunities to be exploited;
  - Recommend appropriate corrective measures to the relevant authorities as soon as possible, within the framework of ordinary or exceptional programming procedures.
- Monitor environmental and social indicators related to anticipated sources of impact and changes in environmental and social parameters induced by the project, and measure the performance levels of measures, with the involvement of environmental authorities.
- Audits to assess the strengths and weaknesses of the ESMP.

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This monitoring plan must imply regular inspections and reporting.

6.3. Description of internal monitoring activities

6.3.1. Introduction

The monitoring activities includes the following activities:

- Monitoring of noise and vibration levels in sensitive areas;
- Air quality monitoring;
- Water quality monitoring,
- Monitoring of erosion and stability of riverbanks
- Monitoring of sediment transport and deposition
- Monitoring of aquatic ecology and ichthyofauna
- Monitoring of invasive plant species
- Monitoring of the terrestrial fauna
- Monitoring of the occupational health and safety
- Monitoring of the community health and safety
- Monitoring of cultural heritage
- Monitoring of revegetated areas in the dam construction site
- Monitoring of the offset plan

6.3.2. Monitoring of Noise and Vibration Levels in Sensitive Areas

6.3.2.1. OBJECTIVE AND METHOD

To check that noise generated by construction and operation activities remains below national and IFC guideline limits at sensitive receptors (villages, schools, health centres, and wildlife zones).

Two methods are proposed:

- Measurement of equivalent continuous sound level (Leq) and maximum level (Lmax).
- Measurements taken using a calibrated sound level meter at representative points within communities and at Majete Wildlife Reserve boundary.

Performance Standard: ≤ 70 dB(A) for daytime and ≤ 55 dB(A) for nighttime at residential receptors.

The noise level (dBa) must be monitored during the construction phase. The monitoring must consider daytime and at nighttime if nocturne construction activities are to be conducted. The noise monitoring can be done with a portable sound meter.

The measures of vibration levels before works begin will be registered at the construction dam site (dam crest area) and at the southern part of the permanent camp

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(quarry site side) with the following measurement parameters: Peak Particle Velocity (PPV < 75% of limit), frequency (Hz) and the distance to source.

6.3.2.2. LOCATION

The monitoring shall be carried out at all sensitive locations such as :

- The construction dam site,
- The temporary campsite,
- At the southern part of the permanent camp (quarry site side),
- Liwonde village,
- Njerenza village,
- At the vicinity of the Majete wildlife reserve.

6.3.2.3. FREQUENCY

- Monthly during construction;
- During major maintenance or operational testing phases.

6.3.2.4. RESPONSIBILITY

Contractor (CP4) for measurements; supervision and verification by the Owner's Engineer for EGENCO E&S team.

6.3.3. Air Quality Monitoring

6.3.3.1. OBJECTIVE AND METHOD

The objective is to monitor dust and gaseous emissions from construction traffic, material handling, and diesel-powered equipment, verifying compliance with national and IFC limits.

Parameters and Method:

- PM_{10}, $PM_{2.5}$, and Total Suspended Particulates (TSP);
- Visual observation of dust dispersion;
- Periodic measurement of NO_2 and SO_2 near machinery areas.

Performance Standard**:** PM_{10} < 100 µg/m³ (24 h average); $PM_{2.5}$ < 25 µg/m³.

6.3.3.2. LOCATION

The monitoring shall be carried out at all sensitive locations such as :

- The construction dam site,
- At the temporary campsite,
- At the southern part of the permanent camp (quarry site side),
- At Liwonde village,

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- On the road between the dam site and Njerenza village,
- At the vicinity of the Majete wildlife reserve.

6.3.3.3. FREQUENCY

- Monthly during construction and rehabilitation works;
- Event-based monitoring after public complaints or high wind conditions.

6.3.3.4. RESPONSIBILITY

Contractor (CP4); supervision and verification by the Owner's Engineer for EGENCO E&S team.

6.3.4. Water Quality Monitoring

6.3.4.1. OBJECTIVE AND METHOD

The objective is to assess changes in surface water quality in the Shire River upstream and downstream of the dam, and around construction areas, to detect possible contamination from runoff, wastewater, or accidental discharges.

Parameters and method to monitor:

- pH, turbidity, Total Suspended Solids (TSS), Dissolved Oxygen (DO), conductivity, oil and grease, and faecal coliforms.
- Grab samples taken at upstream control point, near works area, and downstream point.

Most of the analysis can be done with a multiparameter probe. For the other parameters, water samples must be collected, sent and analyzed by the laboratory " Malawi Bureau of Standards" at Blantyre.

6.3.4.2. LOCATION

The water quality monitoring during must be carried out in the following locations:

- At the beginning of the reservoir,
- In the reservoir 500 m from the dam
- At the Water intake
- Dewatered reach
- At the rivers situated in the vicinity of the quarry (Mivuzu river) and the temporary campsite.
- At the entry and end of Elephant Marsh

6.3.4.3. FREQUENCY

- Monthly during construction;
- Quarterly during operation;
- After any spill incident or major rainfall event.

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6.3.4.4. RESPONSIBILITY

Contractor (CP4) during construction; EGENCO Water Quality Officer (EP2/EP3) during operation. The analyses will be conducted by an accredited laboratory. Supervision and verification by the Owner's Engineer for EGENCO E&S team.

6.3.5. Monitoring of Erosion and Stability of Riverbanks

6.3.5.1. OBJECTIVE AND METHOD

To verify the effectiveness of erosion and sediment control measures and to detect early signs of bank instability or excessive soil loss at the work sites.

Parameters and method:

- Visual inspection of slopes, riverbanks, and access roads;
- Measurement of exposed soil surface area and sediment trap performance;
- Documentation of any gully or bank retreat.

6.3.5.2. FREQUENCY

- After each heavy rainfall;
- Quarterly inspections during the first two operational years.

6.3.5.3. LOCATION

The erosion monitoring must be carried out in the following locations:

- In the reservoir 500 m from the dam
- Downstream the spillway
- At the rivers situated in the vicinity of the quarry and the temporary campsite.

6.3.5.4. RESPONSIBILITY

Contractor (CP5/CP12) under supervision of the Owner's Engineer; EGENCO follow-up (EP2).

6.3.6. Monitoring of Sediment Transport and Deposition

6.3.6.1. OBJECTIVE AND METHOD

To assess the sediment load entering and leaving the reservoir and to check that sediment management measures are effective in maintaining river morphology and storage capacity.

Parameters and method:

- Turbidity, TSS, sediment inflow and outflow volume;
- Bathymetric surveys of reservoir at least every two years.

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6.3.6.2. FREQUENCY

- Quarterly sampling;
- Detailed bathymetry every 24 months.

6.3.6.3. LOCATION

The sediment monitoring must be carried out in the following locations:

- At the beginning of the reservoir,
- In the reservoir 500 m from the dam
- Downstream the spillway
- Dewatered reach
- At the confluence between Mivuzu River and the Shire River.
- At the entry and end of Elephant Marsh

6.3.6.4. RESPONSIBILITY

EGENCO Hydrology and Sediment Management Unit (EP2); support from research institutions if needed. Supervision and verification by the Owner's Engineer.

6.3.7. Monitoring of the E-flow regime

6.3.7.1. OBJECTIVE AND METHOD

EGENCO, in collaboration with the National Water Resources Authority (NWRA), must regularly monitor the E-Flow Regime to verify that the defined E-flow is respected.

6.3.7.2. FREQUENCY

Monthly and annual reporting must be carried out by EGENCO to inform the local communities about the water regime if necessary.

6.3.7.3. LOCATION

- Water level upstream in the reservoir and downstream of the dam.
- Measure the inflow and outflow at Kapichira dam.

6.3.7.4. RESPONSIBILITY

EGENCO, in collaboration with the National Water Resources Authority (NWRA).

6.3.8. Monitoring of Aquatic Ecology and Ichthyofauna

6.3.8.1. OBJECTIVE AND METHOD

In response to the following measures:

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- Construction Sediment Management Plan : Restriction of in-water activities
- Biodiversity Management Plan – Net-gain program: Targeted recovery and riverbank stabilization: site-specific strategy.

The objective is to monitor the status of aquatic life downstream of the dam, including fish diversity and abundance, and to evaluate potential impacts of flow regime changes as well as sediment management.

Parameters and Method:

Monitoring of key aquatic indicators are carried out and deviations are detected for the implementation of corrective actions.

The monitoring aims to bio-monitor the aquatic biodiversity in the targeted areas upstream of the MWR (particularly in recovery areas) and downstream dam reservoir.

The monitoring will focus on:

- The diversity and abundance of fish species;
- The diversity and abundance of macroinvertebrates and diatoms;
- The quality of instream & riparian vegetation.

Monitoring indicators are to be set up to assess the aquatic biodiversity in targeted areas. Will be monitored:

- Presence/ Absence of invasive aquatic species;
- Species diversity;
- Abundance of species;
- The presence of spawning areas;
- Integrated Habitat Integrity.

The method will consist of:

- Biomonitoring protocols :
  - Diatom collection and lab analysis;
  - Sweep netting;
  - Observation and fixed point photography (riparian and instream vegetation);
  - IHI
- Fish inventories :
  - Cast netting (netting with boat on reservoir).
  - Examination of fisher catches.

6.3.8.2. FREQUENCY

- One inventory during the dry and hot season (September to November);
- One inventory during dry and wet season (December to April);
- One inventory during cold season (May to August).

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During the Construction Phase: biomonitoring must start during the pre-Construction phase and construction phase annually The monitoring will be once during the year before construction and three times during construction for 1 year.

During the Operation Phase: annually inspection after the implementation of riverbank strategy and every two years from year the first 10 years of operation.

6.3.8.3. LOCATION

The aquatic monitoring must be carried out in the following locations:

- At the beginning of the reservoir,
- In the reservoir 500 m from the dam
- Downstream the spillway
- At the entry of Elephant Marsh

6.3.8.4. RESPONSIBILITY

EGENCO Biodiversity Officer with external ichthyology consultant (EP3/EP4). Sampling conducted at reference (upstream) and impact (downstream) sites and under supervision of the Owner's Engineer

6.3.9. Monitoring of Invasive Plant Species

6.3.9.1. OBJECTIVE AND METHOD

In response to the following measures:

- Habitat Management Plan: Control of Invasive Alien Species spread;
- Biodiversity Management Plan: Invasive species management during operation;
- Biodiversity Management Plan – Net-gain program: Targeted recovery and riverbank stabilization: site-specific strategy.

The monitoring aims to assess the presence and extent of terrestrial and aquatic invasive alien species in targeted areas: construction influence areas and revegetated areas.

Regular surveys should be carried out to identify any spread of invasive in the area of removal activities. This includes both visual inspections and sampling species to determine their presence/ regrowth and distribution.

The monitoring will focus on:

- The extent of Invasive Alien Species in land-cleared areas;
- The spread of Invasive Alien Species after construction activities.
- The presence of Invasive Alien Species in revegetated areas.

Monitoring indicators are to be set up to assess the presence of invasive species in targeted areas. Will be monitored:

- Presence/ Absence of Invasive Alien Species after land clearance activities in the construction influence area and in the revegetated areas;

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- % of cover of Invasive Alien Species;
- Area (ha) of Invasive Alien Species;
- Species diversity.

The method will consist of driven and walked surveys to record the spread of alien plants for management purposes using GPS and a camera. Records of these surveys and any management actions taken will be logged.

6.3.9.2. FREQUENCY AND LOCATION

- During the Construction Phase: monitoring must be conducted immediately after any land clearance activities and at the end of the construction phase:
  - In the direct footprint area, the quarry, the clay site and camp site.
  - In revegetated areas.
- During the Operation Phase: monitoring must be conducted monthly inspections around in revegetated areas (temporary facilities and along the riverbank in the Shire river).

6.3.9.3. RESPONSIBILITY

Contractor (CP6/CP12) during construction under supervision of the Owner's Engineer; EGENCO (EP4) during operation.

6.3.10. Monitoring of the terrestrial fauna

6.3.10.1. OBJECTIVE AND METHOD

In response to the following measures:

- General mitigation measures;
- Emergency safety plan and wildlife interactions
- Implement a zero-tolerance policy for poaching among workers
- Implementation of a non-intrusive barrier

Regular monitoring patrols will be conducted around the plant's infrastructure in collaboration with the MWR rangers. Their objectives will be to:

- Track wildlife movements near the site;
- Identify and log any incidents or near-incidents involving fauna;
- Assess the effectiveness of the barrier and identify any breaches or weaknesses;
- Recommend adaptive measures where necessary.

Monitoring data will be compiled into a bi-annual report and used to inform any needed adjustments to the barrier or staff awareness program. This will contribute to adaptive management and continuous improvement of biodiversity conflict mitigation efforts.

The method will involve including patrols near the construction area in the Majete wildlife Reserve area.

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6.3.10.2. FREQUENCY AND LOCATION

Bi-annual operation:

- During the construction phase, monitoring must be conducted near the direct footprint area as part of the AP ranger's routine patrol.
- During the operation phase, monitoring must be conducted after the implementation of the non-invasive barrier as part of the AP rangers' routine patrols.

6.3.10.3. RESPONSIBILITY

A MoU will be established by EGENCO with African Parks to perform the wildlife monitoring of regular patrols including the materials needed. The measure is to be included as part of the routine patrol of rangers.

6.3.11. Monitoring of Occupational Health and Safety

6.3.11.1. OBJECTIVE AND METHOD

To verify that OHS standards are maintained for all personnel during construction and operation phases, including routine maintenance and diving activities.

Parameters and Method:

- Number of positions and working hours offered to local community members;
- Number of incidents, near-misses, and lost-time injuries;
- Number of training sessions;
- Compliance with PPE requirements and toolbox meetings.

6.3.11.2. FREQUENCY AND LOCATION

- Monthly reporting.
- Bi-annual survey in the construction area during construction work.

6.3.11.3. RESPONSIBILITY

Contractor OHS Manager (CP10) and EGENCO O&M Safety Officer (EP7), under supervision of the Owner's Engineer.

6.3.12. Monitoring of Community Health and Safety

6.3.12.1. OBJECTIVE AND METHOD

To monitor potential community exposure to project risks, including noise, traffic, dust, and emergency situations.

Parameters and method:

- Number and type of grievances (with special attention for GBVH incidents by monitoring the reporting and the resolution);

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- Traffic incidents;
- Emergency drills and awareness campaigns (at least on GBV, SEA and SH);
- Functionality of early warning systems.

6.3.12.2. FREQUENCY AND LOCATION

- Monthly during construction in the villages in the construction influence area;
- Quarterly during operation.

6.3.12.3. RESPONSIBILITY

Contractor (CP7/CP8) and EGENCO Social and Safety Teams (EP1), under supervision of the Owner's Engineer.

6.3.13. Monitoring of GBV/SEA/SH action plan

6.3.13.1. OBJECTIVE AND METHOD

To verify procedures against the risks of Sexual Exploitation and Abuse and Sexual Harassment during the construction activities (see the appendix B for the SEA/SH action plan) as well as the effectiveness of the measures against GBV..

Parameters and method:

- Codes of conduct signed and understood by the workers;
- Number of awareness enhancement campaign on GBV among the workers and in the villages included in the construction influence area;
- % of women included in the training sessions;
- Presence of dedicated person in the Contractor team specifically to oversee gender, gender-based violence, sexual exploitation, abuse and harassment;
- Number of GBV cases, including SEA/SH, reported, resolved and monitored;

6.3.13.2. FREQUENCY AND LOCATION

Monthly reporting, including data from the workers and the community.

6.3.13.3. RESPONSIBILITY

Contractor (CP1, 8, 10), under supervision of the Owner's Engineer; EGENCO for oversight.

6.3.14. Monitoring of Cultural Heritage

6.3.14.1. OBJECTIVE AND METHOD

To verify chance-find procedures are followed and that cultural resources are protected throughout construction.

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Parameters and method:

- Number of chance-find incidents;
- Compliance with protocol and notification procedures.

6.3.14.2. FREQUENCY AND LOCATION

Continuous during earthworks.

6.3.14.3. RESPONSIBILITY

Contractor (CP9), under supervision of the Owner's Engineer; EGENCO for oversight (with department of antiquities if required).

6.3.15. Monitoring of revegetated areas in the dam construction site

6.3.15.1. OBJECTIVE AND METHOD

In response to the Biodiversity Management Plan: "targeted recovery and riverbank stabilization: site-specific strategy", monitoring of key vegetation indicators is carried out and deviations are detected for the implementation of corrective actions.

The monitoring program aims to assess the growth and natural recovery of biodiversity in targeted areas. It will be conducted annually over a five-year period to track progress and identify the need for any corrective actions.

Intensive monitoring is recommended during the first year following planting, with frequent field visits by an ecological expert. This approach is intended to establish a reliable trend before moving into subsequent phases.

The monitoring will focus on plant survival and growth success, changes in vegetation cover, and riverbank stability. Specific indicators will be developed to assess the survival rate and condition of seedlings in both reforestation and natural recovery areas. The following will be monitored:

- Survival rate;
- Native vegetation cover ;
- Species diversity;
- Presence/absence of plant pests or diseases;
- Erosion and/or drainage conditions on site;
- Wildlife presence/absence.

The method will consist of:

- Driven and walked site inspections to record the proportion of bare ground and the success of natural plant restoration.
- Walked site inspections to survey the presence of seedlings and absence of plant pest/diseases by using camera and GPS.

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6.3.15.2. FREQUENCY AND LOCATION

- During the Construction Phase: monitoring must be conducted immediately after the reforestation activities have finished. In Year 1, monitoring must be conducted more frequently, with four surveys being carried out (two in the dry season and two in the rainy season).
- During the Operation Phase: monitoring must be conducted each year with two surveys, one survey in the dry season and one survey in the rainy season during 5 year in the direct footprint area.

6.3.15.3. RESPONSIBILITY

African Parks (CP6/CP12 and EP4) with EGENCO under supervision of the Owner's Engineer, based on the agreed MOU.

6.3.16. Monitoring of the offset plan

6.3.16.1. OBJECTIVE AND METHODS

In response to the offset plan, the objective of the monitoring is to:

- Verify the effectiveness of reseeding and replanting actions for the target species (*Dalbergia melanoxylon*, *Terminalia sericea*, *Afzelia quanzensis*, *Pterocarpus angolensis*).
- Track natural regeneration and recolonization by fauna.
- Check control and progressive eradication of invasive alien species.
- Guarantee long-term sustainability of results through participatory monitoring and adaptive management.

The monitoring will focus on plant survival and growth success, changes in vegetation cover, and riverbank stability. Specific indicators will be developed to assess the survival rate and condition of seedlings in both reforestation and natural recovery areas. The following will be monitored:

- Survival rate;
- Native vegetation cover ;
- Species diversity;
- Presence/absence of plant pests or diseases;
- Erosion and/or drainage conditions on site;
- Wildlife presence/absence.

The percentage of restored vegetative cover will also be compared against initial objectives to evaluate progress toward ecological equivalence.

Biodiversity monitoring will emphasize the return of indicator fauna species, such as birds and small mammals, as well as the overall species diversity observed within restored areas. These indicators will provide evidence of ecological recovery and habitat functionality.

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Invasive alien species will be tracked through the identification and treatment of Invasive Alien Species hotspots, with particular attention paid to the frequency of recolonization and the effectiveness of removal actions. This will allow that restoration efforts are not undermined by invasive pressures.

Participatory sessions conducted with local communities can be part of the monitoring sessions.

6.3.16.2. FREQUENCY AND LOCATION

Monitoring will include both fauna and flora surveys.

- During the Construction Phase: monitoring must be conducted immediately after the reforestation activities have finished. In Year 1, monitoring must be conducted more frequently, with four surveys being carried out (two in the dry season and two in the rainy season).
- During the Operation Phase: monitoring must be conducted each year with two surveys, one survey in the dry season and one survey in the rainy season during 5 years in the direct footprint area.

6.3.16.3. RESPONSIBILITY

African Parks (CP6/CP12 and EP4) with EGENCO under supervision of the Owner's Engineer, based on the agreed MOU.

6.3.17. Summary of the monitoring activities and budget

The following table summarizes the monitoring activities (methods, frequency, duration and responsibility) with the corresponding costs.

Table 6-1: Summary of the internal monitoring activities

Monitoring measures	Methods	Frequency and duration	Responsible party
Monitoring of noise and vibration levels in sensitive areas	Calibrated SLM; Leq/Lmax at receptors; PPV; compare to IFC limits	Monthly during construction; event-based in operation	Contractor (CP4); OE supervision with support of environmental authorities
Air quality monitoring	PM_{10}, $PM_{2.5}$, TSP; visual dust checks; occasional NO_2/SO_2	Monthly during construction; event-based after complaints	Contractor (CP4); OE supervision with support of environmental authorities
Water quality monitoring	Upstream/works/downstream sampling; lab for pH, turbidity, TSS, DO, oil & grease, coliforms	Monthly (construction); quarterly (operation); incident-based	Contractor (CP4); EGENCO (EP2/EP3); OE supervision with support of National Water Resources Authorities
Monitoring of erosion and bank stability	Visual inspection of slopes/roads/controls; spot turbidity of runoff	After heavy rainfall; quarterly (construction) ; biannual follow-up (operation)	Contractor (CP5/CP12); EGENCO follow-up (EP2); OE supervision
Sediment transport & bathymetry	Turbidity/TSS; inflow–outflow records; bathymetry (biennial)	Quarterly; bathymetry every 2 years	EGENCO (EP2); OE supervision
Monitoring of the E-flow regime	Flow measures	Monthly and annual reporting	EGENCO with support of National Water Resources Authority; OE supervision
Aquatic ecology & ichthyofauna	Fish & macroinvertebrate surveys; upstream/downstream	Twice per year (wet & dry seasons, operation)	EGENCO with support of biodiversity + ichthyology consultant (EP3/EP4); OE supervision
Terrestrial fauna	Transects/camera traps; vegetation cover; with African Parks	Biannual (operation)	EGENCO in coordination with African Parks (EP4); OE supervision

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Monitoring measures	Methods	Frequency and duration	Responsible party
Invasive plant species	Visual inspection; mapping; photo records; control efficacy	Quarterly (construction); biannual (operation)	Contractor (CP6/CP12); EGENCO (EP4); OE supervision with support of flora specialist
Occupational health & safety (incl. diving logs)	Incident/near-miss LTI stats; PPE checks; toolbox/drills; dive plans & logs	Daily recording; monthly reporting (both phases)	Contractor OHS (CP10); EGENCO (EP7); OE supervision
Community health & safety	GRM stats; traffic incidents; awareness sessions; early-warning tests	Monthly (construction); quarterly (operation)	Contractor (CP7/CP8); EGENCO (EP1); OE supervision with support of District social welfare
SEA/SH action plan	GBV stats; awareness sessions; codes of conduct signed	Monthly (construction)	Contractor (CP1/CP8/CP10); EGENCO (EP1); OE supervision with support of District social welfare office
Cultural heritage (chance finds)	Toolbox briefings; on-site observation; Dept. of Antiquities liaison	Continuous during earthworks (construction)	Contractor (CP9); OE supervision; EGENCO oversight with Dept. of Antiquities
Revegetated areas in the dam construction site	Reinstatement checks; survival counts; photo points; stability	Quarterly at close-out; biannual for 2 years post-works	African Parks / Contractor (CP12); EGENCO (EP4); OE supervision
Offset plan	Reinstatement checks; fauna surveys; survival counts; photo points; stability	Quarterly at close-out; biannual for 5 years post-works	African Parks /EGENCO (EP4); OE supervision

6.4. Monitoring indicators and performance levels

Environmental and social monitoring is an essential component of the ESMP. It enables the environmental performance of the project to be assessed. Monitoring must provide continuous information on the actual changes caused by the implementation of the project in natural and socio-economic systems. It also enables the application of planned management measures to be validated. Throughout the project cycle, monitoring environmental and social performance will enable continuous assessment and improvement of the relevance and effectiveness of the proposed environmental and social management measures, thereby contributing significantly to the project's contribution to sustainable development. Monitoring efforts take place at different scales (on site, locally, in neighbouring communities, or regionally) and require the cooperation of different stakeholders.

Based on the above results of the monitoring activities, the components of the project performance are listed in the following table considering SMART (Specific, Measurable, Achievable (or Attainable), Relevant, and Time-bound) indicators to ensure that goals are well-defined and success can be accurately measured. The effects of the ESMP are monitored in relation to the baseline situation prior to implementation.

In addition to quantitative indicators, impact monitoring must be supplemented by the use of qualitative indicators to assess the degree of satisfaction of those affected with environmental initiatives and, consequently, the level of adequacy of these initiatives.

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Table 6-2: ESMP monitoring indicators and performance levels

N° plan	Measures	Monitoring indicators	Performance levels
Contractor's ESMP			
CP1	Labour management measures	• Existing Contractor's labour management plan • Presence of Contractor's ESHS team • Existing codes of conduct signed including in the workers' contract • Number of jobs created • Statistical study of recruitment (gender parity, age, geographical distribution)	• 20 % of direct employment of women • 100% employment contracts signed before mobilisation • 100% worker induction completed • Number of staff absence days • Number of HSS training courses on site • Zero child labour cases • Number of complaints about the site / number of complaints resolved
CP2	Waste management measures	• Presence of a waste management plan (in operation) • Existing waste register • Waste separation system in place	• Quantity and tracking of waste disposed (waste tracking slips) • Number of complaints / number of complaints resolved due to waste
CP3	Hazardous substances management measures	• Presence of a Hazardous substances management plan (in operation) • Presence of emergency pollution management procedure • Presence of a register of hazardous substances on site • License to transport hazardous materials (if necessary)	• % of complaints resolved due to hazardous substances • Number of incidents/accidents due to hazardous substances
CP4	Resource efficiency and pollution prevention management measures	• Monitoring of water withdrawals and discharges • No signs of water contamination • No signs of soil contamination	• Number of mortality cases of wildlife due to construction pollution • Monitoring of water consumption (in m^3/day) • Monitoring of industrial and sanitary discharges (in m^3/day) • % of complaints due to pollution / complaints resolved
CP5 EP2	Sedimentation control measures	• Sediment control systems in place • Protection of river banks put in place • Disposal of materials volume from the construction activities • Revegetation of stored materials	• Erosion phenomena under control
EP3	Environmental flow management measures	• Environmental flow monitoring put in place	• Implementation of environmental flow in dam operation
CP6 EP4	Biodiversity management measures	• Constructor's biodiversity management plan in operation • Presence/absence of endangered species • Presence/ Absence of Invasive Alien Species; • Presence of wildlife tracker: • Procedure for animal rescue operations in place • Number of complaints about biodiversity issues	• Number and variety of plants planted • Number and species of animals spotted on the site • Number of incidents about wildlife-human conflict • Number of awareness sessions about biodiversity for workers • Number and nature of offences such as poaching • % of complaints about biodiversity issues / number of complaints resolved

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N° plan	Measures	Monitoring indicators	Performance levels
CP7	Traffic and road safety management measures	• Valid licence for all the drivers • Training and raising awareness of every driver on driving behaviours • Speed limit signage put in place • Number of complaints due to traffic for the construction activities	• Number of awareness trainings on driving behaviours • Number of incidents/accidents due to construction traffic
CP8 EP1	Community health and safety management measures	• Warning signs of working areas put in place • Awareness of communities about the steps of construction activities • Grievance mechanism put in place • Number of complaints / number of complaints from the communities	• Number of community meetings • Number of training sessions in the villages • Number of security incidents • Number of GBV incidents reported from the communities • Number of body injury from the communities due to construction activities • 100% of complaints or disputes are settled amicably.
CP9	Cultural heritage management measures	• Chance finds procedure put in place • Community's Inception ceremony organised	• Number of cases of damage to the cultural heritage • Number of complaints about cultural heritage
CP10	Workplace Occupational Health, Safety and Security Management measures	• STD/HIV-AIDS prevention programme • Health facility put in place • Presence of ambulance • Appropriate personal protective equipment • Medical examination of workers • First aid kits at all work areas • Pre-work risk assessment in place	• Number of staff absence days • Number of workers absent due to illness • Fatal accident name • Number of workers accident • Number of HSS training courses on site • Number of GBV incidents reported from the workers on site • Number of complaints from workers/ number of complaints resolved
CP11	Construction Emergency Preparedness Plan	• Existing Emergency Preparedness Plan from the Contractor • Emergency plan in case of accidents put in pace	• Number of evacuation drills
CP12	Restoration measures for temporary affected areas	• Dismantlement of all temporary structures and removing of concrete or compacted material • Collect of all solid waste • Area of revegetated land	• Step-by-step decommissioning plan • Decommissioning waste management plan • Forecast of a schedule and budget dedicated to decommissioning • Number of complaints from communities and African parks during decommissioning phase
EP5	Resettlement action plan	• Compensation paid to PAPs and payment dates • Number of claims related to compensation and indemnities recorded	• No physical displacement • Number of complaints from PAPs/ number of complaints resolved. • 100% of complaints or disputes are settled amicably.
EP5	Dam emergency preparedness plan	• Dam emergency preparedness plan in place • Functioning warning alarm system	• Number of permanent information boards installed in the main villages • The population living in the downstream area of the dam is informed of the evacuation plans

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N° plan	Measures	Monitoring indicators	Performance levels
EP7	Occupational Health, Safety and Security	• Up-to-date Occupational Health and Safety procedures • Up-to-date emergency contact lists	• Number of risk assessments carried out by EGENCO on site • Fatal accident name among EGENCO employees • Number of EGENCO employees accident • % of complaints from EGENCO employees/ complaints resolved

6.5. Audits

6.5.1. Internal audit

The role of internal audits is to evaluate activities in relation to the procedures, measures and plans set out in the ESMP to comply with environmental and social commitments and objectives. Each element of the management system is audited at least once a year during construction, then at five-year intervals during operation. Elements with weaknesses will be audited more frequently. Internal audits may be conducted in one or more periods, depending on the audit schedule to be determined. The assessment protocols are based on internal documents related to the element being audited (see Appendix E for the environmental audit template provided by MEPA).

Non-compliance reports will be stored in a database along with preventive or corrective measures, as well as the person responsible, the timeline and the resources required to implement the prescribed measures.

6.5.2. External audit

Like internal audits, the role of external audits is to assess activities in relation to the procedures, measures and plans set out in the ESMP to comply with environmental and social commitments and objectives.

An external audit provides a different perspective from an accredited auditor, checking that activities comply with specific requirements, that environmental and social objectives will be achieved, and that the overall approach is effective.

The external auditor takes a fresh look at tasks and can identify issues that internal auditors may have overlooked due to familiarity. The introduction of best practices and improvements is possible depending on the skills of external consultants. Audit results will be stored in a database. If improvements are required, preventive or corrective measures will be specified, along with the person responsible, the timeline and the resources needed to implement the prescribed measures.

It is recommended that external audit is carried out at mid-term and at the end of construction activities as well as after two years after decommissioning.

EGENCO will commission independent audits to evaluate in particular:

- Environmental Auditing:
  - The pollution prevention and environmental safeguards,

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- The effectiveness of monitoring systems already in place. Auditors will review waste management records, emissions data, and water and soil quality reports produced by contractor.

- Gender Auditing:
  - Robustness of indicators used to track participation and benefits,
  - Women and vulnerable groups are genuinely involved in training, monitoring, capacity building, and employment,
  - Verify the SH/SEA service provider capacity and the effectiveness of the SH/SEA action plan.
- Biodiversity Auditing:
  - The performance of biodiversity offsets and restoration measures, using monitoring data as a baseline.
  - Verify seedling survival rates, canopy cover recovery, and the return of indicator fauna species,
  - Checking that reported progress is accurate and consistent with field observations.

6.6. Organisation and responsibilities of the monitoring plan

The purpose of environmental monitoring is that the environmental and social commitments and recommendations set out in the ESIA, and more specifically in the ESMP, are fully implemented throughout the project's implementation.

Before work begins, the Employer, EGENCO, will appoint a supervising environmental and social team (within the Owner's Engineer) who shall work closely with the internal environmental and social team from the Employee (EGENCO) for the monitoring organisation.

Initially, this monitoring activity involves validating the integration of management measures (avoidance, reduction, compensation and enhancement) and other environmental considerations into plans and specifications. This activity will be carried out by the employer, EGENCO, with the support of the Owner's Engineer.

Monitoring then focuses on the application of all prescribed management measures and various considerations by the Contractor responsible for the work throughout the construction phase. This internal monitoring will be facilitated by the recruitment of an ESHS manager by the contractor, who will provide strict monitoring of environmental and social aspects (see Chapter 7.4 for the Contractor organisation).

All contractual measures related to delivering the ESMP (including the implementation arrangements described in the C-ESMP and E-ESMP) shall be monitored on a day-to-day basis by the Owner's Engineer as Supervising Engineer for EGENCO (see chapter 7.3 for the Owner's Engineer organisation) with the support of African Paks for the aspects relative to the Majete Wildlife Reserve.

The environmental and social monitoring programme includes inspections of work sites and monitoring measures that incorporate sampling, specific observations, or surveys of neighbouring communities. The contractor's construction monitoring activities must be carried out on a daily basis, while supervision, particularly by the owner's engineer,

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may be carried out less frequently, in line with the construction schedule, potentially during critical activities.

At the request of the Employer, EGENCO, and in accordance with their statutory duties, the regulatory authorities will undertake inspections from time to time. This will include, for example:

- the Ministry of Environment and Natural Resources, which is responsible for ensuring compliance with environmental regulations, including the statutory ESIAs and ESMPs ;
- the Ministry of Labor which is responsible for ensuring that labour, health and safety regulations are properly enforced.

6.7. Cost estimate for the monitoring plan

Monitoring and surveillance will require the availability of a vehicle and appropriate equipment (PPE, etc.) for EGENCO's environmental and social team throughout the duration of the project, particularly during the construction phase. The cost estimate for the RAP monitoring is included in the RAP cost estimate. The cost of monitoring activities from EGENCO is included in the cost estimate for the implementation of the ESMP (Chapter 7.5).

Some monitoring activities may be delegated as follows.

Table 6-3: Cost estimate for the monitoring activities

Monitoring measures	Monitoring activity	Frequency and duration	Responsible party	Total cost estimate (USD)
Noise assessment	Measurement of noise and vibration levels in sensitive areas	Monthly during construction; event-based in operation	Contractor (CP4); OE supervision with support of environmental authorities	**10,500** (3,500/year × 3.5years)
Air quality monitoring	Measurement of air quality	Monthly during construction; event-based after complaints	Contractor (CP4); OE supervision with support of environmental authorities	**21,000** (7,000/year × 3.5years)
Water quality monitoring	Measurement of water quality upstream/ in the work area/downstream	Monthly (construction); quarterly (operation); incident-based	Contractor (CP4); EGENCO (EP2/EP3); OE supervision with support of National Water Resources Authorities	**41,000** (7,000/year × 3.5years + 4,000/year × 5years)
Monitoring of erosion and bank stability	Visual inspection of slopes/roads/controls; spot turbidity of runoff	After heavy rainfall; quarterly (construction) ; biannual follow-up (operation)	Contractor (CP5/CP12); EGENCO follow-up (EP2); OE supervision	Included in Kapichira operation activities
Sediment transport & bathymetry	Turbidity; inflow–outflow records;	Quarterly; bathymetry every 2 years	EGENCO (EP2); OE supervision	Included in Kapichira operation activities
Monitoring of the E-flow regime	Flow measures	Monthly and annual reporting	EGENCO with support of National Water Resources Authority; OE supervision	Included in Kapichira operation activities

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Monitoring measures	Monitoring activity	Frequency and duration	Responsible party	Total cost estimate (USD)
Aquatic ecology & ichthyofauna	Fish & macroinvertebrate surveys upstream and downstream	Twice per year (wet & dry seasons, operation)	EGENCO with support of biodiversity + ichthyology consultant (EP3/EP4); OE supervision	**15,000** (3,000/year × 5 years)
Terrestrial fauna	Transects/camera traps; vegetation cover; with African Parks	Biannual (operation)	EGENCO (EP4) in coordination with African Parks; OE supervision	**15,000** (3,000/year × 5 years)
Invasive plant species	Visual inspection; mapping; photo records; control efficacy	Quarterly (construction); biannual (operation)	Contractor (CP6/CP12); EGENCO (EP4); OE supervision with support of flora specialist	**17,000** (2,000/year × 3.5 years + 2,000/year × 5 years)
Occupational health & safety (incl. diving logs)	Incident/near-miss LTI stats; PPE checks; toolbox/drills; dive plans & logs	Daily recording; monthly reporting	Contractor OHS (CP10); EGENCO (EP7); OE supervision	Included in contractor costs, then operation activities
Community health & safety	GRM stats; traffic incidents; awareness sessions; early-warning tests	Monthly (construction); quarterly (operation)	Contractor (CP7/CP8); EGENCO (EP1); OE supervision with support of District social welfare	**36,000** (4,500/year × 3.5 years + 4,500/year × 5 yrs)
SEA/SH action plan	GBV stats; awareness sessions; codes of conduct signed	Monthly (construction)	Contractor (CP1/CP8/CP10); EGENCO (EP1); OE supervision	Included in the occupational and community health & safety monitoring
Cultural heritage (chance finds)	Toolbox briefings; on-site observation; Dept. of Antiquities liaison	Continuous during earthworks (construction)	Contractor (CP9); OE supervision; EGENCO oversight with Dept. of Antiquities	**9,000** (3,000/year × 3.5years)
Revegetated areas in the dam construction site	Reinstatement checks; survival counts; photo points; stability	Quarterly at close-out; biannual for 2 years post-works	African Parks / Contractor (CP12); EGENCO (EP4); OE supervision	**7,500** (2,500 × 1 close-out year + 2,500/year × 2 years)
Offset plan	Reinstatement checks; fauna surveys; survival counts; photo points; stability	Quarterly at close-out; biannual for 5 years post-works	African Parks /EGENCO (EP4); OE supervision	**15,000** (2,500 during decommissioning + 2,500/year × 5 years)
Data management & reporting	Database upkeep; QA/QC; monthly, quarterly & annual reports	Continuous (both phases)	EGENCO E&S Unit (with Contractor inputs); OE supervision	**40,000** (5,000/year × 3.5 years + 5,000/yr × 5 years)
Total monitoring				**USD 227,000**
Audit	Independent third-party audit	mid-term + end of construction + one after 2 yrs after decommissioning		**120,000** (40,000/year x 3)
Contingency (10%)	Unforeseen ESMP monitoring activities or specific expert missions.		EGENCO	**35,000**
TOTAL ESTIMATE				**USD 382,000**

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7. ORGANISATIONAL FRAMEWORK FOR THE IMPLEMENTATION OF THE ESMP

7.1. Introduction

This chapter describes the general organisational framework to be put in place for the implementation of the ESMP. It includes:

- The general organisational framework,
- The role and organisation of the Employer,
- The role and organisation of the project owner's engineer,
- The role and organisation of the contractor during the construction phase,
- The coordination for the management of cumulative impacts,
- The estimated costs of implementing the ESMP.

7.2. General organisational framework

EGENCO has the overall responsibility for environmental and social management of all Project activities. This includes the following responsibilities:

- Verifying compliance with all relevant national legislation, as well as with the environmental controls and mitigation measures contained in this ESMP.
- Verifying compliance with applicable World Bank environmental and social Standards.
- Monitoring the performance of contractor and sub-contractors used for providing workforce, supplies and services, during the construction activities.
- Acting as point of contact for consultation and feedback to stakeholders (including funding bodies such as the World Bank) and the public (stakeholder engagement) in the fields of E&S topics and in general implementation of this ESMP.

The proposed strategy from the Owner's Engineer[8] for the procurement of the construction contract is to have a single lot including civil works and hydro-mechanical works. Therefore, one Contractor will oversee the construction activities with different sub-contractors depending on the expertise. Therefore, EGENCO will delegate the implementation of the environmental and social management plan relative to the construction to the Contractor.

EGENCO, through the Owner's / Supervising Engineer, will be responsible for monitoring the Contractor's performance, providing guidance where needed, and enforcing compliance with the ESHS specifications and contractual obligations.

MEPA will supervise the effective compliance of the Project with these ESMP conditions during the construction and operation periods.

At the time of writing, EGENCO was yet to submit the ESIA to MEPA. Consequently, MEPA was yet to award the environmental clearance and the list of conditions

[8] Contracting strategy report, Detailed design, Studio Pietrangeli consulting engineers, May 2025 – ref. 296GENRSP001A

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associated with the environmental permit. Once this is done, MEPA will supervise the effective compliance of the Project with these conditions during the construction and operation periods.

7.3. Employer role and organisation

7.3.1. Introduction

The employer, EGENCO, will be responsible for the overall management of this ESMP as well for the implementation of the environmental and social measures, tagged E-ESMP, as described in Chapter 5 of the ESMP under the form of sub-plans.

7.3.2. Employer environmental and social responsibilities

As stated above, EGENCO has the overall responsibility for environmental and social management of all Project activities. This includes the following responsibilities:

- Verifying compliance with all relevant national legislation, as well as with the environmental controls and mitigation measures contained in this ESMP.
- Verifying compliance with applicable World Bank environmental and social Standards.
- Monitoring the performance of contractor and sub-contractors used for providing workforce, supplies and services, during the construction activities, through the supervising Engineer.
- Monitoring and management of non-conformities issued by the Supervising Engineer and the MEPA.
- Liaising between the companies involved in the project and all the public bodies and services concerned by the project including the drafting of agreements to designate a public body for the implementation of a sub-plan.
- Acting as point of contact for consultation and feedback to stakeholders (including funding bodies such as the World Bank) and the public (stakeholder engagement) in the fields of E&S topics and in general implementation of this ESMP.
- Financial and administrative implementation and internal monitoring of the ESMP, additional studies that will be or have already been put in place to mitigate or compensate for impact.

EGENCO will be responsible as well for the implementation of the environmental and social measures, tagged E-ESMP, as described in Chapter 5 of the ESMP under the form of sub-plans. During construction activities, some measures are complementary with the ones for the Contractor, related to current infrastructure (dam and hydropower plant) or related to the communities (including local authorities).

During construction activities, EGENCO can halt work if there are ESHS violations or contract breaches that risk personnel well-being or equipment safety. Any costs resulting from such stoppages are the Contractor's responsibility, and EGENCO can offset these costs as stated in the contract. If the Contractor fails to remedy the issue, EGENCO can intervene at the Contractor's cost or dismiss those at fault.

EGENCO will be the key contact for the funding agency.

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7.3.3. Employer organisational capacity and personnel

7.3.3.1. ROLE AND ORGANISATION DURING THE CONSTRUCTION PHASE

EGENCO PIU has the Safeguards staff comprising of Environmental Specialist, Social inclusion and Gender Specialist and the Health and Safety Specialist who should be mobilise full time during construction activities.

They will be in charge to oversee the implementation of mitigation measures relative to E-ESMP, stakeholder engagement including grievance mechanism implementation, reporting and coordination with authorities.

Due to the sensitivity of the area (dam site) with biodiversity aspects, EGENCO shall have the support of international biodiversity expert to implement the biodiversity management plan and provide training to EGENCO staff for the management of biodiversity aspects relative to the project.

7.3.3.2. ROLE AND ORGANISATION DURING THE OPERATION PHASE

The responsibility for environmental and social management of the project facilities will be shared between EGENCO's Operations Division and the Environmental and Social Unit.

The Operations Division will be in charge of the implementation of all technical, occupational health and safety, and emergency preparedness measures as part of day-to-day activities. The Environmental and Social Unit will oversee compliance with environmental standards, biodiversity management, community relations, community health and safety, and monitoring of long-term impacts, as defined in the operation-phase subplans from the E-ESMP.

Regular coordination meetings will be held between these two units to review environmental and social performance.

7.4. Owner's engineer role and organisation

7.4.1. Introduction

EGENCO will delegate the responsibility of monitoring, advisory and compliance enforcement to the Owner's/Supervising engineer.

7.4.2. Owner's Engineer environmental and social responsibilities

7.4.2.1. E&S RESPONSIBILITIES

The Owner's / Supervising Engineer will be responsible for monitoring the Contractor's performance, providing guidance where needed, and enforcing compliance with the ESHS specifications and contractual obligations during the construction activities.

The Owner's / Supervising Engineer shall also verifying compliance with Malawian legislation. He shall identify non-compliances and prepare follow-up reports. He shall

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also assist and provide any relevant information that may help MEPA in its compliance audit role.

All contractual measures related to delivering the ESMP (including the implementation arrangements described in the C-ESMP and E-ESMP) shall be monitored on a day to day basis by the Owner's Engineer, acting as supervising engineer.

The Supervising Engineer shall report to the Employer, EGENCO, all environmental, social, and health and safety issues related to the construction contractor as part of their monthly progress report.

7.4.2.2. E&S INSPECTIONS

The Owner's Engineer will carry out an ESHS inspection of the facilities and worksite on a weekly basis jointly with the Contractor's ESHS manager. A written report will be drafted for each weekly inspection in a format approved by the Owner's Engineer and EGENCO, addressing non-conformities detected on the worksite as specified in the ESHS specifications. Each non-conformity will be documented by a digital photograph with captions to provide a visual illustration, explicitly indicating the location, date of inspection and the non-conformity in question.

During these inspections, the E&S monitoring documents kept by the Contractor will be checked to comply with ESHS specifications from this ESMP:

- ESHS section of the site logbook;
- Reports of site visits by the Contractor's ESHS manager;
- Register of non-conformities;
- Register of new hires to verify compliance with targets for the employment rate of women and the employment rate of local communities on the site.
- Register of internal Contractor complaints;
- Waste monitoring register;
- Maintenance logs for the fleet of vehicles, machinery and equipment;
- Any other document as provided for in the ESHS specifications of the works contract.

7.4.3. Owner's Engineer organisation and personnel

The Owner's Engineer will be required to provide adequate environment, social and health and safety specialists to supervise the contractor's compliance with the E&S Requirements: Environmental Specialist, Biodiversity Specialist, Social and Gender Specialist and the Health and Safety Specialist, with a minimum of a Master's Degree in the relevant field and with a minimum experience of 5 years in the relevant field. Due to the biodiversity challenge of this project, the biodiversity specialist must have a proven experience in supervising construction activities within ecologically sensitive areas.

In addition, it is estimated that the Owner's Engineer will mobilise at least two OHS Specialists on site, to supervise and monitor the implementation of the Contractor's ESMPs (C-ESMPs).

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7.5. Contractor role and organisation during the construction phase

7.5.1. Introduction

The implementation of all Environmental, Social, Health, and Safety (ESHS) requirements related to construction activities will be delegated by EGENCO to the Contractor during the construction phase. The ESHS requirements will be part of the bidding documents. Failure by the contractor to comply with these measures should result in penalties to be included in the Contractor contract.

7.5.2. Contractor environmental and social responsibilities

The ESHS requirements assigned to the Contractor are set out in Chapter 4 of this ESMP and have been tagged C-ESMP. These ESHS requirements will form part of the Contract for the Contractor with EGENCO.

The Contractor must develop a Construction-ESMP and associated sub-plans or procedures to describe how the ESHS requirements will be managed and implemented. EGENCO, through the Owner's / Supervising Engineer, must approve the C-ESMP before the start of the works.

The Contractor is required to fulfil these ESHS requirements including for its sub-contractors. This includes the following:

- Conduct internal monitoring and on-site audits to verify implementation of the C-ESMP, then report on findings to EGENCO.
- Carry out weekly inspections with the Owner's Engineer, who will check the ESHS documents complying with ESHS specifications from this ESMP such as:
  - ESHS section of the site logbook;
  - Reports of site visits by the Contractor's ESHS manager;
  - Register of non-conformities;
  - Register of new hires to verify compliance with targets for the employment rate of women and the employment rate of local communities on the site.
  - Register of internal Contractor complaints;
  - Waste monitoring register;
  - Maintenance logs for the fleet of vehicles, machinery and equipment;
  - Any other document as provided for in the ESHS specifications of the works contract.
- Communicate any environmental issues and incidents to EGENCO immediately.
- Support EGENCO with the training of the construction workers to raise awareness in the fields of E&S topics and in general implementation of this ESMP.

As part of the contract, the Contractor will provide an ESHS performance security, which is in the form of a "demand bank guarantee."

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7.5.3. Contractor's personnel requirements

The Contractor shall set up a team to implement the overall ESHS requirements. The human resources requirements specified hereafter are the minimum resources required for ESHS management by the Contractor. The staffing levels will be consistent with regulatory, EGENCO and World Bank requirements.

This team shall be composed of a minimum of the following specialists:

- An ESHS manager:
  - Who will be responsible for managing the different ESHS specialists. He/she will be directly under the responsibilities of the Contractor project manager.
  - Who will have the necessary authority to require the contractor to modify its techniques or working methods if the situation so requires.
  - Who shall be assisted by a social specialist, an environmental specialist and health, safety and security specialist.
  - Who will carry out an ESHS inspection of the facilities and worksite on a weekly basis jointly with the Owner's Engineer.
  - Who shall hold a relevant University degree and significant experience of at least 10 years in designing and monitoring the implementation of E&S aspects on similar projects in the sub-region.
  - Who have previous experience in working on World Bank financed projects.
  - Who will be able to speak, read and write English fluently.
- A Social specialist:
  - Who will be permanently based at site for the full duration of the Works in charge of managing workers relationships and grievances in relation to the construction works,
  - Who will implement the labour management plan in charge of liaising with the Employer and the Contractor Human resources services to implement the local recruitment strategy, managing social influxes in the site surrounding,
  - Who will implement the community health and safety plan, including those related to sexual exploitation, abuse and harassment in coordination with the social specialist
  - Who will liaise closely with the Employer's Community Relations team and be responsible for resolving community grievances in a timely manner where the Contractor is responsible.
  - Who will be supported by a dedicated GBV/SEA/SH Specialist, in charge of:
    - the implementation of the SEA/SH Action Plan,
    - the management of confidential and survivor-centred reporting channels,
    - the formal agreement with service providers,
    - resolving GBV/SEA/SH grievances in a timely manner where the Contractor is responsible,
    - the organisation of mandatory awareness activities for workers and communities.
  - Who will coordinate the induction and social training programme for the Contractor personnel, with close coordination with the Health, Security and Safety team.

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- Who will be fluent in Chichewa and English.

- An Environmental specialist:
  - Who will permanently be based at site for the full duration of the Works in charge of managing all the measures relative to the physic-biological aspects to the construction works,
  - Who will be responsible for controling the application of the environmental protection measures on the construction site (on air emissions, waste, erosion, etc.), supervising the regular monitoring of air, water and soil.
  - Who will implement the waste management plan, the hazardous substances management plan, the resource efficiency and pollution prevention management plan, the sedimentation control plan as well as the associated trainings.
  - Who will liaise closely with the other Contractor specialists.
  - Who will be supported by a biodiversity specialist, in charge of:
    - The implementation of the construction biodiversity management plan,
    - liaising with EGENCO and the African Parks to implement the fauna and flora measures relative to the Majete wildlife reserve.
- A Health, Security and Safety specialist:
  - Who will permanently be based at site for the full duration of the Works in charge of managing all the measures relative to the Health, Safety and Security aspects to the construction works,
  - Who will implement the Workplace Occupational Health, Safety and Security Management Plan.
  - Who will implement the cultural heritage management plan.
  - Who will implement the traffic and road safety management plan.
  - Who will be qualified, experienced, and competent for this responsibility, as agreed with the Employer.
  - Who have the authority to issue directives to maintain the health, safety and security of all personnel authorised to enter and/or work on the Site and to take protective measures to prevent accidents.
  - Who will oversee the team of a minimum of four (4) full-time OHS officers to cover full-time all construction fronts, shifts, and auxiliary work areas. The mobilisation must provide continuous coverage across all work shifts, night works (if required) at the dam site area as well as at auxiliary sites such as the quarry site, the borrow site, the batching plant area and workers ‘camp. This number includes provision for rotation, illness, and leave.
  - Who will be supported by a dedicated Security Specialist, in charge to oversee contractor security personnel, coordinate with local authorities, and provide implementation of the Security Management Plan in line with the Voluntary Principles on Security and Human Rights.

The ESHS team of the Contractor will be allocated the necessary resources to operate independently. As a minimum, the following equipment will be mobilized from the start of the Contactor site mobilisation:

- At least five vehicles on site and the necessary operating budget.

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- A complete Information Technology workstation each for the ESHS Manager, the social specialist, the environmental specialist and the Health, Security and Safety specialist: mobile phone, computer, printer, Internet access. Additional IT and communication resources shall be provided to the GBV/SEA/SH Specialist, Security Specialist and OHS officers for the full operational capacity.
- Field equipment such as GPS, digital camera, one communication equipment per person adapted to the context (mobile phone with corresponding adequate coverage), portable equipment for water, air, soil, dust, sound and vibration monitoring to perform at minimum the monitoring of the parameters as required by the standards set out in the present ESMP.

All these team members shall work in close coordination with each other, organising weekly coordination meetings and a common ESHS reporting.

7.6. Coordination framework for the management of cumulative impacts

7.6.1. Introduction

This section establishes a coordinated framework to identify, monitor, and manage cumulative environmental and social impacts associated with the Kapichira Dam Rehabilitation Project in the context of other major developments in the Shire River Basin, notably SVTP (Shire Valley Transformation Programme), the Mpatamanga Hydropower Project, and conservation activities led by African Parks in Majete Wildlife Reserve. The objective is to ensure that combined impacts remain within acceptable limits and are proactively mitigated through structured collaboration.

This chapter includes:

- The institutional coordination and roles of parties;
- The data sharing protocols;
- The organisation.

7.6.2. Institutional coordination and roles

A Cumulative Impact Coordination Platform will be established, formalizing collaboration among the key stakeholders:

- EGENCO, lead entity for Kapichira Dam rehabilitation related cumulative impact management, responsible for:
  - Initiating coordination meetings;
  - Consolidating cumulative impact data specific to hydropower operations;
  - Ensuring compliance with national and lender requirements;
  - Providing flow regime, sediment management, and operational data.
- Shire Valley Transformation Programme (SVTP), responsible for irrigation related abstractions and land-use impacts, provides:
  - Water abstraction volumes and schedules;
  - Irrigation return flow data;

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  - Agricultural land-use change information;
  - Input on downstream livelihood impacts.
- Mpatamanga Hydropower Project, responsible for future hydropower cascade interactions, provides:
  - Planned construction activities;
  - Planned and operational flow regulation data;
  - Reservoir operation strategies;
  - Construction-phase cumulative effects (e.g., workforce influx).
- African Parks (Majete Wildlife Reserve Management), responsible for biodiversity and ecosystem-level monitoring, provides:
  - Ecological data (aquatic and terrestrial biodiversity);
  - Information on habitat changes linked to river flow alterations;
  - Human-wildlife interaction data influenced by cumulative pressures.

7.6.3. Data sharing protocols

A Cumulative Impact Monitoring Plan will be jointly developed, including harmonized indicators across projects, shared monitoring locations along the Shire River Basin. It is suggested that the following categories of data will be shared:

- Hydrological: flow releases, water levels, sediment loads;
- Water quality: turbidity, dissolved oxygen, contaminants;
- Ecological: fish populations, habitat condition, biodiversity indicators;
- Social: livelihood data, resource use patterns, resettlement indicators;
- Infrastructure operations: generation schedules, irrigation withdrawals.

The data could be shared using a shared digital platform. The frequency of data should be defined as well as the confidentiality level.

Equipment could be shared between parties if necessary for monitoring.

7.6.4. Organisation

EGENCO will establish a Technical Working Group (with a designated focal point for each party, responsible for coordination), who will meet quarterly (or more frequently if needed) and will conduct biannual joint monitoring missions with reporting summarizing the key findings, the compliance status and the recommended corrective actions.

Any issue between parties will be first addressed within the Technical Working Group. If unresolved, the issue will escalate to a Steering Committee composed of senior representatives from each party. If needed, a neutral third-party expert could be involved. The final escalation will be a regulatory referral (Malawi regulatory authorities depending on the subject).

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7.7. Cost estimate for the implementation of the ESMP

The construction phase covers all EGENCO and Owner's Engineer E&S activities for the 3.5-year rehabilitation period. It is understood that the Contractor will include E&S costs for the implementation's organisation in the overall costs of construction activities.

The operation phase covers five years of post-rehabilitation E&S management, audits, and community engagement.

Category	Description of cost items	Cost (Construction phase) *(USD)*	Cost (Operation phase) *(USD)*	Total (USD)	Responsibility
Environmental & Social staffing (EGENCO)	Environmental Specialist, Gender and Social Inclusion Specialist and OHS Specialist for 3 years equivalent; site visits, reporting, coordination with authorities.	**240 000**	**100 000** (1 specialist part-time × 5 yrs)	**340 000**	EGENCO
Supervision Consultant – ESHS specialists	Environmental / social / OHS experts within the supervision team to verify ESMP performance.	**210 000**	—	**210 000**	EGENCO (through supervision contract)
Training & capacity building (EGENCO staff)	ESMP implementation training; refreshers on IFC/WB standards, GBV prevention, biodiversity topics.	**20 000**	**5 000**	**25 000**	EGENCO
Community engagement & grievance management	Stakeholder meetings, GRM operation, communication materials.	**20 000**	**20 000**	**40 000**	EGENCO (Social Unit)
Administrative & logistics costs	E&S reporting logistics, transport for inspections, data management, communications.	**15 000**	**15 000**	**30 000**	EGENCO
Contingency (10 %)	Unforeseen ESMP activities or specific expert missions.	**45 000**	**15 000**	**60 000**	EGENCO
TOTAL ESTIMATE		**550 000**	**155 000**	**705 000**	

The construction phase covers all EGENCO and Supervision Consultant E&S activities for the 3.5-year rehabilitation period.

The operation phase covers five years of post-rehabilitation E&S management, audits, and community engagement.

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8. WORKPLAN

8.1. Introduction

This chapter sets out the provisional timetable for the implementation of the various PGES plans in line with the project's activities, particularly the construction phase.

8.2. Description of the implementation timetable

The pre-construction activities will commence one year before the start of construction activities.

The duration of the construction phase for the Kapichira rehabilitation project is estimated to be approximately 3,5 years plus 2 months of demobilization.

The duration of the operation phase for the Kapichira rehabilitation project is estimated to be approximately 3 years, depending on the measures.

The total duration of the ESMP is estimated to be 8 years.

The workplan for the construction and operation phases is described as follows.

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Year		N-1				N				N+1				N+2				N+3				N+4			
Quarter		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Main measures	Duration																								
Construction schedule (based on the detailed design report)	**44 months**																								
Commencement date for the Contractor																									
Main construction activities	*42 months*																								
Works preparation activities	*2 months*																								
Demobilisation	*2 months*																								
Commissioning activities	*2 months*																								
Final approval of the ESIA																									
Recruitment and mobilisation of the service provider responsible for implementing the ESMP	***6 months***																								
Implementation of the ESMP	***5 years***																								
Mobilisation and preparation of activities	3 months																								
Implementation of the Resettlement Action Plan (EP6)	6 months																								
Review and approval of the C-ESMP	2 months																								
Implementation of the measures CP1 to CP11 of the C-ESMP	42 months																								
Restoration of temporary affected areas (CP12)	12 months																								
Community Health and Safety Plan (EP1) including stakeholder engagement	50 months																								
Sediment Management Plan (EP2)																									
Biodiversity Management Plan (EP4)																									
Emergency Preparedness Plan (EP6)																									
Occupational Health, Safety and Security (EP7)																									
Implementation of the Environmental and social monitoring plan																									

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9. COST ESTIMATE OF THE ESMP

9.1. Introduction

This chapter sets out the estimated costs of the PGES, specifying the cost, duration and person responsible for implementing each plan.

9.2. Description of the costs

The estimated cost of the ESMP is about 4.2 million US dollars. The estimated budget per year is described in the appendix D.

Many of these measures are the responsibility of the contractor who will carry out the work. Therefore, the costs will only be known when the contractor establishes the construction cost of the project based on the requirements of the tender documents.

Table 9-1: Cost estimate for the ESMP

N°	Sub-plan	Responsible for the execution	Period of execution	Cost estimate in USD
Contractor's ESMP requirements				
CP1	Labor Management Plan	Contractor	During the construction period (44 months)	Included in the contractor's cost
CP2	Waste management Plan	Contractor	During the construction period (44 months)	
CP3	Hazardous substances Management Plan	Contractor	During the construction period (44 months)	
CP4	Resource Efficiency and Pollution Prevention Management Plan	Contractor	During the construction period (44 months)	
CP5	Sedimentation control Plan	Contractor	During the construction period (44 months)	
CP6	Construction Biodiversity Management Plan	Contractor	During the construction period (44 months)	
CP7	Traffic and road Safety Management Plan	Contractor	During the construction period (44 months)	
CP8	Community health and safety Plan	Contractor	During the construction period (44 months)	
CP9	Cultural Heritage Management Plan	Contractor	During the construction period (44 months)	
CP10	Workplace occupational Health, Safety and Security Management Plan	Contractor	During the construction period (44 months)	
CP11	Construction Emergency preparedness Plan	Contractor	Before starting the construction activities	
CP12	Restoration of temporary facilities	Contractor	At the end of the construction period and during commissioning	
Employer's ESMP requirements				
EP1	Community Health, Safety and Security Plan	Employer	During the construction period (44 months)	**720 000**
EP2	Sediment management plan	Employer	During the construction and operation period	**144 000**
EP3	Environmental flow management plan	Employer	During operation	Included in the operation costs
EP4	Biodiversity management plan	Employer	During the construction and operation period	**2 076 000**
EP5	Resettlement Action Plan	Employer	During the construction	**148 000**
EP6	Dam Emergency preparedness Plan	Employer	During the operation	Included in the operation costs
EP7	Occupational Health, Safety and Security	Employer	During the operation	Included in the operation costs
TOTAL cost estimate for the sub plans				**3 088 000**
E&S monitoring plan				**382 000**
Management and implementation				**705 000**
TOTAL cost estimate for the ESMP				**4 175 000**

APPENDIX A. STAKEHOLDER ENGAGEMENT PLAN

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KAPICHIRA DAM REHABILITATION PROJECT
Stakeholder Engagement Plan

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KAPICHIRA DAM REHABILITATION PROJECT
Stakeholder Engagement Plan

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KAPICHIRA DAM REHABILITATION PROJECT
Stakeholder Engagement Plan

LIST OF ABBREVIATIONS AND ACRONYMS

CGRC	Community Grievance Redress Committee
DGRC	District Grievance Redress Committee
EGENCO	Electricity Generation Company (Malawi) Limited
EPRP	Emergency Power Restoration Project
GRM	Grievance Redress Mechanism
HPP	Hydro Power Plant
MEPA	Malawi Environment Protection Authority
NGO	Non-Governmental Organisation
NGRC	National Grievance Redress Committee
RAP	Resettlement Action Plan
SEP	Stakeholder Engagement Plan
SVTP	Shire Valley Transformation Project
WGRC	Workers Grievance Redress Committee

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1. PROJECT OVERVIEW

1.1. Main characteristics of Kapichira dam

Kapichira Hydropower Plant (HPP) is located in Chikwawa District, 70km to the south-west of Blantyre.

It has an installed capacity of 129.6 MW and is the largest contributor to the National Grid whereby it contributes 30% to EGENCO's installed generation capacity accounting for 23% of Malawi's total installed capacity.

It is the most downstream HPP in the Shire River HPP cascade and located within the Majete Wildlife Reserve.

1.2. Background of the project

The January 2022 floods caused by the tropical storm Ana resulted in overtopping of a river training dike, failure of the 160m long fuse plug, and overtopping part of the dam wall on the right bank, as well as erosion of the main dam slopes and crest, and damage to steel structures on the spillway bridge of the station. Following the fuse plug failure, the reservoir emptied, and electricity generation stopped.

The tropical Storm Ana, which extensively damaged Kapichira HPP's dam and fuse plug, also damaged the under-construction irrigation intake and part of the main canal.

Following this event, the Emergency Power Restoration Project (EPRP) was decided through the Government of Malawi – Ministry of Finance and Economic Affairs. The EPRP has two components: (1) Kapichira Hydropower Dam Rehabilitation and Strengthening and (2) Transmission and Distribution Network Restoration .

Electricity Generation Company (Malawi) Limited (EGENCO) is the implementing entity for the component (1) Kapichira Hydropower Dam Rehabilitation and Strengthening. This component includes two phases:

- The phase 1 is for "Energy restoration", to be implemented through raising water levels back to operational levels and by developing a temporary coffer dam upstream of the damaged infrastructure. Phase 1 works lasted from December 2022 to May 2023.
- The phase 2 is to "Build-back better", which includes rehabilitating the damaged infrastructure based on a revised design, and to improve Kapichira HPP sediment management. This Project is relative to this phase.

1.3. Description of the project

Based on a revised design that address key technical and operational features that contributed to the failure, this rehabilitation project will (i) rehabilitate damaged infrastructure (mainly the dam), (ii) upgrade the Kapichira scheme to enhance the

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resilience of the hydropower scheme (especially the main and emergency spillways), and (iii) support companion actions on operation and maintenance and sediment management.

The project aims to enhance resilient operation of the 129.6 MW Kapichira hydropower plant through the rehabilitation of the Kapichira dam and the upgrade of spillway. It should be noticed that the hydropower plant is not concerned by this rehabilitation.

Kapichira dam rehabilitation – phase 2 requires the works on the associated components of the dam:

- the main spillway gates,
- the embankment dam,
- the emergency spillway,
- the right embankment, and,
- the training dyke.

Because it is partly integrated into the Kapichira dam, the project will also rehabilitate the permanent intake for the Shire Valley Transformation Program project.

At the end of the rehabilitation activities, part of the current embankment material, between the existing training dyke and the dam embankment, will be removed, both to restore the function of the training dyke and to allow the water in the reservoir to feed the permanent SVTP irrigation intake.

The construction activities will require the following facilities :

- a quarry site for embankment materials,
- a borrow site for impervious core construction,
- a disposal area for surplus excavated material,
- a batching plant for concrete production,
- a temporary contractor campsite and a permanent camp for EGENCO staff.

The following figure describes the location of the project and provides an overview of the construction influence area.

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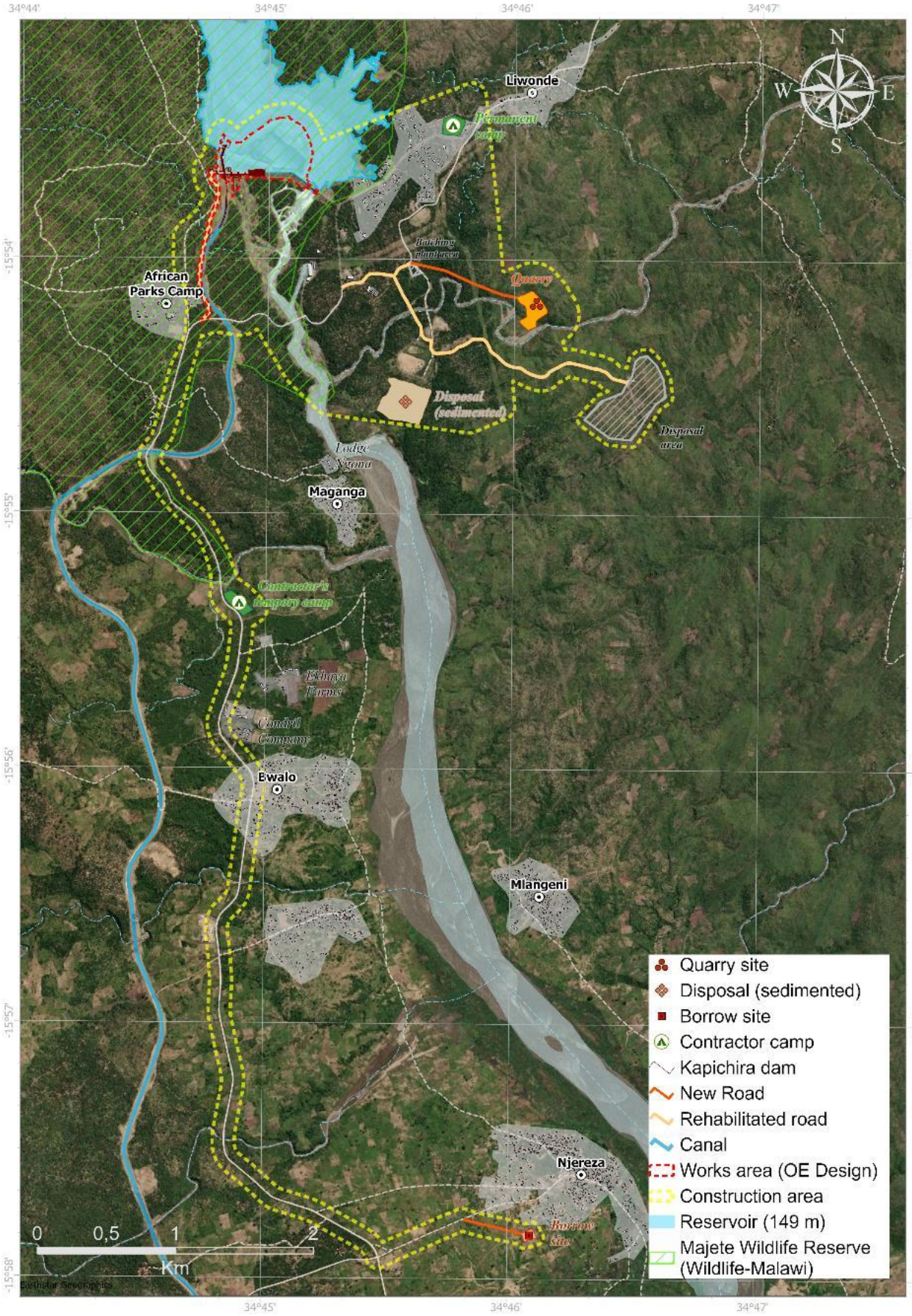


Figure 1-1: Construction influence area for Kapichira rehabilitation project

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1.4. Potential environmental and social risks and impacts

1.4.1. Risks and impacts during the construction phase

The construction phase is expected to last approximately 3.5 years.

No major impact was identified due to the project activities, mainly due to the fact that Kapichira is an existing dam with power plant already in operation. The assessed impacts of moderate significance are as follows:

- About physical environment:
  - Deterioration in air quality due to dust and gas emissions, mainly due to transport activities;
  - Increase in noise level, mainly due to the quarry activity and transport activity;
  - Risk of erosion and modification of the physic-chemical properties of the soil, mainly due to the proximity of river banks from the construction area;
  - Disaster risk due to the lack of emergency spillway;
- About biological environment:
  - Risk of loss, fragmentation and degradation of natural habitats and flora, due to the need of construction facilities such as temporary camp site, quarry site, borrow area, disposal area and corresponding new access roads;
  - Spread of flora invasive species;
  - Disturbance of wildlife due to the proximity with the Majete Wildlife Reserve;
  - Risk of human-wildlife conflict and increased poaching due to the proximity of wildlife from the construction area;
  - Risk of aquatic mortality and loss of aquatic habitats;
  - Specific impacts to the critical habitat qualifying species such as the Black Rhino and African Wild dog confined in the Majete Wildlife Reserve, the Vultures, the Black Heron, the African Openbill, the African Skimmer, the Whiskered Tern, the Collared Pratincole and the Basra Reed-warbler primarily associated in the Elephant Marsh.
- About human environment:
  - Risk of violence based on gender, due to the presence of workers;
  - Risk of damage to the cultural heritage, by uncovering archaeological artefacts during excavation works or by damage community church site at the vicinity of the quarry site;
  - Loss of land due to the acquisition of land for construction facilities;
  - Change in land use due to the construction activities.

All these impacts after mitigation are considered as minor, except for the two last impacts:

- Land acquisition for temporary facilities will require compensation. Although no physical displacement is expected, a Resettlement Action Plan (RAP) is necessary to detail compensation measures for land loss.

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- Use of community land for construction facilities (primarily agricultural land without permanent structures) will alter land use and affect livelihoods. This impact also requires compensation through a RAP.

It should be noticed that employment opportunities could have a longer-lasting positive impact at the local level by prioritizing the employment of local workers from the TA Kasisi.

1.4.2. Risks and impacts during the operation phase

No major impact was identified due to the project activities during the operation phase, as Kapichira is an existing dam with power plant already in operation. The assessed impacts of moderate significance are as follows:

- About physical environment:
  - Disturbance of the sediment balance and erosion of the Shire River with the current operating procedures;
  - Siltation of the Shire River downstream of the dam.
- About biological environment:
  - Risk of trapped fauna in the island between the main spillway and emergency spillway;
  - Risk of disturbance of aquatic wildlife due to sediment management;
  - Risk of human-wildlife conflict;
  - Risk of site invasion by invasive exotic species during maintenance of equipment;
  - Reduction of downstream nutriment load affecting species dependent on nutrient-rich wetland habitats.
- About human environment:
  - Health and safety risks for the communities due to disaster risks.

All these impacts after mitigation are considered as minor, except for the reduction of downstream nutrient load, because the proposed measure—remobilizing dredged sediment downstream—requires further investigation regarding sediment quality and existing downstream loads.

It should be noticed that disaster risk will be reduced due to the presence of emergency spillway providing a significant positive impact on the physical, biological, and human environment. This benefit could be maximized by implementing an Emergency Preparedness Plan.

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2. OVERVIEW OF THE STAKEHOLDER ENGAGEMENT PLAN

2.1. Purpose of the SEP

This report is relative of the Stakeholder Engagement Plan (SEP) of the Kapichira Dam Rehabilitation Project.

The purpose of this SEP is to provide the Project with a framework for undertaking effective and meaningful engagement with stakeholders. The SEP will be a living document that will be applied throughout the duration of the Project and will be reviewed and updated on a regular basis and in particular prior to the construction activities.

The SEP will provide a mechanism for continuous engagement and dialogue with Project stakeholders. It will also allow for stakeholders' perspectives and concerns to be known and to regularly feed into the Project's phased development in an appropriate manner.

The engagement approach set out in the SEP takes into consideration cultural norms and values, the needs of vulnerable and disadvantaged groups, and is gender-sensitive and inclusive.

The SEP focuses on engagement with stakeholders affected by Project activities and those with interest in and influence on the project, including impacted communities, customary authorities responsible for these communities, regional and national government authorities and departments, landowners, Non-Governmental Organisations (NGOs), civil society organisations, environmental and economic projects operating within the Shire River basin, local businesses and suppliers, and other projects in the project area.

This SEP is the overall management plan addressing how Kapichira Dam Rehabilitation Project will conduct regular consultations and interact with identified stakeholders. This SEP is aligned with the Malawi Emergency Power Restoration Project Stakeholder Engagement Plan produced in May 2022.

2.2. Principles of the SEP

This SEP is underpinned by internationally recognised stakeholder engagement principles such as the requirements of the World Bank's Environmental and Social Framework, especially the Environmental and Social Standard (ESS) 10 "Stakeholder Engagement and Information Disclosure." The principles of the SEP follows:

- Stakeholder engagement is an integral part of all Project phases, including development, construction, and operation phases, and is ongoing and iterative. Stakeholder engagement should be initiated early to inform and receive input on studies and processes.

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- Stakeholder engagement should be based on the prior disclosure and dissemination of relevant, transparent, objective, meaningful and easily accessible information which is in a culturally appropriate local language(s) and format and is understandable to affected communities.
- Stakeholder engagement should be inclusive and focused on those directly affected. It should be equitable and non-discriminatory and ensure that vulnerable individuals or groups amongst the affected stakeholders are given opportunities to voice their opinions and concerns.
- Stakeholder engagement should be free of external manipulation, interference, coercion, or intimidation. It should ensure the confidentiality of information and stakeholders, where appropriate, and should protect stakeholders from any retaliation for opinions expressed. It should enable meaningful participation, where applicable, but also avoid unnecessary and excessive consultations that may lead to stakeholder fatigue and/or unrealistic expectations.
- Engagement activities and their outcomes should be documented.

Considering these principles and the Project's overall engagement objectives, the specific objectives of this SEP are to:

- Ensure compliance with national regulatory and the World Bank's Environmental and Social Framework, especially the Environmental and Social Standard (ESS) 10 about Stakeholder Engagement and Information Disclosure";
- Ensure the identification of all stakeholders who are (or will be) directly and indirectly impacted by Project activities and/or are other interested and influential stakeholders;
- Provide the framework for targeted stakeholder consultation and engagement, awareness raising and other mechanisms for the inclusion and participation of stakeholders impacted by and / or interested in the Project;
- Reference the interface with the separate Grievance Redress Mechanism Procedure that should be established to effectively manage stakeholder grievances through a fair and transparent process with a view to seeking resolution in a timely manner;
- Outline the reporting and monitoring activities that will be undertaken in relation to stakeholder engagement with various stakeholder groups and grievance management.

2.3. Content of the SEP

This report will include the following chapters:

- Policy and regulatory framework relative to the stakeholders engagement;
- Stakeholder mapping and analysis;
- Stakeholder engagement activities;
- Stakeholder engagement strategy;
- Grievance redress mechanism.

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3. POLICY AND REGULATORY FRAMEWORK

3.1. National legislation

There are several national legal frameworks which govern public consultation in the implementation of development projects in Malawi. These legal frameworks include, but are not limited to, The Constitution of Malawi, Malawi Vision 2063, Gender Equality Act (N°3 of 2013) and the Environmental Management Act (No. 19 of 2017).

The Constitution of Malawi provides for right to access to information. Under the constitution every person has the right of access to all information held by the State or any of its organs at any level of Government in so far as such information is required for the exercise of his or her rights.

Malawi Vision 2063 promotes inclusiveness in human capital development by promoting gender transformative approaches that aim to reduce gender power imbalances which hinder the economic empowerment of women. It shall expand the provision of necessary social services and opportunities for minority and marginalized groups, including persons with disabilities, to participate in wealth creation activities.

The Gender Equality Act promotes gender equality, equal integration, influence, empowerment, dignity and opportunities, for men and women in all functions of society, to prohibit and provide redress for sex discrimination, harmful practices and sexual harassment, to provide for public awareness on promotion of gender equality, and to provide for connected matters.

The Section 5 from the Environmental Management Act stipulates that for purposes of ensuring effective public participation and enforcement of rights and duties created under this Act, the Authority shall promote the right of every person to:

- Access environmental information: lead agencies, private sector and NGOs shall have a duty to provide such information in a timely manner.
- Participate in environmental decision-making processes directly or through representative bodies and mechanisms, for effective, direct, and indirect public participation.

The Malawi Guidelines for ESIA provide for the need to consult the public during Project implementation processes. The guidelines provide guidance on the methods of public consultation, communication, and information disclosure. The consultation with the public should:

- Be started as early as possible in the project cycle and be continued at some level throughout the project cycle.
- Time major elements of public consultation to coincide with direct planning and decision making activities in the project cycle.

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3.2. International requirements

This SEP has been developed in alignment with the World Bank Environmental and Social Framework (2017).

The World Bank Environmental and Social Standard 10 (ESS 10), relative to the Stakeholder Engagement and Information Disclosure, notes that effective stakeholder engagement allows for the development of strong, responsive, and constructive relationships that can improve the environmental and social sustainability of projects, enhance project acceptance, and make a direct contribution to successful project design and implementation.

ESS 10 stipulates that open, transparent, and inclusive engagement between a project and its stakeholders is an essential element of good international practice. The engagement process must be conducted throughout the project life cycle and is most effective when started at an early stage of project development. Engaging stakeholders at an early stage helps to ensure that stakeholders are an integral part of early project decisions and identifying, managing, and monitoring a project's social and environmental impacts.

ESS 10 recommends a systematic stakeholder engagement approach whereby stakeholders are identified and categorized according to how they are affected by the project as well as their level of interest in and support for the project. This will inform the project's specific engagement strategies and information disclosure needs to different categories of stakeholders and enable stakeholders' views to be considered with regards to project management and social and environmental performance.

The ESS 10 also advises on information disclosure and meaningful consultation. In terms of appropriate project information on environmental and social risks and impacts, these must be disclosed in a timely, understandable, accessible, and appropriate manner and format. Consultation is meaningful when it is culturally appropriate, and free of manipulation, interference, coercion, discrimination, and intimidation.

A key element of effective stakeholder engagement is the development and implementation of an accessible and inclusive grievance management procedure that allows stakeholders to raise Project related issues and grievances and the project to respond to and manage such grievances.

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4. STAKEHOLDER MAPPING AND ANALYSIS

4.1. Introduction

To align with both the World Bank Environmental and Social Framework (2017), stakeholders have been defined as:

- Individuals or groups that are likely to be affected directly or indirectly by the Project, and,
- Other interested or influential stakeholders.

The term “stakeholder” may refer to an individual, group or organisation.

Stakeholder mapping and analysis is the process used to categorise stakeholders and determine the engagement requirements for each stakeholder group. In general, those stakeholders requiring the greatest engagement effort are those who are most affected by and/or have the highest level of influence and/or have interest over a project.

As a first step in preparing this SEP, stakeholder mapping and analysis of Project stakeholders was undertaken in April 2024 by the Consultant.

The objectives of the stakeholder mapping and analysis were, inter alia, to:

- Identify key stakeholders according to type and category,
- Assess stakeholders’ level of interest in and/or impact by the Project as well as stakeholders’ level of influence/power over the Project,
- Use the above assessment to prioritise stakeholders and engage with them accordingly,
- Assess opportunities for partnership and collaboration with stakeholders,
- Identify requirements for implementing the SEP, including staffing and capacity-building requirements.

4.2. Key stakeholders identification

4.2.1. Introduction

The identification has considered the institutional stakeholders and the communities stakeholders.

4.2.2. Institutional stakeholders

This category includes:

- Government ministries, departments, and agencies at national, regional or district level;
- Traditional authorities (traditional authority, group village head, or village head);

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- Public sector, Private sector or programmes in the Project area.
- NGOs.

Institutional stakeholders having direct interest in the project include:

- The project proponent Electricity Generation Company (EGENCO).
- The World Bank as international funding agency.
- The directly impacted district is Chikwawa district (direct footprint areas of project components located here), represented by District Council. It includes District Commissioner, Director of Planning and Development, Director of Natural Resources and Environment, Director of Agriculture, Water and Irrigation Services, Director of Public Works.
- The Kasisi Traditional Authorities.
- The Majete Wildlife Reserve managed by African Parks.
- The Chikwawa Civil Society Organizations Chairperson.
- The Shire Valley Transformation Project (SVTP).

Institutional stakeholders with indirect interest in the project include those at national level:

- Electricity Supply Corporation of Malawi (ESCOM) who are in charge of the distribution of the electricity from Kapichira hydropower plant.
- The Ministry of Finance and Economic Affairs who decided to implement the Emergency Power Restoration Project, provide oversight and control of disbursement project funds to the implementing agency, monitor compliance of financial reporting of project funds by the implementing agency.
- The Ministry of Labour.
- The Ministry of Gender, Community Development and Social Welfare
- The Ministry of Natural Resources and Climate Change.
- The Ministry of Agriculture, Irrigation, and Water Development.
- The Ministry of land.
- The Malawi Environment Protection Authority ("MEPA")
- The Department of Environmental Affairs.
- The Department of National Parks and Wildlife.
- The Department of Forestry.
- The Department of Fisheries.
- The Department of Museums and Monuments.
- The Wildlife and Environmental Society of Malawi.
- The Transport and infrastructure development authorities.
- The Academic and Research Institutions with expertise in environmental and energy studies, ecology, hydrology, and related fields.
- The Civil society Organisations, including NGOs and Community-Based Organisations in the area.
- The Media and Communication Channels (local newspapers, radio stations, and television channels, online media platforms and social media groups).

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- African Parks Limited.
- Mpatamanga hydropower project.

4.2.3. Communities stakeholders

This category includes:

- the directly and indirectly impacted communities, villages and group villages, inclusive of community groups such as those focused on natural resource management, and the potentially vulnerable people.
- The businesses and institutions within the project area and those directly affected.

The direct impacted communities are the communities or businesses included in the construction area as defined in the figure 1-1 in the chapter 1.3. They include the communities from:

- Bwalo village
- Maganga village
- Njereza village
- Liwonde village
- EGENCO camp
- African Parks camp.

The indirect impacted communities are the communities at the vicinity of the construction area. They include the communities from:

- The communities in Chikwawa district,
- Conduril camp
- N'Gona lodge.

4.3. Key stakeholders mapping

This project is the rehabilitation of an existing dam project, with no major impact identified. Consequently, the following table presents the relevance of identified stakeholders being directly impacted by the project without identified the importance of the impacts for each stakeholder. As they are directly impacted by the project, these stakeholders have a high level of interest in the project. The list is not exhaustive and will keep on being updated, hence the stakeholder engagement plan will be a live document.

It is important to note that stakeholder mapping and analysis is an ongoing process since new stakeholders may be identified over time as the Project expands and/or the socio-cultural, economic, and political environment changes. Moreover, current stakeholders' perceptions, expectations, priorities, and concerns may change due to unforeseen events such as the emergence of social conflicts such as land-related, natural disaster such as flood, a surge in communicable diseases such as COVID, or project-related environmental incidents with the Majete Wildlife Reserve or SVTP, to name a few possibilities.

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Table 4-1: Direct impacted stakeholders mapping

Stakeholder	Justification
Project Proponent – Energy Generation Company (EGENCO); 7 Victoria Avenue, Blantyre, MALAWI	As a client for the project, EGENCO is responsible for the studies and the implementation of the proposed project.
The World Bank	As funding agency for the Kapichira dam rehabilitation project.
Chikwawa District Council: District Commissioner, Director of Planning and Development, Director of Natural Resources and Environment, Director of Agriculture, Water and Irrigation Services; Shire Valley Transformation Project; Director of Public Works	Institutional stakeholder in the construction influence area. It is a technical decision making body on all development matters taking place in their city/district. This body will support the project in both construction and operation phases e.g., abstraction and extraction license and permits; any disputes or criminal cases therein locality of the project site….
Kasisi traditional Authorities and Village Heads.	As representative of the communities in the construction influence area, they will be more mobilize and could influence their wards to support the project.
Communities, businesses and institutions within the project area and those directly affected in the operation phase: • Bwalo village • Maganga 1 village • Maganga 2 village • Liwonde village • Njereza village • EGENCO Kapichira camp.	These communities will be directly impacted parties due to their closeness to the project site (within the construction influence area with usual works activities nuisances) or due to land acquisition required for the construction activities. This is relevant both during the construction and operation stages due to their closeness to an access road or the dam works. Their contribution is linked to the acceptance of the project.
African Parks	In charge of the management of the Majete Wildlife Reserve, including in the direct footprint area. They will be key stakeholder for the implementation of the biodiversity management plan for this project.
Shire Valley Transformation Project	In charge of the management of the irrigation program. Because it is partly integrated into the Kapichira dam, the project will also rehabilitate the permanent intake for the Shire Valley Transformation Program project. As this project is in the same area of influence, the coordination of the two projects and the corresponding ESMP measures will be part of the success of the project implementation.

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5. STAKEHOLDER ENGAGEMENT ACTIVITIES

A meeting with EGENCO MEPRP Implementation Unit in Blantyre on the 18th of May 2024 set a concrete plan for engaging with the stakeholders.

The process starts with Institutional consultations with District committees, Council officials and Companies in charge of environmental conservation followed by public consultations in May 2024.

Initial public consultations were followed by interviews with the authorities in the four key villages, as well as focus groups with men, women, youth and fishermen, in seven villages in Chikwawa District during the ESIA on the 2024/25 period.

The process for the purpose of this ESIA ended with Institutional consultations with District committee, Council officials and African Parks followed by public consultations in November 2025.

All the results of the engagement activities during the ESIA are included in the project's ESIA report (volume 1).

6. STAKEHOLDER ENGAGEMENT STRATEGY

6.1. Main principles for stakeholders engagement

Following the environmental studies, the Project will therefore continue the process of stakeholder engagement during the implementation of the project to:

- Create long-term, positive relationships with stakeholders.
- Disclose Project information to enable stakeholders to contribute meaningfully to impact management throughout the Project life cycle.
- Establish a constructive dialogue with key stakeholders to understand their concerns and collaboratively seek solutions.
- Commit to addressing stakeholder concerns and grievances in a fair, transparent, and effective manner.

To ensure the Project's stakeholder engagement is effective and supports the development of strong, constructive, and responsive stakeholder relationships, the following principles guide the stakeholder engagement strategies and practice:

- Consider to involve the direct impacted stakeholders during all the project.
- Timely dissemination of the main steps of the implementation of the project such as the time of the mobilisation of the Contractor and the progress of construction activities.
- Engagement on Project information that is relevant and of concern to different stakeholders.
- Understandable information to be presented in a format and language to different stakeholders, including those with low literacy levels.

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- Allows effective participation of those identified as disadvantaged, vulnerable, or marginalised.
- Respects cultural protocols for accessing stakeholder groups and scheduling, attending, and chairing meetings as well as adopts culturally appropriate dress codes and greeting rituals.
- Disclosure of the grievance management process.

6.2. Stakeholder engagement communication

The SEP is a useful tool for managing communications between EGENCO and its stakeholders. EGENCO has put in place effective on-going communication to share broad project information with stakeholders on the proposed project.

The communication plan outlined in this SEP will ensure that the groups are provided sufficient opportunity to voice their opinions and concerns that are likely to influence Project decisions. To put this commitment into effect the communication matrix to be employed is outlined in the following table.

Table 6-1: Stakeholder engagement communication

Stakeholder Group	Communication Method	Time/Period	Route of communication
Local communities /groups	Group meetings	Monthly, when required	District council
Governmental agencies	Briefing	Quarterly, when required	Offices
Traditional authorities	Face-to-face meetings	Weekly, when required	TA residence
Local administration	Briefing	Weekly	District Council
Private or commercial groups	Face-to-face meetings	When required	Office
NGOs	Briefing	Monthly	Offices, town halls

6.3. Community engagement strategy

The Community Engagement Strategy focuses on engagement with Project-affected communities and the traditional (Kasisi traditional Authorities) and government authorities (Chikwawa District) relative to these communities.

The corresponding administrative authorities are Village Head, Group Village Head, Traditional Authority and District Council.

Project-affected communities reside in rural villages. The Project-affected communities generally have low education and low literacy levels. The language most spoken and widely understood in the communities is Chichewa.

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The following table provides the presentation of the community engagement to be implement during the project construction, including the objective of engagement, the frequency of engagement, the methods, the responsibility.

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Table 6-2: Community Engagement

Stakeholder/group	Objective of engagement	Frequency of engagement	Engagement Methods	Record Keeping	Responsibility
Directly impacted communities					
Bwalo village Maganga 1 village Maganga 2 village Liwonde village Njereza village	• Keep informed and disclose Project information. • Record and respond to questions, concerns, and comments. • Provide feedback on local employment to date and upcoming employment opportunities. • Inform on coming training or sensibilisation. • Record and respond to complaints. • Feedback on Project-related questions, concerns, and comments • Present, then review grievance management procedure, including GBV/SHEA. • Provide feedback on Project-related grievances (number received, number resolved, number under investigation).	Ongoing or as required (at least monthly during construction activities)	Community meeting	• Attendance register • Minutes of meetings • Photographs of meeting participants, with permission • Feedback Register • Grievance register	EGENCO
	• Consultation and participation on certain Project aspects, e.g. improving GRM and GBV/SHEA management procedures; improving local labour process etc. • Consultation about resettlement process and measures with project affected people. • Identifying and obtaining feedback from vulnerable groups.	As required	• Face to face meetings • Focus groups	• Attendance register • Minutes of meetings • Photographs of meeting participants, with permission • Feedback Register • Grievance register	EGENCO

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Stakeholder/group	Objective of engagement	Frequency of engagement	Engagement Methods	Record Keeping	Responsibility
EGENCO Kapichira camp	• Keep informed and disclose Project information. • Record and respond to questions, concerns, and comments. • Record and respond to complaints. • Feedback on Project-related questions, concerns, and comments • Present, then review grievance management procedure, including GBV/SHEA. • Provide feedback on Project-related grievances (number received, number resolved, number under investigation).	Ongoing or as required (at least monthly during construction activities)	• Community meeting	• Attendance register • Minutes of meetings • Photographs of meeting participants, with permission • Feedback Register • Grievance register	EGENCO
Project stakeholder committees					
Village Grievance Redress Committee	• GRM access point: In-person • Project feedback access point: In-person. • GRM management procedure: Support sensitization of communities on GRM; Provide immediate response to grievances when possible; participate in investigation of grievances; and support in communicating resolutions. • GBV/SHEA access point (selected Village Grievance Redress Committee members). • Support sensitization of communities on procedure; connect complainant to GBV/SHEA referral pathway and service provider.	One Village Grievance Redress Committee per directly impacted communities	• Focus group meetings • Face to face meetings • Participatory workshops	• Attendance register • Minutes of meetings • Grievance register	EGENCO / District Council
Indirectly impacted communities					
Villages in Chikwawa District at the vicinity of the project such as Kandeu, Mlangeni…	• Keep informed and disclose Project information. • Record and respond to questions, concerns, and comments. • Provide feedback on local employment to date and upcoming employment opportunities. • Record and respond to complaints.	As required and annual during construction activities	• Community meeting	• Attendance register • Minutes of meetings • Grievance register	EGENCO

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Stakeholder/group	Objective of engagement	Frequency of engagement	Engagement Methods	Record Keeping	Responsibility
	• Feedback on Project-related questions, concerns, and comments • Present, then review grievance management procedure, including GBV/SHEA. • Provide feedback on Project-related grievances (number received, number resolved, number under investigation).				
Traditional Authorities					
Kasisi traditional Authorities and Village Heads.	Build a trustful relationship, manage expectations and seek to ensure a sound understanding of each step of the project. Important communication channel and for disseminating information about the Project (progress, schedule, activities, resettlement etc.) to the wider community.	Ongoing or as required (at least monthly during construction activities)	• Face to face meetings • Focus groups • Project site visits for members/leaders of communities	• Attendance register • Minutes of meetings • Photographs of meeting participants, with permission • Feedback Register • Grievance register	EGENCO
District Authorities					
Chikwawa District Council	Establish a Project presence in the impacted District (Chikwawa) where all stakeholders can come to engage Project staff, collect and/or share information, submit feedback, including grievances.	As required (at least monthly during construction activities)	• Face to face meetings • Project site visits for a representative of Chikwawa District Council	• Attendance register • Minutes of meetings • Photographs of meeting participants, with permission • Feedback Register • Grievance register	EGENCO

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7. GRIEVANCE REDRESS MECHANISM

7.1. Objectives

In compliance with the World Bank's ESS 10, a Project-specific Grievance Redress Mechanism (GRM) is being set up by EGENCO to handle concerns, complaints, feedback, suggestions, and questions raised by Project-affected-persons and all stakeholders. It will specifically address complaints related to the environmental and social performance of the Project in a timely manner. In the case of labor related grievances, those will be addressed in accordance with the Labor Management Procedure (LMP), which requires a specific GRM (Project workers GRM) to be set up by contractors to handle labor related complaints. The Contractor GRN must be consistent with the World Bank's ESS 2 .

A grievance is any complaint, comment, or question about the way the Project is being implemented. It may take the form of specific complaint about impacts, damages, or harm caused by the Project, concerns about access to the project stakeholder engagement process or about how comments and concerns about Project activities during construction or operation, or perceived incidents or impacts have been addressed.

A Grievance Procedure specific to the Project must be developed with the following aims:

- to build and maintain trust with all stakeholders;
- to prevent adverse consequences of failure to adequately address grievances; and
- to identify and manage stakeholder concerns and thus support effective risk management.

7.2. Grievance principes

The grievance redress mechanism will be based on the following principles:

- Transparency and impartiality: the process is transparent, according the respect of local culture and in the appropriate language. The procedure will be elaborate in collaboration with communities. It ensures that the mechanism will not interfere with judicial or administrative resorts.
- Accessible and culturally appropriate: free of charge for all users, available to all stakeholders without discrimination, culturally appropriate and sensitive to gender, disabilities, literacy levels.
- Regular and open communication: many options will be proposed to choose a preferred method to file a grievance.
    - Written records: all grievances will be recorded on a grievance form and they will be monitored until solution;
    - Dialogue and site visits: all grievances could be discussed with the complainant and a site visit could be realized to have an exact idea of the nature of the concern;

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- Appropriate solution: the Project will aim to resolve the maximum of grievance within the minimum of delay and retain the required confidentiality thresholds.

Based on the existing EGENCO procedure, taking into account national and World Bank requirements, the proposed grievance procedure to be implemented for this project is as follows.

7.3. Grievance procedures

7.3.1. Grievance management process

The grievance redress mechanism will be communicated to the communities, contractors and employees including all relevant stakeholders, in order to be aware of its objective and its operation. It will evolve and improve based on stakeholder feedback as well as other monitoring and evaluation activities regularly undertaken by EGENCO social specialist and Supervision Consultant.

In line with the GRM arrangements for the Malawi Emergency Power Restoration Project, there will be three levels in the grievance management procedure:

- The first level being the Community Grievance Redress Committee (CGRC), then
- The District Grievance Redress Committee (DGRC), and the last one will be:
- The National Grievance Redress Committee (NGRC) after which external remedies will be sought if the complainant is still not satisfied.

There will also be a Workers Grievance Redress Committee (WGRC) which shall be responsible for all employment related grievances between the Contractor and their Workers.

At each level of Grievances Redress Committee, there will be a Grievance Log and Resolution Form to record the complaint. Each grievance will be assigned a number. Secretary of the Committee will complete the Form or will help the complainant to fill in the Form. Both the Secretary and the affected person and their witnesses (one for the Committee and one for the affected person) will sign the Form to confirm that what has been recorded is true reflection of the grievance as reported by the affected person. A copy of the Form shall be forwarded to the project Implementation Unit for record purposes.

7.3.2. GRM stages

The best solutions to conflicts are generally achieved through localised mechanisms that consider specific issues as well as cultural context, local customs and the project conditions. This GRM will adopt a cascade model in which grievances will be managed successively, through grievances redress committees. The committees are Community Grievance Redress Committee (CGRC), District Grievance Redress Committee (DGRC) and National Project Grievance Redress Committee (NPGRC).

There will also be external remedies through the formal courts or other legally accepted preferred options. The National committee shall be the top most and last internal tribunal in handling grievances.

In the case of a complaint, the affected person always retains the right to take the matter to the appropriate legal or judicial authority as per the laws of Malawi at any point in

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time. This is in cases where the affected person feels that s/he is not being assisted appropriately.

The public shall be well sensitized of the existence of these structures throughout the Project period. The process will ensure that most of the grievances are addressed at community level in order to ensure expediency when addressing grievances. However, for every Project workplace where implementation shall be taking place, there shall be an additional committee known as the Workers Grievance Redress Management Committee (WGRMC). This particular committee will manage all issues raised by the workers in the course of their work and it will report directly to the project Implementation Unit where grievances have not been settled.

The detailed procedure of grievance management shall be as follows:

Stage 1:

The affected person will file the grievance in writing or verbally to the Community Grievance Redress Committee and will be directed and assisted to complete a grievance log and resolution form (see in Appendix).

If the affected person cannot write, a responsible member of the CGRC will assist in completing the grievance form.

The grievance form should be signed and dated by the affected person. A copy of this completed form shall be submitted to the PIU. The PIU shall ensure that adequate copies of the grievance registration forms are available with the CGRC.

The CGRC at this level shall record, assess and hear cases as submitted to them by the affected person. The issue will then be resolved and feedback provided accordingly. If the person is satisfied with the resolution, the issue will be closed. In the event that the case has not been resolved within 14 days, the grievance shall be referred to the District Grievance Redress Committee.

The affected person shall be communicated that his/her issue was referred to the upper committee for hearing. During assessment, when it is noted that the grievance is criminal, the complainant will be encouraged to report the issue to the nearest Police Station or, if sexual complaint, to the GBV Service Provider.

The CGRC members will be trained and empowered with resources to ensure that most of the grievances are addressed at the community level.

Stage 2:

Upon receiving the issue from the CGRC, the District Grievance Redress Committee shall record the case and proceed to conduct due diligence and carry out any other investigations required in assisting to resolve the grievance. The DGRC will assess, resolve and provide feedback to the affected person. If the matter is not resolved and upon expiry of 14 days, or the resolution is provided at this level is still unsatisfactory, the DGRC will refer the issue to the National Grievance Redress Committee (NGRC).

Stage 3:

In the event that the case was not closed at DGRC, the case will be referred to the National Grievance Redress Committee (NGRC). The NGRC shall make arrangements to invite the affected person to hear the case and also review the decisions made by the two lower committees. If the complainant shall accept the resolution made, the case shall therefore be closed at this level. In the event that the affected person is still not satisfied at this level, then recourse can be sought from the courts accordingly.

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APPENDIX : PROJECT GRIEVANCE FORM

	GRIEVANCE NO.	
	DATE	
	LOCATION	
2	**GRIEVANCE REDRESS COMMITTEE**	
2.1	GRC level (select as appropriate)	1. COMMUNITY GRIEVANCE REDRESS COMMITTEE 2. DISTRICT GRIEVANCE REDRESS COMMITTEE 3. WORKERS GRIEVANCE REDRESS COMMITTEE 4. NATIONAL GRIEVANCE REDRESS COMMITTEE
2.2	Name of the GRC	
3	**Affected person**	
3.1	Name of Person	
3.2	Age	
3.3	Occupation	
3.4	Name of village	
3.5	Phone Number	
4	**Person reporting grievance/feedback**	
4.1	Name of Person	
4.2	Link to the affected person	
4.3	Occupation	
4.4	Village	
4.5	Phone Number	
5	**Grievance details**	
6.	**Signatures**	
6.1	Signature of reporting person	Signature of reporting person
6.2	Name and Signature of witness	

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APPENDIX B. SEA/SH ACTION PLAN

I. JUSTIFICATION AND OBJECTIVES

The objectives of the plan is to manage the risks of Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH), outline strategies for promoting gender and social inclusion throughout the Project's implementation, both within the workforce and in surrounding communities. The requirements defined in this plan apply to the Employer, Contractor, Subcontractor, Partners and Supervising firms.

This plan aims to mitigate the negative impacts identified in the ESIA as follows.

Negative social impacts of the project		
Impact	**Assessment**	**Description of the Impact**
Gender Based Violence	High and localized	Large infrastructure projects, such as the rehabilitation of Kapichira Dam, can be a high-risk environment for GBVH affecting community members, workers and service users. With employment opportunities in the area money will be available in the community because of this, men might opt for multiple partners this might lead to misunderstandings in households bringing in gender-based violence cases. The study found that the prevalence and acceptance of domestic and gender-based violence were high in the project area, with women and girls being the main victims. The commonest form of domestic violence towards women is physical assault, followed by verbal abuse and defilement. It was further established that even though the perpetrators of GBV may be known, many domestic and gender-based violence cases go unreported because women who report such violence to the authority's fear being criticised, harassed, or shamed by others in the community.
Sexual Exploitation Abuse and Harassment (SEA/SH)	High and localized	The risks of SEA/SH are envisaged to be high in the area, with the projected large influxes of male workers from outside Chikwawa district, who may have large disposable incomes and pose risks of sexual harassment, violence and exploitative relationships. Poverty levels in the area may also contribute to young girls getting coerced into relationships with workers. Cases in the past of requests for sexual favors against works were reported during the survey.
Public Health and Safety	High and localised	Communities around Kapichira Dam would be highly exposed to health and safety hazards due to the rehabilitation works., These risks include, and are not limited to, exposure to construction waste, emissions, noise pollution, and potential flooding due to changes in the Shire River's course. Additionally, the presence of migrant workers from other regions and countries may increase the risk of disease outbreaks through new social and health interactions.
Human Trafficking and prostitution	High and localised	Stakeholders have expressed concerns about the potential increase in human trafficking and prostitution in the district due to the influx of migrant workers associated with the rehabilitation of the Kapichira Dam and the SVTP. Past experiences with the SVTP have shown a rise in prostitution activities, particularly involving young girls arriving in the area. The arrival of migrant workers may place significant pressure on local social services and could lead to an increase in violent crimes, especially those targeting women and girls. "The project may need stringent measures on human trafficking, women and girls' abuses, such projects provide fertile grounds for the same" (CCJP, Chikwawa).

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Negative social impacts of the project		
Impact	**Assessment**	**Description of the Impact**
Child labour and labour trafficking	High and localized	The socio-economic analysis identified a potential risk of child labour associated with the dam rehabilitation. Stakeholders and community members expressed concern that in areas where construction workers are commonly deployed, children under the age of 18 are sometimes engaged in sand mining. Additionally, there were reports indicating that underage children may be vulnerable to performing domestic tasks during school hours or engaging in physically demanding and exploitative work, driven by poverty and social vulnerability.
Increased risk of HIV, STDs and other infectious diseases	High and localized	The socio-economic analysis identified a heightened risk of HIV, STDs, and other infectious diseases in the district during the rehabilitation of the Kapichira Dam and implementation of the SVTP. The influx of migrant workers creates a high-risk environment for disease transmission, particularly through interactions between the workforce, local communities, and sex workers. Evidence from similar large-scale projects indicates that the spread of HIV and other STDs tends to cluster around project sites. In Chikwawa, this risk is especially pronounced due to increased disposable income among migrant workers, which may attract commercial sex establishments and lead to transactional sex involving vulnerable rural women and girls. Mobile and migrant workers are at significant risk of contracting and transmitting HIV and other infections to the general population. Their presence, combined with increased risk behaviours and limited access to health services, creates conditions conducive to the rapid spread of infectious diseases.
Disruption of Marriages	High and localized	Stakeholders have raised concerns about a potential increase in promiscuity due to the arrival of new workers at the construction site. There is a risk that some women may seek financial support or favours from workers, both within the site and in surrounding communities. This dynamic could place strain on existing relationships and potentially lead to the breakdown of marriages.
Risks associated with creation of the borrow pit	High and localized	The Construction works at the dam will necessitate creation of Borrow Pit outside the dam area, close to Njereza village. The proximity of workers with the surrounding population could increase the risks of Sexual Exploitation and Abuse and Sexual Harassment.
Sexual exploitation and sex trafficking	High and localized	It is feared that most girls/women will fall prey to sexual exploitation because of poverty in the area. Sex trafficking is a pervasive issue in large infrastructure projects in Malawi. Poverty, orphanhood, and desperation can drive the youth into sex work. Young women and men are also made false promises of work and trafficked into sex work in commercial centres and bars, lodges, and nightclubs near large infrastructure projects. For instance, similar incidents have been reported at Chikwawa boma.

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II. CONTENT OF THE SEA/SH PLAN

The following table brings together all the measures described in the ESMP. The SEA/SH plan shall comply with EGENCO Social and Gender inclusion policy, Malawi legislation (in particular the Gender Equality Act), the international guidelines such as the World Bank Guidance on GBV in infrastructure Projects.

Plan	Description of measures	Responsibility	Period
CP1 – Labour Management Plan – Recruitment conditions	• Comply with EGENCO social and gender inclusion. • Provide at least 20% of direct employment of women in Kapichira dam rehabilitation works to comply with the World Bank gender strategy (2024-2030). • Check that no discriminatory practices are being used to limit participation of women to the construction activities. • Apply the principle of equal opportunity by promoting diversity and do not practice ethnical, racial, religious or gender discrimination, including in recruitment. • Have Codes of conduct signed and understood by the workers with a physical presence at the project site. • Visibly display signs at the temporary camp site that signal to workers and the community that the project site is an area where GBV is prohibited. • Provide gender-based Personal Protective Equipment (PPE) with properly designed and fitted PPE to all women workers. • Provide gender-based training for workers. • Assure equal safety conditions for both men and women. • Provide the salary for equal jobs for men and women.	Contractor	During construction work
CP1 – Labour Management Plan – Plan to fight against GBV	• Launch awareness enhancement campaign on HIV/AIDS and GBV among the workers before the start of the works. • Employ a person in the Contractor team specifically to oversee gender, gender-based violence, sexual exploitation, abuse and harassment, who will work closely with the stakeholder engagement specialist. • Provide gender-separate accommodations in the temporary campsite and gender-separate lockable latrines and wash facilities that are well-lit, conveniently located and easily accessible. • Define a clear procedure in case of harassment. This procedure implies an identification phase with the verification of facts, testimony, etc. Then a phase of resolution when decisions must be taken to sanction the harasser and change the way of working for the victim (reorganization of the work). • Assure every case of SEA/SH is notified, correctly registered and treated. • Assure the identity of the victim as well as the details of the harassment remain confidential.	Contractor	During Construction work
CP8 – Community Health and Safety Plan	• Respect local customs. • Prevent and avoid any case of gender-based violence, sexual exploitation and abuse and sexual harassment amount the communities due to the presence of workers. • The Contractor must prevent social influxes through local recruitment and workers' rotation practices. To do so, the Contractor must apply the measures defined in the labour	Contractor With the participation of EGENCO	During Construction work

Plan	Description of measures	Responsibility	Period
	management plan and must liaise with the Employer and local authorities to limit the development and installation of a population resulting from spontaneous migration around the Project area.		
CP10 – Workplace occupational Health, Safety and Security – Workforce health and safety requirements	• Implement comprehensive measures to prevent the spread of diseases, such as HIV/Aids. • Develop and implement workplace measures that specifically target HIV/AIDS and STI and include: (i) Awareness and education campaigns, (ii) Condom distribution programs, (iii) Screening, diagnosis and treatment, (iv) HIV/AIDS and STI policy, (v) Outbreak preparedness and response, and (vi) Surveillance and monitoring. • Assure equal safety conditions for both men and women.	Contractor	During Construction work
EP1 – Community Health, Safety and Security Plan – Engagement of communities	• Take into account gender considerations in the ongoing consultation process with local communities (women must have adequate information at all stages of the project implementation process, regardless of their status, whether affected or not). Women will engage in public decision-making. • Develop awareness-training sessions on GBV, SEA/SH, STIs and AIDS/HIV for the community, especially in school with relevant specialists, considering the sensitizations on GBV risks provided for SVTP. • Provide information education and communication materials to the illiterate, especially women. • Provide all the information to the communities about the availability of an effective grievance redress mechanism (considering the one implemented for SVTP) with multiple channels to initiate a complaint including GBV-related ones.	EGENCO	During Construction and Operation phase
EP1 – Community Health, Safety and Security Plan – Gender and social inclusion	• Raise awareness among competent authorities, and customary authorities about GBV, SEA/SH, different forms of sexual exploitation and sex trafficking. These prevention and resolution resources should be mobilized from the start of construction and throughout the construction and operation phase. • Provide educational awareness sessions in the villages (considering the awareness program already implement by SVTP). • Implement measures to support and collaborate with local Victims Support units.	EGENCO	During Construction and Operation Phase
EP1 – Community Health, Safety and Security Plan – Grievance Redress Mechanism for communities	• Develop a process for the cases of GBV and SEA/SH. This process will be strictly confidential, handled by a GBV service provider who can be seen as trustworthy and unbiased by survivors. • This process will be strictly confidential, handled by a GBV service provider who can be seen as trustworthy and unbiased by survivors. • Assure every case of SEA/SH is notified, correctly registered and treated. • Assure the identity of the victim as well as the details of the harassment remain confidential.	EGENCO	During construction and Operation Phase

III. CONTENT OF THE MONITORING FOR THE SEA/SH PLAN

Plan	Monitoring parameters	Responsibility	Period
CP1 – Labour Management Plan – Recruitment conditions	• % of direct employment of women in Kapichira dam rehabilitation works • % of codes of conduct signed and understood by the workers • Number of complains reported relative to gender aspects among the workers, resolved and monitored. • Number of gender-based training for workers.	Owner's Engineer	During construction work
CP1 – Labour Management Plan – Plan to fight against GBV	• Number of awareness enhancement campaign on HIV/AIDS and GBV among the workers. • % of women included in workers training sessions. • Presence of dedicated person in the Contractor team specifically to oversee gender, gender-based violence, sexual exploitation, abuse and harassment. • Presence of gender-separate accommodations in the temporary campsite and gender-separate lockable latrines and wash facilities that are well-lit, conveniently located and easily accessible. • Number of GBVH cases among the workers reported, resolved and monitored.	Owner's Engineer	During Construction work
CP8 – Community Health and Safety Plan	• Number of GBVH cases reported in the communities, resolved and monitored.	Owner's Engineer	During Construction work
CP10 – Workplace occupational Health, Safety and Security – Workforce health and safety requirements	• Number of awareness and education campaigns about HIV/AIDS and STI. • Number of complains reported relative to gender aspects among the workers, resolved and monitored.	Owner's Engineer	During Construction work
EP1 – Community Health, Safety and Security Plan – Engagement of communities	• Number of complains reported relative to gender aspects among the communities, resolved and monitored. • Number of awareness-training sessions on GBV, SEA/SH, STIs and AIDS/HIV for the community. • % of women included in community training sessions. • Presence of an effective grievance redress mechanism • Presence of an effective GBV grievance redress mechanism.	Owner's Engineer	During Construction and Operation phase
EP1 – Community Health, Safety and Security Plan – Gender and social inclusion	• Number of awareness among competent authorities and customary authorities about GBV, SEA/SH. • Number of educational awareness sessions in the villages. • % of women included in community training sessions.	Owner's Engineer	During Construction and Operation Phase
EP1 – Community Health, Safety and Security Plan – Grievance Redress Mechanism for communities	• Number of GBVH cases reported in the communities, resolved and monitored.	Owner's Engineer	During construction and Operation Phase

IV. ORGANISATION OF SEA/SH ACTION PLAN

EGENCO has already put a “social and gender inclusion and anti-sexual harassment policy” in place. This policy must be implemented for the project.

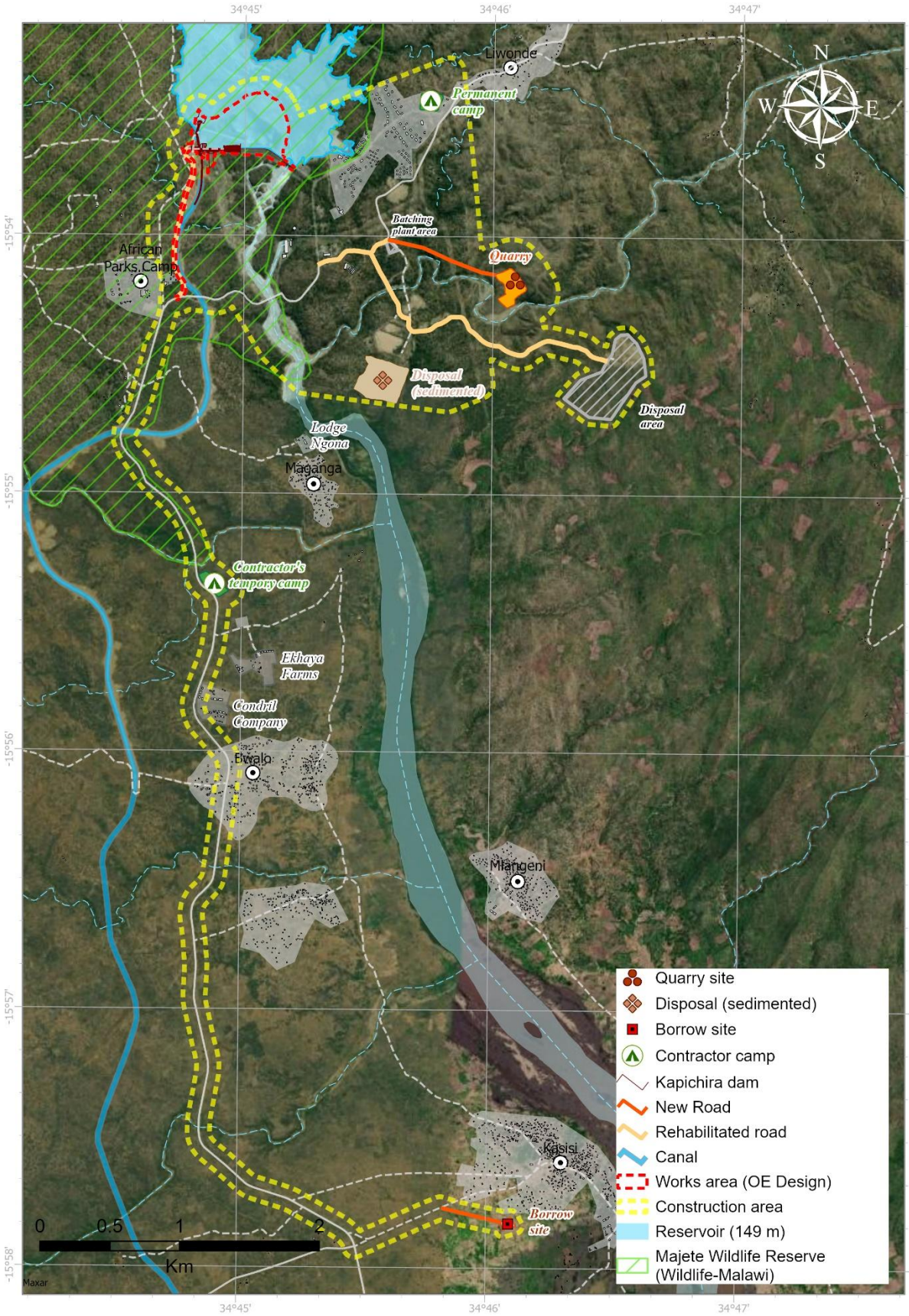
The Contractor should implement the following measures as part of its Labour Management Plan:

- Employ a person in the Contractor team specifically to oversee gender, gender-based violence, sexual exploitation, abuse and harassment, who will work closely with the stakeholder engagement specialist.
- Define a clear procedure in case of harassment. This procedure implies an identification phase with the verification of facts, testimony, etc. Then a phase of resolution when decisions must be taken to sanction the harasser and change the way of working for the victim (reorganization of the work).
- Provide a survivor-centred and confidential reporting system with safe, anonymous and specialized SEA/SH pathways.
- Assure every case of SEA/SH is notified, correctly registered and treated.
- Assure the identity of the victim as well as the details of the harassment remain confidential.
- Establish and train a work place grievance redress mechanism committee.
- Define a clear governance structure with defined responsibilities and accountability mechanisms.
- Establish a formal agreement with qualified GBV/SEA/SH service providers in place before construction begins.
- Define clear procedures for rapid and appropriate response to SEA/SH allegations.

EGENCO shall, in addition with the measures that must be carried out by the Contractor:

- Raise awareness among competent authorities, neighbouring communities, and customary authorities about GBV, SEA/SH, different forms of sexual exploitation and sex trafficking. These prevention and resolution resources should be mobilized from the start of construction and throughout the construction and operation phase.
- Provide educational awareness sessions in the 5 villages (considering the awareness program already implement by SVTP) within the construction influence area.
- Implement measures to support and collaborate with local Victims Support units (survivor-centered, confidential and specialized process for GBV and SEA/SH cases). This process shall be managed by a qualified GBV service provider perceived as trustworthy and unbiased by survivors.

APPENDIX C.MAP OF THE CONSTRUCTION AREA



APPENDIX D.ESTIMATED BUDGET BY YEAR

N° of sub-plan	Description of sub-plans	Responsibility	Pre-Construction phase	Construction phase (USD)					Operation phase *(USD)*				Total cost (USD)
			Year N-1	Year 1	Year 2	Year 3	Year 4	***Sub-total***	Year 5	Year 6	Year 7	***Sub-total***	
CP1	Labor Management Plan	Contractor [a]	-	-	-	-	-	-	-	-	-	-	-
CP2	Waste management Plan	Contractor [a]	-	-	-	-	-	-	-	-	-	-	-
CP3	Hazardous substances Management Plan	Contractor [a]	-	-	-	-	-	-	-	-	-	-	-
CP4	Resource Efficiency and Pollution Prevention Management Plan	Contractor [a]	-	-	-	-	-	-	-	-	-	-	-
CP5	Sediment management plan	Contractor [a]	-	-	-	-	-	-	-	-	-	-	-
EP2		EGENCO	-	7 000	50 000	50 000	35 000	***142 000***	2 000	-	-	***2 000***	**144 000**
CP6	Biodiversity Management Plan	Contractor [a]	-	-	-	-	-	-	-	-	-	-	-
EP4		EGENCO	82 000	193 800	193 800	193 800	530 800	***1 194 200***	470 800	267 000	144 000	***881 800***	**2 076 000**
CP7	Traffic and road Safety Management Plan	Contractor [a]	-	-	-	-	-	-	-	-	-	-	-
CP8	Community Health, Safety and Security Plan	Contractor [a]	-	-	-	-	-	-	-	-	-	-	-
EP1		EGENCO	-	180 000	180 000	180 000	180 000	***720 000***					**720 000**
CP9	Cultural Heritage Management Plan	Contractor [a]	-	-	-	-	-	-	-	-	-	-	-
CP10	Occupational Health, Safety and Security Management Plan	Contractor [a]	-	-	-	-	-	-	-	-	-	-	-
EP7		EGENCO [b]	-	-	-	-	-	-	-	-	-	-	-
CP11	Emergency preparedness Plan	Contractor [a]	-	-	-	-	-	-	-	-	-	-	-
EP6		EGENCO [b]	-	-	-	-	-	-	-	-	-	-	-
CP12	Restoration of temporary facilities	Contractor [a]	-	-	-	-	-	-	-	-	-	-	-
EP3	Environmental flow management plan	EGENCO [b]	-	-	-	-	-	-	-	-	-	-	-
EP5	Resettlement Action Plan	EGENCO	80 000	15 000	15 000	15 000	15 000	***140 000***	8 000	-	-	***8 000***	**148 000**
	E&S monitoring plan		-	45 000	85 000	45 000	85 000	***260 000***	45 000	42 000	35 000	***122 000***	**382 000**
	Management for the implementation of the ESMP	EGENCO	110000	110000	110000	110000	110 000	***550 000***	55 000	50 000	50 000	***155 000***	**705 000**
	TOTAL		**272 000**	**550 800**	**633 800**	**593 800**	**955 800**	***3 006 200***	**580 800**	**359 000**	**229 000**	***1 168 800***	**4 175 000**

(a) Included in construction costs ; (b) Included in operation costs

APPENDIX E. ENVIRONMENTAL AUDIT TEMPLATE

This template is taken from the Appendix 23 of the "guidelines for environmental assessment" (second edition – August 2025) from Malawi Environment Protection Authority.

Note:
It is for use by anyone who intends to undertake an audit. The aim of this template is to ensure that all personnel carrying out audits do so in a consistent manner. For any item with "No", a non-conformance should be assigned and proposed corrective action and close out date shall be recorded in consultation with the project related parties.
N.A means "Not Applicable".

LAND USE					**ASSIGN AS FOLLOWS**			
Name and Organization:	**Inspected Activity:**	**Location:**	**Date:**	**Signature:**	**Yes**	**No**	**N.A**	**Remarks**
Do the permits and approvals exist before commencing the works?					☐	☐	☐	
Are the activities taking place within agreed boundaries (i.e., is it encroaching outside the activity area)?					☐	☐	☐	
Have already disturbed areas been preferred during site selection for workers' accommodation, storage, workshop and the worksite?					☐	☐	☐	
Have cultivated lands or fruit trees, wetlands, grave sites or any sensitive environment or social site/area been clearly marked as No Go Areas?					☐	☐	☐	
Is there any project equipment located or parked outside of the working area?					☐	☐	☐	
Has the land been cleaned-up and reinstated after finalizing the activity?					☐	☐	☐	

NOISE					**ASSIGN AS FOLLOWS**			
Name and Organization:	**Inspected Activity:**	**Location:**	**Date:**	**Signature:**	**Yes**	**No**	**N.A**	**Remarks**
Are community roads used by the project? If yes, are the speed limits reduced in these roads?					☐	☐	☐	
Are there any sensitive receptors near the activity area (e.g. schools, hospitals, residents, places of worship, etc.) those can be disturbed by noise during activities? If yes, are the operation hours limited considering the receptors?					☐	☐	☐	
Are there any noisy activities during night?					☐	☐	☐	
Are there any engines on although not required?					☐	☐	☐	

DUST AND AIR QUALITY					ASSIGN AS FOLLOWS			
Name and Organization:	**Inspected Activity:**	**Location:**	**Date:**	**Signature:**	**Yes**	**No**	**N.A**	**Remarks**
Is there any indication of excessive exhaust emissions, or black smoke generated by equipment and machinery?					☐	☐	☐	
Are there any indications of dust and nuisance related with project activities close to schools, hospitals, residents, places of worship, crops, etc.? If yes, is there any dust control (e.g. water spraying) to minimize the impact?					☐	☐	☐	
Are there any trucks transporting spoil or dusty material? If yes, are they covered?					☐	☐	☐	
Are there any dusty construction materials (cement, sand, etc.) storage areas? If yes, are they covered?					☐	☐	☐	

WATER					ASSIGN AS FOLLOWS			
Name and Organization:	**Inspected Activity:**	**Location:**	**Date:**	**Signature:**	**Yes**	**No**	**N.A**	**Remarks**
Are there any refuelling activities within 30 m of watercourses or open trenches?					☐	☐	☐	
Are there any hazardous materials stored near watercourses or open trenches?					☐	☐	☐	
Are there any signs or indications of pollution in watercourses, drainages, ponds, etc.?					☐	☐	☐	
Are there any activities and vehicle movements in the watercourses? If yes, are there any mitigation measures taken to prevent spills?					☐	☐	☐	
Is there any indication of natural water blockage caused by activities? If yes, is there a diversion channel to let the natural flow?					☐	☐	☐	
Are the approvals in place by local authorities and local leaders for the water resources used by the activities?					☐	☐	☐	

WASTE MANAGEMENT					ASSIGN AS FOLLOWS			
Name and Organization:	**Inspected Activity:**	**Location:**	**Date:**	**Signature:**	**Yes**	**No**	**N.A**	**Remarks**
Is there any indication of waste burning?					☐	☐	☐	
Is all waste stored in designated storage areas?					☐	☐	☐	
Are hazardous waste and non-hazardous waste segregated?					☐	☐	☐	
Is there evidence of any spills / leaks from the waste containers?					☐	☐	☐	
Are any waste storage containers showing signs of corrosion or being damaged?					☐	☐	☐	
Is waste stored securely to prevent scavenging by animals?					☐	☐	☐	
Are waste containers clearly labelled?					☐	☐	☐	
Is hazardous waste stored in an impervious and secure bund?					☐	☐	☐	
Is there any excavation activity? If yes, is excavated soil reused by the Project?					☐	☐	☐	
Are there any indication of sharp, dangerous objects and organic wastes at and around the activity area (especially in the areas where there are nearby settlements)?					☐	☐	☐	
Are all type of waste transported and disposed based on the legal requirements in consultation with local authorities?					☐	☐	☐	
Are wastes from workers camps being dealt with in a satisfactory way?								

EMPLOYMENT AND LABOUR RIGHTS					ASSIGN AS FOLLOWS			
Name and Organization:	**Inspected Activity:**	**Location:**	**Date:**	**Signature:**	**Yes**	**No**	**N.A**	**Remarks**
Is there a fair and transparent employment process in place?					☐	☐	☐	
Have there been any grievances regarding the employment process?					☐	☐	☐	
Do the employees have working contracts and do they know their rights?					☐	☐	☐	
Is there any child or forced labour?					☐	☐	☐	

CODE OF CONDUCT					ASSIGN AS FOLLOWS			
Name and Organization:	**Inspected Activity:**	**Location:**	**Date:**	**Signature:**	**Yes**	**No**	**N.A**	**Remarks**
Is there a Code of Conduct in place?					☐	☐	☐	
Are the employees aware of the content of the Code of Conduct?					☐	☐	☐	

GRIEVANCES					ASSIGN AS FOLLOWS			
Name and Organization:	**Inspected Activity:**	**Location:**	**Date:**	**Signature:**	**Yes**	**No**	**N.A**	**Remarks**
Is there a grievance mechanism in place for both community and the employees?					☐	☐	☐	
Are grievances recorded?					☐	☐	☐	
Are the complainants responded to in an acceptable time period?					☐	☐	☐	

COMMUNITY SAFETY					ASSIGN AS FOLLOWS			
Name and Organization:	**Inspected Activity:**	**Location:**	**Date:**	**Signature:**	**Yes**	**No**	**N.A**	**Remarks**
Have all the drivers been trained with regard to road safety and are they familiar with driving close to villages and along access roads?					☐	☐	☐	
Are dangerous routes and times of day avoided to reduce the risk of accidents?					☐	☐	☐	
Is local traffic signage in place?					☐	☐	☐	
Are there sufficient and adequate site boundary and access controls near settlements to prevent unauthorized entry to construction or activity sites especially by children (e.g. fencing of construction section in the vicinity of settlements or communities)?					☐	☐	☐	
Are there sufficient passages (vehicle and pedestrian) left to ensure that pedestrians or others do not enter the unauthorized points.					☐	☐	☐	
Has the worksite been secured and safe diversions, temporary bridges, traffic controls, barricades, signs and warning lights been provided?					☐	☐	☐	
Are there any open trenches? If yes, is there water accumulated in the trench?					☐	☐	☐	
Have open trenches been demarcated and fenced?					☐	☐	☐	
Are there any indication of sharp, dangerous objects and organic wastes at and around the activity area (especially in the areas where there are nearby settlements)?					☐	☐	☐	
Have there been any damages on utilities such as underground and aboveground electricity lines, water lines, gas lines, oil pipelines, etc.? If yes, have the relevant authorities and communities been informed?					☐	☐	☐	

TRAFFIC MANAGEMENT					ASSIGN AS FOLLOWS			
Name and Organization:	**Inspected Activity:**	**Location:**	**Date:**	**Signature:**	**Yes**	**No**	**N.A**	**Remarks**
Have speed restrictions been implemented and communicated to all employees?					☐	☐	☐	
Do all drivers have valid driver's licenses?					☐	☐	☐	
Do the vehicles have reverse signals?					☐	☐	☐	
Do the trucks use a flagman or watchmen in case of reversing, loading and unloading?					☐	☐	☐	
Are there any observations with reckless driving by project vehicles?					☐	☐	☐	
Do the drivers use cellular phone while driving?					☐	☐	☐	
Are there any damages on the roads caused by project activities? If yes, have they been repaired?					☐	☐	☐	
Are there adequate number of barricades, signs and warning lights?					☐	☐	☐	
Are there any flagmen at blind spots and risky areas?					☐	☐	☐	

OCCUPATIONAL HEALTH AND SAFETY					ASSIGN AS FOLLOWS			
Name and Organization:	**Inspected Activity:**	**Location:**	**Date:**	**Signature:**	**Yes**	**No**	**N.A**	**Remarks**
Have all employees received health and safety training?					☐	☐	☐	
Is there a dedicated safety expert for the activity?					☐	☐	☐	
Has a risk assessment been conducted and mitigation measures been defined for the activity?					☐	☐	☐	
Are all employees aware of the risks related with their activity? Did they receive training and are there records?					☐	☐	☐	
Are workplace hazards or any incidents or injuries recorded and reported?					☐	☐	☐	
Do all employees have proper PPEs? Is there a list of provided PPEs to employees?					☐	☐	☐	
Is there any indication of damages on PPEs?					☐	☐	☐	
Are there any written instructions, warning signs with regard to usage of equipment, machineries, Dos and Don'ts etc.?					☐	☐	☐	
Do the employees use the right tool for the specific activity?					☐	☐	☐	
Are the tools regularly inspected by authorized staff?					☐	☐	☐	
Are there any damages on tools? If yes, has it been fixed by authorized person?					☐	☐	☐	

OCCUPATIONAL HEALTH AND SAFETY					ASSIGN AS FOLLOWS			
Name and Organization:	**Inspected Activity:**	**Location:**	**Date:**	**Signature:**	**Yes**	**No**	**N.A**	**Remarks**
Is good housekeeping implemented? Any observations that may cause trips, slips and falls?					☐	☐	☐	
Are there daily tool-box talks / conversations on health and safety issues before the daily activity starts?					☐	☐	☐	
Are there adequate number of toilets, sanitary facilities separately for women and men?					☐	☐	☐	
Is an adequate amount of drinking water provided to the employees (especially in hot weather conditions)?					☐	☐	☐	
Are there adequate numbers of first aiders and first aid kits available?					☐	☐	☐	
Are there any open trenches? If yes, are the trenches and bankments regularly monitored and inspected?					☐	☐	☐	
Are proper ladders used to get in and out of trenches?					☐	☐	☐	
Is there water accumulated in trenches? If yes, has it been pumped out?					☐	☐	☐	
Have the open trenches been demarcated and fenced?					☐	☐	☐	
Are proper ladders present on site? If yes, are they stable and without damages?					☐	☐	☐	
Are metal ladders used close to overhead lines?					☐	☐	☐	
Is the basic fire-fighting equipment available?					☐	☐	☐	
Are employees aware how to act in case of a fire? Did they receive training and are there records?					☐	☐	☐	

HOUSE KEEPING					ASSIGN AS FOLLOWS			
Name and Organization:	**Inspected Activity:**	**Location:**	**Date:**	**Signature:**	**Yes**	**No**	**N.A**	**Remarks**
Are working areas clean and tidy?					☐	☐	☐	
Have loose materials that have potential to fall been secured?					☐	☐	☐	
Have the aisles, stairways, passageways, ladders, etc. been kept free of obstructions, materials, cables, chords, hoses, etc.?					☐	☐	☐	
Have the materials kept away from the edge of excavations, trenches, roofs, etc.?					☐	☐	☐	
Have the open trenches, holes and other openings been covered and secured?					☐	☐	☐	
Is daily clean-up conduced at the end of the day?					☐	☐	☐	

HAZARDOUS MATERIAL					ASSIGN AS FOLLOWS			
Name and Organization:	**Inspected Activity:**	**Location:**	**Date:**	**Signature:**	**Yes**	**No**	**N.A**	**Remarks**
Have fuels, oils, chemicals and other hazardous materials been stored on a suitably sized impervious and bunded base?					☐	☐	☐	
Have the storage yard and containers been clearly labelled with content, handling, storage, expiration, and health and safety information?					☐	☐	☐	
Are drip trays being used during fuelling and maintenance?					☐	☐	☐	
Is smoking prohibited? Are there warning signs?					☐	☐	☐	
Have the storage areas been fenced and secured with a locked gate?					☐	☐	☐	

At the helm of the Energy Transition, Tractebel provides a full range of engineering and consulting services throughout the life cycle of its clients' projects, including design and project management. As one of the world's largest engineering consultancy companies and with more than 150 years of experience, it's our mission to actively shape the world of tomorrow. With about 5,000 experts and offices in 33 countries, we are able to offer our customers multidisciplinary solutions in energy, water and urban.

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