NAMAACHA

WIND POWER

ELECTRICIDADE DE MOÇAMBIQUE, E.P.

GLOBELEQ

POWERING AFRICA'S GROWTH

SOURCE

ENERGIA

UPDATED ESIA FOR TRANSMISSION LINE

Executive Summary

Introduction

Electricidade de Moçambique E.P. ("EDM" or the "Proponent"), with the support of its implementation partners Globeleq Africa Limited and Source Energia, are proposing to construct and operate a transmission line for the evacuation of energy generated by Central Eléctrica da Namaacha (CEN) Wind Farm Project. The proposed transmission line will connect the CEN Wind Farm Project to the Boane Substation.

To obtain the Environmental License required in terms of the Environmental Law (Law No. 20/1997, of 1 October), the Proponent has followed the detailed Environmental Impact Assessment (EIA) process required under national legislation. Consultec - Consultores Associados, Lda, was appointed by the Proponent to carry out the EIA process on their behalf. A summary of the EIA Process to date is provided in the table below.

Summary of EIA Process to Date[1]

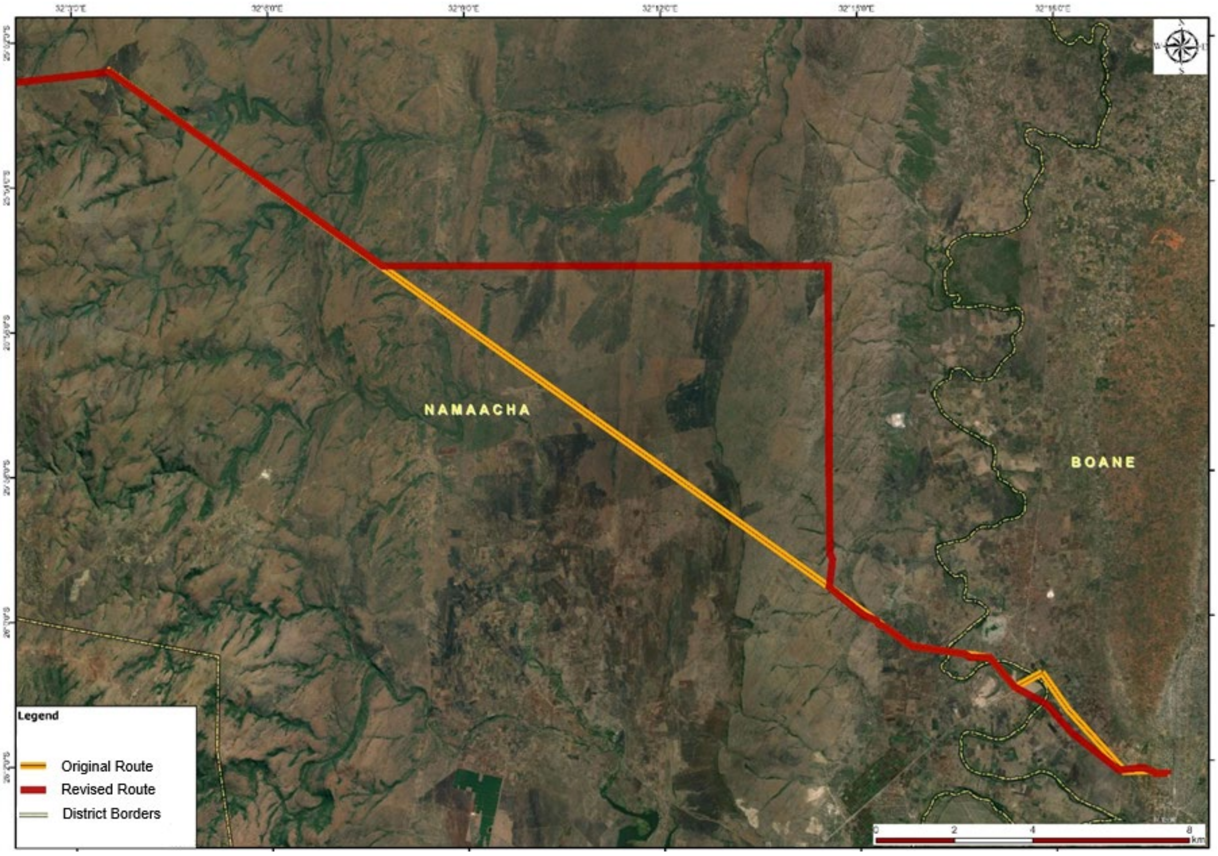
Step	Date
Submission of Screening Report	May 2022
Categorization of Project	June 2022
Submission of Environmental Pre-Feasibility and Scope Definition Study (EPDA)	November 2022
EPDA Public Participation Process	December 2022
EPDA Approval by MTA	April 2023
Submission of the Environmental Impact Study (EIS) Report	October 2023
EIS Public Participation Process	October 2023
EIS Approval by MTA	January 2024
Notification to MTA of Proposed Route Change	Sept 2024
MTA Approval of ESIA Addendum Terms of Reference	Sept 2024
Submission of ESIA Addendum to MTA	Sept 2024
MTA Approval ESIA Addendum	October 2024
Receipt of Environmental Installation License for Transmission Line	November 2024
[1]Note that these steps exclude the resettlement process, which has occurred concurrent to the EIA process and is at a similarly advanced state. Approval was obtained on the RAP for the original route in October 2024.	

Proposed Change

As part of the Project's continued stakeholder consultation along the transmission line route associated with the Project's Resettlement Action Plan (RAP)[1], several sensitivities (e.g. two military areas) were identified along the original route that posed a material risk to the Project. Additionally, it was identified that the original route assessed in the EIS Study did not align with national regulations regarding the minimum required set back distance from national roads (Land Law, Law No. 19/97, dated October 1st, and its Regulation, Decree 66/98, dated December 8th) and a modification of the original route is therefore needed to allow for future expansion plans of National Road N2.

[1] Resettlement Action Plan for the 66 kV Power Evacuation Line from Namaacha Wind Power Project to Boane Substation, Final Report. September 2024.

The Project Proponent commissioned an alternatives assessment to evaluate such sensitivities and assess potential alternative routes. Following this process, an alternative route was identified that will result in reduced environmental and social impacts and will fully align with the minimum set back distance stipulated in the Land Law. This proposed route, compared to the original route, is shown in the figure below.



Proposed variation to previously assessed transmission line route

The Project intends to follow the same approach as described in the EIS Report[2] for land take for compensation and resettlement purposes. Where the two 66 kV lines will run parallel to each other (i.e., now the first 32.8 km after leaving the Namaacha wind energy facility site) the protection zone will be a 70 m wide corridor (25 m to either side plus a 20 m separation distance). For the rest of the overhead transmission line route (5.37 km in total) the transmission line will be installed on monopole towers (double circuit overhead line) and this corridor would be 50 m (25 m to each side). For the last 339 m on the approach to the Boane substation the line will be buried, and as such, only a corridor of 2 m will be required for this section of the route.

No other changes to the general Project Description presented in the original EIS Report are proposed.

This revised route passes through the same regions and communities as the original route and the relative baseline conditions were verified through field reconnaissance by a multi-disciplinary team of specialists.

[2] Environmental Impact Assessment for the 66 kV Power Evacuation Line from Namaacha Wind Power Project to Boane Substation, Environmental Impact Study, Final Report. November 2023.

The table below provides a summary of the expected key differences in impacts.

Summary of Expected Key Changes in Impacts

Topic	Original Route	New Route
Resettlement		
Total Number of Affected Households (HHs)	115	45 + HHs associated with 9 commercial farms*
Total Number of Project Affected People (PAPs)	642	252 + PAPs associated with 9 commercial farms*
HHs Subject to physical displacement	4	0*
HHs subject to economic displacement[1]	101	45 + HHs associated with 9 commercial farms*
Loss of trees of economic value[1]	142	252*
Loss of graves	8	1*
Loss of spiritual house (private)	1	1*
Environmental sensitivities in original route versus new route	The residual significance rating of the revised route for biodiversity is unchanged from the originally assessed route; however, the route does affect a slightly larger area of natural habitat than the original route and some additional mitigation measures to reduce potential impact on elephants have been included as part of this revised ESIA.	
Infrastructure or concessions affected by new route in comparison to original route (Mining concessions, wells, roads, power lines, etc.)	Crosses 4 mining concessions, including one (Riolitos) that EDM has had difficulty in negotiating with previously	Crosses 3 mining concessions and 2 mining license areas. Avoids Riolitos mining concession.
Other sensitivities	Crosses a firing range and two large cattle farms owned by political VIPs (the President and Minister of Defence). The route also overlaps part of the future expansion plans for the national road (N2)	Avoids these VIP plots and firing range. Outside of the national road expansion area.
Notes: *To be confirmed during detailed the enumeration of revised transmission line route that commenced in November 2024.		

Because the impacts from the revised route will be the same or less for all technical disciplines, there will be no change in the proposed mitigation measures required. A revised version of the Environmental Management Plan (EMP) has also been prepared that now references the proposed change to the transmission line route and is included as Annex 1.

The Project carried out stakeholder engagement with each of the affected communities along the transmission line route to notify them of the change and to obtain feedback to inform this ESIA. See Section 8 for further details.

Next Steps

The Project Proponent requested that the Ministry of Land and Environment (MTA) approve an amendment to the environmental approval to incorporate the proposed change to the transmission line footprint. The Addendum submission to MTA following the agreed Terms of Reference structure was made on 24 September 2024. For transparency, this Addendum is provided in Annex 2. A workshop was held by MTA on 30 September - 1 October to review the Addendum and the Project received confirmation of the approved change on 15 October 2024.

The Project Proponent will conduct a revised asset enumeration for the altered sections of the route, consistent with the methodology set out in the RAP and will conduct focused stakeholder consultation with both those Project Affected Peoples (PAPs) no longer affected by the Project and new PAPs. New PAPs will be compensated following the entitlements matrix set out in the RAP that is pending final approval with authorities. Following the asset enumeration for the changed sections of the route, the Project Proponent will submit a revised RAP to MTA for approval.

Key Changes in Report from Original EIS Report

Section	Change
Executive Summary	This is a new section of the report and summarises the key changes between the Lenders' ESIA and the original EIS Study.
Section 1: Introduction	Chapter updated to include activities following approval of the original EIS Report.
Section 2: Legal and Regulatory Framework	No change from the previous EIS Report.
Section 3: EIA Approach and Methodology per National Process	This chapter was streamlined and renamed to reflect that it only relates to the requirements of the EIA Process under the Mozambiquan regulatory process.
Section 4: Project Description	This section has been revised to reflect the revised route. Note that the Project Area of Influence, previous Section 5 was moved into the Project Description chapter.
Section 5: Alternatives	This is a new section. Alternatives were previously presented in sub-section 4.1.3. To improve readability, this content was pulled out of the Project Description chapter (Section 4) and details for the most recent alternatives alignments assessed were included.
Section 6: Baseline Assessment	The baseline data presented in the original EIS Report was amended to include additional baseline data collected since the original EIS Report was issued. Sources of additional data include: habitat mapping conducted in March - April 2024, a reconnaissance survey of the new proposed route conducted in July – August 2024, and a resettlement scoping survey conducted for the new transmission line sections in August – September 2024. Using the combination of new and previously compiled baseline data, the baseline sensitivities of the entire new route were re-evaluated, and the revised assessment is included in this report.
Section 7: Impact Assessment	Whilst impact significance and required mitigations are unchanged from the original EIS Report, the text throughout this chapter has been updated to reflect the current route and changes to the baseline chapter. The impact assessment methodology used is the same as used in the original assessment. Because the physical baseline conditions were extremely similar to the original route, most revised text relates to biodiversity and resettlement impacts. Additionally, it was noted that some ecosystem services were not fully assessed in the previous EIS Report, so this impact has now been captured.
Section 8: Public Participation Process	This chapter now includes some of the detail previously included in Volume V of the EIS Report, "Public Participation Process Report", as well as the summary previously included in Chapter 8. It has been expanded to include details on the community engagement activities conducted for the changes to the route in September – October 2024. Note that all meeting minutes from the previous ESIA Public Participation Process, as well as the recent engagement around the revised route, are included in Annex 3 to this report.
Section 9: Conclusions and Recommendations	This section has been revised to reflect the revised route.
Section 10: References	This section has been revised slightly to reflect the additional data used in Section 6 for the revised route, as well as references to the original EIS Report.

Table of Contents

List of Figures

List of Tables

Abbreviations and Acronyms

AFDB	***AFRICAN DEVELOPMENT BANK***
BAP	***BIODIVERSITY ACTION PLAN***
CEN	***CENTRAL ELECTRICA DE NAMAACHA***
DUAT	***DIREITO DO USO E APROVEITAMENTO DA TERRA (MOZAMBIQUE LAND USE RIGHT)***
EDM	***ELECTRICIDADE DE MOÇAMBIQUE E.P.***
EIA	***ENVIRONMENTAL IMPACT ASSESSMENT***
EIS	***ENVIRONMENTAL IMPACT STUDY***
EMP	***ENVIRONMENTAL MANAGEMENT PLAN***
EPDA	***ENVIRONMENTAL PRE-FEASIBILITY STUDY AND SCOPE DEFINITION***
ESIA	***ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT***
ESMP	***ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN***
HH	***HOUSEHOLD***
HHH	***HEAD OF HOUSEHOLD***
IFC	***INTERNATIONAL FINANCE CORPORATION***
KBA	***KEY BIODIVERSITY AREA***
MTA	***MINISTRY OF LAND AND ENVIRONMENT***
OHL	***OVERHEAD LINE***
PAPS	***PROJECT AFFECT PEOPLES***
PPZ	***PARTIAL PROTECTION ZONE***
PPP	***PUBLIC PARTICIPATION PROCESS***
RAP	***RESETTLEMENT ACTION PLAN***
ROW	***RIGHT OF WAY***
TIPA	***TROPICAL IMPORTANT PLANT AREA***
TOR	***TERMS OF REFERENCE***

1. Introduction

Electricidade de Moçambique E.P. (“EDM” or the “Proponent”), with the support of its implementation partners Globeleq and Source Energia, propose the construction of a transmission line, for the evacuation of energy generated by Central Eléctrica da Namaacha (CEN) Wind Farm Project, through two 66 kV overhead lines that connect the wind farm to Boane Substation.

To obtain the Environmental License required in terms of the Environmental Law (Law No. 20/1997, of 1 October) for the development described above (hereafter the “Project”), the Proponent must conduct an Environmental Impact Assessment (EIA) Process. Consultec - Consultores Associados, Lda, was appointed by the Proponent to carry out the EIA process on their behalf.

The EIA Process was initiated through the submission of a Screening Report to the Ministry of Land and Environment (MTA) in May 2022. Following MTA’s pre-assessment, the Project was classified as Category A on 16 June 2022, thus requiring a full EIA Process.

The next step in the EIA Process was the submission of an Environmental Pre-Feasibility and Scope Definition Study (EPDA) to MTA. The EPDA draft report was disclosed as part of the Public Participation Process (EPDA-PPP) in November 29th, 2022. Two public meetings were held for the EPDA phase PPP, one per each district crossed by the line, namely Namaacha and Boane, on the 13th and the 14th of December 2022, respectively. The final EPDA report was submitted to MTA in January 2023. Following MTA’s review, the EPDA Report was approved on 28th of April 2023.

Following the EPDA’s approval, the next step in the EIA process was the development of the Environmental Impact Study (EIS) Report. The EIS Draft Report was disclosed to the Public Participation Process (EIS-PPP) in the beginning of October 2023 and public meetings were held in Namaacha and Boane on the 18th and on the 19th of October 2023, respectively. After the completion of the EIS-PPP, the final EIS Report was submitted to the MTA in November 2023. Following MTA’s review, the EIS Report was approved on 10th January 2024.

As part of the continued stakeholder consultation along the transmission line route associated with the Resettlement Action Plan (RAP) and the land access discussions with affected mining concessions, it was identified that a modified transmission line route to the one assessed in the EIS would be preferrable from both a legal and environmental and social sensitivity perspective. On 20 September 2024 MTA was notified of the Project’s request to amend the environmental approval to apply to the proposed revised transmission line route.

This ESIA Report presents the proposed revised route for the transmission line and the revised environmental and social impact assessment for this route. This document supersedes the Final EIS Report from November 2023 and has been structured to mirror this document where practical.

2. Legal and Regulatory Framework

2.1. Introduction

The EIA Process is being developed in compliance with Mozambique’s national legislative requirements and with applicable international guidelines. This Chapter presents the national and international development and environmental and social legal frameworks applicable to the proposed Project, including:

National Development Framework: national development and strategic plans with relevance to the proposed Project (see section 2.2)

- Institutional Framework: relevant governmental institutions and authorities with jurisdiction over the Project or over relevant environmental or social aspects (see section 2.3)

Legislative Framework: legal requirements which are relevant for the Project's impact assessment (see section 2.4)

- Relevant International Conventions (see section 2.5)
- International Best Practice Guidelines and Policies (see section 2.6)

2.2. National Development Framework

2.2.1. National Development Strategy (2015-2035)

The National Development Strategy (2015-2035), approved in July 2014 (GoM, 2014), defines the Government of Mozambique's (GoM) main development strategies to achieve the goal of "*raising its people's quality of life through the structural transformation of the economy and the expansion and diversification of the production base*".

The National Development Strategy believes that industrialisation, grounded in an inclusive and sustainable growth model, is the main way to achieve Mozambique's vision of prosperity and competitiveness. To materialise industrialisation, the strategy defines four main development pillars, namely:

- Human capital development;
- Infrastructure development;
- Research, innovation, and technological development; and
- Institutional coordination and articulation.

With regards to infrastructure development, the strategy considers that massive investment in the infrastructure sector is required and is a determinant factor for economic growth. As such, the strategy lists the main infrastructure that should be the focus of investment, including:

- Logistics - transport and storage infrastructure (the latter with a focus on storage of agricultural, fisheries, mineral and hydrocarbon products);
- Maritime cabotage for cargo transport at long distances;
  Power generation, including alternative energy sources;
- Natural gas supply systems;
  Sustainable management of water resources;
- Social infrastructure; and
  Tourism infrastructure.

The Project under assessment proposes the development of a transmission line, which will evacuate the power produced at the Namaacha WPP. This is in full alignment with the infrastructure development strategic goals, as defined in the National Development Strategy for the 2015-2035 period.

2.2.2. Governmental Five-Year Plan (2020-2024)

The main objective of the Government's Five-Year Plan for the current period (2020-2024), approved in April 2020 (GoM, 2020), is the improvement of well-being and quality of life of the Mozambican people, the reduction of poverty and social inequalities, the creation of an environment of peace, harmony and tranquillity, and a strong focus on job creation. To achieve these goals, the five-year plan defines strategic areas of development on which the GoM should focus its action, and on which private and public investment should be incentivised.

The development of economic and social infrastructure (including energy infrastructure) is one of these strategic areas, for which the five-year plan sets the following overall strategic goal: "*prioritize investment in quality infrastructure, such as energy, telecommunications, ports, roads and railways, that facilitate economic activity, reduce transactional costs, create jobs, promote regional and national integration, and improve the population's life conditions*".

The CEN - Boane transmission line is an energy infrastructure that will facilitate regional integration and improve life conditions in its area of influence, through increased power supply reliability to the main consumption centers in the region. As such, the goals of the proposed Project are fully aligned with the strategic goals of the GoM's Five-Year Plan (2020-2024).

2.2.3. Economic and Social Plan for 2022

The Economic and Social Plan and State Budget (PESOE) is an instrument for the implementation of the economic and social objectives defined in the 5 Year Government Program (2020-2024). It defines objectives regarding economic growth, inflation, export, net international reserves, public good production, basic social services, and public finances.

The 2022 PESOE (approved by Law No. 6/2021, of 30 December) includes several programs for human, social and economic development, which translate the GoM's main strategic objectives. With regards to economic development, one of the subprograms pertains to infrastructure development, including the energy sector. The PESOE 2022 plans a continued effort for expansion of the power production, transmission, and distribution infrastructure, including the construction of solar, hydro and gas-fed power plants, the expansion of the transmission network (both 400 kV and 110 kV) and the construction of several new substations.

Although not specifically mentioned in the PESOE 2022, the proposed CEN Project and transmission line is in line with its overall strategic goals of development for Mozambique's power infrastructure.

2.2.4. Energy Sector Strategy

The Energy Sector Strategy was approved by Resolution No. 10/2009, of 4 June, and establishes strategic guidelines for the implementation of the Energy Policy (approved by Resolution 5/98, of 3 March). This strategy recognises that energy is one of the main factors contributing to national economic growth and poverty relief, and believes that Mozambique has a significant potential, in terms of energy resources, sufficient to respond both to national and regional demands, in the context of Southern Africa.

The strategy sets forth some principles for the energy sector, which include, among others:

- Sustainable increase of access to electricity;
- Sustainable development and preservation of the environment;
- Institutional coordination and consultation with all stakeholders;
- Exploration of the regional market, enabling large power projects; and
  Efficient use of energy.

The proposed project will increase the availability of electricity in the southern region, thus improving the reliability of energy supply hence expected to stimulate investments and economic growth. The proposed Project is thus fully in line with the goals of the Energy Sector Strategy.

2.2.5. New and Renewable Energies Development Policy

The Project is aligned with the New and Renewable Energy Development Policy, approved in 2009 by the Government of Mozambique and established as one of the strategic priorities of implementation the evaluation of new and renewable energy resources. In this context of the evaluation of resources, the Policy and, later, the Strategy for the Development of New and Renewable Energies, approved in 2011, established as measures to develop, inter alia, the mapping of the water, wind, solar, biomass, geothermal and maritime potential, as well as the identification and mapping of the sites of occurrence. In this context, the Mozambique Renewable Energy Atlas emerges, which has addressed one of the strategic priorities defined in the Policy and Strategy of the Government of Mozambique.

2.3. Institutional Framework

2.3.1. Energy Sector

The **Ministry of Mineral Resources and Energy** (MIREME) was created by Presidential Decree No. 1/2015, of 16 January. The Ministry's attributions are defined by Resolution No. 14/2015, of 8 July, and include, among others, promoting improved knowledge of national energy resources and their development and usage and the development of energy production to satisfy national needs and to seize the opportunities of the regional market.

The **Energy Regulatory Agency** (ARENE) was created by Law No. 11/2017, of 8 September, replacing the former National Electricity Council. ARENE possesses supervision, regulation, inspection, and sanctioning powers over the energy sector.

The **National Directorate of Energy** (DNE), created by Resolution No. 14/2015, of 8 July, is the department of MIREME responsible for the conception, promotion, assessment, execution, and monitoring of the electricity sector policies.

Electricidade de Moçambique, E.P. (EDM) was created in 1977 by Decree-Law No. 38/77, of 27 August, as the state-owned national electricity utility. It became a public enterprise in 1995, expected to operate on commercial terms (Decree No. 28/95, of 17 July). EDM is under the tutelage of MIREME and is tasked with the establishment and operation of the public service of production, transmission, distribution, and commercialisation of electricity in Mozambique, and as such manages the national electrical grid (Decree No. 43/2005 of 29 November).

2.3.2. Environmental Authorities

The **Ministry of Land and Environment** (MTA), established by Presidential Decree No. 1/2020, of 17 January, is the central authority that plans, coordinates, controls and ensures the execution of policies related to the management of land, forests and wildlife, environment, conservation areas and climate change. Presidential Decree No. 4/2020, of 7 February, defines MTA's role and scope of intervention. At the provincial level, MTA is represented by the **Provincial Environmental Services (SPA)**.

EIA applications are managed by MTA through the **National Directorate for Environment (DINAB)** at the national level, and through SPA at the provincial level.

The management and monitoring of environmental quality, such as pollution control, water, soils and air quality, noise emissions and waste management, are also a part of MTA's attributions. The **National Agency for the Control of Environmental Quality** (AQUA) was created by Decree 80/2010, of 31 December, amended by Decree 2/2016, of 10 February, and is responsible, among other attributions, to develop and implement strategies for the integrated control of water, air, and soil pollution.

Management of conservation areas falls under the responsibility of the **National Administration for Conservation Areas (ANAC)** created by Decree 11/2011, of 25 of May, amended by Decree 8/2016, of 15 of April.

2.4. Legislative Framework

The Constitution of the Republic of Mozambique defines the right of all citizens to a balanced environment and the duty to protect it (Article 90º). Additionally, the State is required to ensure: *(i)* the promotion of initiatives to ensure ecological balance and environmental preservation, and *(ii)* the implementation of policies to prevent and control pollution and integrate environmental concerns in all sectorial policies to guarantee the citizen the right to live in a balanced environment supported by sustainable development (Article 117º).

The proposed Project must comply with the legal requirements for environmental licensing, taking into consideration not only the specific EIA regulations but also all the applicable environmental regulation (physical, ecological, social, and economic) that may be relevant to the Project throughout its life cycle (construction, operation, and decommissioning).

The environmental instruments and regulations relevant to the proposed Project's EIA Process, as well as the relevant legal framework in place for the Energy Sector, are discussed in the table below.

Table 1: Key environmental and social legislation

Legislation	Description	Relevance
ENVIRONMENTAL IMPACT ASSESSMENT		
Resolution 5/95 - National Environmental Policy	Establishes the basis for all environmental legislation. According to clause 2.1, its main goal is to ensure sustainable development, to maintain an acceptable balance between socioeconomic development and environmental protection. To reach this goal, the Policy requires the integration of environmental considerations in the socioeconomic planning, the management of the country's natural resources and the protection of ecosystems and of the essential ecological processes.	The Project should strive to meet the policy's goals, integrating environmental considerations in its design, thus minimizing impacts on natural resources and ecosystems. The environmental and social assessment developed in this EIA will generate inputs to the project's design.
Law 20/97 - Environmental Law	Defines the legal basis for the sound use and management of the environment towards the sustainable development of the country. The Environmental Law applies to all public and private activities that may directly or indirectly affect the environment.	The Project should strive to meet the sustainable development principle defined by the Environmental Law, throughout its life cycle. This EIA is part of that effort.
Decree 54/2015 - Regulation for the EIA Process	Establishes the EIA Process as one of the fundamental instruments for environmental management, aiming at mitigating the negative impacts that public or private projects may cause to the natural and socio-economic environment, through the undertaking of environmental studies prior to commencement of the projects. Defines the EIA Process, the required environmental studies, PPP, studies review process, project environmental feasibility decision process and environmental license issuance. Applies to all public or private activities with direct or indirect influence in environmental components.	The Project needs to be submitted to a formal EIA Process, in accordance with this regulation. An environmental license needs to be obtained from MTA, and the issuance of the environmental license precedes any other license or permit required for the Project. The EPDA is the second step in the Project's EIA Process, as described in Chapter 3. Note that the Decree is not explicit on how changes to approved EIS Reports should be handled and as such consultation is required with MTA to confirm the approach that should be followed on a case-by-case basis.
Ministerial Decree 129/2006 - General Guidelines for Environmental Impact Studies	Provides details on environmental licensing procedures, as well as the format, structure, and contents of the environmental impact assessment report. The objective is to standardise procedures followed by various role-players in the EIA process.	The EIS report must conform to the guidelines outlined in this Ministerial Decree. During the compilation of the EIS, the requirements of this legislation will be considered.
Ministerial Decree 130/2006 - guides the PPP of the EIA Process	Defines the basic principles, methodologies, and procedures for the EIA consultation process. Considers public participation as an iterative process that initiates at the design stage and continues throughout the lifetime of the project.	The PPP for the EIA Process (including for this EPDA) is being developed in compliance with the guidelines provided in this Ministerial Decree.
Decree 25/2011 - Regulation on the Environmental Audit Process	Defines an environmental audit as a documented and objective instrument for management and systematic assessment of the management system and relevant documentation implemented to ensure protection of the environment. Its objective is to assess compliance of work and operational processes with the environmental management plan, including the environmental legal requirements in force, as approved for a project.	Throughout the Project's lifecycle, the Proponent should conduct independent environmental audits at least once a year. In addition, public environmental audits may be requested under this decree.

Legislation	Description	Relevance
Decree 11/2006 - Regulation for Environmental Inspections	Regulates the supervision, control, and verification of compliance with environmental protection rules at a national level.	During the construction or operational phases of the Project, MTA may undertake inspections to ascertain compliance with environmental legislation and the Environmental Management Plan (EMP). The Proponent must allow for and facilitate such inspections.
ATMOSPHERIC EMISSIONS AND AIR QUALITY		
Law 20/97 - Environmental Law	Article 9 forbids the discharge of any toxic substances to the atmosphere if exceeding the legal standards. The emission standards are defined by Decree No. 18/2004 (see below).	The Project must comply with the air quality emissions limits, as defined in this regulation. Given the nature of the project, this will mostly be applicable to the emissions of vehicles and machinery.
Decree 18/2004 (as amended by Decree 67/2010) - Regulation for Environmental Standards and Effluent Emissions	Establishes parameters for the maintenance of air quality (Article 7º); patterns of emission of gaseous pollutants for various industries (Article 8º); and standards for emission of gaseous pollutants from mobile sources (Article 9º) - including light and heavy vehicles.	
Decree 24/2008 of July 1st - Approves the Regulation on the Management of Substances that Deplete the Ozone Layer	It establishes the general bases of the environmental protection regime, the discharge into the atmosphere of any toxic or polluting toxic or polluting substances, the production and deposit in the soil, and assigns to the Government the responsibility to ensure that measures are taken for the protection of the ozone layer.	
Resolution No.78/2009, of December 22nd (on the banning of import, export, production, commercialization, and transit of Ozone-Depleting Substances	It aims to strengthen the legal framework for the implementation of the Vienna Convention on the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer. As part of the adoption of measures to protect the Ozone Layer, this Resolution bans the import, export, production, marketing and transit of substances that deplete the ozone layer. The banned substances are Chlorofluorocarbons (CFC's), Halogenated hydrocarbon (Halon-1211, Halon-1301 and Halon-2402) and Carbon Tetrachloride (CCL4).	The banned substances must not be used in any of the project phases
WATER RESOURCES AND WATER QUALITY		
Law 16/91 - Water Law	This law is based on the principles of public water use, basin scale management, and user-pays and polluter-pays. Intends to safeguard the ecological balance and environment. Water uses require either a water concession (permanent or long-term water uses) or a water license (short term water uses). Licenses are given for a period of 5 renewable years, while concessions are valid for a period of 50 renewable years. Article 54 of this Law stipulates that any activity with the potential of contaminating or degrading public waters, in particular the discharge of effluents, is subject to a special authorisation to be issued by the Regional Water Administration and payment of a fee.	The project needs to include measures to prevent the pollution of any water resources in the construction and operation phases. If the Project requires the discharge of effluents into water bodies, a discharge license must be obtained.

Legislation	Description	Relevance
Decree 18/2004 – Regulations for Environmental Quality Standards and Effluent Emissions	Determines that when industrial effluent is discharged into the environment, the final effluent discharged must comply with discharge standards established in Annex III of the decree. The discharge of domestic effluent must comply with the discharge standards in Annex IV.	The Project must comply with the effluent emission limits established by this regulation. This may be applicable to any construction camps used in support of the Project's construction.
POLLUTION AND WASTE MANAGEMENT		
Law 20/97 – Environmental Law	Limits the production and / or disposal into the soil or subsoil and the disposal into water or the atmosphere of any toxic or polluting substances, as well as the practice of activities that accelerate erosion, desertification, deforestation, or any other form of environmental degradation to those limits established by the law (Article 9).	The Project needs to include measures to prevent pollution during and after implementation. Any project must conform to the requirements outlined in this regulation. The EMP will include such measures.
Decree 94/2014 - Regulation for Urban Solid Waste Management	Establishes the legal framework for urban solid waste management. The key objective is to establish rules for the generation, collection, and disposal of urban solid wastes, so as to minimise their impacts on public health and the environment. Urban solid wastes are to be classified in accordance with the Mozambican Norm NM339 – Solid Wastes – Classification. Waste management is a responsibility of Municipal Councils and District Governments, as applicable.	
Decree 83/2014 - Regulation for Hazardous Waste Management	Establishes the legal framework for hazardous waste management. The key objective is to establish rules for the generation, collection, and disposal of hazardous wastes, so as to minimise their impacts on public health and the environment. Annex IX of this decree provides waste classifications. MTA is the competent entity to manage hazardous wastes, namely by licensing waste management units. Only entities which are licensed by MTA can collect and transport hazardous wastes, beyond the limit of the facilities where they were generated.	The project should implement suitable waste management practices throughout its life cycle, in compliance with the requirements outlined in this regulation. To the effect, a Waste Management Plan will be included in the EMP.
Decree No. 8/2003 of February 18th - Regulation on Biomedical Waste Management	Aims to establish the rules for the management of biomedical waste in order to safeguard the health and safety of health care facility workers, ancillary workers and the general public and to minimize the impacts of such waste on the environment.	
BIODIVERSITY		
Law 20/97 – Environmental Law	Articles 12 and 13 state that the planning, implementation, and operation of projects should guarantee the protection of biological resources, particularly of plant or animal species threatened with extinction or that, by their genetic value, ecological, cultural, or scientific, require special attention and this issue is to extend their habitats, especially those built within areas of environmental protection.	The Project must consider protected biodiversity. The presence of potentially relevant biodiversity values in the Project area will be assessed in the EIA. The EMP will include adequate mitigation to minimize the Project's impacts on biodiversity.
Law 10/99 - Forests and Wildlife Law	Establishes the principles and basic rules on protection, conservation and sustainable use of forest and wildlife resources.	The Project must consider the protection of forest and wildlife.

Legislation	Description	Relevance
Decree 12/2002 – Regulation on the Forests and Wildlife Law	Applies to protection, conservation, use, exploration and production activities of fauna and flora resources. Includes the commerce, transport, storage and primary artisanal or industrial transformation of these resources. Annex I include a list of classification of wood-producing species, including precious wood and woods of 1st, 2nd, 3rd, and 4th grades. Annex II includes a list of protected fauna species, for which hunting is prohibited.	The Proponent must notify MTA if a species listed in this regulation is affected or disturbed.
Decree No. 25/2008 – Regulation for the Control of Invasive Alien Species	Article 8 of this decree prohibits activities involving invasive alien species without prior authorization and states that 'after hearing the Interinstitutional Group for the Control of Exotic Species Invasive, the National Environmental Authority (MTA) may prohibit any activity which, by its nature, may involve the spread of invasive alien species'. Activities include the following: - Import of any type of invasive exotic species, whether by sea, land or air; - Possess any type of invasive exotic species; - Develop, breed or otherwise propagate any type of invasive alien species; and - Transport, move or relocate any type of invasive alien species	The Project must ensure the control of the propagation of invasive alien species. Article 11 of the decree suggests that adequate methods must be implemented to control and eradicate invasive alien species. The Project should include mitigation measures for potential impacts related to invasive alien species, which must be binding and ensure compliance with the requirements of the Regulation by the proponent.
Law 16/2014 (as amended by Law 5/2017) – Protection, Conservation and Sustainable Use of Biodiversity Law and its Regulation	This Law regulates the creation and management of all conservation areas in Mozambique, revoking the Forestry and Wildlife Law competences in this matter. Article 16 states that all activities that could result in changes to vegetation cover, or that could disturb flora, fauna, and ecological processes up to the point of compromising their maintenance, are interdicted within national parks, except if required for scientific reasons or management needs. Article 26 states that activities can be approved within conservation areas, if planned in the area's management plan, which among other things defines the construction of the infrastructure required for the area's management or that aimed to improve the quality of life of the local populations.	No protection or conservation areas are interfered by the Project.
Decree No. 89/2017 of December 29th - Regulation of Protection, Conservation and Sustainable Use of Biological Diversity;	The present Regulation applies to the set of values and natural resources existing in the national territory and in the waters under national jurisdiction, covering all public or private entities that may directly or indirectly influence the national system of the country's conservation areas, under the terms of the Law No. 16/2014 (Amended by Law 5/2017), law for the Protection, Conservation and Sustainable Use of Biological Diversity.	

Legislation	Description	Relevance
Decree 51/2021 of July 19th - Regulation for the Protection, Conservation and Sustainable Use of Avifauna	This decree regulates the protection, conservation and sustainable use of avifauna, including its natural, continental, marine, lake and river habitats. Art 5 defines as avifauna protection zones the "Key Areas for Biodiversity", and "Important Areas for Birds" and art. 4 prohibits the exercise of any activity or construction of infrastructure capable of disturbing the avifauna or its habitat in the protection areas, as well as any economic or social infrastructure, to be built in sensitive areas for birds, must respect the international standards of good practice, ensuring the placement of signalling devices that prevent collision of birds or any other damage that affects the avifauna. Appendices A and D define the protected species whose exploitation is not permitted; Appendix B defines the species of avifauna in Mozambique included in CITES.	The Project must consider the protected avifauna as well as their habitats. The presence of relevant potential avifauna values in the Project area, namely "Key Areas for Biodiversity", and "Important Areas for Birds", should be assessed in the EIA.
Ministerial Diploma No. 55/2022 of May 19th – Adoption of the Biodiversity Counterbalances Directive	Establishes the principles, methodologies, requirements and procedures for the correct implementation of Biodiversity Counterbalances, integrated into environmental impact assessment processes.	The Project must consider Biodiversity Counterbalances if significant residual impacts over key biodiversity areas, critical habitats or threaten species or ecosystems are identified. Biodiversity Action Plan should be part of the EMP.
LAND OWNERSHIP AND RESETTLEMENT		
Resolution 10/95 – Land National Policy	Establishes that the State must provide the land for each family to build or possess their own habitation, and is responsible for land use and physical planning, although plans can be made by the private sector.	The Project must conform to the principles of this policy, as per the regulations defined in the implementing legislation, which is discussed below.
Law 19/1997 – Land Law	Defines land use rights (DUAT), including details on customary rights and procedures for acquisition and use of land titles by communities and individuals. This law recognises and protects the rights acquired through inheritance and occupation (customary rights and duties of good faith), except for legally defined reserves or areas where land has been legally transferred to another person or institution.	The Land Law and its regulation define total and partial protection zones. In these zones, land use is restricted. According to this regulation, the corridor of 50 m to each side of a new transmission line is considered to be a partial protection zone (the line's RoW). The approval of power transmission line projects by the Council of Ministers or by the relevant competent authorities automatically implies the creation of the respective partial protection zones. The establishment of the RoW will create the need to compensate existing assets and resettle existing settlements within the RoW. This issue has been assessed in this document, as well as the associated RAP.
Decree 66/98 – Regulation for Land Law	Defines total protection areas, set aside for nature conservation and State defence, as well as partial protection areas, where land use titles may not be granted, and where activities cannot be implemented without a license. Partial protection areas, which include, amongst others, the 50 m strip of land along lakes and rivers, 100 m strip of land along the seafront and estuaries, 50 m along aerial, surface or underground pipelines/cables for electricity, telecommunications, oil, gas and water, 30 m along primary roads and 15 m along secondary and tertiary roads.	

Legislation	Description	Relevance
Decree 31/2012 – Regulation for the Resettlement Process Resulting from Economic Activities	Defines rules and basic principles for resettlement processes from the implementation of public or private economic activities. Article 15 states that the Resettlement Plan is part of the EIA Process and that its approval precedes the issuance of the environmental license. There are three steps in the Resettlement Plan (article 19): a) Physical and socioeconomic data collection; b) Resettlement Plan; and c) Resettlement Action and Implementation Plan.	If physical displacement results from the Project, this regulation is applicable, and a resettlement action plan will be required. Any potential economic displacement (such as the loss of farming plots or other assets) will also need to be assessed in the EIA and, if present, duly compensated for, in abidance with the Land Law. Note that for electricity projects, expropriation procedures may apply (please see Decree 21/97 below).
Technical Directives No. 155/2014 and 156/2014	TD 155/2014 approves the internal regulation for the Monitoring and Supervision Technical Committee for Resettlement. TD 156/2014 approves the technical requirements for the preparation of RAP. Section 3 describes in detail the requirements for the 3 steps of the RAP: a) Physical and Socioeconomic Survey Report; b) Resettlement Plan; and c) Resettlement Action and Implementation Pan. It also defines the requirements of the RAP's Public Consultation and Participation Process.	The Resettlement Plan to be prepared has to follow the technical requirements stated on Technical Directive 156/2014, regarding the process steps and specifications. The Physical and Socioeconomic Survey Report is developed along with the ESIA.
Law 12/2022, Electricity Law	Approves the new Electricity Law, revoking previous Law n.º 21/97. Article 43, concerning land use and expropriation, states that: 1) The land to carry out energy production, transportation and distribution activities is governed by the Land Law and related applicable legislation; 4) The construction or deployment of electrical facilities, including overhead, surface, underground and subsea power lines, for the transport and distribution of electricity, as well as for the connection of production installations to transport or distribution grids, requires the creation of an administrative servitude, to be defined in accordance with the tension levels and technical and safety standards, up to 50 metres of confining land from the line's axis; 5) The terms and conditions of the confining strip of land indicated in paragraph 4 of this Article is in accordance with tension levels and other technical and safety standards, and is assessed in function of the rural or urban environment; 6) (…) a safety zone for the electrical facilities, corresponding to the adjacent strip. is established, within the servitude area; 8) The acquisition of the right of land use, as well as the creation of the servitude for the purpose of carrying out energy supply activities is subject, where applicable, to the resettlement rules and the payment of compensations, in accordance with the applicable legislation.	According to this law, a servitude of up to 50 m from the 66 kV line's axis needs to be established in accordance with the tension levels and technical and safety standards. Within this area, a safety zone shall be established. The technical and safety standards to define the specific width of these areas are yet to be published.

Legislation	Description	Relevance
Decree 23/2008 – Regulation for Land Planning	Aims to establish regulatory territorial planning measures and procedures to ensure the rational and sustainable use of natural resources, regional potentials, infrastructure, and urban centres, and to promote national cohesion and safety of the people. Articles 68 to 71 deal with expropriation procedures for private property for national public interest reasons. Article 70 states that expropriation should be preceded by fair compensation.	If expropriation of land or land rights is required for Project implementation, the requirements of this regulation should be complied with. Expropriation requires the issuance of a declaration of public interest for the Project, as defined in the Electric Energy Law.
Ministerial Decree 181/2010 – Guidelines for the Expropriation Process Resulting from Land Planning	Establishes procedures for expropriation processes resulting from land planning, including procedures for the issuance of a declaration of public interest, compensations for expropriation (including calculation methods) and the expropriation process itself.	If expropriation of land and land rights within the Project area is required, the procedures established in these guidelines should be followed.
CULTURAL HERITAGE		
Law 10/88 - Cultural Heritage Law	Aims to legally protect material and non-material assets of the Mozambican cultural heritage. Under this law, cultural heritage is defined as a “group of material and non-material assets created or integrated by the Mozambican people through history, with relevance to the definition of the Mozambican cultural identity”. Material cultural assets include monuments, groups of buildings with historic, artistic, or scientific importance, places or locations (with archaeological, historic, aesthetic, ethnologic or anthropologic interest) and natural elements (physical and biological formations with particular interest from an aesthetic or scientific point of view).	The potential presence of cultural heritage on the Project area will be assessed in the EIS. Archaeological objects may also be found during the construction phase of the Project. In such cases, the Proponent must immediately communicate the finding to the relevant cultural heritage agency.
WORK AND SAFETY		
Law 23/2007 - Labour Law	Defines general principles and establishes the legal framework applicable to individual and collective employment relationships in respect of work rendered to an employer for remuneration.	The project must, throughout its entire life cycle, abide by Mozambique’s labour law.
Law 19/2014 - Law of Protection of People, Workers and Job Applicants Living with HIV/AIDS	This law establishes the general principles that aim to ensure that all employees and job applicants are not discriminated against in the workplace or when applying for jobs, for being suspected of having or having HIV / AIDS. It is prohibited testing of HIV / AIDS to workers, job seekers, or candidates to training or promotion, at the request of employers, without the employee's or job seeker consent.	Testing job applicants for HIV / AIDS is prohibited. Testing of workers without the employee's consent is also prohibited. The proponent must train and reorient all HIV positive workers who are able to fulfil their duties at work, with activities compatible with their capabilities.
Decree 45/2009 - Regulation on the General Labour Inspectorate	This Regulation lays down the rules on inspections, under the control of the legality of work. Paragraph 2 of Article 4 provides for the employer's responsibility for the prevention of occupational health and safety risks for the employee.	The Proponent shall comply with the requirements. In the case of an inspection, the proponent must help to provide all necessary information to the inspectors.

Legislation	Description	Relevance
Decree 62/2013 - legal regime for accidents at work and occupational diseases	Establishes the legal regime for accidents at work and occupational diseases and aims to bring the legal in line with the current labour law, introduce new formulas for calculating pensions and indemnities, as well as the possibility of revising pensions as a result of the aggravation or corrosion of the elements that served as the basis for its calculation.	The Proponent shall comply with the requirements.
ELECTRIC ENERGY		
Law 12/2022, Electricity Law	Same as above.	Same as above.
Decree 42/2005 – Regulation establishing rules for the national electric grid	Article 3 reinforces that the construction and operation of power transmission infrastructure requires the issuance of a concession, as required by Law No. 21/97.	EDM has been designated as the managing entity of the national power transmission grid, as per Decree No. 43/2005. As such, EDM will be the operator of the proposed transmission line.
Decree 57/2011 – Safety Regulation for High Voltage Power Lines	This Decree establishes several standards and guidelines for the design of power lines, to ensure their safety. Article 28 (clause 3) states that in order to ensure a safe operation of high voltage power lines, trees close to the power line may need to be cut, within a protection zone with a maximum width of: *(i)* 30 m, for lines under 66 kV, and *(ii)* 50 m, for lines equal or over 66 kV.	According to this decree, trees and other obstacles that may result in a risk to the infrastructure will need to be removed. Note that the protection zone named in this decree is a safety zone, and is not equivalent to the line's partial protection zone (the Project's RoW), as defined in the Land Law.

2.5. Relevant International Conventions

Relevant international conventions for the Project under assessment are provided in the table below.

Table 2: Relevant international conventions

Convention	Description
BIODIVERSITY	
African Convention on the Conservation of Nature and Natural Resources (AU 1968) as well as its Revised Version (AU 2017)	Under this Convention, the Contracting States commit to take action to ensure the conservation, use and development of soil, water, flora, and fauna resources in accordance with scientific principles and with due regard to the best interests of the people. Pursuant to Resolution 18/81, of 30 December 1981, the Republic of Mozambique acceded to this convention.
United Nations Convention on Biological Diversity (UN 1992)	The main goals of this convention are the conservation of biodiversity, the sustainable use of biodiversity, and the fair and equitable sharing of the benefits arising from the use of genetic resources. Its overall objective is to encourage actions which will lead to a sustainable future. Mozambique ratified this convention in 1994, through Resolution 2/94.
Convention on Wetlands of International Importance, Especially as Waterfowl Habitat – Ramsar Convention (UNESCO 1971)	Pertains to the sustainable use and conservation of wetlands. Ratified by Mozambique in 2003.

Convention	Description
Convention on the International Trade of Endangered Species of Wild Fauna and Flora (CITES 1973)	Aims to ensure that international trade in specimens of wild animals and plants does not threaten the species survival. It accords varying degrees of protection to more than 33,000 species of animals and plants. Convention ratified by Mozambique through Resolution 20/81.
Convention on the Conservation of Migratory Species of Wild Animals (CMC 1979)	Aims to foster protection measures for migratory species of wild animals throughout their natural range, through a conservation strategy of wildlife and habitats on a global scale. Ratified by Mozambique in 2008.
SADC's Protocol on Wildlife Conservation and Law Enforcement (SADC 1999)	Aims to ensure the conservation and sustainable use of wildlife resources. Ratified by Mozambique in 2002.
NON-HAZARDOUS AND HAZARDOUS WASTE	
Basel Convention on the control of Trans-boundary Movements of Hazardous Wastes and their Disposal (UNEP 1989)	This convention regulates the import, export, and trans-boundary movement of hazardous waste. The Basel Convention was superseded by the Bamako Convention (see below). The Republic of Mozambique ratified the Basel Convention on the control of Trans-boundary Movements of Hazardous Wastes and their Disposal by way of Resolution 18/96 of 26 November.
Convention on the Ban of the Import into Africa and the Control of Transboundary Movements and Management of Hazardous Wastes within Africa (AU 1991)	During the negotiation of the Basel Convention, the African states represented by the Organisation for African Unity adopted the Bamako Convention believing that the Basel Convention was not strict enough. The Bamako Convention totally prohibits the import of hazardous waste into Africa. The Convention came into force on April 22, 1998. The Republic of Mozambique ratified the Bamako Convention by way of Resolution 19/96 of 26 November.
AIR QUALITY / CLIMATE CHANGE	
The United Nations Framework Convention on Climate Change (UNFCCC 1992) and the Kyoto Protocol (UNFCCC 1997)	UNFCCC is an international environmental treaty produced with the objective of achieving stabilisation of greenhouse gas concentrations in the atmosphere at a low enough level to prevent dangerous anthropogenic interference with the climate system. The Kyoto Protocol to the UNFCCC was adopted in December 1997, whereby the signing parties agreed to legally binding reductions in greenhouse gas emissions of an average of 6 to 8% below 1990 levels between the years 2008-2012, defined as the first emissions budget period. The UNFCCC was ratified by way of Resolution 1/94, of 24 August and the Kyoto Protocol acceded to by the Republic of Mozambique by way of Resolution 10/2004, of 28 July.
Vienna Convention for the Protection of the Ozone Layer (UNEP 1985)	Under this Convention, the parties committed to take appropriate measures to protect human health and the environment against adverse effects resulting or likely to result from human activities which modify or are likely to modify the ozone layer. Pursuant to Resolution 8/93, of 8 December, the Republic of Mozambique acceded to the Vienna Convention for the Protection of the Ozone Layer and to its 1990 and 1992 Amendments.
The Montreal Protocol on Substances that deplete the Ozone Layer (UNEP 1987), London Amendment (UNEP 1990), Copenhagen Amendment (UNEP 1992), Montreal Amendment (UNEP 1997)	Designed to control the production of ozone depleting substances to reduce their abundance in the atmosphere, and thereby protect the earth's fragile ozone Layer. Forbids the use of chlorofluorocarbons. Mozambique ratified this convention through Resolution 9/2009.
POLLUTION PREVENTION	
Stockholm Convention on Persistent Organic Pollutants (UNEP 2001).	Action and control at world level of chemicals that persist in the environment, bio-accumulate in the food chain, and pose a risk to human health and the environment. These substances are listed in Annex I. Mozambique ratified this convention in 2005.

Convention	Description
CULTURAL HERITAGE	
UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage (UNESCO 1972)	Designed to help identify and protect both cultural (monuments, groups of buildings and sites) and natural heritage (natural features, geological and physiographical formations, and natural sites). Mozambique ratified the convention in 1982.
UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (UNESCO 2003)	Aims to safeguard to ensure respect for the intangible cultural heritage of communities, groups, and individuals. Ratified by Mozambique in 2007.
UNESCO Convention on the Protection and Promotion of the Diversity of Cultural Expressions (UNESCO 2005)	Aims to protect and promote the diversity of cultural expressions, promote dialogue between cultures and promote respect for cultural diversity. Ratified by Mozambique in 2007.
HUMAN RIGHTS	
International Labour Organisation Conventions	Forced Labour Convention, ratified in June 2003: Convention concerning Forced or Compulsory Labour (ILO 1930) Freedom of Association and Protection of the Right to Organise Convention, Dec 1996: Convention concerning Freedom of Association and Protection of the Right to Organise (ILO 1948) Right to Organise and Collective Bargaining Convention, Dec 1996: Convention concerning the Application of the Principles of the Right to Organise and to Bargain Collectively (ILO 1996) Equal Remuneration Convention, Jun 1977: Convention concerning the equal remuneration for men and women workers for work of equal value refers to rates of remuneration established without discrimination based on sex (ILO 1977) Abolition of Forced Labour Convention, Jun 1977: Convention concerning the Abolition of Forced Labour (ILO 1977a) Discrimination (Employment and Occupation) Convention, June 1977: Convention concerning Discrimination in Respect of Employment and Occupation (ILO 1977b) Minimum age specified: 15 years Jun 2003: Convention concerning Minimum Age for Admission to Employment (ILO 2003) Worst Forms of Child Labour Convention, June 1999: Convention concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour (ILO 2003a)
International Covenant on Civil and Political Rights (UN 1966)	Recognises equal and inalienable rights to all human beings in terms civil and political freedom. Ratified in 1993.
International Covenant for the Elimination of Racial Discrimination (UN 1969).	The signing parties undertake to pursue by all appropriate means and without delay a policy of eliminating racial discrimination in all its forms and promoting understanding among all races. Ratified in 1983.
Convention on the Elimination of Discrimination against Women (UN 1979)	States have the obligation to ensure the equal rights of men and women to enjoy all economic, social, cultural, civil, and political rights. Ratified in 1997; 2008.
Convention Against Torture (UN 1985)	State parties prohibit themselves under any circumstances from committing acts of torture and other cruel, inhuman, or degrading treatments or punishments. Ratified in1999.
Convention on the Rights of the Child (UN 1989)	Guarantees protection of children's rights. Signed in 1990 and ratified in 1999.

Convention	Description
International Convention on the Rights of Migrant workers (UN 1990)	Its primary objective is to protect migrant workers and their families, a particularly vulnerable population, from exploitation and the violation of their human rights. Signed in 2012; ratified in 2013.
International Convention on the Rights of Persons with Disabilities (UN 2007)	States have the obligation to protect the rights and dignity of persons with disabilities; signed in 2007.
African Union related protocols	Several protocols and charters promoting and protecting human rights and basic freedoms, children rights and others on the African continent.

2.6. International Best Practice Guidelines and Policies

This EIA is being developed in compliance with national regulations and in line with international best practice, notably the environmental and social policy and performance requirements as defined by the World Bank / International Finance Corporation (IFC). The most important of these international standards and guidelines applicable to the Project are described below.

2.6.1. IFC Performance Standards

The IFC Performance Standards (PS) on Environmental and Social Sustainability, which were published in January 2012 (IFC, 2012), are among the most comprehensive standards available to international finance institutions working within the private sector. The principles provide a framework for an accepted international approach to the management of social and environmental issues.

The seven IFC PS applicable to the proposed Project are:

- **PS 1: Assessment and Management of Social and Environmental Risks and Impacts** underscores the importance of managing environmental and social performance throughout the life of a project. PS 1 requires the client to conduct a process of environmental and social assessment and to establish and maintain an Environmental and Social Management System (ESMS), appropriate to the nature and scale of the project and commensurate with the level of its environmental and social risks and impacts;
- **PS 2: Labour and Working Conditions** recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers;
- **PS 3: Resource Efficiency and Pollution Prevention** recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels;
- **PS 4: Community Health, Safety and Security**, recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts;
- **PS 5: Land Acquisition and Involuntary Resettlement**, recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land;

- **PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources**, recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development;
- **PS 8: Cultural Heritage** recognizes the importance of cultural heritage for current and future generations.

It should be noted that PS 7 (Indigenous People) is not applicable to the Project, as the concept of Indigenous People, as defined in this PS, is not applicable to Mozambique. Under this PS, Indigenous Peoples are groups who, by virtue of their economic, social, and legal status and/or their institutions, custom, culture and/or language may be characterized as distinct from mainstream society, and that maintain a collective attachment to distinct habitats or ancestral territories. Although Mozambican society is composed of several different ethnicities, they are all integrated into one mainstream society and do not have differentiated claims over the territory.

PS 1 establishes the importance of *(i)* integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects; *(ii)* effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and *(iii)* the client's management of environmental and social performance throughout the life of the project.

IFC PS's 2, 3, 4, 5, 6 and 8 present requirements to avoid, reduce, mitigate, or compensate for impacts on people and the environment, and to improve conditions where appropriate. Where social or environmental impacts are anticipated, the client is required to manage them through its ESMS consistent with PS 1.

2.6.2. IFC Environmental Health and Safety Guidelines

IFC's Environmental Health and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice, as defined in IFC's PS 3 on Resource Efficiency and Pollution Prevention.

The EHS Guidelines contain the performance levels and measures that are normally acceptable to IFC and are generally considered to be achievable in new facilities at reasonable costs by existing technology. For IFC-financed projects, application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets with an appropriate timetable for achieving them. The environmental assessment process may recommend alternative (higher or lower) levels or measures, which, if acceptable to IFC, become project- or site-specific requirements.

Relevant Industry Sector IFC guidelines applicable to the proposed Project include:

EHS General Guidelines (IFC, 2007a);

- EHS Guidelines for Electric Power Transmission and Distribution (IFC, 2007b).

2.6.3. Southern African Power Pool Guidelines

The Southern African Power Pool (SAPP) is a regional body that was formed in 1995 through a Southern African Development Community (SADC) treaty to optimize the use of available energy resources in the region and support one another during emergencies. SAPP is comprised of twelve

SADC member countries represented by their respective Electric Power Utilities, including Mozambique, represented by EDM.

SAPP's Environmental Sub-Committee has developed a number of environmental management guidelines, aiming to ensure that energy sector activities are developed sustainably. The following SAPP guidelines were taken into consideration:

EIA Guidelines for Transmission Infrastructure for the SAPP Region (September 2010) - provides a recommended framework and guide to a systematic approach to performance of EIA for power transmission infrastructure projects in the SAPP region;

- SAPP Occupational Health, Safety and Environmental Guideline (November 2007).

2.6.4. AfDB's Integrated Safeguard System

Other lender standards that will be applicable include the ones from the African Development Bank (AfDB). AfDB's Integrated Safeguard System consists of an Integrated Safeguards Policy Statement, Operational Safeguards (OSs), a revised set of Environmental and Social Assessment Procedures (ESAPs) and Integrated Environmental and Social Impacts Assessment (IESIA) Guidance Notes. The set of 5 OSs is globally aligned with IFC PSs as well as the ESAPs. The OSs include:

- OS1: Environmental and social assessment
- OS2: Involuntary resettlement: land acquisition, population displacement and compensation
- OS3: Biodiversity, renewable resources and ecosystem services
- OS4: Pollution prevention and control, hazardous materials and resource efficiency; and
- OS5: Labour conditions, health and safety

OS1 sets out the AfDB's overarching requirements for borrowers or clients to identify, assess, and manage the potential environmental and social risks and impacts of a project, including climate change issues. OSs 2-5 support the implementation of OS1 and set out specific requirements relating to different environmental and social issues, including gender and vulnerability issues, that are triggered if the assessment process reveals that the project may present certain risks.

3. EIA Approach and Methodology per National Process

The Project is subject to the national EIA process for Category A projects, as defined in the EIA Regulations. Whilst the national EIA legislation is not explicit regarding the process that should be followed for changes to approved EIS Reports, in practice amendments to the granted environmental approval due to design changes can be sought from MTA. The process that is applied is dependent on the extent of the changes to predicted environmental and social impacts and associated mitigation measures. For simple changes, e.g. where no change in overall impact significance or mitigation measures is expected, MTA will issue an amendment to the environmental authorisation following an abbreviated process. The Project notified MTA of the proposed route change and submitted a proposed Terms of Reference (ToR) to outline the assessment of the impacts from the proposed change. MTA agreed this ToR and the Project submitted an Addendum (See Annex 2) following this agreed structure on 24 September 2024 and received formal approval of the change ESIA Addendum on 15 October 2024.

To further document the expected changes in the environmental and social impact assessment from the proposed change, the Project has prepared this ESIA Report. This approach is consistent with the impact assessment methodology used in the original EIS Report and the approaches set out in IFC's Performance Standard 1 and AfDB's Operational Safeguard 1, to which the Project is subject. Note that this *Lenders' ESIA for the Revised Transmission Line* has not been disclosed to national authorities as the afore mentioned ESIA Addendum was used to meet regulatory requirements under the national EIA process.

Per MTA's guidance, formal stakeholder consultation was not required under the national EIA Process for the Addendum given the expected scale of change in environmental and social impacts; however, CEN conducted a series of Focus Group Discussions with the communities in which the transmission line route has changes. See Section 8 for further details.

4. Project Description

4.1. Project Overview

4.1.1. Objective and Desirability

In Mozambique, EDM has been designated as the managing body of the national power transmission network, in accordance with Decree 42/2005. Article 9 states that the transmission of electricity requires the issuance of a concession for this purpose. Article 14 provides that the management of the national energy transmission network is allocated to a public entity and that private capital may participate in the development of the national energy transmission network.

The Central Eléctrica da Namaacha SA will conclude a contract for the purchase and sale of energy with EDM for a period of 25 years. Central Eléctrica da Namaacha Project is responsible for the production of electricity through the existing wind resource in the Namaacha district. An infrastructure for evacuating the generated electricity is required and the future buyer, EDM, defined the delivery point as the Boane substation, located in the District of Boane.

The Transmission Line Project aims to mitigate the problems that include restructuring, rehabilitation and enhancement of the energy transport infrastructure in the southern region of Maputo province, by reducing transmission losses and providing the delivery of quality energy.

The Central Eléctrica da Namaacha Project will export power via two 66 kV lines that shall run from the wind farm in Namaacha to Boane substation with a length of approximately 33.5 km. The purpose of the two separate overhead lines is to provide n-1 redundancy on the connection of the WPP to the EDM network in Boane Substation, in accordance with the Mozambican grid code requirements.

The Central Eléctrica da Namaacha Project, together with the transmission power line, are aligned with the environmental and energy policies recommended not only in the country, but also worldwide, in order to enable the fulfilment of international commitments in reducing greenhouse gas (GHG) emissions, with particular emphasis on the targets set out in the Paris Agreement, and resulting from the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21), signed by Mozambique on 22 April 2016.

The Project is aligned with the New and Renewable Energies Development Policy, approved in 2009 by the Government of Mozambique, which has established as one of its strategic priorities the evaluation of new and renewable energy resources. In this context of the evaluation of resources, the Policy and, later, the Strategy for the Development of New and Renewable Energies, approved in 2011, established as measures to be developed, among others, the mapping of the water, wind, solar, biomass, geothermal and maritime potential, as well as the identification and mapping of the sites of occurrence. In this context, Mozambique's Renewable Energy Atlas emerges, which has addressed one of the strategic priorities defined in the Policy and Strategy of the Government of Mozambique.

According to the Energy Sector Strategy (adopted by Resolution No. 10/2009 of 4 June), in Mozambique "the existing potential for electricity production, valued at 12000 MW in the water component, corresponding to 60000 GWh/year, the equivalent of 21600TJ/year, which is increased by 500 MW on the basis of natural gas and 5000 MW of coal-fired gas, is quite high. However, electricity will still take some time to replace biomass fuels because the country is large and rural population centres are dispersed.

Currently only 32% of the population has access to electricity. However, the country aims for a set of energy solutions that take into account this concrete reality, which include the intensification of the use of electricity in the areas served by the national grid and, in remote areas, by hybrid solutions using the resources of sustainable biomass, solar, wind, water."

4.1.2. Project Location

The proposed Project is still located in Maputo Province and in the Districts of Boane and Namaacha, and it crosses Namaacha Sede and Boane Sede administrative posts. Figure 1 shows the proposed revised transmission line route compared to the previous route.

The total length of the revised transmission line from the Boane substation to the CEN wind farm DUAT is 38.9 km. This is 5.4 km of additional distance. The revised route comprises two primary areas of deviation from the original route (one in Boane District and one in Namaacha District). For the Boane district deviation (~4.75 km) the distance from the original route varies between 0 and 650 m. For the Namaacha district deviation (~19.37 km in total), the distance ranges from 0 - 6.47 km (average distance is 3.24 km).

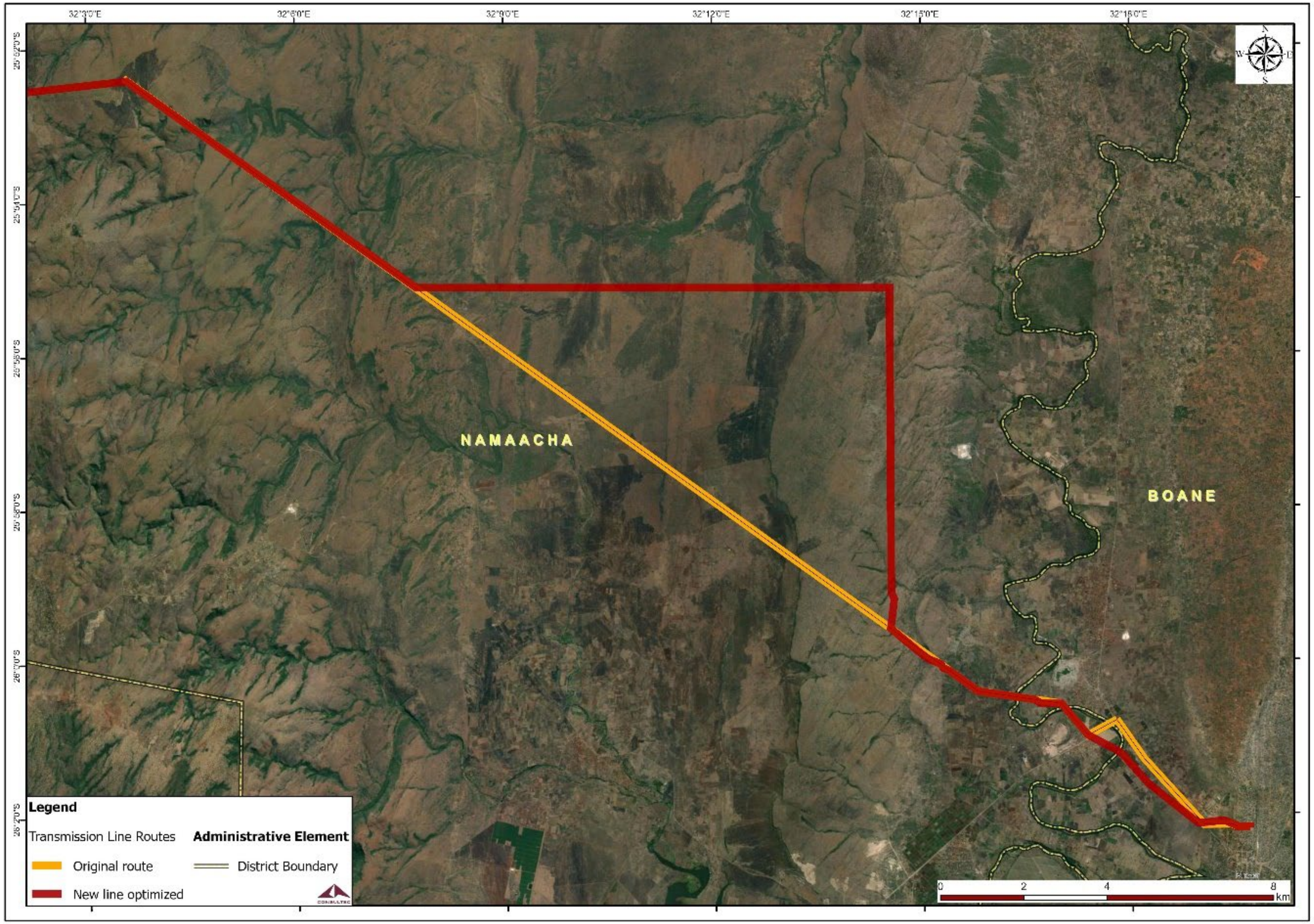


Figure 1: Original Transmission Line Route versus Revised Route

4.1.3. Project Area of Influence

The EIA Regulations define the Area of Influence (AoI) as the geographical space directly or indirectly affected by an activity's environmental impacts. The IFC's Performance Standard 1 has a slightly more expanded definition:

"The area likely to be affected by:

(i) the project and the client's activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the project;
(ii) impacts from unplanned but predictable developments caused by the project that may occur later or at a different location; or
(iii) indirect project impacts on biodiversity or on ecosystem services upon which Affected Communities' livelihoods are dependent."

Despite these seemingly straightforward definitions, in practice the definition of a project's AoI is not an easy task, given that the AoI is a function of many factors which have changing and varying degrees of influence on the areas surrounding the project throughout the course of the project's lifecycle.

The AoI can be thought of as the sum of several fluctuating factors. The geographical extent of some of these can be partially quantified (e.g., the area of vegetation cleared in the RoW), while the extent of others is very difficult to measure (e.g., direct and indirect economic effects). Project impacts also change over time, e.g., a project employing hundreds of workers during construction, but only a small number once operational, has a very different social AoI in those two phases.

A further consideration is the presence of other organisations or developments - each with their own AoI - within the AoI of the proposed project, making it very challenging to assign an AoI to each individual development. To this end it is often useful to consider and/or adopt existing units, such as shorelines, catchments, cadastral boundaries (national, provincial, local), linear infrastructure and/or natural features (notably railway lines, roads, rivers, canals etc.) when defining the AoI.

Considering the above, determining the AoI therefore requires informed but subjective judgment, based on available information and the knowledge of previous and similar project impacts.

The EIA Regulations require the definition of an Area of Direct Influence (ADI) and an Area of Indirect Influence (AII):

- **Area of Direct Influence (ADI)** – is defined as the geographic area affected by the project's direct (or cumulative) impacts, including the project's footprint (the area where the project's infrastructure is constructed) and the areas where the impacts deriving from the construction and operation of the project are felt (e.g., the area affected by the project's noise emissions);
- **Area of Indirect Influence (AII)** – is defined as the geographic area indirectly affected by the project, that is, the area where the secondary impacts resulting from the direct or cumulative impacts are felt (e.g., the project may attract other investments to the region, resulting in indirect socioeconomic impacts).

The Direct Area of Influence has changed to reflect the revised route as shown in Figure 2 below. The Indirect Area of Influence has not changed (see Figure 3).

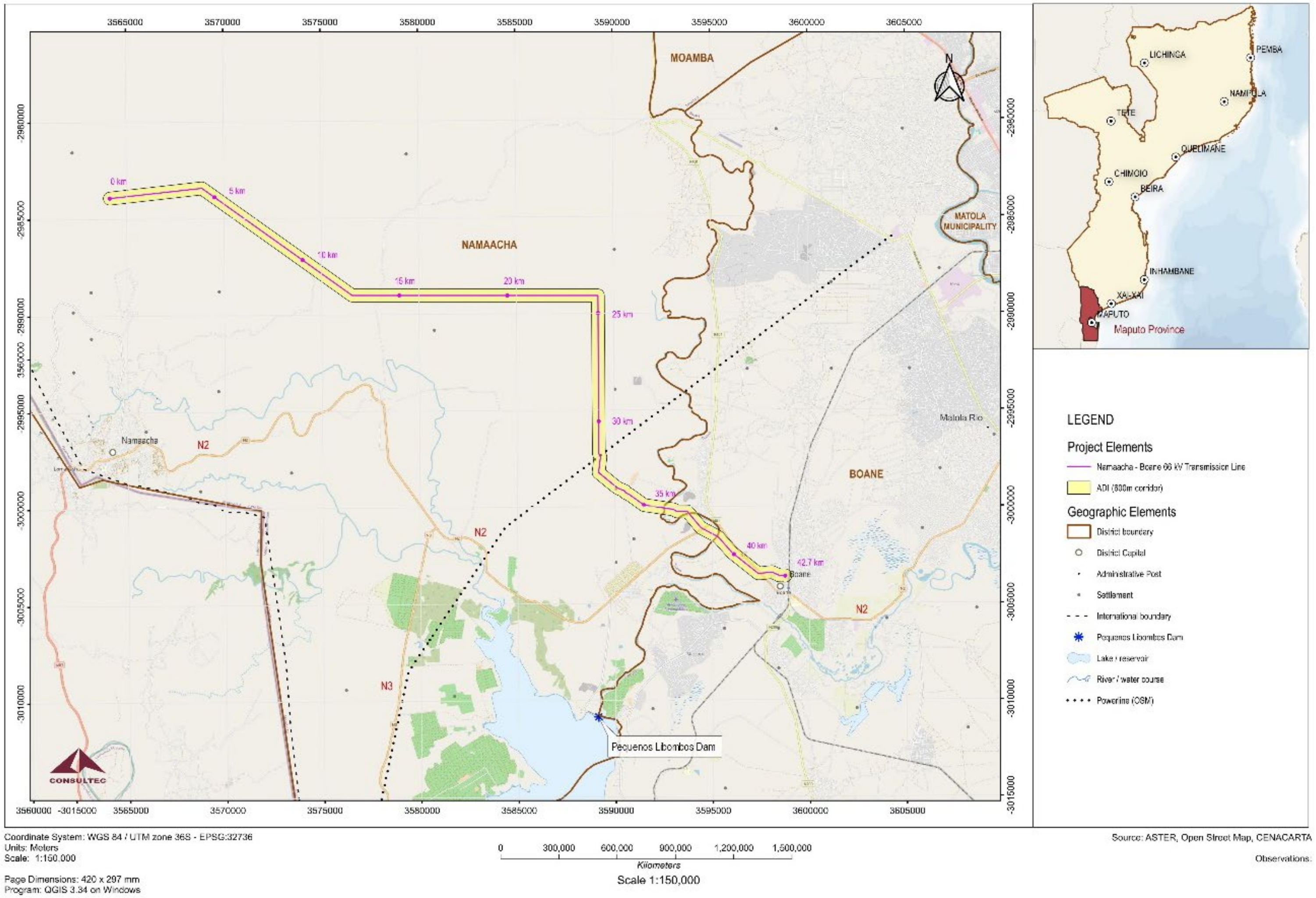


Figure 2: Revised Direct Area of Influence

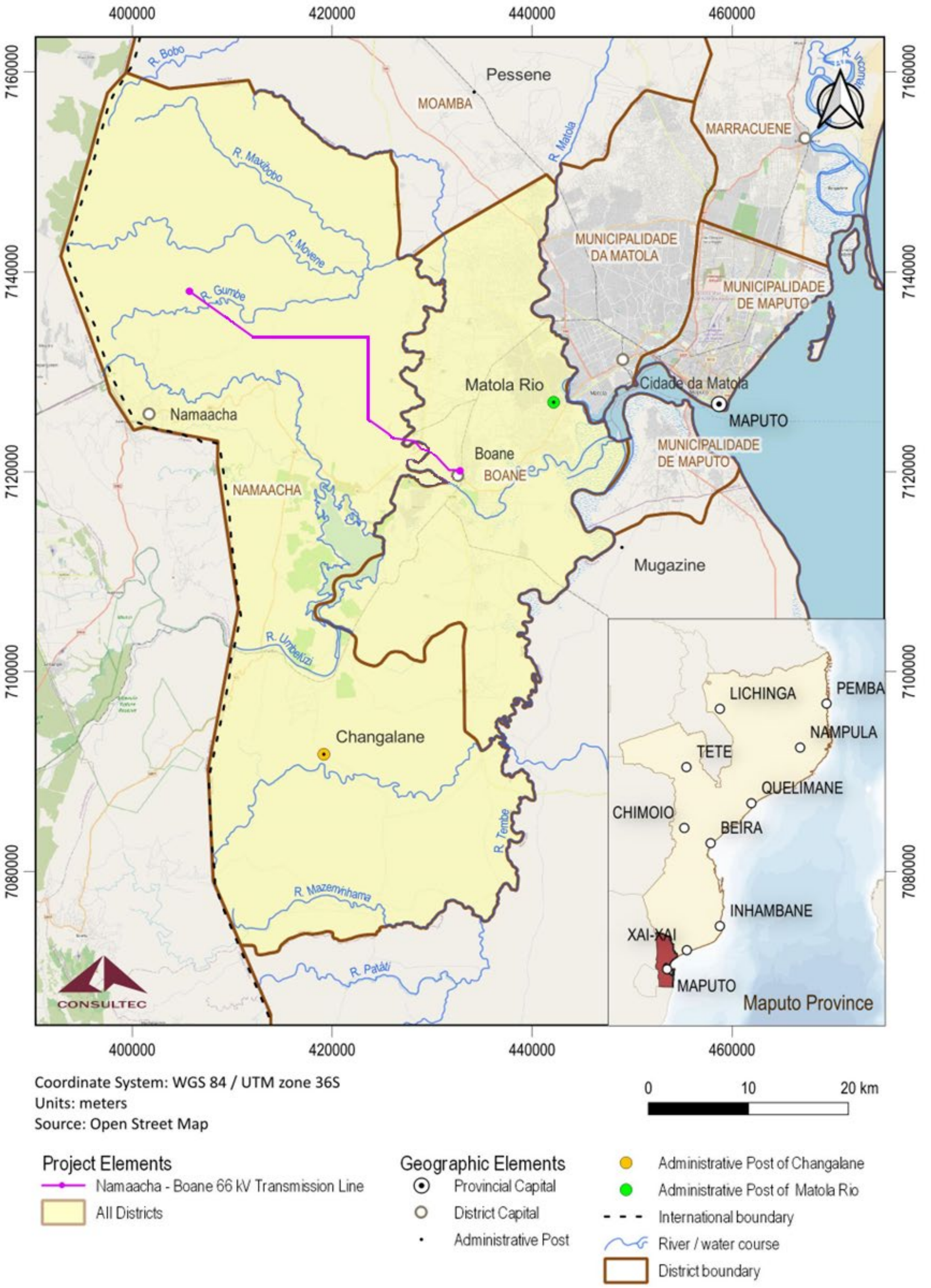


Figure 3: Indirect Area of Influence

4.1.4. Land Take Requirements

As presented in the EIS Report, the safety regulation for high voltage power lines (Decree 57/2011) requires a Partial Protection Zone (PPZ) width of 25 m to either side of the overhead transmission lines equal or over 66 kV. The Project has three different design configurations that result in three different PPZ widths along the route.

For the first ~340 m from the Boane substation, the transmission line will be a buried cable. As such, the required PPZ from Decree 57/2011 does not apply to this section. Instead, a PPZ of 2 m is needed for construction and maintenance.

For the remainder of the transmission line route the design will consist of overhead transmission lines. The first 5.37 km of the overhead transmission line route following the buried cable section will consist of monopoles hung with a double line. Given the single pole configuration, the PPZ of this section will be 25 m to either side of the route.

For the final 32.8 km of the route, the double lines will split to run on parallel transmission lines that will be separated by 20 m. As such, the total PPZ for this section will be 70 m total in width.Figure 4 shows these three sections of the route.

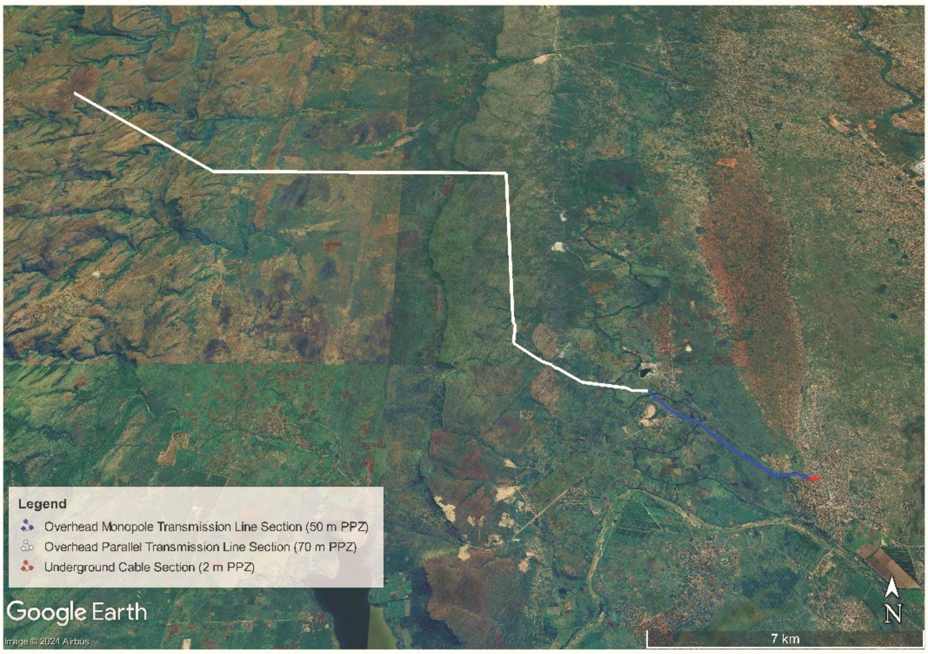


Figure 4: Overview of PPZ Widths

4.2. Main Project Components

The main Project components are the following:

1. Two 66 kV powerlines, approximately 38.9 km long, connecting the CEN to Boane substation (see section 4.2.1 for details);
2. 66 kV electrical extensions at Boane substation (see section 4.2.2 for details).
3. The following sections provide additional information for each of these project components.

4.2.1. Transmission Line

The CEN will export power via two 66 kV powerlines that shall run from the site in Namaacha to Boane substation with a length of approximately 38.9 km. The purpose of the two separate overhead lines is to provide n-1 redundancy (i.e., the full export of the wind farm capacity on one of the lines, if the other line fails) on the connection of the wind power project to the EDM network in Boane Substation in accordance with the Mozambican grid code requirements. For the first 32.8 km of the route (starting from the Namaacha wind farm site), two parallel 66 kV lines will be installed on monopole towers. For the next 5.37 km, a single monopole tower will be used, with two lines installed to minimize the corridor affecting resettlement. In the last 339 m of the route, the transmission line will transition to a buried underground cable.

The overhead lines shall be designed, supplied and installed, based on the following criteria:

- Arrangement: two single-circuit monopole lines (first 32.8 km from Namaacha wind farm), 20m minimum separation, one double-circuit monopole line (5.37 km), underground buried cable (in the last 339 m approaching Boane substation);
- Conductor: 2xDove, 2xBear or 2xCondor; and
- Shield Wire: ACS 12_48 OPGW on each line.

The line is expected to be supported by the following main types of lattice steel towers:

- <u>Suspension towers</u>, which support the conductors on straight stretches of line;
- <u>Tension towers</u>, which are used at points where the route changes directions; and
- <u>Terminal towers</u>, which are used to connect to substations.

Monopole towers will be used (see figure below).

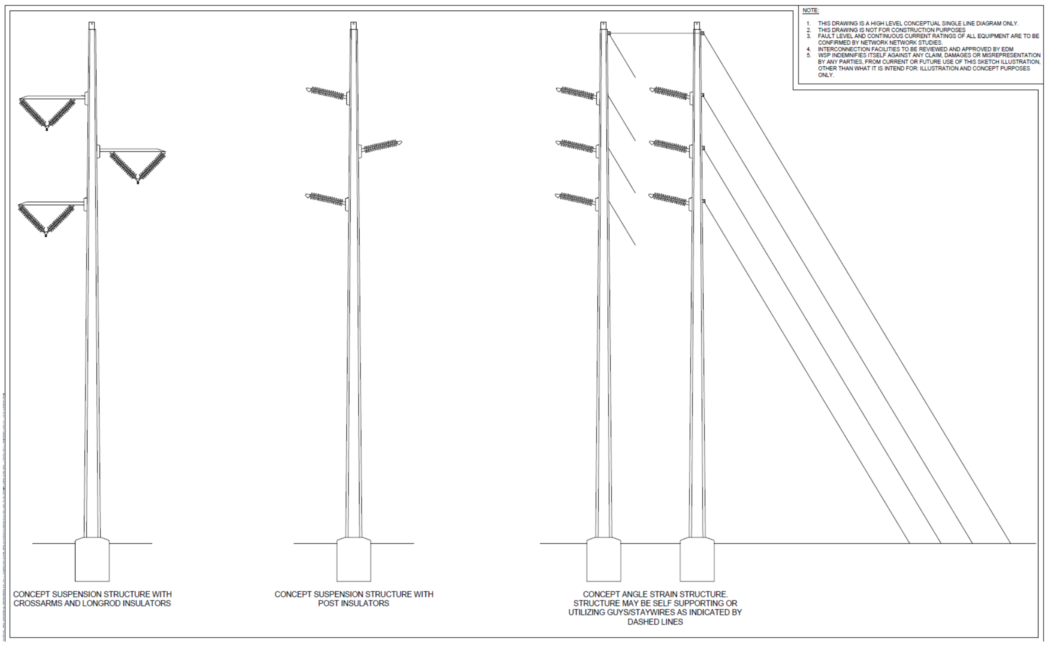


Figure 5: Concept of 66 kV line tower arrangement

Distance between towers (span length) will typically be 200 m but may be longer in areas of difficult terrain. Tower height will be dependent on the terrain, height above sea level and span length. The table below provides an overview of the transmission line's technical features.

Table 3: Overview of technical features of the transmission line

Technical Characteristics	66 kV Transmission Line
Approximate number of towers	approx. 194
Typical distance between towers (span length)	approx. 200 m
Typical tower height	20 – 25 m

Source: Project Proponent.

All towers shall be equipped with an approved guard against birds' device immediately above each suspension and tension insulator string attachment, to prevent perching and injuries of birds.

Tower footprints and foundation requirements will vary, depending on site specific geotechnical characteristics. Anti-vandalism steel monopoles can have a tower base diameter vary between 600 and 1800 mm. The below ground foundation on intermediates would typically be 3x3m and on the strains it would be dependent on the bending moment but can be as large as 6 m x 12 m.

4.2.2. 66 kV Extensions at Boane Substation

At Boane 66/33kV Substation, a second busbar is to be added and allow for the connection of two new 66 kV line bays at the substation to accommodate the new 66 kV Namaacha WPP export lines.

The complete Boane substation 66 kV existing busbar conductor and associated clamps and support structures is to be replaced to allow for an uprated conductor to be used.

The two new 66 kV line bays are to be installed in the existing Boane substation control building and are to match those that are already in place at Boane substation. The two new line bays are to be interfaced to the EDM remote SCADA system by means of a separate gateway for the two modern integrated control and connection panels.

The existing 66 kV substation yardstone is in need of replacement, therefore new yardstone and curbstone is required to improve the safety for touch and step potential. A new earth electrode is to be established for the new expansion, and this electrode is to be connected to the existing electrode.

Lightning protection coverage shall be implemented by means of shield wire strung across the new section of the substation. No lightning masts are required.

A Stacom (27MVAr) is to be supplied and installed at Boane substation.

In order to accommodate the additional busbar and the two incomer 66kV feeder lines from the Namaacha WPP, as well as the Statcom, the Boane substation yard is to be extended by approximately 25m to the East. The figure below shows the anticipated extension area.

Figure 6: Existing Boane substation (yellow) and proposed extension (red)

4.2.3. Support Components and Activities

4.2.3.1. Overview

Further to the Project's main components, described above, the implementation of the transmission line will require complementary components and activities, which are required to support the Project's construction or to allow its operation and maintenance. These include:

- Construction of access roads, for line construction and maintenance purposes;
- Exploration of borrow pits to provide aggregates and inert materials;
- Establishment of construction camps; and
- Development and maintenance of right-of-way (RoW).

These activities are discussed in further detail below.

4.2.3.2. Construction of access roads

During the construction phase, road access will be required to access tower locations. Preferably, this will be done either through the line's RoW or through existing roads. In general, an access track will be built along the line route (RoW), with 4 m minimum width. This will be the main access for construction and maintenance, and it will be located within the RoW.

Access roads are mainly expected to be just bush clearance, some slight grading to take place, perhaps with some additional gravel in places. Location will need to be confirmed at a later stage of the Project.

4.2.3.3. Opening and exploration of borrow pits

The inert materials and aggregates required for access construction and civil works associated with the line and substation will be sourced from existing borrow pits. These materials will be sourced as close to the work site as possible. The location of these borrow pits has yet to be defined at this phase of project development and is normally selected by the construction contractor with approval from the Proponent and District authorities. No new borrow pits will be opened up to support this Project.

4.2.3.4. Worker accommodations and services

There shall be a construction compound at the CEN[3] windfarm site in Namaacha that will contain catering, changing rooms, welfare (including showers), parking, workshop, laydown area, first aid, septic tank, etc. The area is expected to be circa 22,500 m^2. The transmission line construction will also be supported by this main camp. A bus transportation service shall be provided.

Locally hired workforce are expected to utilise local accommodations for the staff rather than having an independent accommodation unit.

4.2.3.5. Establishment of right-of-way (RoW) and vegetation clearance

As discussed in section 4.1.4, the establishment of a RoW is required along the route. The RoW is required to protect the system from windfall, contact with trees and branches and other potential hazards that may result in damage to the system, power failures or forest fires. The RoW will also be utilized to access, service and inspect the transmission line.

Large trees and other large vegetation will need to be cropped, cut back or removed from the RoW whichever applies best, as they constitute a risk to the power line. Similarly, built structures located within the RoW will need to be removed or relocated if they constitute a risk to the infrastructure. This will result in some localized resettlement impacts, which are assessed through the EIA/RAP process.

The table below lists the minimum requirements for vegetation clearance within the RoW, in compliance with Decree No. 57/2011 (Article 28).

Table 4: Standards for vegetation clearance within the line RoW

Item	Construction clearance	Operational maintenance
Centreline (minimum clearance strip)	Clearance of all vegetation in a 5 m corridor (area directly under the line to be cleared). This strip of land shall be completely cleared of all trees, scrub, and undergrowth by felling not more than 150 mm above ground.	Re-growth inside the same 5 m corridor cleared during construction shall be cut within 150 mm of the ground and maintained through manual labour, as necessary.
Vegetation within the RoW (outside the minimum clearance strip)	Selective trimming or cutting down of trees interfering or posing threat to the integrity of the power line. This includes clearing or selective trimming of trees, by ensuring that any tree after falling will not be less than 2.5 m clear of the tower outermost conductor.	Selective trimming to maintain 6 m between the top of trees and the conductor cables (at resting position).

[3] Out of scope of the present EIA/EIS. CEN (WPP) has an independent EIA process.

Tower sites	Clear all vegetation within the proposed tower position and within a maximum radius of 6 m around the position.	Re-growth shall be cut within 150 mm of the ground and maintained through manual labour, as necessary.

Source: Decree No. 57/2011; Consultec (2021).

Vegetation clearance shall not be done by bull-dozing or other mechanical equipment, to minimize soil compaction and erosion. Care shall be taken to avoid unnecessary removal of topsoil, damage or interference to farm roads, ploughed lands, water courses, contours, and land ridges to avoid soil erosion. Should such damage be incurred, the Contractor shall make repairs where necessary to the satisfaction of the land users and the Owner. All timber and bush shall be removed to the outer limits of the cleared strip, except when used as erosion protection in seasonal stream courses.

4.3. Construction Phase

4.3.1. Main Activities

The main activities of the construction phase will involve civil construction works, including:

- Preliminary earthworks - preparation of the site work areas will start with preliminary site survey and earthworks activities which include, removing of shrubs and trees, surface slope and grading, drainage line and containment according to the design drawings;
- Setting up of the site and mobilization of equipment and auxiliary structures;
- Transmission line survey, environmental and social clearance surveys;
- Land clearing – the construction areas will be marked and cleared, including the clearing of vegetation and tree roots and the removal of the upper layer of soil;
- Earthworks – including cuts and fills to model the terrain and prepare the foundations;
- Transportation of construction materials and workers to/from site;
- Operation of vehicles and heavy equipment;
- Construction of the transmission power line and Boane substation expansion;
- Installation of the equipment and control systems;
- Pre-commissioning and commissioning activities.

The table below lists the typical tasks expected for the construction of transmission lines.

Table 5: Typical tasks associated with overhead line construction

Task	Description
Site preparation	This may include vegetation clearance, verification of local utilities and underground services, and geotechnical surveys, as necessary.
Site enabling works	Vehicle access to each tower site is required either via direct access road or along the RoW. This may require the construction of one or more temporary access roads.
Civil works	Tower foundations are mechanically excavated and filled with concrete. Piled foundations may be required in some areas where ground conditions are unstable. The dimensions of the excavation will differ depending on local conditions. Concrete will be delivered by ready mixed concrete truck from batching plants.
Steel structure fabrication	Steel structure fabrication may not be carried out in Mozambique. In such case the materials need to be transported via Maputo Port to the tower location along the power line route.

Steel erection	Steelwork sections for the towers will be delivered by road using a four-wheel drive vehicle. Cranes may be necessary to support the assembly of higher sections of the towers.
Conductor stringing	Stringing is undertaken using a winch to pull the conductor along the towers and a "tensioner" at the other end to keep the conductor above the ground.
Testing of equipment	Overhead line components including conductors, insulators, towers, joints, and fittings are designed and tested to prove compliance with structural, mechanical, and electrical requirements.
Reinstatement of tower construction area (during construction decommissioning)	At completion, the area and materials will be disassembled and transported for reuse or recycled. Site along the PPZ will be, cleared and tidied up. Access routes and disturbed land will be reinstated in agreement with the land users and title owners or Mozambique Authority.

4.3.2. Construction Materials and Equipment

4.3.2.1. Materials

The following materials are expected to be required for the construction phase:

- Inert materials and aggregates required for civil works (accesses, tower bases and substation bays). These will be sourced from borrow pits, to be selected by the construction contractor(s). No estimate is currently available for the required volumes of these materials;
- Soils: approximately 2,000 m3 for the structure foundations. This will just generally be excavated material that would be re-used as backfill. Should there be any excess, a plan shall be used for appropriate disposal.
- Others: approximately ~1,500 m3 of concrete; approximately 150 x 18 m high steel monopole structures, plus 200 m of re-bar; 80 km electrical overhead lines (for the 2 parallel lines).

It is not expected that the project would need a dedicated concrete batching plant. Concrete will be sourced either from external providers or from the CEN WPP project construction site.

4.3.2.2. Chemical products

No relevant chemical products will be required for the construction phase, other than normal chemicals used in any civil construction works (such as lubricants, oils, cleaning products, etc.).

4.3.2.3. Equipment

The construction phase will use common civil construction equipment, including the following:

- 2 x excavators (TLB) (50 tonne)
- 2 x dumper/tipper truck (50 tonne);
- 2 x excavators (30 tonne);
- 2 x dumper/tipper truck (30 tonne);
- 1 x roller/compactor (15 tonne);
- 1 x blader/graders;
- 4 x diesel generators;

- 2 x mobile crane (30/50 tonne); and
- 2 x access platform (cherry picker) 16m;

4.3.2.4. Fuel and oil requirements

During construction, fuel and lubricating oil will only be required to operate the construction machinery, and as such will be similar to any similarly sized construction work. Fuel and oil will be sourced from commercial entities in the national market.

4.3.2.5. Water and energy consumption

During construction, electricity will only be required to supply construction sites and/or camps and will be sourced diesel generators: ~50,000 kWh (based on 8kW generators x 4, approximately 6 hours a day, for 52 weeks (over the 18 month period).

Water will be required for concrete batching and to supply construction. Total approximately 2,300 m^3 (2.3 m litres): 1.5 million litres (for roads based off approximately 20 km of roadways, 3 m width), 300,000 litres for concrete (based on 190 litres/m^3 of concrete), 500,000 litres (for personnel, based on average of 50 staff, 20 litres/day, 18 months). The required volumes will be sourced from local sources or public supply.

4.3.2.6. Waste management

The waste management procedures for the construction phase are defined in the EMP (See Annex 1).

4.3.2.7. Construction traffic

Construction traffic is related to transportation of supplies, equipment, construction materials and spoil disposal, as well as workers' transportation.

Early estimated point to approximately 400 containers for equipment/supplies and plant, approximately 3 busses for worker transportation, plus 5 additional pick-up trucks. This includes both the transmission line and the wind farm construction. Major transportation route for equipment is along the main road from Maputo Port to the site.

4.3.2.8. Workforce

The required labour force quantities for the construction phase are currently estimated to be no less than 200 workers for the transmission line, which will include civil construction, electromechanical, transport teams, assembly, Inspection teams, Owner of Work, among others. Most of these workers will be national. A small number of foreign workers may be required to provide specialized knowledge.

4.4. Operational Phase

4.4.1. Main Activities

4.4.1.1. Transmission line operation

Once built, the transmission line will be handed over to EDM, that will be responsible for the maintenance and operation.

The expected average annual evacuated electricity through the transmission line is 350GWh/yr.

The main works associated with transmission line operation are the maintenance of the RoW, tower and line inspections and line maintenance works. Control of vegetation regrowth is necessary to avoid disruption to the overhead line and towers. If tree and plant growth is left unchecked, there are higher risks of power outages from contact with trees, forest and bush fires, corrosion of steel equipment, equipment access blockages, and interference with grounding equipment.

Access for technical inspection and repairs will be intermittent and use existing access roads and take place within the existing RoW. One aspect that will be monitored during technical inspections is the encroachment of new infrastructure and settlements into the RoW, which may constitute a risk.

4.4.1.2. Substation operation

During operations, the substation will be mostly automated. A few EDM workers will monitor the substation operation, as it is already the case for the existing Boane substation. Maintenance works will be intermittent and within the operational site boundary.

4.4.2. Materials and Equipment

4.4.2.1. Materials

No raw materials will be required for the operational phase.

4.4.2.2. Equipment

During the operational phase, only standard equipment, such as light vehicles for RoW inspection and hand tools for vegetation clearance, will be used.

4.4.2.3. Fuel and oil requirements

The fuel and oil requirements during the operational phase will be negligible, as they will be limited to the vehicles used for RoW inspections and the emergency diesel generator (3-phase 50kW 420V).

4.4.2.4. Water and energy consumption

No relevant water or energy consumption needs were identified for the operational phase.

4.4.2.5. Waste management

The waste management procedures for the construction phase are defined in the EMP (see Annex 1).

4.4.2.6. Workforce

The operation of the line and substation will be done by EDM’s existing personnel. Small teams (e.g., <5 individuals) may be employed to perform maintenance clearance of the RoW.

4.5. Decommissioning Phase

The design lifetime of the infrastructure is 35 years[4], although this may be prolonged via maintenance and/or upgrades. The Project’s decommissioning phase is thus likely to occur in a relatively distant timeframe, and as such the degree of confidence regarding the activities to be developed at that stage is relatively low. In general, however, the decommissioning phase will include the following activities:

- Removal of foundations and towers;
- Removal of wastes and decontamination of sites;
- Disposal of wastes and hazardous materials, in adequate waste disposal facilities; and
- Devolution and reuse of RoW, in line with the proposed end use.

Given the distant timeframe of these activities, a Decommissioning Plan should be developed by EDM prior to decommissioning, which should include all specialist studies required to guide the decommissioning activities and minimize their environmental and social impacts.

4.6. High-level Project Schedule

Total project development will take 18 months, of which 9 to 12 will be the construction, depending on the contractor and terrain issues.

The CEN (wind farm project) will be constructure approximately in the same timeframe.

The design life of the line and substations is usually around 35 years. However, with adequate maintenance and/or upgrading it may stay in operation for longer than that.

4.7. Investment Budget

The construction of the transmission line from Central Eléctrica da Namaacha Project to Boane Substation will have an investment of approximately USD $ 30,000,000 (line + statcom).

[4] The useful life could be considered 35 years. The Concession Agreement is a BOOT (Build Own Operate Transfer) arrangement, therefore after the term of the PPA (25 years), the asset transfers to EDM.

5. Project Alternatives

5.1. Original Routing Alternatives Assessment

5.1.1. Original Alternatives Considered

Two preliminary alternative routes were initially provided by the Proponent, followed by an additional 3 options (3 to 5) proposed by a technical advisor (Zutari), totalling 5 route options for the transmission line from the Central Eléctrica da Namaacha (CEN) project site to Boane substation. These options were as follows:

- **Option 1** has a total of 33,64 km and takes a more direct route from the CEN towards Boane Substation.
- **Option 2** develops to the South of the first to be able to follow the N2 road and the existing 33 kV transmission line route for the longest possible distance, until it deviates to find the shortest possible distance to get to Boane Substation, and totals 39,62 km. Both options share its last 6,600 m, including a final section to be buried when approaching Boane's Substation.
- **Option 3** starts in a similar manner to Option 1 and 4, before following rural tracks to exit the Lebombo Mountains. The line then develops towards the south-east before it crosses the mountain folds in a parallel manner to the existing 400 kV overhead line (≈ 23 km). Moving slightly more east, the line crosses Movene River, passes two quarries and a community before approaching the N2. The last 4.8 km are common for Option 3, 4 and 5, including the 400 m section to be buried when approaching Boane's Substation.
- **Option 4** starts in a similar manner to Option 1 and 3, before heading west towards one of the mountain fold openings (≈ 13 km). It then turns in a south-easterly direction along the edge of a community for approximately 8 km. The remainder of line continues along the R401 before crossing the N2 towards Boane Substation. The last 4.8 km are common for Option 3, 4 and 5, including the 400 m section to be buried when approaching Boane's Substation.
- **Option 5** starts is identical to Option 1 for the first 25.5 km. The remainder of the line follows the same route as Option 3. The last 4.8 km are common for Option 3, 4 and 5, including the 400 m section to be buried when approaching Boane's Substation.

The layout of these options in shown in Figure 7.

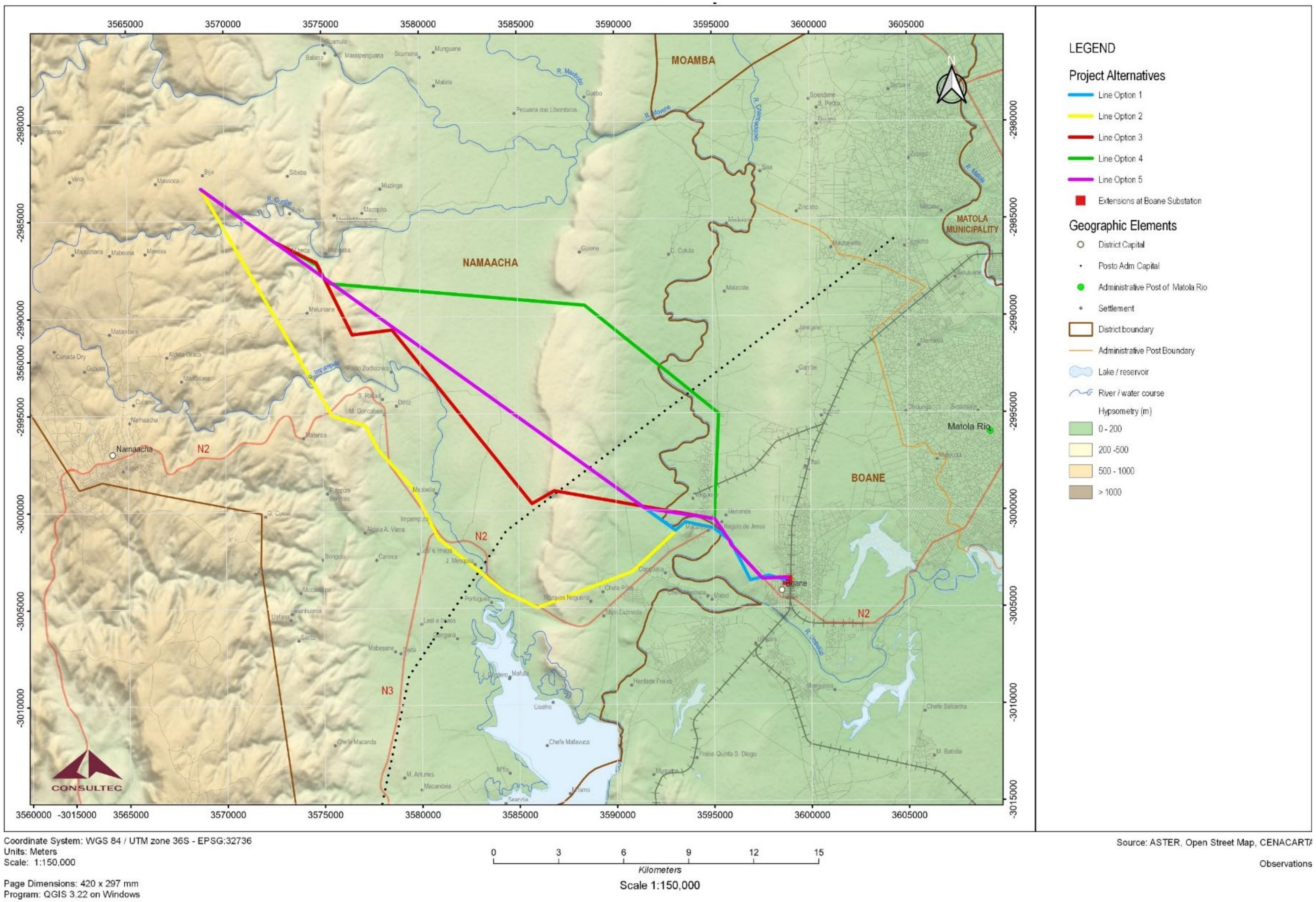


Figure 7: Map of Route Alternatives Initially Assessed

5.1.2. MCDM Analysis of Original Options

The technical advisor (Zutari) conducted a Multicriteria Decision-Making (MCDM) process to determine the most feasible route and to inform the following project stages and the ESIA. The MCDM method that was applied was the Analytical Hierarchy Process (AHP), developed by Prof. Thomas L Saaty. It is widely used and accepted as the most reliable method. It is a defendable method that allows for easy application, while still being able to check the validity and consistency of the decision making.

The line route alternatives were assessed through the application of several environmental, social, technical criteria, as described in the table below.

Table 6: MCDM Criteria

Category	Criteria	Description
Technical	Te1. Slope	Avoid steep slopes more than 1:10
	Te2. Access	Access to site
	Te3. Length	Line length and associated cost
	Te4. Constructability	Ability to construct the line
	Te5. Maintainability	Ability to maintain the line after construction
Environmental	En1. Biodiversity	Aquatic and terrestrial ecology; ecological services (based on the information available)
	En2. Avifauna	Flight paths: nesting areas, focal points (based on the information available)
Social	So1. Compensation & Resettlement	Homes or other assets that will require resettlement or other compensation
	So2. Communities & Visual Impact	Proximity to existing large villages or towns that will remain. Distance to communities. Distance from commercial areas. Visibility on ridges for nearby communities.

Source: Zutari (2022)

An MCDM workshop was held in Maputo, Mozambique, on the 20th of October 2022 to interrogate the potential route alignments identified to aid the project team; with the selection of the best route alignment corridors to be taken forward to more detailed study.

Within the MCDM workshop, participants representing each field of expertise or interests were asked to discuss and assess the suite of options against one another, on a one-to-one basis, and reach consensus on which option is preferred and by what margin. This process was repeated until all options and scenarios had been compared with all other options and scenarios using each of the pre-selected criteria. The MCDM Model then arithmetically collated preference scores and provided an overall ranking of the options.

The criteria were weighted to ensure that criteria considered as more important in terms of route selection were given more significance in the route selection process. The criteria weighting was determined through the application of the AHP method at the workshop. This required participation from all attendees such that when the weighting was applied to the results, it was done on the basis that everyone is aligned and in agreement on the way forward. The weighting is detailed below.

Table 7: Criteria weighting from the Initial MCDM Workshop

Category	Criteria Weighting
Technical (including Financial)	49%
Environmental	20%
Social	31%

Source: Zutari (2022)

The results indicated an overall preference for Option 5, followed very closely by Option 1. Option 1 and Option 5 share similar results for most of the criterion, but Option 5 was preferred for most of the technical criteria. Option 2 showed the lowest preference for all criteria, except with regards to access.

Table 8: Preferences per category and criterion for each route (1 = most favoured and 5 = least favoured)

Category	Criteria	Option 1	Option 2	Option 3	Option 4	Option 5
Technical (including Financial)	Te1. Slope	2	5	4	1	2
	Te2. Access	4	1	2	5	3
	Te3. Length	1	5	3	4	2
	Te4. Constructability	3	5	2	4	1
	Te5. Maintainability	4	3	1	5	2
Environmental	En1. Biodiversity	1	5	4	3	1
	En2. Avifauna	1	5	4	3	1
Social	So1. Compensation & Resettlement	1	5	4	3	2
	So2. Communities & Visual Impact	2	5	4	3	1

Source: Zutari (2022)

When applying the weighting criteria, Option 5 was the preferred option, followed closely by Option 1. Option 5 was selected as the preferred alternative and was taken forward as the base case alignment for the original EIS. However, during the EIS preparation and the field work phase, some further adjustments to the originally assessed Option 5 route were introduced to further minimise impacts, namely:

- Going around Mabanja, between km 27 and km 29 of the route, to avoid affecting houses;
- Using EDM's 33 kV line servitude about to be decommissioned along the N2 approaching Boane (between km 29 and km 32), to minimise new land take.
- Use of a buried cable in the last 310 m approaching Boane substation, where the density of surrounding houses was highest along the route, to minimise new land take and avoid affecting the existing houses.

5.2. Supplemental Routing Alternatives Assessment

5.2.1. Supplemental Alternatives Considered

Since developing the EIS Report and RAP for the transmission line associated with the Namaacha Wind Energy Facility, several sensitivities/ constraints were identified along the original transmission line route which put the Project's desired schedule in jeopardy and/ or may pose a critical flaw to the design. To address this, the Project Proponent and implementation partners evaluated several alternative transmission line routes to avoid these identified sensitivities.

To inform decision making, the Project Proponent and implementation partners held another alternatives workshop in August 2024 to discuss the identified constraints and map out several potential alternative routes that would avoid these. Following the workshop, a field trip was held from July 26 to August 2, 2024 to ground-truth the environmental and social sensitivities of each potential route, as well as any relevant technical considerations.

Unlike the initial alternative route assessment summarised in section 5.1, the alternatives evaluated at this stage only applied to specific sections of the route versus the entire line. For the purposes of this supplemental assessment, the transmission line was divided into four sections for consideration:

- the area crossing the active military land (in Boane District);
- the area across the road from the military land (in Boane District); and
- the area near the mining concessions and other sensitivities to the north (in Namaacha District).

The options considered are presented in the table below.

Table 9: Transmission line alternative routes considered

Section	Alternative Routes Considered	Description
Section through Active Military Land (ESFA / Military Base Servitude)	To be determined following walkover	Consultec performed a walkover of this area previously but was not allowed by the military onsite to conduct a formal census. Anecdotal information from that walkover indicates that the route passes through machambas (perhaps 2 PAPs associated with the military), but this was not documented. Consultec flagged that this route does not actually fully follow the previous EDM transmission line (as intended by the Project). The route also appears to pass through a military structure and within 18 m of a house (also associated with the military).
Alternative Route across the Road from Military Area (ESFA / Military Base Servitude)	**Boane Option 1** (alternative length is 4.1 km vs 4.58 km for the original route, ~130 m from original route most of the way)	This route change is proposed to avoid the PAPs currently farming on military land who are not associated with the military and whom the military does not want the Project to compensate. It is also proposed as a way to ensure the Project's compliance with nation legislation requiring a minimum 30 m set-back distance from the national road.
Alternative Route Near Mining Concessions and Other Sensitivities to North	**Namaacha Option 1** (10.4 km for alternative vs 9.55 km for original) - *This option deviates from original route by as much as 1.6 km.*	During the workshop the team reviewed the map of mining concessions and mining licenses for the area, and there is no route to fully avoid all of them. Alternatives to avoid the currently affected mining concessions by going to the east or southwest would

	Namaacha Option 2 (19.5 km for alternative vs 14.03 km for original) **Namaacha Option 3** (27.33 km for alternative vs 22.48 km for original) - *Alternatives 2 & 3 deviate from original route by as much as 6.5 km*	result in extensive additional resettlement and were thrown out from additional evaluation on that basis. EDM reiterated their stance that the Project should avoid crossing the mining concessions as much as possible (especially Riolitos given past dealings) and avoid crossing the large farms near the military area. Three routes were taken forward for more detailed consideration: o the minimal deviation to avoid the active military area + neighbouring large landowners; o the shortest deviation that would fully avoid Riolitos mining concession + active military area + neighbouring large land owners; and o the route that fully avoids Riolitos mining concession + active military area + neighbouring large land owners and results in the shortest overall T-line.
Notes: Two micro alignments were also considered in Mabanja (one to smooth the rout, i.e. avoid unnecessary 90 degree turns, and another to avoid a mining concession); however, these were not taken forward for further analysis.		

The additional alternatives evaluated in this report are summarised in Figure 8.

ELECTRICIDADE DE MOÇAMBIQUE, E.P.

GLOBELESOURCE ENERGIA

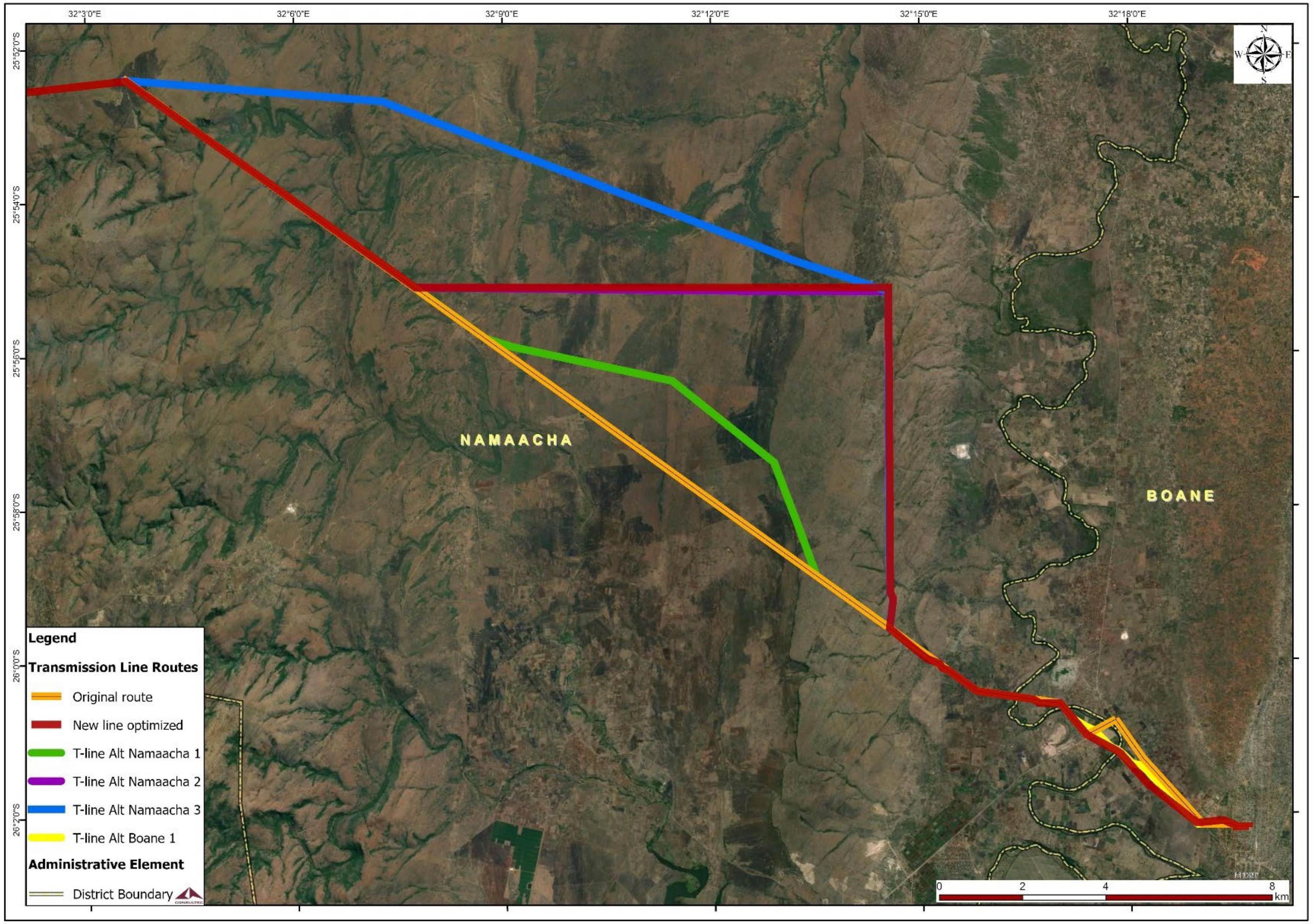


Figure 8: Transmission line alternative routes subject to field verification

5.2.2. MCDM Analysis of Supplemental Options

Following the initial workshop and reconnaissance survey to identify conditions along the various routes, an MCDM analysis using the same methodology described in section 5.1.2 was conducted for the various options. For further details on the underpinning sensitivities noted in the workshop and reconnaissance survey, see the ESIA Addendum submitted to MTA that is included as Annex 2.

Table 10: MCDM for supplemental transmission line alternatives

Category	Criteria	Original Route (Boane)[1]	Boane Option 1	Original Route (Namaacha)[1]	Namaacha Option 1	Namaacha Option 2	Namaacha Option 3
Technical	Te1. Slope	1	1	2	2	2	2
	Te2. Access	1	1	3	3	3	4
	Te3. Length	1	1	2	3	4	4
	Te4. Constructability	5	1	5	4	2	2
	Te5. Maintainability	1	1	2	2	2	2
Environ-mental	En1. Biodiversity	1	1	2	2	2	4
	En2. Avifauna	1	1	2	2	2	2
Social	So1. Resettlement	4	2	2	2	2	4
	So2. Communities and visual impact	1	1	1	2	3	4

[1]With modifications made post initial MCDM analysis described in in section 5.1.2. Rating of Original Route amended to reflect identified sensitivities after initial analysis.

When applying the weighting criteria, the Boane Option 1 was preferred over the original route in Boane District with a score of 1.91 versus 3.31. This difference was due to the significant improvement in resettlement for the alternative route.

For the Namaacha District options, the original route came out as marginally preferred with a score of 6.42; however, with a constructability score of 5 due to the crossing of an active military firing range and a mining concession that EDM has had previous unsuccessful negotiations with, the Project felt that this made the route unfeasible. As such, the next best option, Namaacha Option 2, with a score of 6.65, was selected. As can be seen in the table, the original route and Options 1 and 2 are considered equal with regards to environmental and resettlement impacts. The community and visual impacts (So2) are expected to be greater for the alternative options due to the longer distance of the route and the more remote terrain crossed. What is predominately driving the high scores for the Namaacha alternatives is the increased length and access, as the weighting criteria used prioritises technical factors over environmental and social factors.

Figure 9 below shows the combined selected alternatives for the entire transmission line route that has been taken forward as the new route for the purposes of the revised detailed impact assessment.

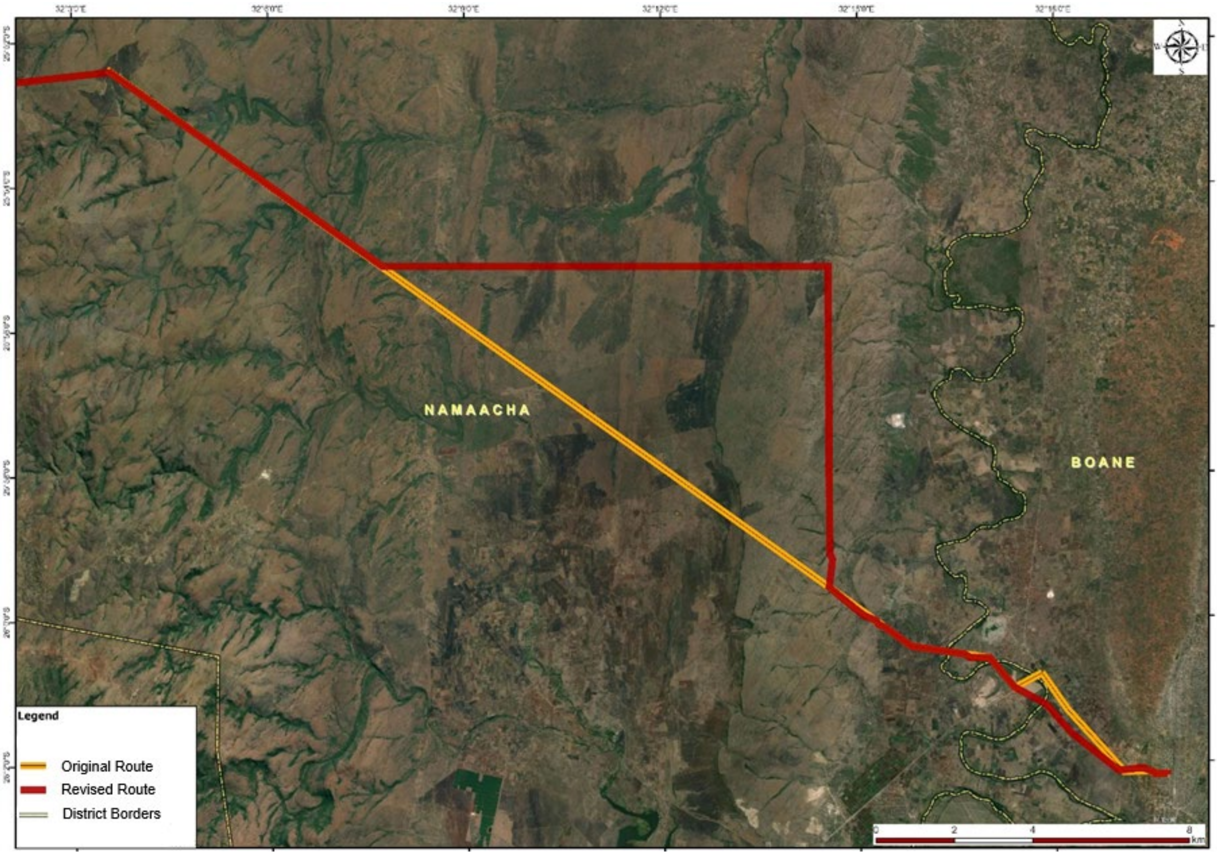


Figure 9: Selected revised transmission line route compared to original route

6. Baseline Assessment

This Chapter provides a brief baseline assessment of the potentially affected environment within the preliminary Project's AoI, as defined in Chapter 5. The baseline assessment is based on desktop review of available secondary information for the study area and direct field observations collected during a site visit to the Project area (August 2022). An effort was made to focus the baseline on the more relevant environmental and social components, given the Project typology and expected potential impacts. Table 10: shows the structure of the EIA baseline assessment.

Table 11: Structure of the baseline assessment

Environment	Component
Physical Environment	– Climate and Climate Change – Air Quality – Noise – Geology – Soils – Water Resources – Landscape
Biotic Environment	– Flora and Vegetation – Fauna – Conservation Areas

	– Natural, Modified and Critical Habitat – Ecosystem Services
Socioeconomic environment	– Administrative Division and Governance – Population and Demographics – Culture and Cultural Heritage – Ethnicity, Language and Religion – Education – Health – Land Use – Housing and Living Conditions – Basic Services and Infrastructures – Economic Activities

6.1. Physical Environment

6.1.1. Climate and Climate Change

6.1.1.1. Climate

According to Köppen's climate classification, most of the coastal territory of Mozambique has a tropical savannah rainy climate (Aw), which is influenced by the movement of the Intertropical Convergence Zone and expressed through a reduction or increase in the temperature of the Indian Ocean – a phenomenon known as El Niño (increased temperature) and La Niña (reduced temperature).

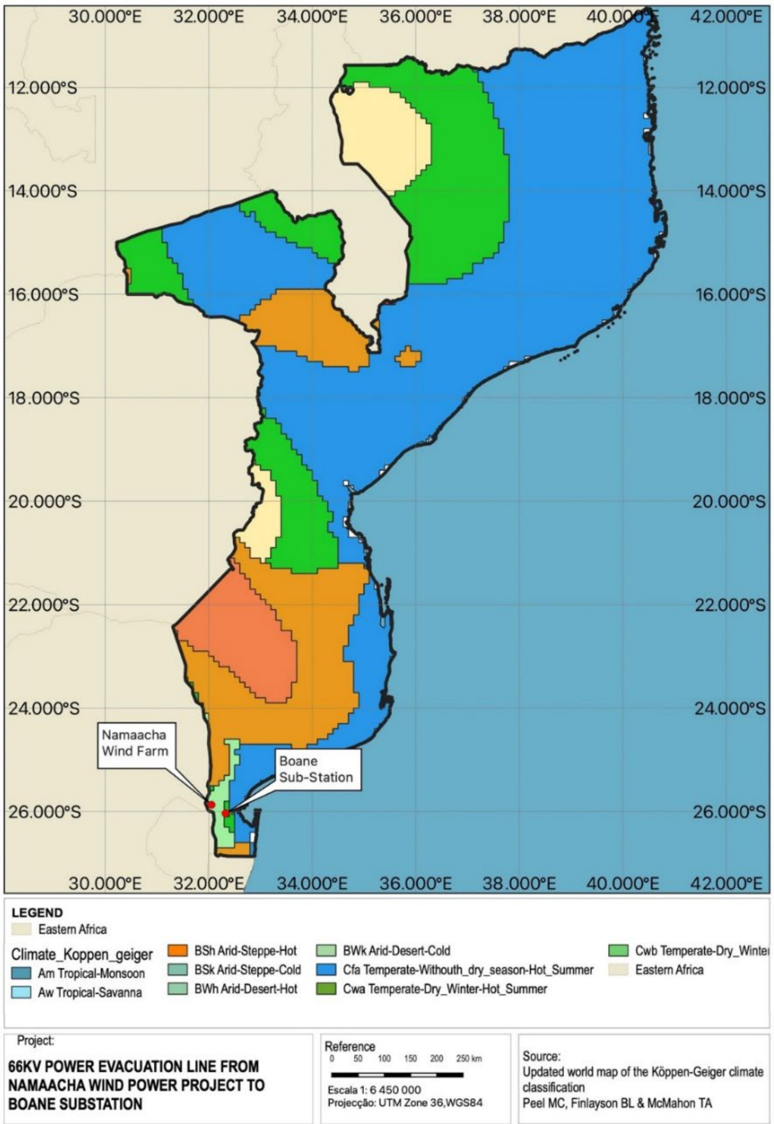
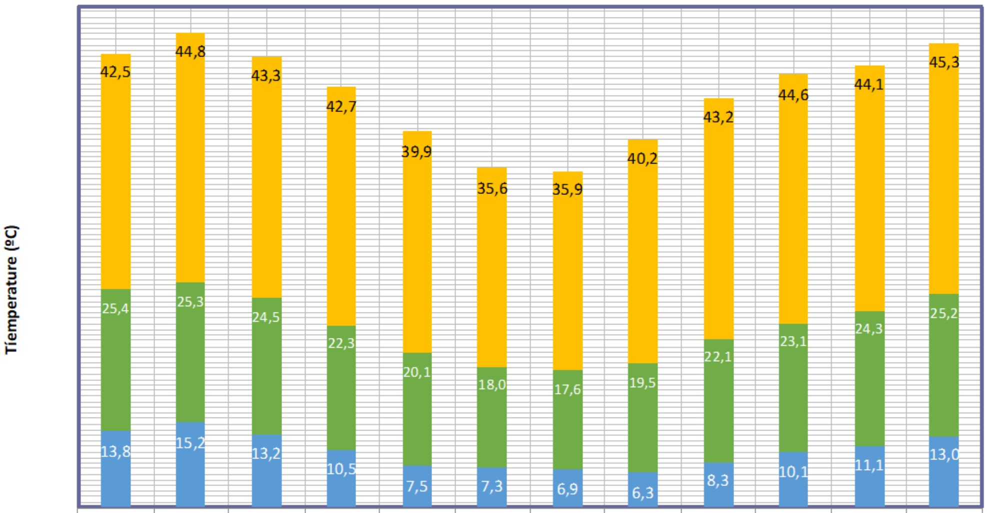


Figure 10: Köppen classification in the south of Mozambique

The Aw climate type is characterised by two well-accentuated climatic periods caused by seasonal temperature variations: A rainy season that occurs typically from November to April, and a cool dry season from May to October. Also, according to Köppen's climate classification (Peel, 2012), the Power evacuation line route falls under the C type of climate, more specifically the Cfa climate type, which is a monsoon-influenced Humid Subtropical Climate where average monthly temperatures can descend below 18 °C.

Local meteorological parameters for this region were collected from the NASA/POWER CERES/MERRA2 Native Resolution Climatology covering a period of 31 years (1991-2021) for the project region (with a reference point location of Latitude: -25.9825 & Longitude 32.0904).

Based on the 1991-2021 time series database, the lowest temperatures across the year occur during the dry season (April to September), with June and July being the coldest months with an average monthly temperature below 18 ºC. The hottest months occur during the rainy season (October to March) where from December to March the average temperatures are around 25 °C.

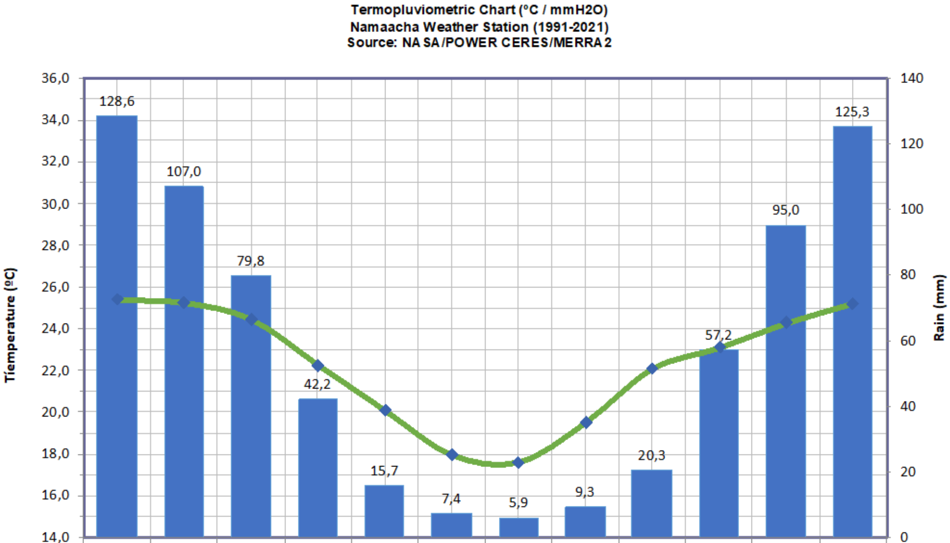


	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
T_MAX	42,5	44,8	43,3	42,7	39,9	35,6	35,9	40,2	43,2	44,6	44,1	45,3
Temp	25,4	25,3	24,5	22,3	20,1	18,0	17,6	19,5	22,1	23,1	24,3	25,2
T_MIN	13,8	15,2	13,2	10,5	7,5	7,3	6,9	6,3	8,3	10,1	11,1	13,0

Source: *NASA/POWER CERES, 2022*

Figure 11: Maximum, average and minimum monthly temperature

The seasonal distribution of rainfall is very pronounced, with over 80% of annual precipitation occurring during the wet season (November to April). Precipitation episodes in this region may occur in the form of storm, where individual precipitation events can be quite intense. This precipitation pattern creates an irregular rainfall distribution throughout the wet season. January is the wettest month with rainfall reaching maximum values near 129 mm followed by February. June to August are the driest months, with rainfall reaching minimum values below the 10 mm. Figure 11 correlates the temperature and precipitation variation throughout the year.

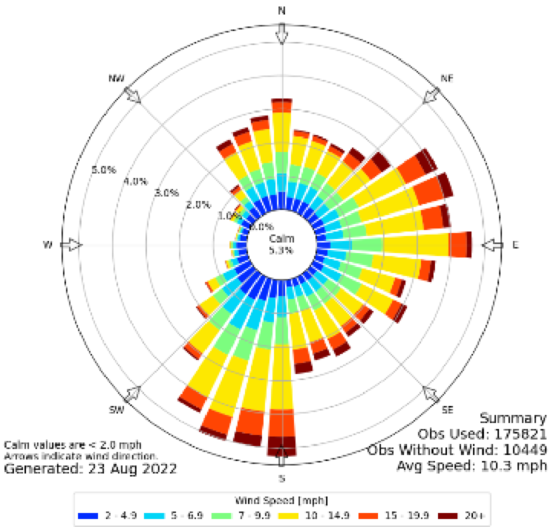


	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Rain	128,6	107,0	79,8	42,2	15,7	7,4	5,9	9,3	20,3	57,2	95,0	125,3
Temp	25,4	25,3	24,5	22,3	20,1	18,0	17,6	19,5	22,1	23,1	24,3	25,2

Source: *NASA/POWER CERES, 2022*

Figure 12: Thermo-pluviometric graph

In southern Mozambique, the wind regime is characterised by prevailing winds from the south, northwest and northeast quadrants, as illustrated in the wind rose below. Atmospheric circulation in the southern region of the country is also affected by the influence of SE trade winds, with easterly and southerly prevailing winds throughout the year. The wind rose illustrates the annual distribution of wind speed and prevailing directions between 1991-2021 in the Maputo observatory weather station. The average wind speed is of 10.3 mph.



Source: *IEM 2022.*

Figure 13: Annual average wind speeds and predominant directions

Mozambique is a country vulnerable to natural disasters from meteorological origin such as droughts, floods and tropical cyclones due to its geographic location with about 2,700 km of coastline and several international rivers emptying into the Indian Ocean as well as several areas below sea level. Extreme weather events have cumulative and devastating impacts on a population, on infrastructure (e.g. roads, bridges, power lines) leading to economic losses as well.

Other factors such as the lack of capacity to predict extreme events, inadequate timely warning notices, extreme poverty and dependence on natural resources which in turn depends on climate variability, contribute to the country's vulnerability to extreme meteorological events. Cyclones tend to be cyclic, with an increasing frequency due to climate change effects. The cyclone season in Mozambique occurs between November and April, peaking in December and January and usually affecting the central region of the country, as illustrated in Figure 13 below.

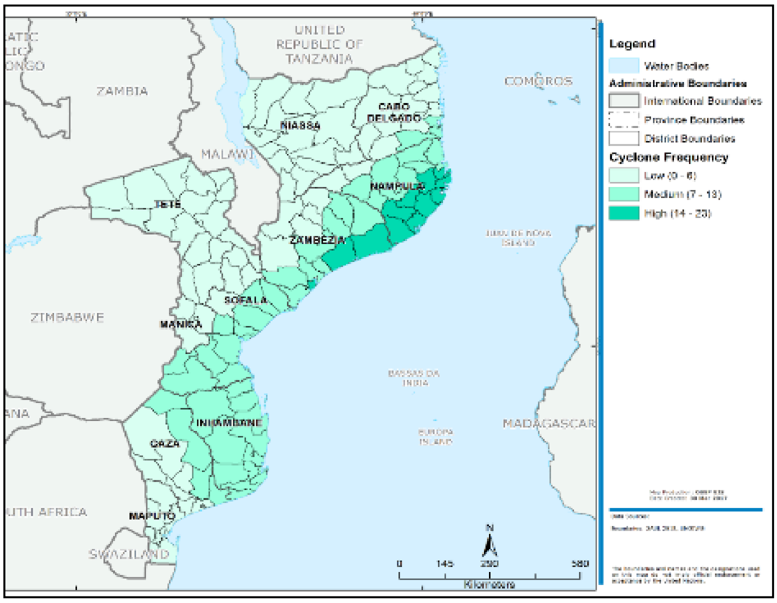


Figure 14: Cyclone hazard frequency and distribution

In general, hurricane wind top speeds range from 63 km/h up to speeds higher than 212 km/h following the Saffir-Simpson Scale classification (National Hurricane Center, 2018). The most frequent hurricanes reaching Mozambique have winds from categories 1 to 4, with speeds ranging from 63 to 212 km/h respectively. Category 5 hurricane wind speeds of over 212 km/h are rare.

Between 1993 and 2017, more than 40 cyclones have occurred in the Mozambican Channel, with an average of two per year reaching Mozambique's coast, none of which affected the Namaacha region. Table 11 lists the cyclones hitting the Mozambican Chanel with some affecting the Mozambican coast from 2000-2019.

Table 12: Main cyclones and storms that hit Mozambique (2000 to 2019)

Name	Duration	Max Wind Intensity	Classification	Category	Affected areas (Provinces)
Astride	23/12/99 – 03/01/00	95 km/h (60 mph)	Severe Tropical Storm	Category I	Nampula
Leon-Eline	07/02/00 - 22/02/00	185 km/h (115 mph)	Intense Tropical Cyclone	Category IV	Maputo and Gaza
Hudah	24/03/00 - 08/04/00	220 km/h (140 mph)	Very Intense Tropical Cyclone	Category IV	Zambezia and Nampula
Dera	05/03/00 - 12/03/01	140 km/h (85 mph)	Tropical Cyclone	Category IV	Zambezia and Nampula
Cyprien	30/12/01 – 03/01/02	100 km/h (65 mph)	Severe Tropical Storm	Category IV	Sofala and Zambezia Coast
Atang	04/11/02 - 12/11/02	55 km/h (35 mph)	Tropical Storm	---	Cabo Delgado Coast
Delfina	30/12/02 – 05/01/03	90 km/h (55 mph)	Severe Tropical Storm	---	Nampula and Northern Zambezia
Japhet	25/2/03 – 06/3/03	112 km/h (70mph)	Intense Tropical Cyclone	Category IV	Inhambane, Manica and southern Sofala
Cell	05/12/03 – 21/12/03	120 km/h (75 mph)	Tropical Cyclone	Category I	Mozambique Channel
Elita	26/01/03 – 12/02/03	120 km/h (75 mph)	Tropical Cyclone	Category I	Mozambique Channel

Gafilo	01/03/04 – 1/03/04	230 km/h (145 mph)	Very Intense Tropical Cyclone	Category V	Inhambane and Sofala Coast
Ernest	16/01/05 – 25/01/05	165 km/h (105 mph)	Intense Tropical Cyclone	Category III	Sofala and Zambezia Coast
Boloetse	20/01/05 – 06/02/06	155 km/h (100 mph)	Intense Tropical Cyclone	Category III	Zambezia
Anita	26/11/06 – 04/12/06	83 km/h (52 mph)	Moderate Tropical Storm	---	Mozambique Channel
Favio	11/02/07 - 23/02/07	222 km/h (138mph)	Intense Tropical Cyclone	Category IV	Inhambane and Vilanculos
Jaya	26/03/07 - 08/04/07	22 km/h (138mph)	Intense Tropical Cyclone	Category III	Northern coast of Mozambique
Elnus	29/12/07 – 05/01/08	65 km/h (40 mph)	Moderate Tropical Storm	---	Mozambique Channel
Jokwe	02/03/08 – 16/03/08	195 km/h (120 mph)	Intense Tropical Cyclone	Category III	Nampula and Zambezia
Fanel	18/01/09 – 23/01/09	185 km/h, (115mph)	Intense Tropical Cyclone	Category III	Mozambique Channel
Izilda	24/03/09 – 27/03/09	20 km/h (75 mph)	Severe Tropical Storm	Category I	Mozambique Channel
Joel	26/05 -29/05/10	20 km/h (75 mph)	Tropical Depression	---	Mozambique Channel
Funso	19/01/12- 28/01/02	212 km/h 132 mph	Very Intense Tropical Cyclone	Category IV	Mozambique Channel
Haruna	19/02/13- 25/02/13	194 km/h (121 mph)	Tropical Cyclone	Category II	Zambezia
Guito	18/02/14- 22/02/14	120 km/h (75 mph)	Tropical Cyclone	Category I	Mozambique Channel
Hellen	28/03/14- 01/04/14	102 km/h (63 mph)	Tropical Storm	---	Mozambique Chanel (Cabo Delgado Coast)
TC15S Fifteen	05/03/15- 07/03/15	46 km/h (29 mph)	Tropical Depression	---	Mozambique Channel
Dineo	13/02/17- 16/02/17	157 km/h (28 mph)	Tropical Cyclone	Category II	Central Mozambique (Inhambane)
IDAI	09/03/19- 15/03/19	213 km/h (132 mph)	Very Intense Tropical Cyclone	Category IV	Central Mozambique (Beira, Sofala)
Kenneth	23/04/19- 25/04/19	231 km/h (144 mph)	Very Intense Tropical Cyclone	Category IV	North Mozambique (Cabo Delgado Coast)

Source*: Naval Oceanography Portal. https://www.metoc.navy.mil/jtwc/jtwc.html?cyclone*

Figure 14 illustrates the main cyclones routes hitting the Mozambican channel between year 2000 -2019.

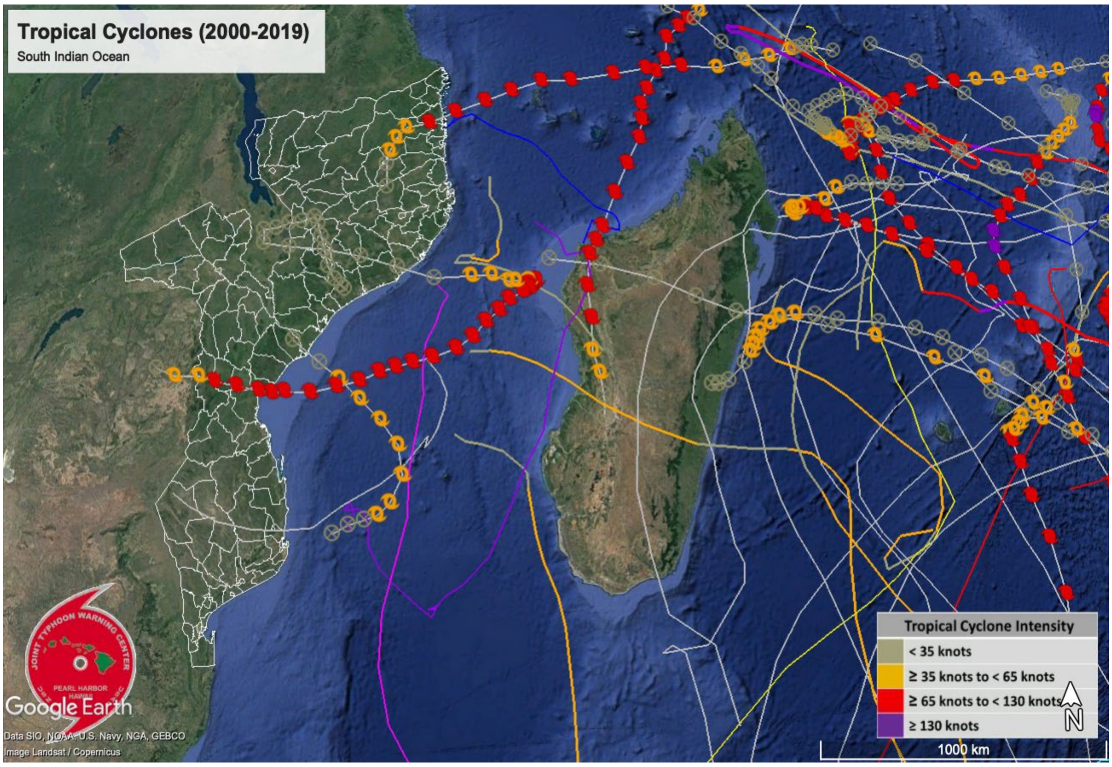
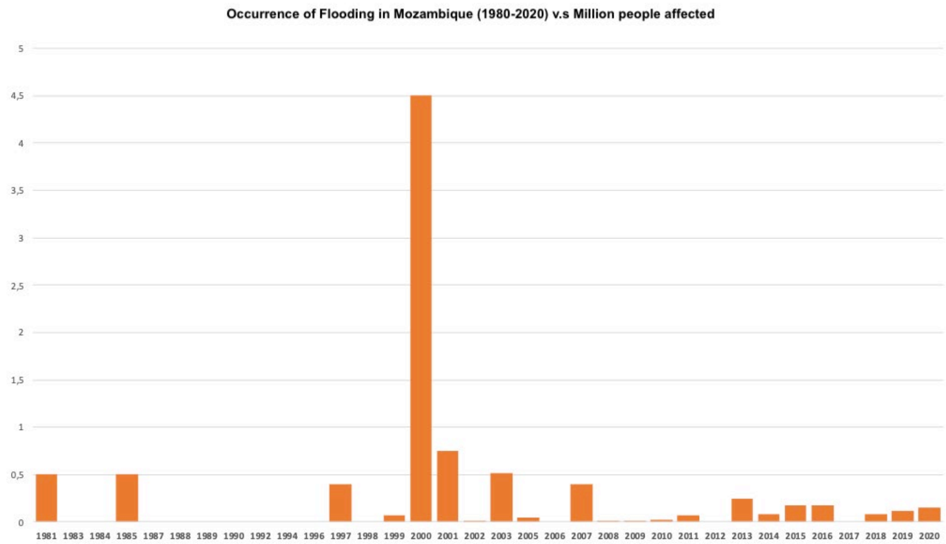


Figure 15: Main cyclones routes along the Mozambican Channel

The environmental risk of floods results from the action of natural phenomena that, although not directly the result of man's action, are currently magnified by the action of this, often with serious implications in the territory, loss of life and generating emergencies/natural disasters. This extreme phenomenon is enhanced by climate change to which Mozambique is particularly vulnerable. The chart below illustrates the number of flood episodes that occurred in Mozambique between 1980 and 2020 and relates these episodes to the number of people affected. Since the year 2000 flooding events occur with an annual frequency.

Storm Freddy hit the Mozambican coast on March 12th, 2023, with its epicenter in the district of Namacurra, locality of Macuze, with winds of 148 Km/h and gusts up to 213 Km/h, and heavy rains, of more than 200mm, affecting several Mozambican provinces, including the south of Mozambique. This storm caused 165 deaths registered and 511 people injured, 886,487 people (corresponding to 191,146 families) were affected counting in 98,975 people displaced. 5,059km of roads were affected and floods affected a total area of 347,862 ha. Severe rains flooded vast areas of Boane District and caused major damages, as well as in parts of the Namaacha district.



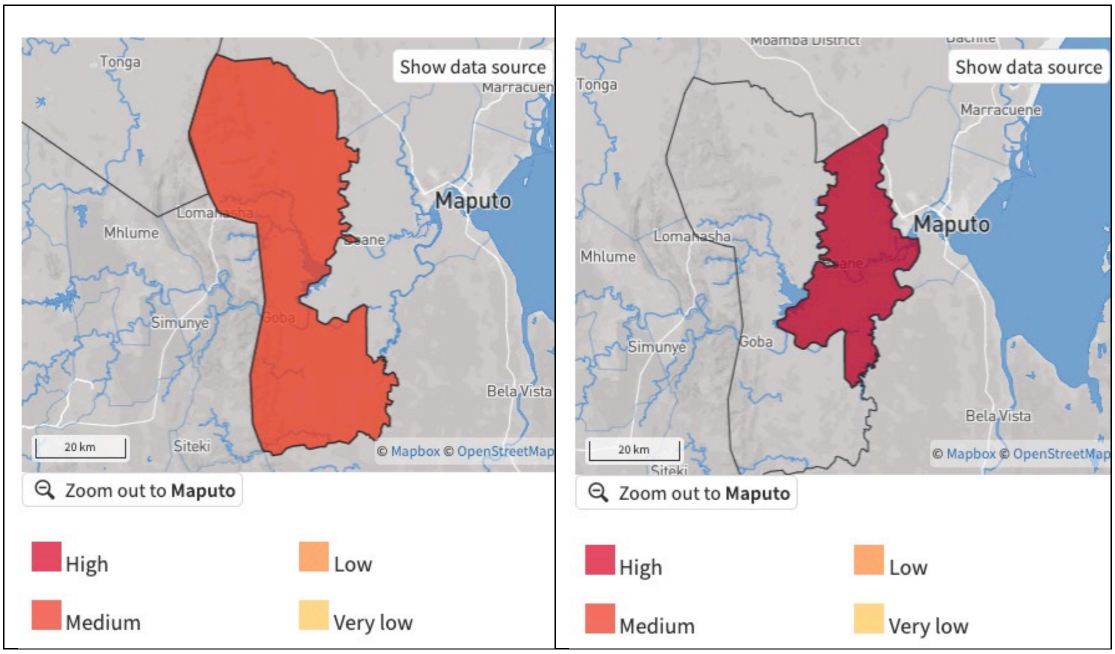
Source: *CCKP, 2022, adapted.*

Figure 16: Floods in Mozambique and number of affected persons

The Global Facility for Disaster Reduction and Recovery (GFDRR) is a global multi-donor partnership together with World Bank Group that helps low and middle-income countries better understand and reduce their vulnerability to natural hazards (heat waves, cyclones, urban and river floods, Tsunami, landslides) and climate change.

In the Namaacha area, River flood hazard is classified as **medium** based on modeled flood information currently available in the GFDRR tool. This means that there is a chance of more than 20% that potentially damaging and life-threatening river floods occur in the coming 10 years.

In the Boane area river flood hazard is classified as **high** based on modeled flood information currently available in the GFDRR tool. This means that potentially damaging and life-threatening river floods are expected to occur at least once in the next 10 years. Project planning decisions, project design, and construction methods must consider the level of river flood hazard.



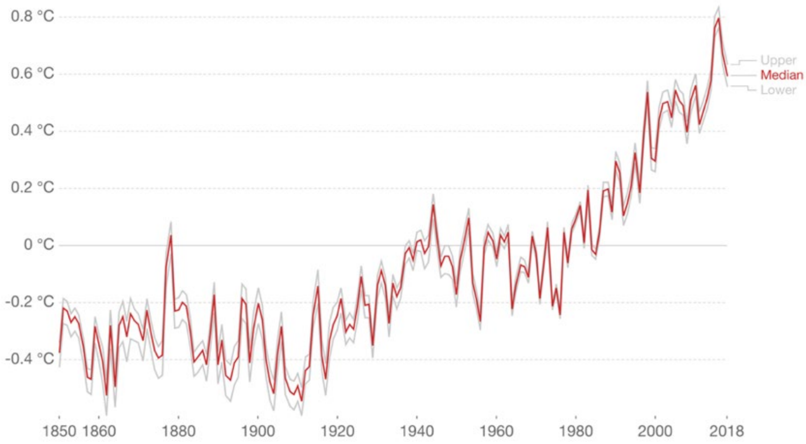
Data Source: *INAM, INGC & ARCC, accessed November 2022.*

Figure 17: River flood Risk Hazard classification for Namaacha and Boane

6.1.1.2. Climate Change

Climate change refers to any change in the current climate, attributed directly or indirectly to human activity, to which is added the natural climate variability observed over comparable time periods (MTA, 2007). It is widely accepted by the scientific community that climate pattern worldwide is already changing and that the trend will be towards an overall increase in average air temperature, greater variability in rainfall regime, rise in the average level of the sea and the increased occurrence of extreme situations such as flooding phenomena, cyclones and extended periods of drought. The observed warming since the mid-twentieth century is largely due to the increased concentration of greenhouse gas (GHG) emissions resulting from human activities. Excessive increase of greenhouse gas affects the amount of retained heat has increased and the planet has warmed, which is currently affecting the climate globally. Some of the most common gases that create the greenhouse effect include carbon dioxide, water vapor, methane, nitrogen oxides and chlorofluorocarbons (CFCs). The most relevant elements are water vapor, carbon dioxide and Methane. Carbon dioxide, for example, remains in the atmosphere for centuries after being emitted, and it is stored on earth in different forms. Water vapor is a potent greenhouse gas due to the capacity to absorb and emitting infrared radiation, as heat energy.

In 2010, the world global average temperature showed an 0,53 ° C increase in relation to the 1961-1990 average values period. Together with 1998, 2018 was the higher temperature year on the planet (Hadley Center, 2018). The World Meteorological Organization confirmed that the last ten years were the hottest, since 1984. Figure 17 illustrates this trend of rising average global temperature of the planet from 1880 to 2018.



Source: *Hadley Center, 2018*

Figure 18: Temperature anomalies in relation to the 1961-1990 global average.

In the southern African region, the meteorological observations from the last 50 years suggest that temperatures have been increasing considerably over the second half of the 20th century and the heating rate has also increased, especially in the last two decades of the twenty-first century. From 1961 to 2014 the temperature increased at a rate of 0,4 ° C per decade. The temperature patterns throughout the seasons indicate a slightly higher heating in the austral summer (December - January - February) and also during the period from March to May compared to the rest of the year.

Mozambique has become a signatory of the Kyoto Protocol, having ratified it in 2005. Mozambique is classified as a non-Annex I party to the Protocol which means that it has no specific emissions targets that it is obligated to meet. Being a signatory of the Kyoto protocol and being among the first States that have signed the Paris Agreement, Mozambique is an active country in the effort to reduce Climate change negative effects. According with the National Strategy for Climate Change report (2013-2025), published by MITA, Mozambique is particularly vulnerable to climate change due to: the geographical location, in the inter-tropical convergence zone and in the downstream shared hydrographic basins; the long coastal area and the existence of large areas with altitude below the current sea level.

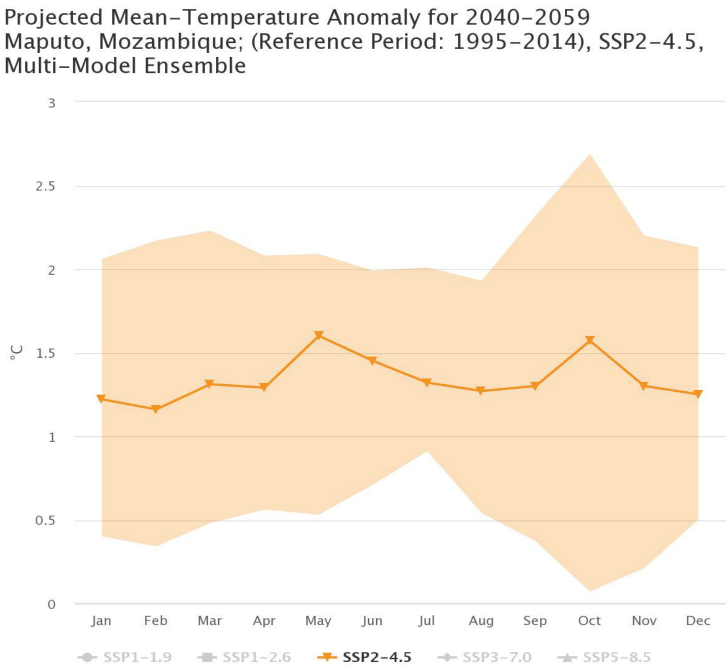
Contributing also to Mozambique’s vulnerability and low adaptive capacity are factors such as: poverty, limited investments in advanced technology, and the fragility of the infrastructure and social services, particularly health and sanitation. In the country, climate changes are observed through the changes in temperature patterns. A report published by (INGC,2009), indicates that for the 45 years’ period between 1960 and 2005, a clear trend of increasing temperature in most of the country has been already observed.

Temperatures in Mozambique may increase considerable until 2095. The rainfall variability will increase, potentially affecting the beginning of the rainy season and the rainfall distribution and resulting in more humid rainy seasons and drier dry seasons. The central provinces are more prone to floods, tropical cyclones and epidemics, followed by the Southern and Northern provinces. The South with its savanna climate, tropical and dry, is more prone to droughts than the central and northern regions, which are respectively dominated by a rainy tropical climate and moderately humid climate modified by altitude (INGC, 2009).

Since the 1960s, mean temperatures across Mozambique rose by an average of 6°C (0.15-0.16°C per decade), especially during the rainy season. The number of hot days (defined as the temperature exceeded on 10% of days or nights in the current climate of that region and season) increased by 25 in the last 40 years, and much of this has occurred during the southern hemisphere autumn (GFDRR, 2011).

Based in the Climate projection data modeled data published by UNDP Mozambique Country Profile and World Bank Climate Change Data Portal, it can be concluded that the mean annual temperature in Mozambique is to increase by 1.4-3.7 °C by 2060, with warming more rapid in southern and coastal areas. The number of hot days and nights (defined as the temperature exceeded on 10% of days or nights in the current climate of that region and season) are projected to increase throughout the country, with hot days by 17- 35% in 2060 and hot nights by 25-45% in 2060.

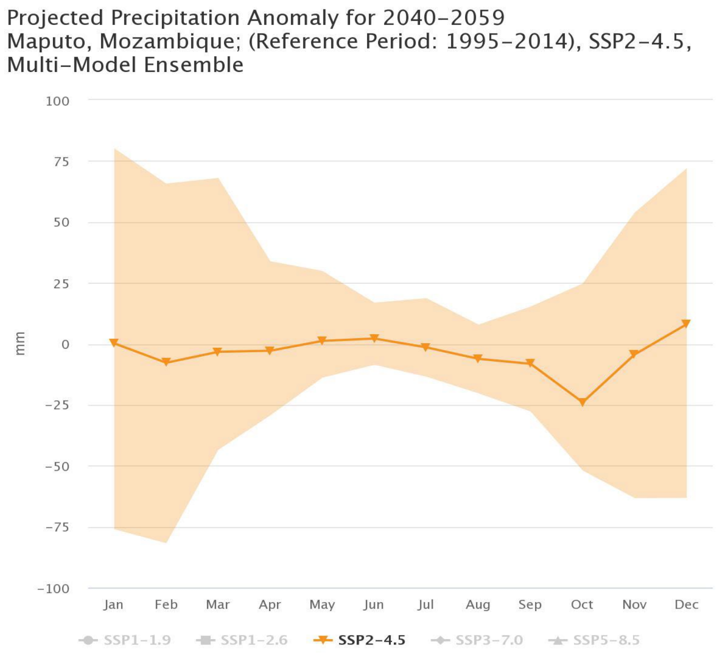
Figure 18 illustrates the projected mean temperature anomaly for 2040-2059 period under a SSP2-4.5 scenario for the Maputo Province. (SSP2- 4.5 - Medium challenges to mitigation and adaptation) a scenario with intermediate GHG emissions.



Source: *CCKP/World Bank, 2021*

Figure 19: Projected Temperatures anomaly for Maputo.

Since the 1960s, mean rainfall decreased by an average of 2.5 millimeters per month (3.1%) per decade. Spatial manifestations are varied, with increased rainfall over the northern regions, highly variable conditions in the central regions, and persistent drought periods coupled with episodic floods in the south (GFDRR, 2011). In what regards future precipitation patterns, Rainfall projections are less certain for the country as a whole and vary by region. Seasonal level projections are more certain and indicate decreased dry season rainfall (January-June) and increased wet season rainfall (July-September). The number of heavy rainfall events (defined as a daily rainfall total which exceeds the threshold that is exceeded on 5% of rainy days in the current climate of that region or season) is projected to increase by 2060, particularly during the dry season (January-June). Figure 19 illustrates the projected precipitation anomaly for 2040-2059 period under a SSP2-4.5 scenario.



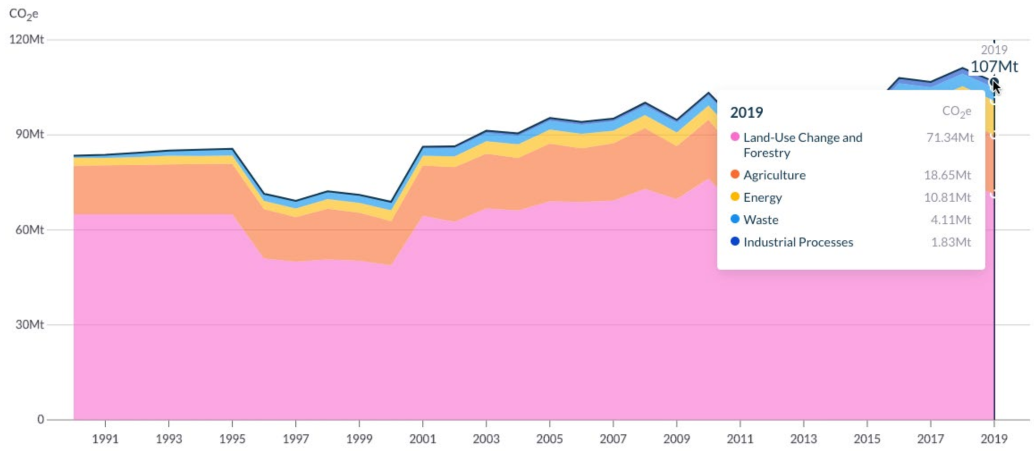
Source: *CCKP/World Bank, 2021*

Figure 20: Projected precipitation anomaly

Based on this analysis, it may be concluded that climate change may potentially impact the project's region through:

- A possible increase in the number of episodes of extreme rainfall with possible occurrence of floods.
- An increase in temperature at an average increase 1.4-3.7 °C by 2060, with warming more rapid in southern and coastal areas.
- Rainfall projections are less certain for the country as a whole and vary by region. Seasonal level projections are more certain and indicate decreased dry season rainfall (January-June) and increased wet season rainfall (July-September).
- The number of heavy rainfall events (defined as a daily rainfall total which exceeds the threshold that is exceeded on 5% of rainy days in the current climate of that region or season) is projected to increase by 2060, particularly during the dry season (January-June).

Total Mozambican Greenhouse Gases Emissions when expressed in global warming potential (CO_2 eq.), reached in 2019 an equivalent amount of 106.74 MtCO2e/year, (WRI, 2022). This quantified data was retrieved from the World Resources Institute database (CAIT, Country Greenhouse Gas Emissions Data (1850-2019)). This includes the accounting of emissions from land-use change and deforestation (LUCF), calculated by FAO.



Source: *WRI, CAIT. 2022*

Figure 21: National Greenhouse Gas emissions

Of the total amount of 106.74 MtonCO2eq., 71.3 million tons of CO2 eq. are from changes in land use and Forestry (LUCF), 18.7 Mton CO2eq. are emissions from agricultural activity, and the remaining emissions have their origin from the energy sector (10.8 Mton), transport and industrial process sectors. The most significant greenhouse gas is CO2. Other greenhouse gases such as CH4 and N2O are emitted on a smaller scale, but still in quantities considered relevant. It should be noted that CO2 is mainly emitted by industries associated with the energy sector, manufacturing and construction industries, transport and other sectors, namely the residential, commercial/institutional and fisheries/agriculture/forestry sectors.

Greenhouse gas emissions from energy industries are mostly related with diesel used to generate electricity. The emissions from the energy sector in Mozambique emanate from the combustion of carbon-based fuels (fossil and biomass).

On a global scale and in relative terms, Mozambique's contribution for Global Greenhouse Gas Emissions is insignificant at 0.15% of the global GHG emissions (Our World in Data, 2019).

As cited in the Intended Nationally Determined Contribution (INDC) of Mozambique to the United Nations Framework Convention on Climate Change (UNFCCC) and established in the National Climate Change Adaptation and Mitigation Strategy (NCCAMS) (MTA, 2012), the national priority is defined in its mission "*to increase resilience in the communities and the national economy including the reduction of climate risks, and promote a low-carbon development and the green economy through the integration of adaptation and mitigation in sectorial and local planning*".

The present and future planned actions (post2020) directed at the increase of resilience and risk reduction will correspond to the update of the adaptation component of this Strategy which will correspond to the Mozambican National Adaptation Plan (NAP). The country will update and implement its NAP for the following time periods: short (2015 to 2019), medium (2020 to 2024) and long (2025 to 2030) terms. The strategic actions to be included in the NAP are:

- Reduce climate risks through the strengthening of the early warning system and of the capacity to prepare and respond to climate risks.

- Improve the capacity for integrated water resources management including building climate resilient hydraulic infrastructures.
- Increase the effectiveness of land use and spatial planning (protection of floodplains, coastal and other areas vulnerable to floods).
- Increase the resilience of agriculture, livestock and fisheries, guaranteeing the adequate levels of food security and nutrition.
- Increase the adaptive capacity of the most vulnerable groups.
- Reduce people's vulnerability to climate change related vector borne diseases or other diseases.
- Ensure biodiversity's protection.
- Reduce soil degradation and promote mechanisms for the planting of trees for local use;
- Develop resilient climate resilience mechanisms for infrastructures, urban areas and other human settlements and tourist and coastal zones.
- Align the legal and institutional framework with the NCCAMS
- Strengthen research and systematic observation institutions for the collection of data related to vulnerability assessment and adaptation to climate change.
- Develop and ameliorate the level of knowledge and capacity to act on climate change. and
- Promote the transfer and adoption of clean and climate change resilient technologies**.**

Mozambique is part of the group of countries which are implementing the Pilot Programme for Climate Resilience (PPCR), which encompasses support for the institutional and policies' reform, for the funding of pilot projects (roads, agriculture, early warning systems, coastal cities and irrigation) and for knowledge management. In addition to the PPCR, the World Bank is also funding actions in water resource sectors and conservation areas. The country is also implementing other projects supported by the Least Developed Countries Fund (LDCF), the PASA, the African Development Bank, the JICA, the USAID and the Portuguese Carbon Fund, among others. (MTA, 2015).

The Namaacha Power Plant Project, together with the transmission power Line, are aligned with the environmental and energy policies recommended not only in the country, but also worldwide, in order to enable the fulfilment of international commitments in reducing greenhouse gas (GHG) emissions, with particular emphasis on the targets set out in the Paris Agreement, and resulting from the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21), signed by Mozambique on 22 April 2016.

6.1.2. Noise

Mozambique has yet to establish national ambient noise guidelines. National environmental quality standards are established through Decree No. 18/2004 (Regulation on Environmental Quality Standards and Effluent Emissions), as amended by Decree No. 67/2010 which determines environmental standards and effluent emission limits, aiming to control and maintain acceptable concentrations of pollutants in the environment. This decree also states that ambient noise guidelines will be established by MTA. However, to date, specific guidelines regarding noise monitoring have yet to be published.

The World Health Organization's (WHO's) recommended noise guidelines have been determined considering the potential negative effects of noise on health and specific environments. Under WHO's noise guidelines, residential areas, schools and hospitals are considered sensitive receptors / land uses. Table 12 lists WHO's ambient noise guidelines for such sensitive receptors.

Table 13: WHO Ambient Noise Levels Guidelines

Land use / Specific Environment	Guideline (L_{Aeq} in dB (A))	Reference Period	Effect on Health
Outdoor of residential areas (daytime)	55 dB(A)	16 hours (06h00 – 22h00)	Serious annoyance
Outdoor of residential areas (night-time)	45 dB(A)	8 hours (22h00 – 06h00)	Sleep disturbance

Source: *Berglund et al. (1999).*

World Bank and IFC also have ambient noise guidelines, which state that noise impacts from a particular project should not exceed the levels presented in Table 13 or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site.

Table 14: WB/IFC Noise Levels Guidelines

Receptor	One Hour Laeq (dB(A))	
	Daytime (07:00 - 22:00)	**Night-time (22:00 – 07:00)**
Residential; institutional; educational	55	45
Industrial, commercial	70	70

Source*: IFC (2007).*

As can be seen from the table above, the WHO noise guideline for outdoors of residential areas are the same as the WB/IFC's guidelines for residential, institutional or educational receptors, for both the daytime and night-time periods. In the absence of national regulation, WHO and WB noise guidelines are referenced and proposed as project standards.

The project area is mostly located in area with scarce population density and a low level of development and industrialisation. Consolidated habitation is to be found only on the last ~300 meters of the future transmission line near the Boane substation. It can be concluded that, the majority of the territory in the vicinity of the future wind farm is mostly described as being 'natural'. The mainland uses around the project area are non-mechanised farming and woodlands and croplands.

As mentioned no significant anthropogenic noise or vibration sources have been identified. The main noise sources that define the acoustic environment in the project area are:

- Natural noises – such as the noise induced by wind, rainfall and animals (insects, birds, frogs, etc.);
- Scattered Human settlements – Noise generated from human activities such as people talking, children playing, music, etc.; and
- Vehicular traffic – noise caused by the heavy and light motorised vehicles that cross the N2, a primary road.

Vehicular traffic across Mozambique's road network is low to very low, accounting a low volume of vehicles/day along primary roads (AICD World Bank, 2008). Only one primary road (the N2) is located in the vicinity of the project Transmission Line Solution 2 route, and, as such, the vehicular traffic noise is anticipated to be of low significance.

As for vibration, no relevant sources have been identified in the project's area.

The baseline ambient noise levels characterization in ADI was based on *in situ* noise measurements made during January 2023. Noise measurements were recorded in several locations (eight) along the proposed site implantation route, in areas considered to be sensitive to noise in order to:

- Determine as rigorously as possible the existing ambient noise levels in the project area of influence; and
- Obtain a general perspective, as representative as possible, of the acoustic environment in the areas that may be potentially affected by the noise emissions generated by the project.

Noise monitoring locations were selected based on the proximity to sensitive receptors to the project's potential noise emissions (essentially residential areas). These sensitive receptors were preliminarily identified through aerial photographic coverage and were then ground-truthed in the field. The selection of the monitoring locations was based on the following criteria:

- Locations considered to be representative of the current noise levels in residential areas;
- Locations with dwellings in close proximity to the project's ADI;
- Easy access by road in current conditions;
- Safety conditions for undertaking the noise measurements;
- Existing restrictions to perform night-time measurements; and
- Settlements that expected to continue to exist after the project implementation and are therefore valid for comparison purposes in future noise monitoring activities.

The field survey included a photographic record of the selected monitoring locations and the measurement of noise parameters, including the equivalent continuous noise level (LAeq), L_{max}, L_{min} and statistical parameters such as the L_{10}, L_{50} and L_{90} indicators. The location of these monitoring points is illustrated in Figure 21 and listed in the table below. Note that all sampling locations are associated with residential properties that would be considered noise sensitive receptors. This table also offers information regarding the tested noise indicators, the sampling equipment and the duration of the acoustic samples.

The noise monitoring procedures abided by the recommendations of international standards for noise measurement, namely:

- SO EN 1996-1: 2016 – Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic Quantities and assessment procedures; and
- ISO EN 1996-2: 2018 – Acoustics – Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels.

The following noise measurement procedures were followed:

- The acoustic samples were collected through the use of a Type 1 digital integrating sonometer (Solo – BlackSolo 01 dB), compliant with international standards. This sonometer is equipped with a high sensitivity electronic microphone and octave bands statistical analyses filters.
- During the sampling, the microphone was fitted with a wind guard, to prevent the recording of wind induce low frequency signals. Any residual energy from the filtering is irrelevant since all measurements were A-weighted.
- The sonometer was duly calibrated, prior to the start of the sampling and at the end of each sampling day. The equipment's acoustic sensibility was checked before and after each independent measurement through the use of an acoustic calibrator with a 94 dB(A) reference level. The sampling results were discarded if a discrepancy greater than 0.5 dB(A) was noted in the levels checked before and after the measurement.
- The ambient noise levels were assessed with the SLM impulse integration option on, through a noise sampling with duration equal to 3X10 min for each sampling point.
- For each measurement the equivalent continuous noise level (LAeq), by 1/3 octave band spectrum and in dB(A), of the monitoring period was recorded. The LAeq parameter reflects the average value of the sound pressure levels. It is the equivalent continuous sound which would contain the same sound energy as the time varying sound which is measured in the sampled environment.
- The L_{10}, L_{50} and L_{90} statistical parameters, and 1/3 octave band spectrum and in dB(A), were also recorded for each monitoring period. The L_{10} parameter correspond to the noise levels that are exceeded 10% of the monitoring time and the L_{90} is the noise level that is not exceeded during 90% of the measuring time under consideration.
- The coordinates of each sampling point were recorded using a Garmin GPS equipment, in the WGS 84 coordinate system. A photographic record of each sampling point was also taken.

Table 15: Noise monitoring points - location, parameters, sampling equipment and duration

COORDINATES (WGS84)	DESCRIPTION	PARAMETERS	EQUIPMENT	SAMPLE DURATION
25°59'53.49"S 32°15'1.07"E	DWELLINGS	LAEQ DB(A) L_{10}, L_{50}, L_{90} DB(A) LMAX AND LMIN	BLACK SOLO SONOMETER DB LAB CLASS I	3 INDEPENDENT 10 MINUTES' RUNS DURING DAYTIME AND NIGHT-TIME
26° 0'4.83"S 32°15'14.37"E	DWELLINGS	LAEQ DB(A) L_{10}, L_{50}, L_{90} DB(A) LMAX AND LMIN	BLACK SOLO SONOMETER DB LAB CLASS I	3 INDEPENDENT 10 MINUTES' RUNS DURING DAYTIME AND NIGHT-TIME
26° 0'35.39"S 32°17'14.06"E	RESIDENTIAL SETTLEMEN T	LAEQ DB(A) L_{10}, L_{50}, L_{90} DB(A) LMAX AND LMIN	BLACK SOLO SONOMETER DB LAB CLASS I	3 INDEPENDENT 10 MINUTES' RUNS DURING DAYTIME AND NIGHT-TIME

26° 0'37.58"S 32°17'30.30"E	RESIDENTIAL SETTLEMENT	LAEQ DB(A) L_{10}, L_{50}, L_{90} DB(A) LMAX AND LMIN	BLACK SOLO SONOMETER DB LAB CLASS I	3 INDEPENDENT 10 MINUTES' RUNS DURING DAYTIME AND NIGHT-TIME
26° 2'16.00"S 32°19'35.02"E	RESIDENTIAL SETTLEMENT	LAEQ DB(A) L_{10}, L_{50}, L_{90} DB(A) LMAX AND LMIN	BLACK SOLO SONOMETER DB LAB CLASS I	3 INDEPENDENT 10 MINUTES' RUNS DURING DAYTIME AND NIGHT-TIME
26° 2'9.96"S 32°19'35.02"E	RESIDENTIAL SETTLEMENT	LAEQ DB(A) L_{10}, L_{50}, L_{90} DB(A) LMAX AND LMIN	BLACK SOLO SONOMETER DB LAB CLASS I	3 INDEPENDENT 10 MINUTES' RUNS DURING DAYTIME AND NIGHT-TIME

Source: Consultec. EIS Report, 2023.

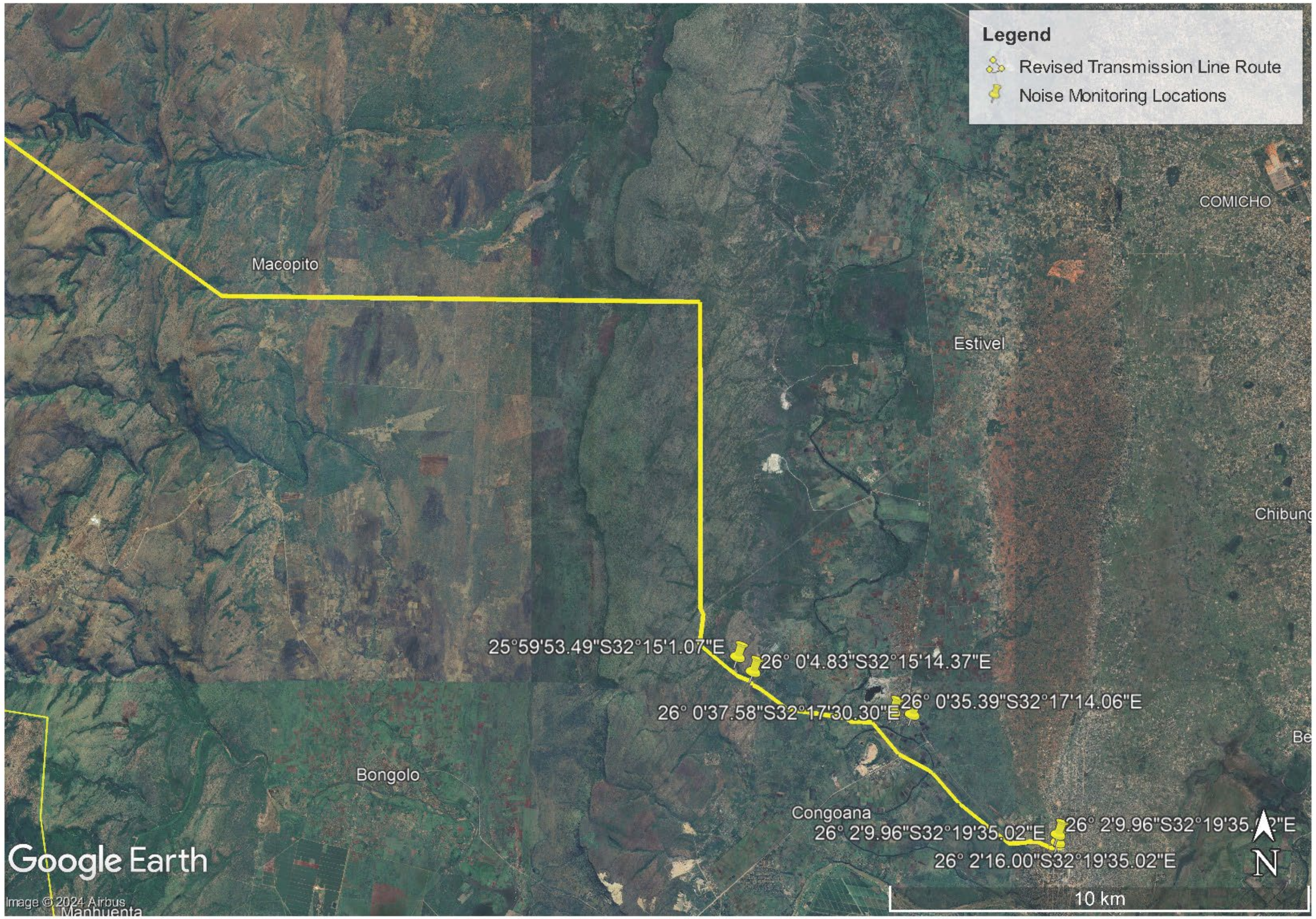


Figure 22: Location of the noise monitoring points

Two major residential areas were found along the transmission line route, one in Boane and one in Mabanja. The field reconnaissance survey conducted in August 2024 identified no additional residential properties near the proposed PPZ for the new area crossed in Namaacha District, so no additional noise monitoring was conducted. No health center or places of worship are within the area of direct influence. A school is located 280 meters south of the future transmission line, within the military compound located west of the Boane Substation, as illustrated below.

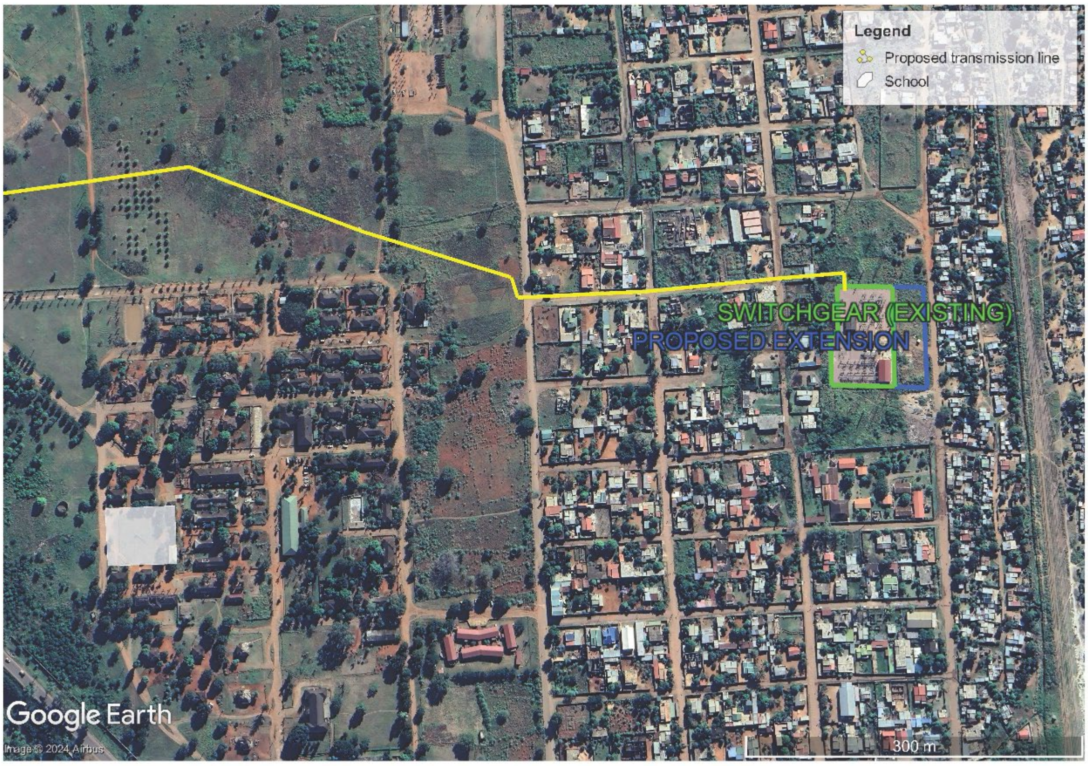


Figure 23: School located south of the transmission line (inside the military compound)

Table 15 presents the recorded daytime ambient noise levels for the 6 monitoring locations. Red colour denotes an exceedance above the guideline value for residential areas during the daytime period as per WHO criteria.

Table 16: Recorded daytime noise levels

Coordinates (WGS84)	Daytime Ambient Noise Levels (07h-22h)					
	LAeq [dB(A)]	L10 [dB(A)]	L50[dB(A)]	L90 [dB(A)]	Lmin [dB(A)]	Lmax [dB(A)]
25°59'53.49"S 32°15'1.07"	44,4	47,8	39,8	35,8	32,3	60,4
26° 0'4.83"S 32°15'14.37"E	41,0	43,8	36,8	32,7	30,1	56,6
26° 0'35.39"S 32°17'14.06"E	48,0	50,8	44,8	41,5	38,2	63,4
26° 0'37.58"S 32°17'30.30"E	45,8	49,0	45,9	40,3	38,5	56,5
26° 2'16.00"S 32°19'35.02"E	58,9	61,5	56,5	50,5	43,1	71,1

26° 2'9.96"S 32°19'35.02"E	52,3	55,3	44,2	46,2	37,6	68,0

Source: Consultec. EIS Report, 2023.

The noise levels measured during the daytime period show that the baseline acoustic environment has a low degree of noise disturbance, as all the noise levels measured across the selected sampling points, with the exception of one location, did not exceeded the daytime applicable IFC noise guideline (i.e., 55 dB(A)). The recorded noise levels were mostly due to noise caused by human activity occurring in or near the residential areas under assessment. The noise levels at the sampling locations for the two highest recorded noise levels were also partially influenced by road traffic induced noise.

Table 16 presents the recorded night-time ambient noise levels for the 6 monitoring locations.

Table 17: Recorded night-time ambient noise levels

Coordinates (WGS84)	Night-time Ambient Noise Levels (22-07h)					
	LAeq [dB(A)]	L10 [dB(A)]	L50[dB(A)]	L90 [dB(A)]	Lmin [dB(A)]	Lmax [dB(A)]
25°59'53.49"S 32°15'1.07"	46,0	46,7	45,6	44,9	43,6	52,4
26° 0'4.83"S 32°15'14.37"E	36,4	37,3	35,2	33,3	32,2	52,1
26° 0'35.39"S 32°17'14.06"E	48,1	49,6	45,5	40,6	38,1	64,0
26° 0'37.58"S 32°17'30.30"E	43,6	43,8	45,9	41,9	40,7	53,1
26° 2'16.00"S 32°19'35.02"E	45,1	45,8	37,3	34,7	33,2	63,4
26° 2'9.96"S 32°19'35.02"E	46,5	45,4	42,7	41,2	39,2	66,6

Source: Consultec. EIS Report, 2023.

The noise levels measured during the night-time period revealed low levels of acoustic disturbance as well. The recorded ambient noise levels in the sampled locations ranged between a minimum of 36.4 dB(A) – to a maximum of 48.1 dB(A) measured near a large house cluster.

Slight exceedances of the night-time applicable noise guideline (45 dB(A)) could be verified, but as could be observed by the Consultec noise surveyor team, the predominant noise is from natural origin (wind, nocturnal wildlife and nocturnal insects) and by human activity like people talking, moving around near the evaluated human settlements.

Globally, the acoustic environment of the project area of influence can be classified as good, with low acoustic levels being typical of natural/rural areas that are mainly influenced by natural acoustic sources (such as wind and fauna) and by some vehicular traffic noise along the N2 roadway. Exceedances of the WHO/IFC recommended noise guidelines for the daytime (LAeq 55 dB(A)) were found in only one sampling location. The night-time (LAeq 45 dB(A)) was slightly exceeded in several sampling locations but essentially due to natural noise sources and due to human activities found within the settlements. The results from this noise survey are consistent with the inventory of the existing noise sources, as described previously in the baseline characterization.

6.1.3. Air Quality

In general, air quality standards aim to safeguard public health and the protection of ecosystems. They are established taking into consideration the different forms of absorption of gaseous compounds or particulate matter present in the atmosphere. Air quality standards in Mozambique are established through Decree No. 18/2004, of 2 June (Regulation on Environmental Quality Standards and Effluent Emissions), as amended by Decree No. 67/2010, of 31 December.

These regulations define ambient air quality standards and pollutant emissions limits for several types of fixed and mobile sources. At present, Mozambique has ambient air quality standards for sulphur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), and Total Suspended Particulate Matter (TSP). Table 17 lists Mozambique's ambient air quality standards.

Table 18: National ambient air quality standards

Pollutant	Unit	Concentration	Averaging period
Total Suspended Particles (TSP)	µg/m³	150	Average daily maximum
		60	Annual average
Nitrogen Dioxide (NO_2)	µg/m³	190	Average hourly maximum
		--	Average hourly maximum
		10	Annual average
Sulfur Dioxide (SO_2)	µg/m³	500	Instantaneous value – 10 min average
		800	Average hourly maximum
		100	Average daily maximum
		40	Annual average
Carbon Monoxide (CO)	µg/m³	30 000	Average hourly maximum
		10 000	8 hour maximum
		60 000	30 min maximum
		100 000	15 min maximum
Ozone (O_3)	µg/m³	160	Hourly maximum value
		120	8 hours maximum
		50	24 hours maximum
		70	Annual average

Source: *Decree No. 18/2004, as amended by Decree No. 67/2010.*

Mozambique has yet to establish standards for particulate matter with size up to 10 µm (PM10). In the absence of national standards, the World Health Organization (WHO, 2021) standards for this pollutant were considered: maximum concentrations of 45 µg/m³ (24-hour averaging period) and 15 µg/m³ (annual averaging period). For reference, Table 18 presents other relevant international air quality guidelines, namely those established by WHO, European Union and South Africa, in comparison with Mozambique's standards.

Table 19: Comparison of national and international ambient air quality standards

Pollutant	Averaging Period	Mozambique (µg/m³)	WHO (µg/m³)	European Union (µg/m³)	South Africa (µg/m³)
PM10	24 hours	--	45	50	--
	1 year	--	15	40	--
SO2	Instantaneous	--	--	--	500
	1 hour	800	--	350	--
	24 hours	100	40	125	125
	1 year	40	--	20	50
CO	1 hour	30 000	--	--	--
	24 hours	10 000	4 000	10 000	--
NO2	1 hour	190	--	200	376
	24 hours	--	25	--	188
	1 year	10	10	40	94

The Project area presents a predominantly rural and natural (non-disturbed) character. The proposed transmission line route cross one main primary road and a low number of human settlements. Some relevant sources of atmospheric pollutant emission can be identified as summarized below:

- Road traffic – line source responsible for the emission of gaseous and particulate emissions, generated by internal combustion vehicles exhaust emissions and vehicle entrainment on unpaved roads;
- Miscellaneous fugitive dust sources – area sources of dust emissions, generated by wind erosion from open areas (with low vegetation cover);
- Household fuel burning – gaseous and particulate emissions from household fuel burning found in human settlements; and
- Biomass burnings – gaseous and particulate emissions from biomass burning, including wildfires and slash-and-burn agricultural practices.

Road network - In Mozambique, roads are classified as primary, secondary, or tertiary in nature. Most primary roads have been recently upgraded and have a generally good quality infrastructure. The country's traffic density can be classified in general terms, as low across all existing networks. The main roadways crossed by the one of the transmission line alternatives is the N2. Given the restricted vehicle activity in the area, vehicle entrainment of dust and vehicle exhaust emissions are anticipated to be of minimal significance. As such, no heavy air pollution is expected to arise from vehicular traffic across the study area.

Miscellaneous fugitive dust sources - Fugitive dust emissions can be generated from wind erosion in open areas, such as newly planted farming areas, scarcely vegetated areas and others naked soil exposed areas. The extent, nature and duration of agricultural activities and/or the moisture and silt content of exposed soils are required to be known to quantify fugitive emissions from this kind of dust potential emitting source since the quantity of wind-blown dust is a function of the wind speed, the extent of exposed areas and the moisture and silt content of such areas. Some open areas are expected to occur along the proposed project alignment which will constitute a fugitive dust airborne source. Farming activities occurs in the study area, but traditional sustenance agriculture accounts for the majority of farming lands, with low vegetation control. Considering the mainland uses along the proposed Project alignment, fugitive dust emissions can be a contributor to air pollution in the Project's region.

Household fuel burning - Energy use within the residential sector is given as falling within three main categories, namely: *(i)* traditional - consisting of wood, dung and bagasse, *(ii)* transitional - consisting of coal, paraffin and LPG, and *(iii)* modern - consisting of electricity (increasingly includes use of renewable energy). Except for the major cities, which are electrified, most human settlements in the Project's region resort to wood and coal as the main domestic energy sources. It should be noted, however, that it is unlikely that household fuel burning emissions levels are sufficient to cause exceedances to the Mozambican air quality standards.

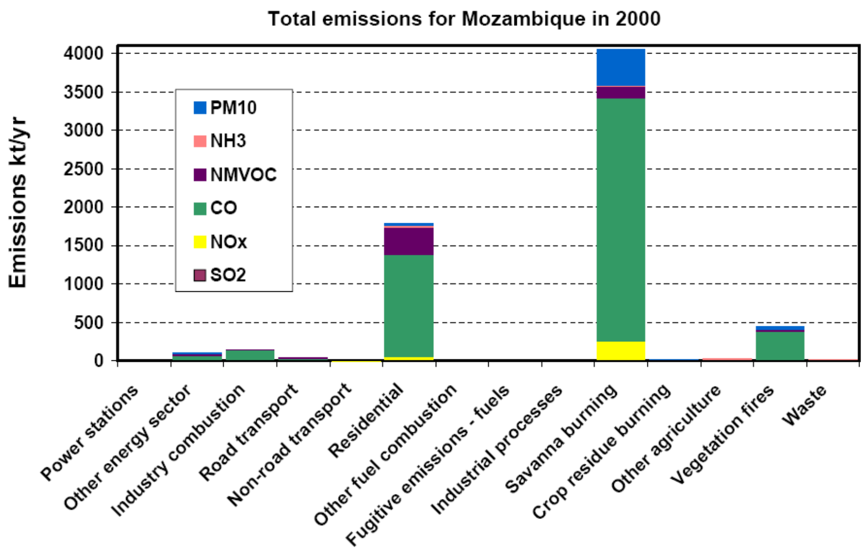
Biomass burnings - Biomass burning includes the burning of evergreen and deciduous forests, woodlands, grasslands, and agricultural lands, and may result either as wildfires or as human induced fires, as part of a slash-and-burn agricultural practice. Biomass burning is an incomplete combustion process, with CO, methane and NO_2 gases being emitted to the atmosphere. Approximately 40% of the nitrogen in biomass is emitted as nitrogen, 10% is left is the ashes, and it may be assumed that 20% of the nitrogen is emitted as higher molecular weight nitrogen compounds. The visibility of the smoke plumes is attributed to the particulate matter content.

Prior to the rainy season, from July up to September/October a considerable number of set fires which aim to clear new areas for traditional agriculture are expected to occur in rural areas. Slash-and-burn practices are common in this region, and this type of biomass burnings can be a significant emission source of Particulate Matter and NO_2, mainly.

In Mozambique the degree of industrialization is still low in general, but already relevant in and around cities like Maputo, Beira and Matola. In these locations, pollution may result, among other reasons, from the combined effect of industrialization, waste management problems and automobile traffic-related emissions (particularly CO_2, CO, NO_x). Uncontrolled bush burning in rural zones is other of the main sources of pollutants. In fact, burning of biomass was the main source of particulate matter pollution, followed by industrial activities (Schwela, 2007). Schwela points to the uncontrolled burnings in rural zones especially as one of the main sources of emissions of air pollutants into the atmosphere resulting in air pollution. Crutzen & Andreae (1990) reinforce this thesis referring that, of the different pollutant emission sources, biomass burning assumes a significant relevance as atmospheric emission source in the tropics.

Cumbane (2004) points to biomass burning is one of the main sources of emission of particulate matter into the atmosphere, followed by emissions from industrial activities. Cumbane & Ribeiro (2004) indicate that the main potential sources of pollutant emissions into the atmosphere in Mozambique are biomass burning of natural and/or induced occurrence, including the preparation of soil for subsistence agriculture; burning of household waste (urban solid waste); road vehicle traffic; open-air burning of solid waste; industrial activities and the burning of firewood and coal.

As seen Figure 23 below in the largest emission sources of pollutant gases into the atmosphere in Mozambique, in 2000, were caused by savannah burnings, followed by natural vegetation fires and residential fuel burning.



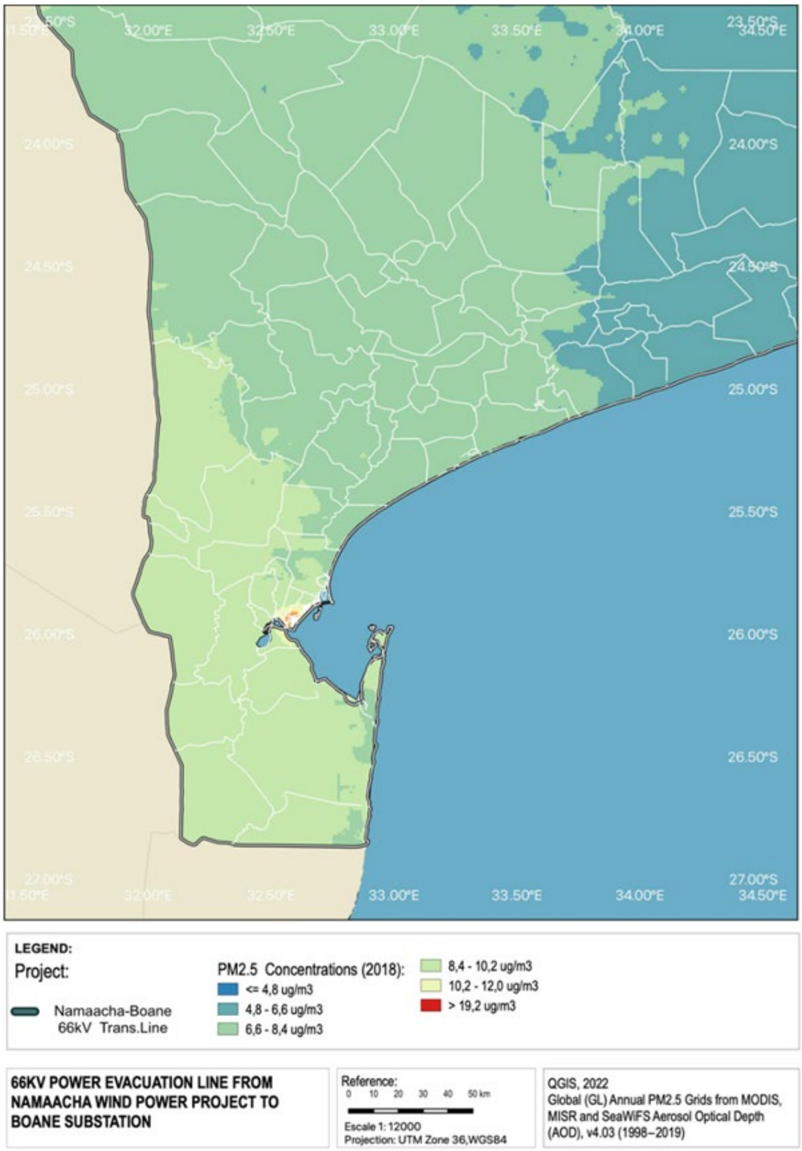
***Source**: adapted from Gondwe, Kenneth J., (APINA)*

Figure 24: Total emissions for Mozambique in 2000

Other sources of air pollution in Mozambique are: Industry (manufacturing, services), transport, power generation (corporate utilities, households), agriculture and waste (Cumbane, 2011). Taking into account the system of household production and the use of widespread practice of burning in Mozambique, agriculture is also responsible for the emission of air pollutants, mainly greenhouse gases (MTA, 2014).

No air quality monitoring network (and data) is available from air quality monitoring stations in Mozambique. As such, a qualitative assessment of the existing air quality is presented based on literature review and considering the major pollution emission sources that may be expected to be present in the study area Secondary data was retrieved through international databases as the NASA's Earth Observing System Data and Information System and the European Copernicus Monitoring Service.

Figure 24 illustrates the modelled estimate of PM2.5 (particulate matter with a diameter of less than 2.5 µm), within the ADI according with the NASA's Earth Observing System Data and Information System for the period 1998-2019 (MODIS/MISR and SeaWiFS Aerosol Optical Depth, V4.03 prediction Model).



***Source**: Adapted from NASA's Earth Observing System Data and Information System (EOSDIS, 2019).*

Figure 25: PM2.5 concentrations distribution (µg/m³)

Based on the above, the background concentration of Particulate Matter with a diameter of less than 2.5 µm (PM2.5) in the project area ranges between a minimum of 8.4 µg/m^3 up to a maximum of 10.2 µg/m^3.

In what regards the background concentration of Particulate Matter with a diameter of less than 10 µm (PM10), Seinfield & Pandis, suggest that globally background concentrations for particulate aerosols, among them PM10, have concentrations of 5 µg/m^3 in remote locations, 15 µg/m^3 in rural zones and 32 µg/m^3 in urban areas.

Figure 25 illustrates the Nitrogen Dioxide (NO_2) concentration at surface level expressed as 24h average during the 2022 dry season (June 2022) from the EAC4 (ECMWF Atmospheric Composition Reanalysis 4) datasets grids published by the Copernicus Monitoring Service within the project region. As can be visualized below, NO_2 at surface ranges between 0.40 and 0.80 ug/m^3 along the Transmission Line route, thus below both WHO, 2021 Air Quality Guidelines (25 ug/m^3 24h average) and below the National Decree nº 67/2010 (set as 10 ug/m^3 Annual average) as well.

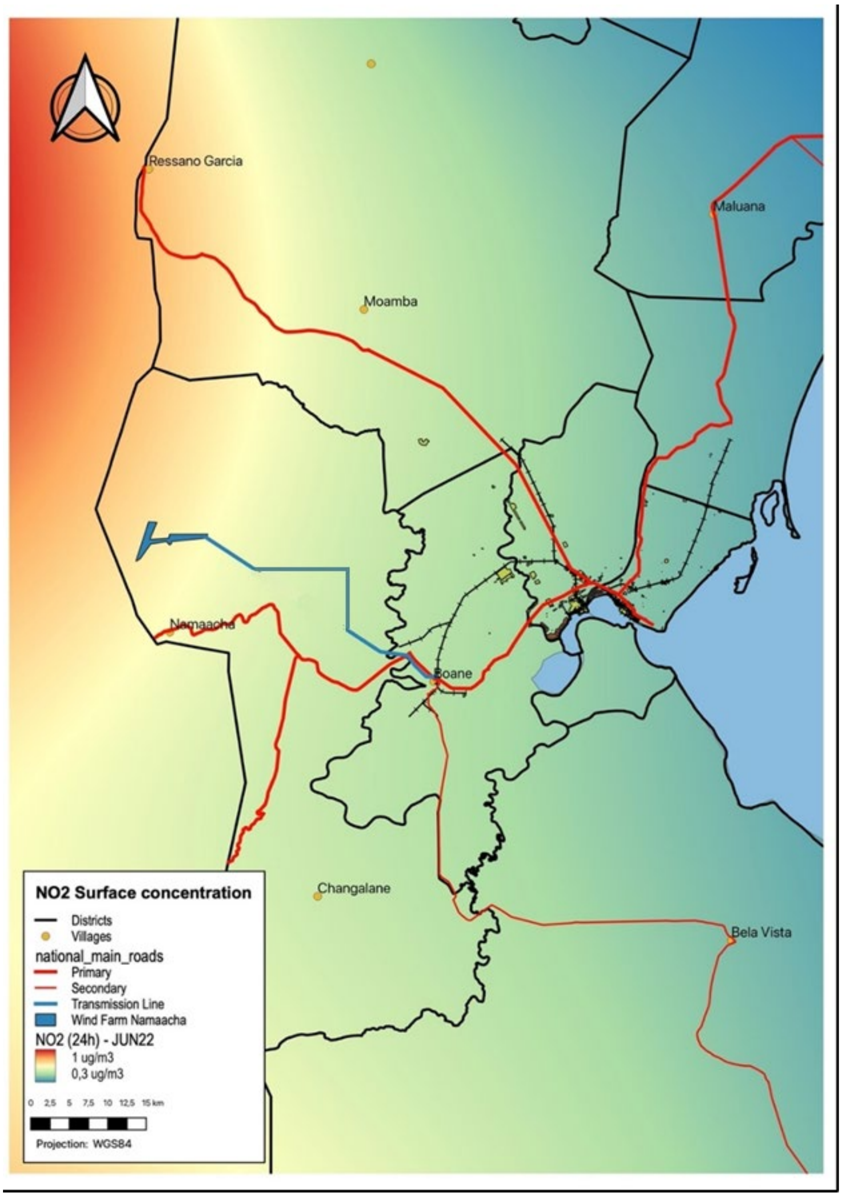


Figure 26: NO_2 surface concentration

Along the Transmission Line pathway scattered dwellings, small communities and cultivated fields and a school have been identified. A consolidated urban area near the Boane Substation has been identified as well. No health centers are to be found in the direct influence area of the transmission line. As the transmission line will only generate air quality emissions during construction, only short-term receptors are considered. For short-term impacts, the entire direct Area of Influence should be considered as sensitive.

Few atmospheric pollution emission sources were identified in the Project area, and none of them are of high intensity. Considering the low significance of the existing emission sources along the project area and based on the background concentrations of atmospheric pollutant, as discussed above, the ambient air quality of the study area can be described as being relatively good. The ambient levels of key pollutants, such as Particulate Matter and Nitrogen dioxide are low and in full compliance with the limit values established by the national air quality standards. In conclusion, the ambient air quality is expected to be relatively good as the study area will fall mainly in mostly undeveloped and rural areas with one significant residential area near the Boane substation.

6.1.4. Geology

6.1.4.1. Geology and Topography

The geological assessment of the study area was based on literature review. Of the several bibliographic sources reviewed, special mention should be made to the geologic maps of the National Directorate of Geology (1:250 000), in particular sheets 2531/2532 and 2632 that cover the study region.

The following sections present the geologic characterization of the study area. Information is provided both at a regional point of view and at a more local perspective, focused on the corridor surrounding the proposed power lines.

Physiographically, the Mozambican territory is divided into four zones (Afonso et al. 1998). These units (see below) are delimited by more or less accentuated escarpments and, as a general rule, the altitude progressively increases from the coast to inland.

- **Mountainous Zones**, with elevations of more than 1000 m. This region occurred as a result of the permo-carbonic Gondwana movements. The mountain tops and ridges are intrusive-tectonic in metamorphic formations of the Upper Archaean and Proterozoic Eras.
- **Great Plateau Zone**, with elevations from 500 to 1000 m, resulting from the erosive cycle associated with the break-up of the Gondwana during the Lower Cretacic. These are characterised by erosive-denuded surfaces, ruffled by granitic inselbergs carved in the Pre-Cambric formations and Karoo rocks.
- **Middle Plateau Zone**, with elevations from 200 to 500 m, resulting from the tilting movements during the middle Tertiary. These regions have flat areas, depressions, volcano-sedimentary rock surfaces and accumulation lowlands.
- **Great Coastal Plains Zone**, with elevations of less than 200 m, attributed to the Congo cycle, which probably initiated in the Plio-Pleistocene. This zone, dominated by tertiary and quaternary sediments, covers the region south of the Save River and the coastal strip.

The study area crosses several geomorphological units, from the Lebombo Mountains to the alluvial plain in Boane.

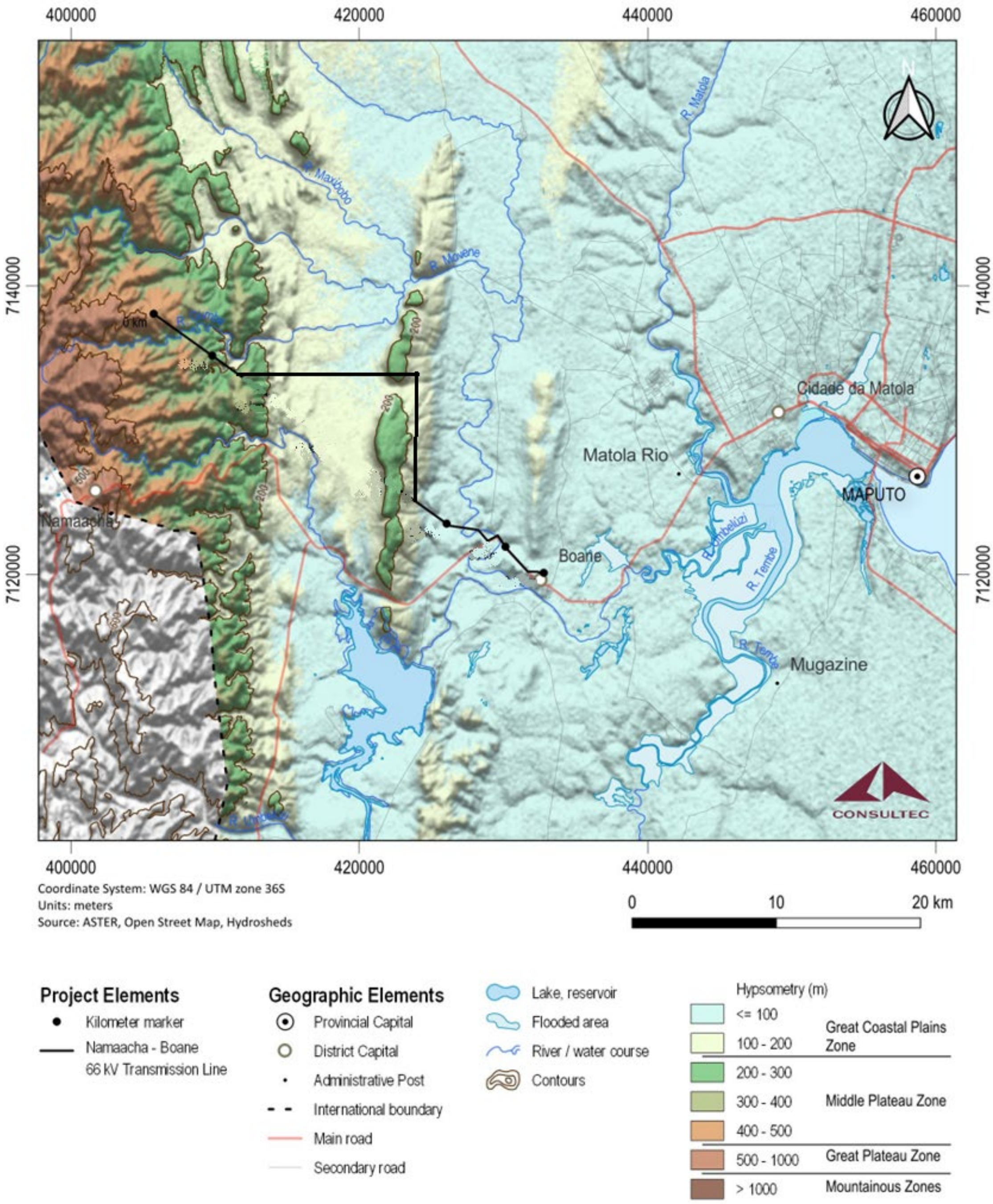


Figure 27: Hypsometric map

The elevations along the transmission line differ greatly between Boane and Namaacha Districts. Where the line starts at the Boane substation, the elevation is approximate 31 m above sea level. The elevation ranges from approximately 19 m – 52 m above sea level from Boane substation to the Movene River valley. After the transmission line leave the Movene River valley, the elevation rises sharply in the approach to the wind farm. The elevation at the terminus at the wind farm is approximately 482 m above sea level.

At the geomorphological level, in the study area, the transmission line crosses two distinct morphological structures:

- Accumulation reliefs, in particular, lowered valley bottoms with alluvial deposits

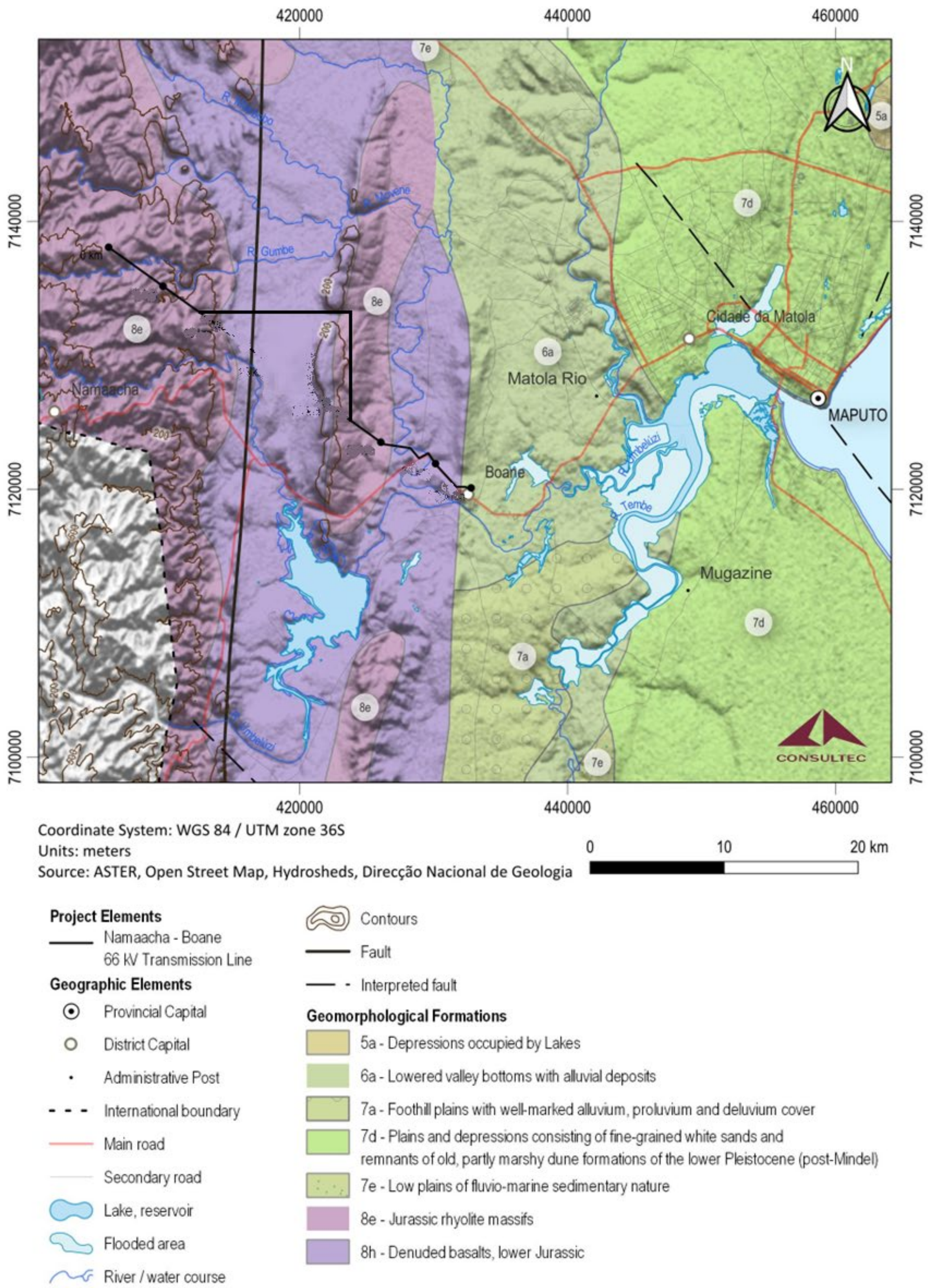
- Volcanoes and lava covers, particularly, Jurassic rhyolite massifs and denuded basaltic mantles from the lower Jurassic.

The denuded lower Jurassic basaltic mantles are morpho-structures widely represented in southern Africa, related to fracture volcanism.

The Lebombo Mountains, also called Lubombo Mountains (Portuguese: *Montes Libombos*), are a narrow (~30km) range of mountains in Southern Africa and Mozambique (the name of the mountains is derived from the Zulu word *ubombo* meaning "big nose"). They stretch from Hluhluwe in KwaZulu-Natal in the south to Punda Maria in the Limpopo Province in South Africa in the north, and parts of the mountain range are also found in Mozambique and Eswatini (Watkeys, 2002).

In Mozambique, the *Montes Libombos* are located from the Limpopo River to the Maputo River, bordering with the coastal plain. They are constituted by two mountainous alignments: (i) The *Pequenos Libombos*, bordered directly by the coastal plain, extend from the vicinity of the Incomati River to Changalane, with a maximum altitude of 291 m, and (ii) The *Grandes Libombos*, extend over 500 km on the western border of the region and have an average altitude of 580 m, the highest altitude being located on Mount Imponduine, north of the Namaacha Town (809 m).

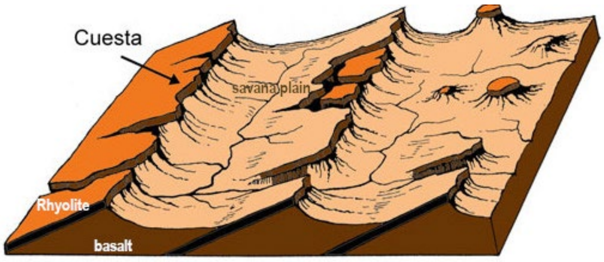
Geologically the Lebombo Mountains are a monocline - a 600 km long and 5–30 km wide linear flexure (N-S and dips to the east) along the border between South Africa and Mozambique. It is composed of a sequence of Jurassic age volcanic rock, both basaltic lavas and rhyolitic flows and tuffs. The sequence rests on essentially horizontal Karoo Supergroup sedimentary rocks of the Kalahari Craton to the west and is overlain by Cretaceous to recent sediments to the east.



Source: *DNG (1983)*

Figure 28: Excerpt from the Geomorphologic Map

In the Lebombo monocline, mafic and felsic volcanism occurred in pulses, and rhyolites forming the "Great" (Grandes) and "Little" (Pequenos) Lebombo mountains are interlayered with Movene basalts. As basalts are poorly exposed due to intense weathering and soil formation, they generally form plain savannas. The most exposed rocks are rhyolites that form cuesta-type geomorphology, slightly tilted to east. Hence, the regional geomorphology is characterised by alternation of cuestas and plane valleys.



When the rocks are uplifted by the mountain building process and are tilted in one direction, erosion of the softer, less resistant rock occurs leaving a ridge of the more resistant rock. If the angle of dip is low, the ridges are called Cuestas

a) Typical geomorphology of Lebombo monocline associated basalt plain savannas in Mozambique. b) Rhyolites of the Pequenos Libombos Mountain, slightly tilted cuestas ~40 km SW of the city of Maputo (adapt form: Manninen *et al*, 2008).

Figure 29: The alternating resistant rhyolite and easily eroded basalts produce a series of parallel sharp cuesta ridges separated by savanna plains

Mozambique has a rich and complex geology, including formations as old as the Mesoarchaic age (3200 million years), occupying one third of the country, mainly in the centre and southern regions and in the NE coastal strip, to formations of the Quaternary age.

The Mesozoic Karoo large igneous province is one of three continental flood-basalt provinces that are associated with voluminous, possibly plume related magmatism at ~183 Ma and subsequent break-up of the Gondwana supercontinent during the Early-Middle Jurassic period. Volcanic and intrusive rocks belonging to the Karoo province are widespread in southern Africa, but they are also found in western Dronning Maud Land, Antarctica.

The Karoo volcanic rocks, which generally overlie various sedimentary formations of the Karoo Supergroup, consists mainly of tholeiitic to picritic lava flows, felsic pyroclastic rocks, and related dyke swarms and sills, emplaced prior to the break-up of Gondwana and the opening of Indian Ocean.

The Karoo always occurs in Mozambique in superimposed depressions, graben-type structures or volcanic zones (chains). In contrast to the classic Karoo Basin in South Africa, the Karoo in Mozambique is always controlled by tectonic zones of weakness, lineaments, fractures, structural sutures as well as ancient mobile belts. In the study area it occurs in Volcanic zones (chains), i.e., the Lebombo Mountains.

The description of geological formations in the study area is based on GTK Consortium mapping of the Karoo volcanic rocks and related hypabyssal intrusions in southern and central Mozambique and of the quaternary deposits, subdivided into Pleistocene deposits such as the Internal Dunes, Fluvial Terraces, Coastal Sandstones (or 'Beach Rock') and Lacustrine Limestones and Holocene deposits such as flood plain deposits of a sandy-clayey or mud composition. Table 19 and Figure 29 provides an overview of the geological formations in the study area.

The dominant geologic units in the study area are the Upper Karoo, the Movene and Umbeluzi Formation. To a lesser extent, Tertiary and Quaternary formations of sedimentary nature occur.

Table 20: Geologic Formations Intercepted by the Project

CODE	GROUP | SUITE FORMATION	LITHOLOGY	ERA PERIOD	EXTENSION
TeB	Boane Formation	Silstone, conglomerate	Paleocene Pliocene	1 047.9 m
JrM	Upper Karoo | Movene	Basalt	Jurassic	15 222.1 m
JrMr		Pequenos Limbombos; Member; rhyolite		4 899.7 m
JrMq		Quartz latite		784.1 m
JrUr	Upper Karoo | Umbelúzi	Rhyolitic ash-flow tuffs and ignimbrites		11 283.0 m

***Source**: Consórcio GTK (2006)*

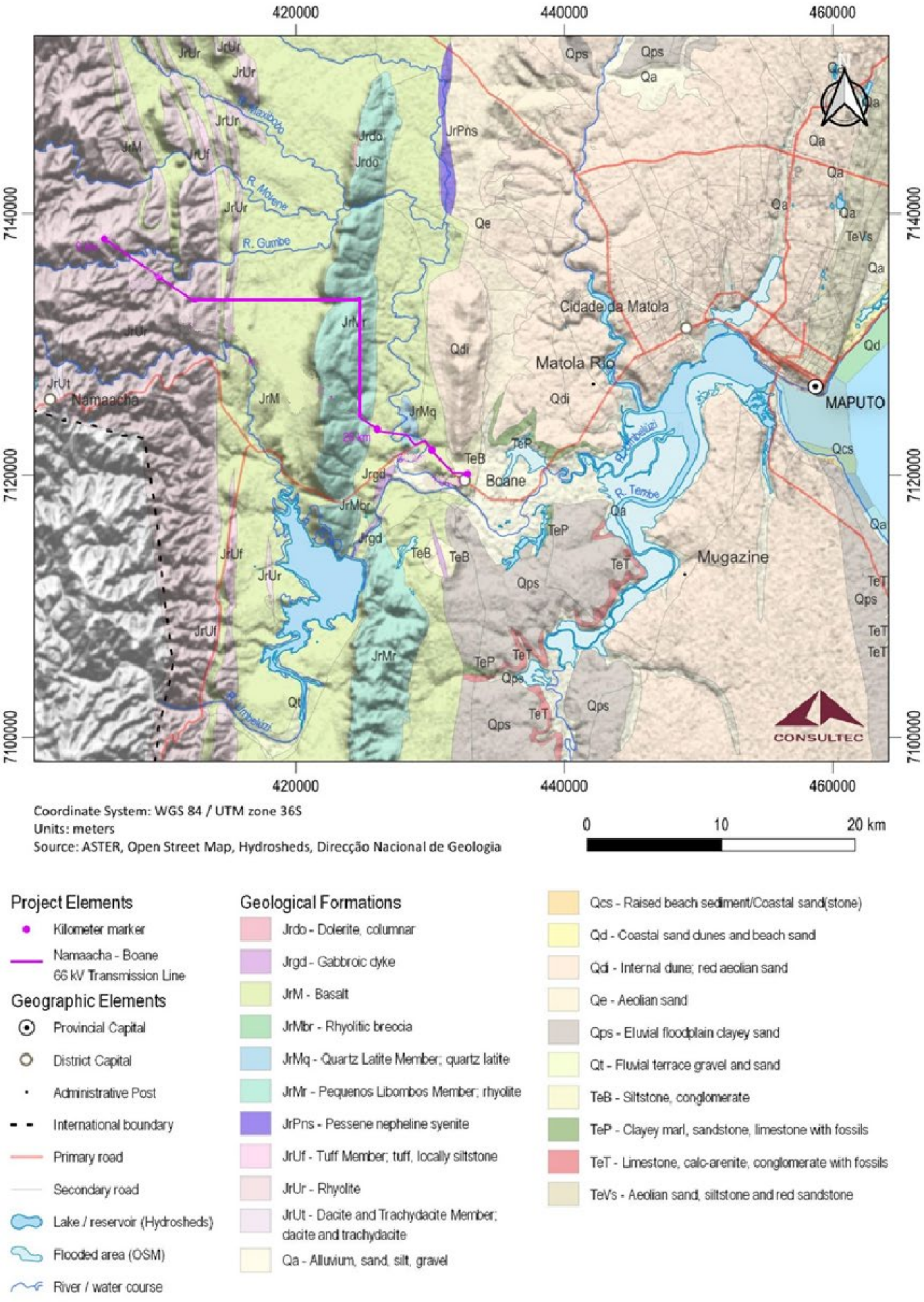


Figure 30: Geological formations in the study area

Umbelúzi Formation

A smoothly E-dipping succession of dacitic and rhyolitic rocks assigned to the Umbelúzi Formation overlie basalts of the Sabie River Formation, comprising high-grade ignimbrites, pyroclastic ash-fall deposits, and random lava interflows.

In the Lebombo Mountains, rhyolitic flows form smoothly (~10 – 15°) east tilting terraces, with thickness of single flows probably ranging from some tens of metres up to 200 – 300 m. Although the rhyolitic rocks generally show gentle dips, patterns developed during the emplacement and cooling of single flows, including shrinkage jointing and ramp structures, may occasionally show variously steep, or even vertical attitudes. In addition to rhyolitic rocks, the Umbelúzi Formation also includes minor interflows of basaltic lavas and subvolcanic sills and dykes.

Movene Formation

The Movene (Basalt) Formation represents the uppermost lithological unit of the Lebombo Monocline. Dominating the fertile lowlands between the rhyolitic Lebombo mountain range in the west and Quaternary formations in the east, the Movene Formation mostly comprises a succession of basaltic lava flows but includes also intercalated rhyolite flows of the Pequenos Libombos Member in the upper part of the basaltic lava pile.

Boane Formation

Rocks attributed to the Boane Formation (previously Boane Sandstone Formation) are exposed in a few small polygons around and south of the Boane town. The lithology is predominantly siltstone and slightly sandy siltstone. Texturally these siltstones are highly immature and consist of a deeply weathered feldspathic framework resulting in a friable, poorly consolidated rock.

These highly immature, thoroughly weathered siltstones are derived from distal (peri) volcanic erosion products, including tuffs. Combined traction (channel) and gravity sliding took place on an unstable, low-angle slope dipping towards the east. Some traction transport and deposition were shortly followed by gravity sliding. This scenario supposedly reflects an unstable continental margin during incipient rifting.

Mining Cadastre

It is possible to observe the large-scale evolution of mining activities and their contribution to the country's development, specifically in the regions (provinces) where geological resources occur and where they are traded.

Table 14 provide an overview of the mining concessions or licenses near the transmission line route.

Obtaining a mining title is necessary to carry out mining activities in Mozambique. This title may be a license or an authorization, which are distinguished in that the license confers the right to carry out an activity the law prohibits (except when the Government, through a license, permits it). Figure 30 and

Table 21: Registered mining titles crossed by the powerline

Company Name	Product	License Status	Overlap with Project
Research and Exploration License			
CC Investimento	Construction stone	Valid title	Crossed by the new line route
Namaasha Mining, Lda	Bentonite	Valid title	Crossed by both the original route and the new line route
Niel Ricardo	Construction stone	Valid title	Crossed by the new line route
Mining Concessions			
Riólitos, Limitada	Rhyolites	There has been no mining activity since 2019. It does not submit activity reports nor pay surface taxes, therefore, the license is in an irregular status.	Not crossed by revised line route
MIMOC – Minerais Industriais de Moçambique, Lda	Bentonite	The company has never declared mining production data. It does not submit activity reports nor pay surface taxes, therefore, the license is paralysed and in an irregular status.	Crossed by both the original route and the new line route
MKAP	Construction stone	A request was submitted for the exploration of construction stone and to date the license has not been granted, however the technical-economic feasibility study was approved. The license is in good standing.	Crossed by the new line route
Sulbrita, Limitada	Rhyolites	The license expired in 2021. An extension was requested, but not approved due to legal irregularities. It did not submit activity reports in 2022 and 2023 nor pay surface taxes, therefore, the license is in an irregular status.	Crossed by both the original route and the new line route
Probrita S.A.R.L.	Construction stone	The license expired in 2011. An extension was requested, but not approved due to legal irregularities. The license is paralysed and in an irregular status.	Not crossed by revised line route

***Source**: MIREME (2024)*

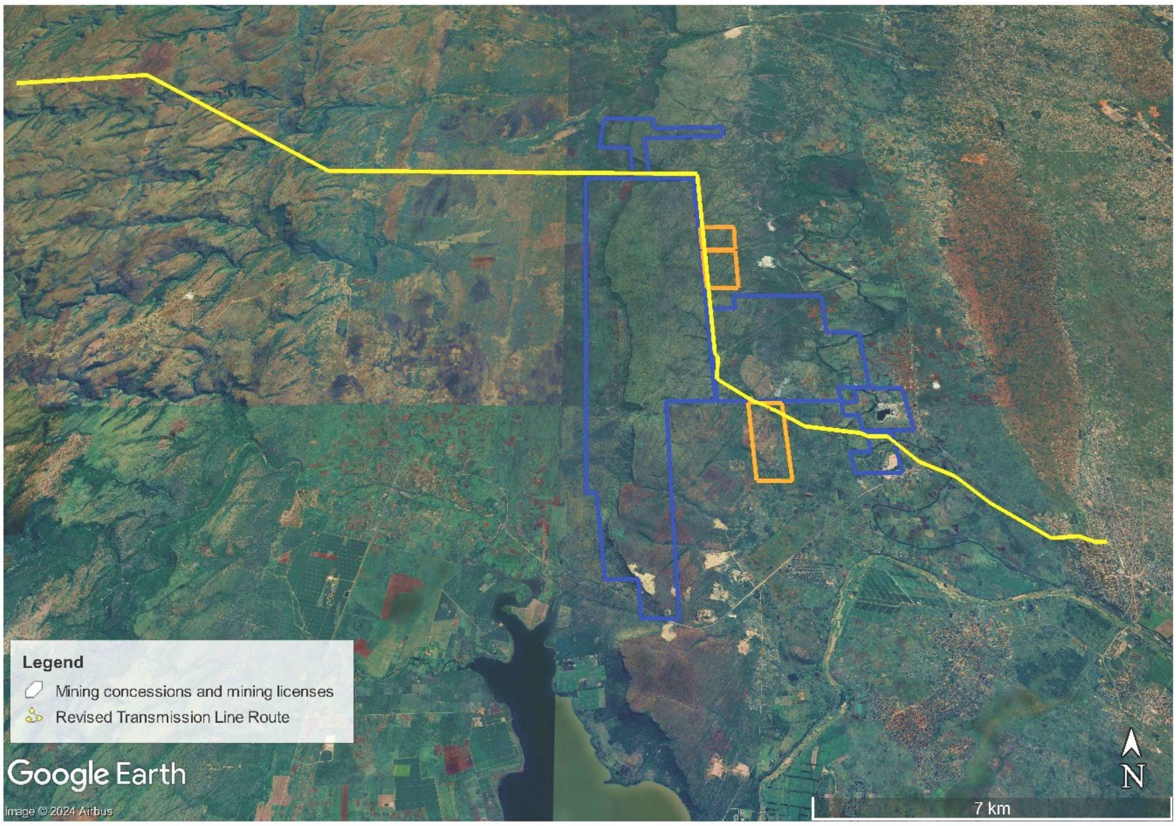


Figure 31: Mining cadastre

6.1.4.2. Seismicity

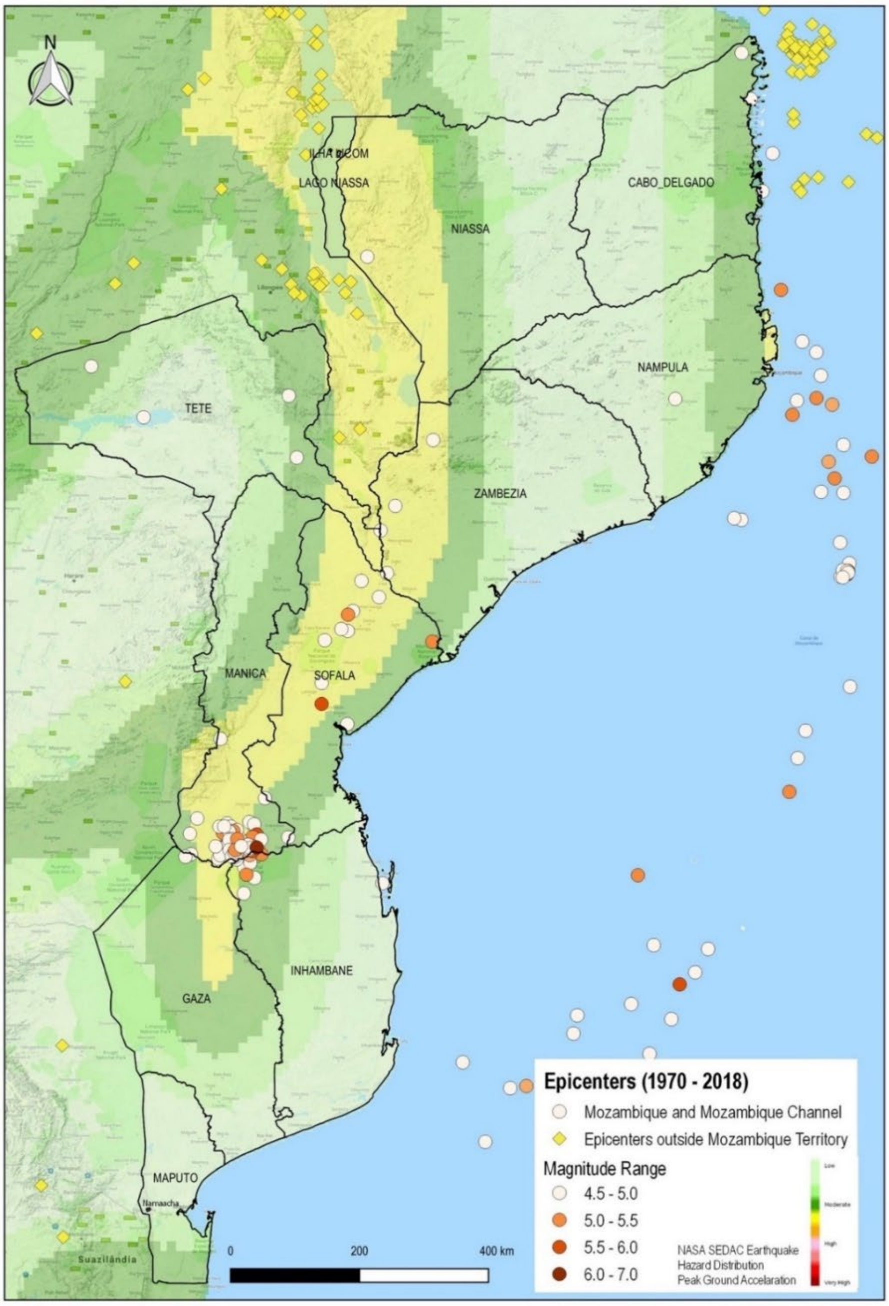
Central Mozambique is under the influence of the Great Rift Valley, which separates the Arabian, African and Indian plates, extending in a north-south direction from northern Syria to central Mozambique.

In Africa, the Rift begins in the Red Sea, in the separation of the African and Arabian plates, extending along the NW-SE direction to the Gulf of Aden. Then, it is directed south to the Urema region, within the African plate. Prolongations of this Rift to the south can also be observed in the area of Machaze (Manica) in the Graben region of Funhalouro, apart from others in the same region. The southern section is part of Lake Niassa, following the Shire River until it flows into the Zambezi River, about 250 km downstream from Moatize.

According to USGS (2018), 133 earthquakes of magnitude higher than 4.5 were registered in Mozambique between 1970 and 2018 (38 of which in the Mozambique Channel). More than 75% of these had a magnitude of less than 5.0 (liquid oscillates in containers, sleeping people wake up), and 24% had a magnitude lower than 6.0 (difficult to stand up, cracks in saturated soils, small structural damages).

In Mozambique, only one earthquake measuring 7.0 (highest magnitude recorded) occurred on 22 February 2006 in the Machaze District in the south of Manica Province. Most of the epicentres of recent continental seismic activity were located in the Machaze region.

From the information presented, it can be concluded that the seismic activity in Mozambique is recurrent but generally of reduced magnitude. However, the recent tectonic evolution of the Miocene Rift system throughout East Africa, represented in Mozambique by the Lake Niassa - Chire - Urema - Sofala branch, may be responsible for an increase in the frequency of recorded earthquakes.



Source: USGS 2018.

Figure 32: Earthquake epicentres with a magnitude greater than 4.5 between 1970 and 2018

6.1.4.3. Soils

The description of the soil units in the study area is based on the Soil Map of Maputo Province, at a scale of 1:1 000 000 (INIA, 1995), which allows the identification and description of the soil units in the study area.

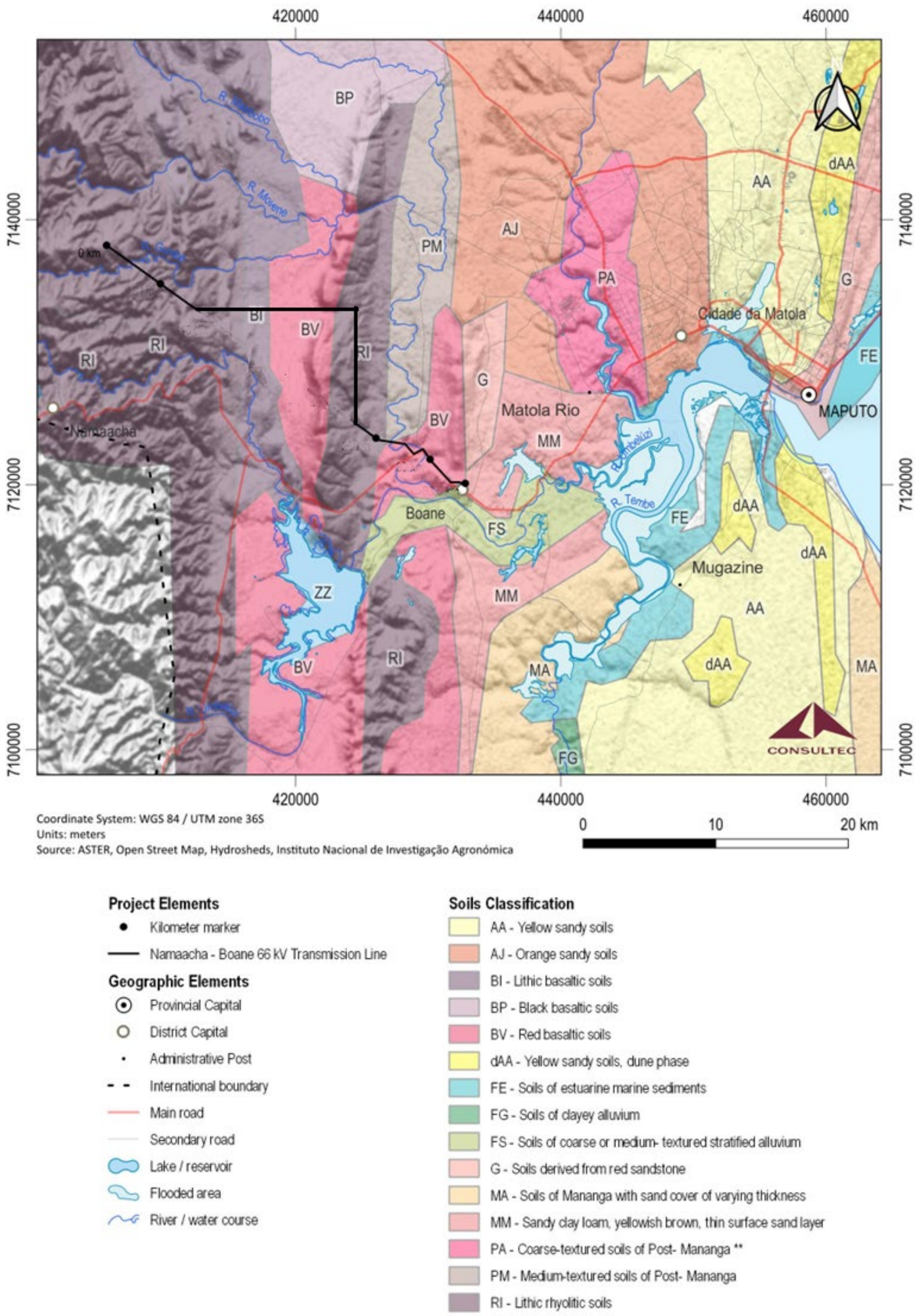


Figure 33: Types of soils in the project area

Main soil units in the study area are associated with volcanic conditions and soils are grouped into one major physiographic unit - Igneous Rocks Areas. These soils occur in areas associated with the Limbobos' volcanic range, Karroo rhyolites in elevated regions with non-level topography.

Table 22: Main characteristics of the predominant soils

Main Characteristics	Lithic rhyolitic soils (RI)	Red basaltic soils (BV)
Map (relative location)		
Dominant characteristics	Sandy clay loam, yellowish brown, shallow over weathered rock	Clayey, dark reddish brown, varying depth
Geology	Limbobos' volcanic range, Karroo rhyolites	Basaltic mantle along the Precambrian shield and the Limbobos' volcanic range, Karroo basalts
Geomorphology	Cuestas and valleys' side slopes	Plains and slopes
Texture*	Top soil: LS-SCL weathered rock	Top soil: SCL-C Sub soil: CL-C
Drainage	Moderate	Good
Acidity and alkalinity (pH)	moderately acid (5-6)	Top soil: 4.8-6.5 Sub soil: 5-7.5
Main limitations for agriculture	Soil depth	sometimes soil depth
Organic matter	Moderate	Moderate-high
USDA (1992) classification	Typic and Lithic Ustorthents	Kanhaplic Rhodustalfs
Land capability (USDA)	Marginal pastures / forests	Good-Moderate
Land suitability for irrigation (USBR)	not recommended (potentially suitable)	Very to marginal
Vegetation Type	wooded savannah or open shrubland	Wooded savannah, grassland
*** SC: sandy clay; siC: silty clay; siCL: silty clay loam; L: loam; siL: silt loam.**		

The available erosion risk information for the study area is the Mozambique Erosion Risk Map, produced at a national scale (1:2 000 000). Erosion risk for the study area is shown in Figure 33.

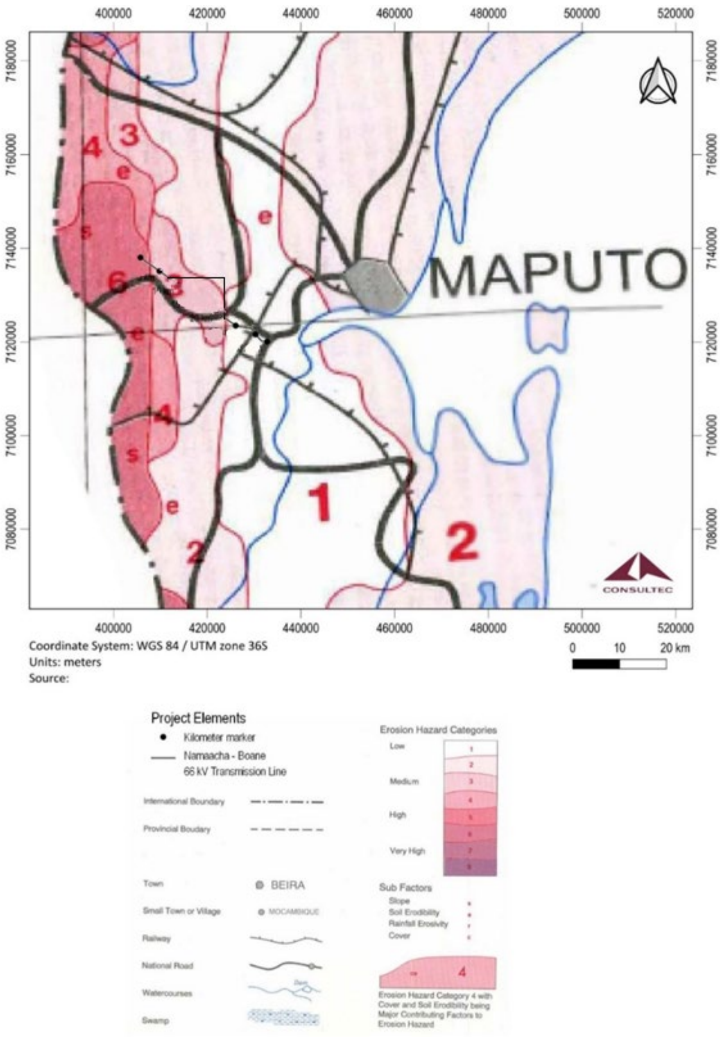


Figure 34: Erosion risk map of Mozambique

As can be seen in the figure above, at the regional level, the proposed at the beginning of the routes is within a region with a very high erosion risk due to sloping terrain. Rainfall is typically concentrated in high energetic torrential rains and removal of vegetation on or close to slopes is likely to increase erosion.

6.1.5. Water Resources

6.1.5.1. Surface Water

The proposed transmission power line route fall on the Umbeluzi River basin. The Umbeluzi River catchment area is shared with Mozambique, South Africa, and eSwatini, and has a total area of 5,460 km^2 (of which only 41% is in Mozambique). The Umbeluzi Rivers enters Mozambique in Goba. The river headwater is in eSwatini, close to its western border with South Africa. The river flows in an easterly direction and discharges into the Maputo Bay.

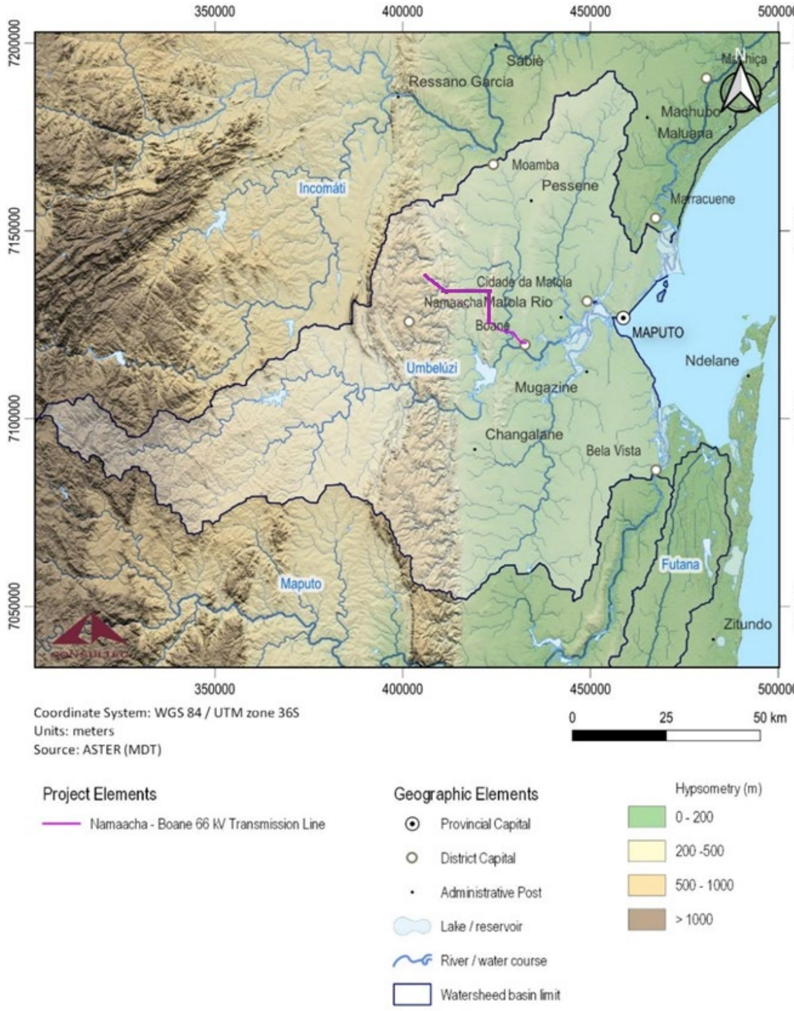
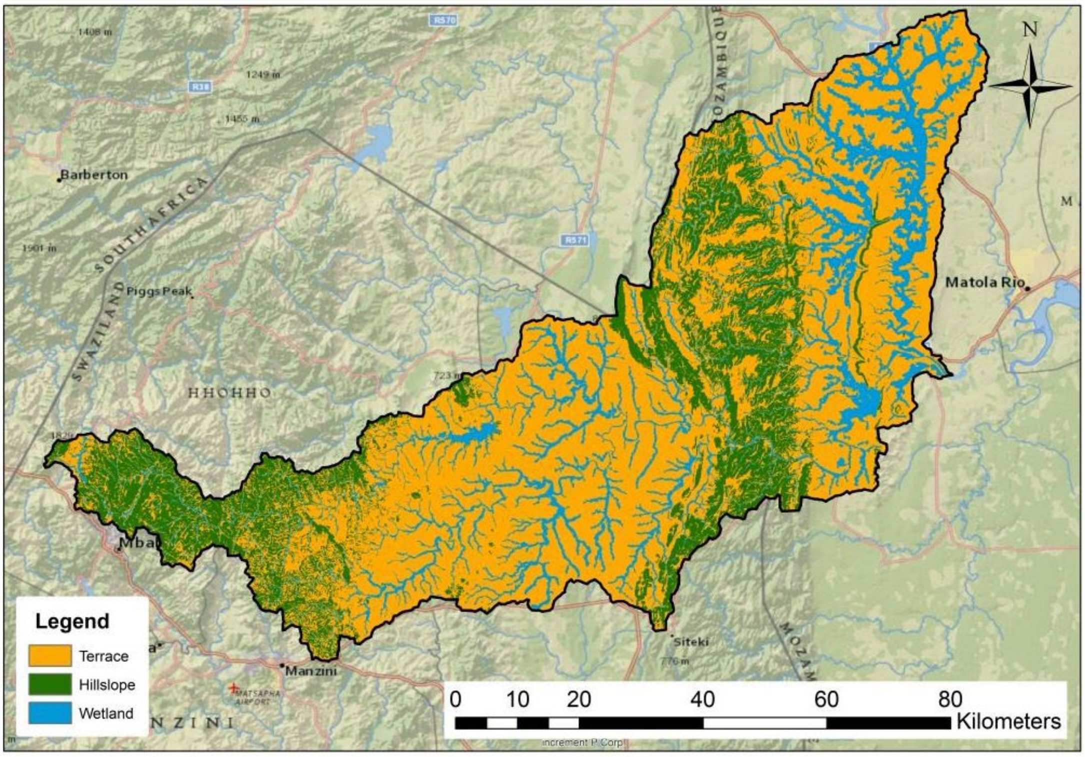


Figure 35: Umbeluzi river basin

The elevation of the Umbeluzi River basin varies from 10 to 1809 meters above mean sea level and is distributed over two hilly and two flat areas. The river springs in the steep 'Ngwenya Hills' of South-Africa and Swaziland, after meandering through a vast plateau area. Then, after crossing the border with Mozambique, it is fed with water originating from the *Pequenos Libombos* hills just before draining into the Indian Ocean.

The western part of the watershed is mountainous, while the central part is a plain area with several sugar cane productions. A small mountain range (Pequenos Limbobos) separates the central plain area from the coastal plain area to the east. The landscape is ordered by three classes (Gijsbers, 2015): wetland (16%), hillslope (21%) and terrace (63%).



Source: *Gijsbers (2015)*

Figure 36: Landscape classification of the river basin

As mentioned, the Umbeluzi river flows in an easterly direction to Maputo, the capital city of Mozambique and a major harbour on the Indian Ocean. The main tributaries of the Umbeluzi are the White and the Black Umbeluzi in Swaziland as well as the Movene and the Impamputo rivers in Mozambique in the ADI.

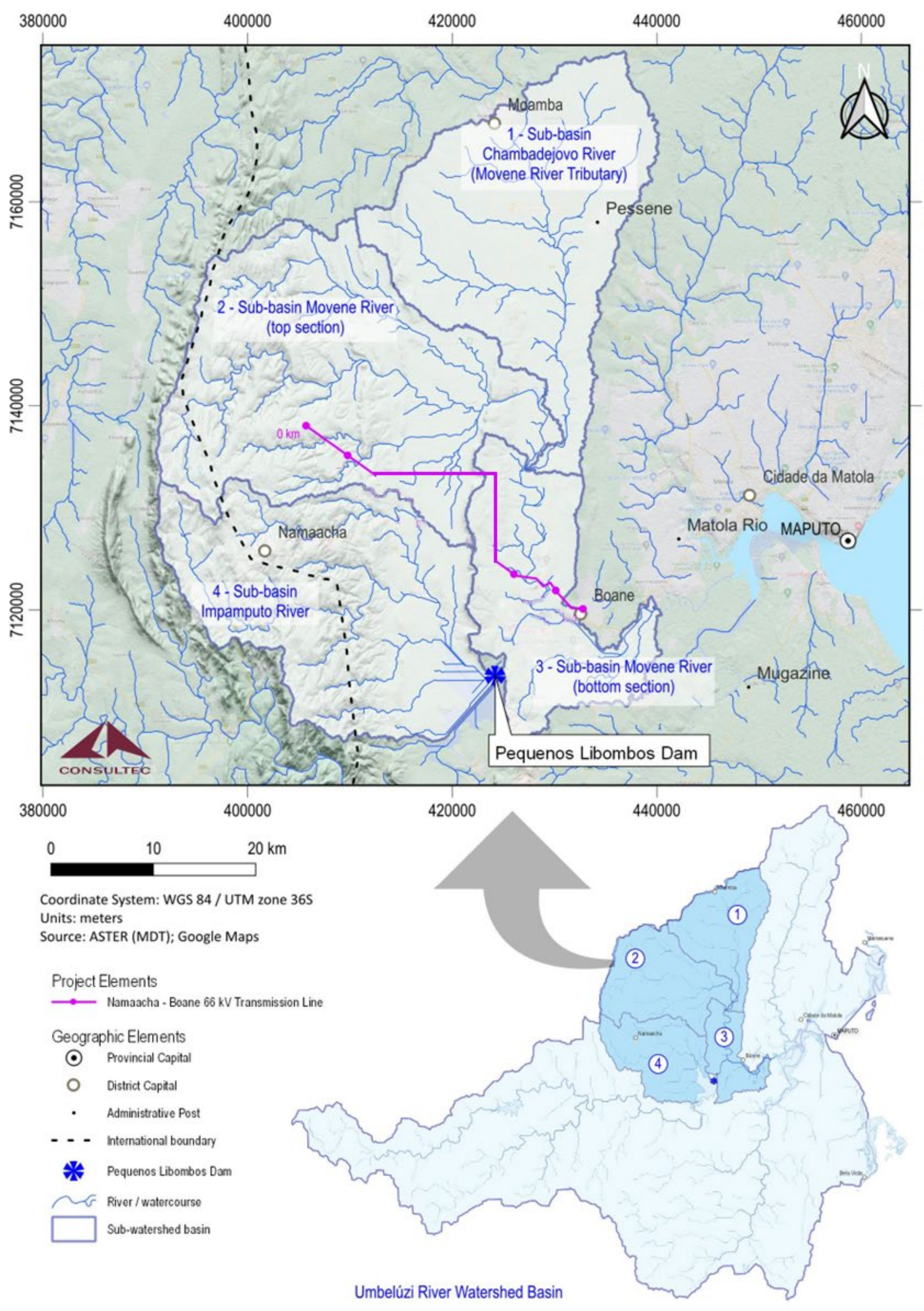


Figure 37: Umbeluzi sub basin intercepted by the proposed power line route

The Movene River flows from the left bank, meeting the Umbeluzi near the town of Boane. Most of the tributaries and sub-tributaries on Mozambican territory originate in the great Libombos. Almost every year the Movene River dry up in the dry season. The main tributaries of the Movene River are the Matalha, Maxibobo and Cumbe Rivers.

The Umbeluzi River in Mozambique has been subject to a range of ecological stresses over the years, which have had negative impacts on the river's ecological state. The river is a vital water source for the country, providing water for agriculture, domestic use, and industrial activities, but the high levels of pollution and other factors have reduced the quality of the river's water and impacted its ecosystem.

One of the main ecological concerns for the Umbeluzi River is the high levels of pollution from various sources, including industrial discharges, agricultural runoff, and domestic wastewater. These pollutants have led to a decline in water quality, with high levels of nutrients, suspended solids, and organic matter in the water. This has led to eutrophication, where algae growth is promoted, leading to reduced oxygen levels and negatively affecting the river's ecosystem.

Another ecological concern is the impact of sedimentation on the river. The river is subject to high levels of erosion, particularly in the upper parts of the basin, which leads to sediment being washed into the river. This sedimentation can negatively impact the river's ecology, causing changes in the river's flow dynamics and making it more difficult for aquatic life to survive.

There are also concerns about the impact of invasive species on the river's ecosystem. Species such as water hyacinth have been introduced to the river and have rapidly spread, causing problems such as clogging of waterways and changes in the river's flow regime.

Some of the most serious pressures include:

- Cessation of flow;
- Dams and weirs that inundate riverine habitats, retard migration of fish, and change downstream flow patterns;
- Spread of alien vegetation that lead to significantly reduced low flows, unstable banks and reduced biodiversity;
- The removal of natural riparian vegetation and associated bank erosion;
- water quality problems associated with agricultural return flows and industrial and domestic wastewaters that lead to proliferation of benthic algae and in the lower reaches, the proliferation of the floating aquatic alien weed, *Salvinia molesta*.

6.1.5.2. Groundwater

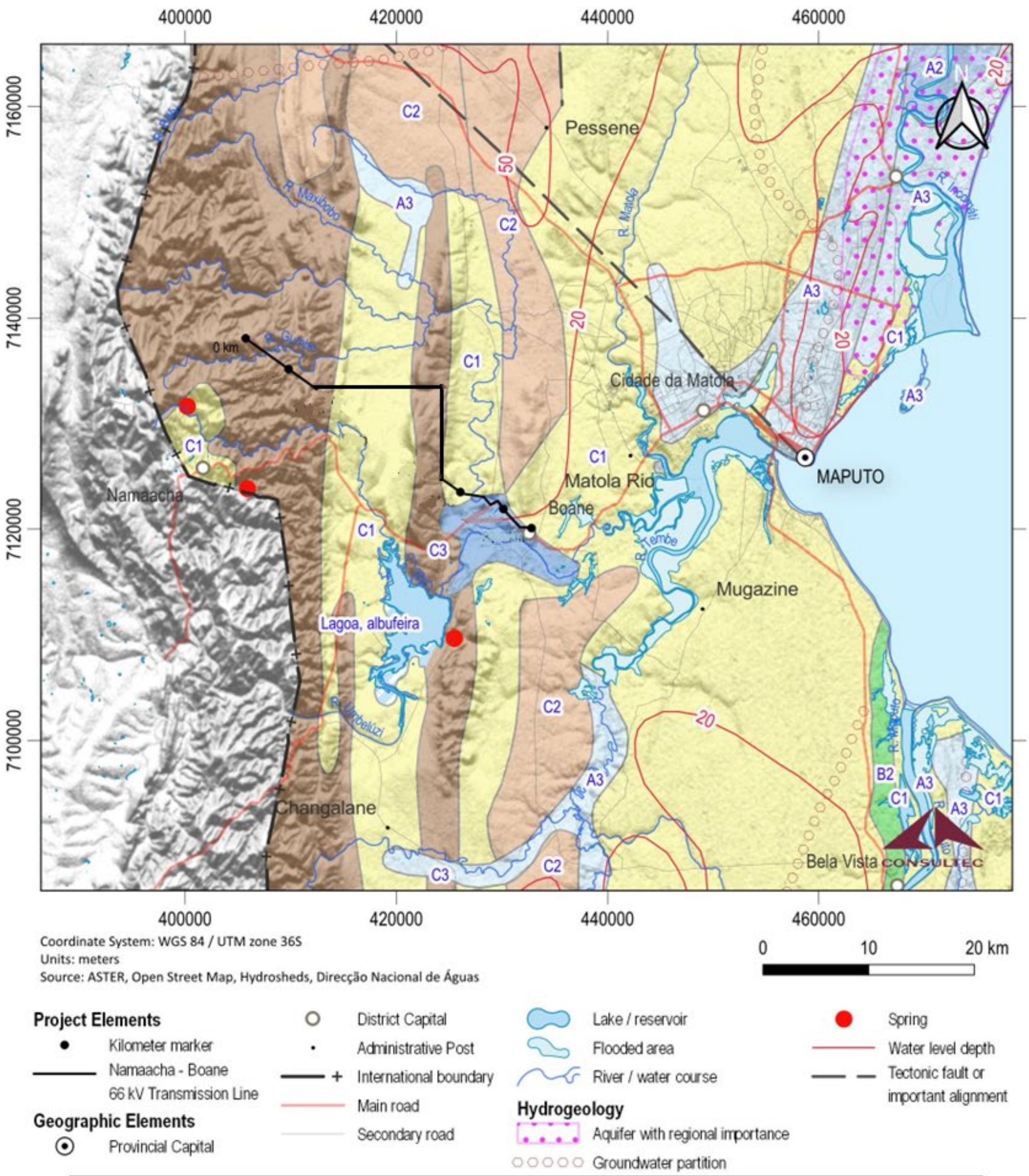
From a hydrogeological point of view the areas in the Umbeluzi River basin do not favour any larger groundwater yield and is thus not suitable for large municipal water supply. The major part of the areas is characterised by crystalline rocks, basalts and consolidated sedimentary rocks with no primary porosity. In such areas, groundwater occurrence is restricted to secondary features such as zones of fracturing or deeper weathering.

The description of groundwater resources provided is based on information from the Explanatory Notes of the hydrogeological map of Mozambique (scale 1:1,000,000) (Ferro & Bouman / DNA, 1987).

The Mozambican part of the Umbeluzi River Basin can be roughly characterized by a large variability of the groundwater resources presenting all major types of predominant aquifers in the country (classes), namely (A) aquifers in intergranular formations, (B) groundwater in fissured formations belonging to the crystalline complex and (C) aquifer sites in fissured or limited productivity intergranular formations. This division into 3 classes (A, B, C) is based on the dominant porosity type, the extend of the aquifers and the productivity of the formations. Each class was assigned a color:

- **The blue colored Class A** – represents aquifers in which the water predominantly circulates through intergranular pores. Generally, they are continuous and consist of unconsolidated or semi-consolidated material. Yield prospects range from 3 to over 50m^3/h.
- **The green colored Class B -** represents aquifers in which the water predominantly circulates through fractures and fissures. Usually, they are discontinuous and consist of consolidated rocks. Yield prospects range from 3 to over 50m^3/h. Class B also includes karsic rocks, in which the fissures might be widened by chemical solution.
- **The brown colored Class C –** comprises areas with limited or local groundwater resources. The porosity can be intergranular of fissured. Yield prospects generally range from less than 1 to over 5m^3/h.

Given the nature of the geological formations along the alignment, surface aquifers are likely to behave in a similar way to Unconsolidated intergranular aquifers.



Type of Aquifers	Classes and Groups of Groundwater occurrence		Groundwater development characteristics		
	Intergranular formations	Fissured formations	Average yield (m^3/h)	Maximum pumping period (h/day)	Probable Water Supply Capacity
	Class A	Class B			
Productive Aquifers	A1	B1	>50	24	Large cities, industries and irrigation schemes
	A2	B2	10 – 50	24	Towns (>5000inh), medium-sized industries and irrigation schemes
	A3	B3	3 – 10	16	Villages (2000-5000 inh), small-sized industries and irrigation schemes
Areas with limited or no groundwater resources	-	Class C			
	-	C1	<5	5	Villages (1000-2000 inh) Cattle (<2000 head)
	-	C2	<3	5	Small villages (<1500 inh) Cattle (<1500 head)
	-	C3	<1	6	Groups of houses (<250) Cattle (<250head)

Figure 38: Types of aquifers along the power line route

Groundwater plays an important role in supplying water for the rural communities within the basin. For many of these communities, groundwater is the sole source of water for the domestic supply. Groundwater is relatively cheap to develop and is less vulnerable to drought than surface water. Moreover, the resource is considered to be under-utilised within the basin and has thus potential to be further developed.

6.1.6. Landscape

6.1.6.1. General considerations

This subchapter aims to present the reference situation of the landscape resources of the areas of influence of the project under analysis - construction of a transmission line between Namaacha Wind Farm and Boane Substation.

The objective of this environmental factor is to characterize the landscape features of the study area, through a visit to the project implementation area, so that this description will provide a basis to analyse later the intensity of use of the proposed site, in terms of its effect in the Landscape.

Landscape can be defined as "a part of the territory, as it is perceived by the people, whose character results from the action and interaction of natural and human factors" (EC 2000). A landscape unit is understood to mean not only "an area limited by relief or other elements, within which all points are seen mutually" (Neuray 1982), but also one in which the landscape presents a certain homogeneity in relation to the relief, geology, vegetation and humanisation.

The evaluation of the quality of the landscape stems from the scenic value attributed to it and from the landscape sensibility.

6.1.6.2. Methodology

The description of the study area was carried out in two phases. The first phase was based on the review of secondary data: bibliographic review, Google Earth image analysis and Mozambique Topographic Chart analysis, Mozambique Geomorphological Chart and Relief Charter, to the scale of 1/2 000 000.

The second phase comprised the recognition of the area for primary data collection and was based on visits to the project area of influence. Site visits were made to key locations by ESIA team members. Site visit photos along the entire routing have been used to assist in the assessment of visual impact and landscape character.

Through the field work, information was collected on the sites with visibility, i.e. the villages and population clusters (sites with potential observers), throughout the project area of influence.

The data collected in the field was then later treated in GIS software, in particular for the delineation of the viewing basins.

6.1.6.3. Zone of Visual Influence

The Zone of Visual Influence (ZVI) is defined as the extent of potential visibility to or from a specific area or feature. However, the large scale of the proposed project and the accessibility issues over some of the areas and lack of access roads create difficulties in identifying the real extent of the ZVI.

A review of the ZVI was made for existing infrastructure developments (existing substation of Boane) to inform the setting of an indicative spatial scope. The indicative spatial scope has been defined for the Project area as approximately three kilometres (3 km) from the OHL alignment to address the potential impacts on the existing landscape character and visual amenity.

The Project ZVI includes a varied cross section of the Maputo province, including the valleys of Movene and other rivers of lesser concern. Land use patterns also vary considerably reflecting sparsely populated areas and suburban areas, areas of natural vegetation, cultivated areas and exploited areas. A full overview is provided in the following sections.

6.1.6.4. Landscape Character

Landscape character includes the natural and man-made attributes of the study area, including topography, land cover and vegetation. The character and sensitivity of the visual environment within the study area varies at a local scale, depending on the presence of water bodies, ridges, agricultural use, roads, and urban or rural settlements. The overall landscape character is influenced negatively by incompatible activities, or positively by the presence of natural or man-made features that enrich the character.

6.1.6.5. Topography

Based on the relief shapes observation (Muchangos, 1999) it is possible to interpret and characterize the physiography of the territory. The Namaacha District, where the study area is located, can be divided according to the following geomorphological units:

- Highlands - the Complex of the Libombos chain;
- Medium plateaus - adjacent to the first;
- Slopes; and
- Small plains of 100 - 200 m in the alluvial valleys along the rivers.

It is marked by the Libombos mountain range, which extends in a north-south direction, with its highest point about 800 m, on Mount Mponduine. The surface of applanation descends towards the east, with several rivers cutting the mountains in a W-E direction.

6.1.6.6. Landscape type

Landscape types were determined by mapping land cover. Land cover describes the physical make up of an area based on interpretation of satellite imagery.

Land cover in the project area has mixed characteristics, ranging from areas of natural vegetation with some scenic value, punctuated by agricultural areas. The main land uses in the proposed area are shrubs and agriculture.

Although the Kruger National Park and Phongolo Nature Reserve are part of and protected parts of the range, they lie far to the north and south of the site, respectively.

6.1.6.7. Vegetation cover

The land of the site and surrounding areas of the transmission line is currently mainly shrubby vegetation and woodland areas within the low-lying hills of Lebombo. Other areas are vacant lands are used for pasture farming and agriculture, with the main agricultural products being corn, cassava, cowpea, peanut, and sweet potato.

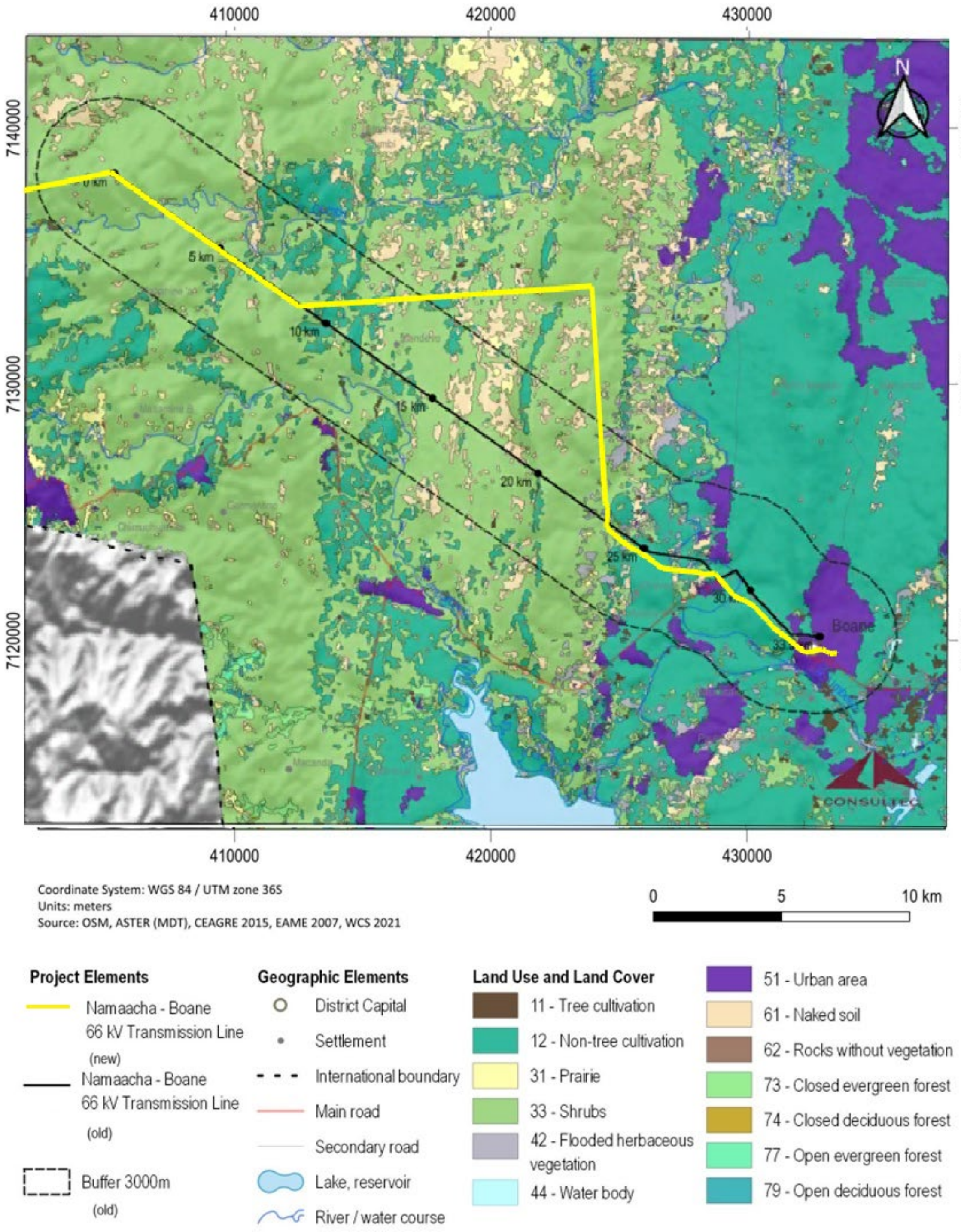


Figure 39: Land Cover and Vegetation Unit in project area

6.1.6.8. Sense of place

The sense of place in the study area derives from the combination of all landscape types and their impact on the senses and is influenced negatively or positively by natural or man-made features or activities that interrupt the vast open space. The sense of place is informed by the aspects of scale, texture, landform, enclosure and land use.

The proposed study area has a rural feel with an even outstretched natural landscape, intercepted by dispersed rural settlements, homesteads and infrastructure associated with agricultural activities.

Landscape is separated by patchworks of subsistence farming dotted with more mountainous areas and dirt roads that connect various smaller settlements.

6.1.6.9. Landscape Quality

Landscape quality is based on human perceptions and expectations in the context of the existing environment. Landscape quality increases with the presence of water, topographic ruggedness and where diverse patterns of vegetation occur. Areas that contain more natural features or harmonious man-made compositions will have a more favourable landscape quality than areas with non-harmonious human activity.

Table 23: Landscape quality rating

Landscape quality rating	Criteria
High	• **Unmodified landscape**: The landscape is almost free from human encroachment, Visual integrity occurs and where human intervention is visible, no visual discontinuity occurs, and visual order is harmoniously maintained. Strongly defined landforms are noted, including mountains and large bodies of water. Distinct visual patterns are formed through patterns, colours and textures
Moderate	• **Moderately transformed/disturbed landscape**: There is average visual integrity between the natural and manmade landscape. Some visual encroachment is visible which lacks visual order. There is some disruption of the natural and man-made patterns. Moderately distinctive landscape patterns are visible, including rolling hills and smaller water bodies
Low	• **Extensively transformed human intervention**: There is low or no visual integrity between the natural and manmade natural features. The visual integrity of the landscape is disrupted, and visual order is entirely lost. Little visual patterns are formed and vegetation patterns, colours and textures are not noticeable.

Regarding the quality of the landscape in the study area it was considered that landscape occurs with different degrees of quality. Most of the area would be considered of moderate landscape quality.

6.1.6.10. Receptors

Receptors for visual impacts are potential viewers of the proposed alignment. Receptor sensitivity refers to the degree that a project affects people. Receptor sensitivity type depends on the number of people viewing the line and their perceptions of the study area.

Perception of an object is linked to the purpose for which a viewer is present in the study area (i.e. the reason for their visit). The sensitivity of an individual to the visual impact of a proposed development may, therefore, also vary over time as they experience different features and land uses in the area. Receptor sensitivity is also affected by how likely the receptors are to be affected. It is also dependent on their perception of the area and their ability to adapt to changes in their environment and can include how frequently they are exposed to the view. The most sensitive receptors will be people permanently residing in the area (formal residential as well as informal settlements). These areas are associated with a few dispersed settlements mostly located along access roads.

The overall receptor sensitivity is low as from previous experience lower income residents may view transmission lines as a sign of progress.

6.2. Biological Environment

6.2.1. Methodology

The characterization of the biological environment within the Project's Direct Area of Influence was carried out through the collection of secondary and primary data.

Primary data was collected along the route as part of four field surveys:

- Two field surveys by Consultec in 2022 and 2023 to inform the original EIS Report. The study area for this assessment was 300 m around the original route alignment.
- A floral assessment and vegetation mapping survey carried out by Dr. Gareth Coombs in March – April 2024 to inform the Biodiversity Action Plan (BAP). The study area for this assessment was 170 m – 1000 m around the original route alignment. This mapping covers the original route, as well as the Boane District route changes.
- A high-level field reconnaissance survey was conducted by Consultec and Globeleq's Biodiversity Manager Marli Schoeman in August 2024 to assess biodiversity sensitivities. This survey included a walkover of the proposed route (including the Namaacha District deviation not covered by the previous habitat mapping) and evaluated a 100 m corridor around the proposed alignment. Photos were taken of key biodiversity sensitives and it was confirmed that the habitat types for the area not previously mapped by Dr. G. Coombs was consistent to the rest of the route (i.e. including agromosaic, Southern Lebombo Bushveld, and forest).

Table 24: Overview of Primary Data Collection

Biodiversity group	Type	Timing	Source
Flora and vegetation	Transects in sampling plots	Oct-Nov 2022 Mar 2023	Consultec (Original EIS Report)
	Plotless survey transects	Mar – Apr 2024	Dr. G. Coombs (Flora assessment and vegetation mapping)
	Reconnaissance survey	Aug 2024	M. Schoeman (Globeleq) and Consultec
Amphibians and reptiles	Transects Targeted searches in suitable microhabitats	Nov 2022 Mar 2023	Consultec (Original EIS Report)
Birds	Transects Point counts at water bodies and rivers	Nov 2022 Mar 2023	Consultec (Original EIS Report)
Non-flying mammals	Transects Enquires to local communities	Nov 2022 Mar 2023	Consultec (Original EIS Report)
	Reconnaissance survey	Aug 2024	M. Schoeman (Globeleq) and Consultec
Bats	Roost survey Enquires to local communities	Nov 2022 Mar 2023	Consultec (Original EIS Report)

6.2.1.1. Methodology for Original EIS Surveys

Fauna (excluding Avifauna)

There is no specific literature on the fauna of the area of direct influence of the project (600 m transect around the power line). Therefore, secondary data was collected through a comprehensive literature review on mammals (including bats), reptiles and amphibians of the broad Namaacha and Boane region. Literature review consisted on the analysis of species distribution maps from books on the distribution of mammal of Mozambique (Smithers and Tello, 1976) and southern Africa (Walker, 1996; Stuart and Stuart, 2001 and Skinner and Chimimba, 2005), reptiles of southern Africa (Branch, 1998) and amphibians of southern Africa (Caruthers, 2001). Literature was also consulted to report the conservation status of the species recorded in the area, namely the IUCN Red Data List of species threatened with extinction (IUCN, 2022), the List of Species Protected by Law in Mozambique (Decree nº 12/2002 of 6 June) and the species listed in CITES appendices.

Field data collection was conducted in November 2022, corresponding to dry season. A wet season survey was conducted in March 2023.

Mammals (including bats), reptiles and amphibians were documented through direct and indirect observations. Twelve sampling points were established for vegetation assessment (see vegetation report). From each vegetation sampling point, a 600 m long and 5 m wide transect perpendicular to the power line trajectory was walked and along the transect data on fauna species was collected through search and direct observation and identification of mammals using field guides (e.g. Stuart & Stuart, 2001); observation and identification of indirect evidences of occurrence of mammal species such as spoor/footprints, droppings, feedings signs and food leftovers, burrows and diggings (Walker, 1996), direct observation and identification of reptiles following Branch (1998) and of amphibians following Carruthers (2001).

Specific sampling effort for bats consisted of active inspection in potential microhabitats or roosting places such as abandoned buildings, hollows in rocks, trees with dense crown cover and areas with fruit trees, to observe bats or indirect evidence such as guano. Local people were interviewed about the occurrence of bat species in the project area. Additional search effort was devoted to microhabitats favoured by reptiles such as dead logs and rocky areas and by amphibians such as seasonal pans and waterlogged areas.

Data was also obtained through consultations with local people about fauna species of historical and current occurrence. In the consultations or interviews with local people, field guides of mammals with coloured photographs (e.g., Stuart and Stuart, 2001) were used to assist in the identification of species by the interviewed people. From the interviews only species mentioned with high confidence by the interviews, including reports of recent observations in the area, were included in the species list.

Avifauna

Bird sampling targeted raptors, passerines, and water birds. Raptors and passerines sampling was undertaken through walking transects, with 30 minutes duration.

Along the route where the wind transmission line will pass, bird sampling points were taken. Sampling sites were mainly along the natural areas and were assessed during both the dry season (early November 2022) and the wet season (late March 2023). The table below shows the approximate sampling locations in relation to the revised route.

Table 25: Overview of Avifauna Sampling Sites

Segment of Line[1]	Dry Season	Wet Season
0-5 km	8	4
5-10 km	10	9
10-15 km	N/A	N/A
15-20 km	N/A	N/A
20-25 km	N/A	N/A
25-30 km	N/A	N/A
30 – 35 km	10	7
35 - 38.2 km	1	1
Additional sampling sites in Namaacha District along ridge lines[2]	7	9
Additional sampling sites in Namaacha District in Gumbe agricultural areas[3]	8	11
Notes: [1]Measured from the Namaacha end of the line. [2]Similar habitat to 20 – 25 km segment. [3]Similar habitat to 10 – 20 km segments.		

Source: Consultec 2023

As this survey was conducted for the original route, there are no sampling sites directly adjacent to part of the revised line in Namaacha District (i.e. segment 10 – 30 km); however, the habitat along these areas can be grouped into two categories: areas of higher biodiversity (e.g. ridges/valleys) and bushveld/ agricultural areas. For the areas of higher biodiversity (most notably near 20 – 25 km), the original surveys included sampling sites along the ridges and valleys to the west of the original line that can be used as a proxy. Additionally, for the sections from 10 – 20 km, this area consists of large-scale farms, so is similar in habitat to the agricultural areas passed through in Gumbe by the previous line.

Point counts targeting water birds were undertaken at water bodies and rivers for a variable amount of time, according to the water body size. The water bodies sampled were both inside the study area and in its surroundings, because of possible waterbird movements crossing the study area. All birds seen or heard were identified and counted. The observations were undertaken using binoculars.

Figure 39 shows the original survey sampling locations versus the new and old transmission line route.

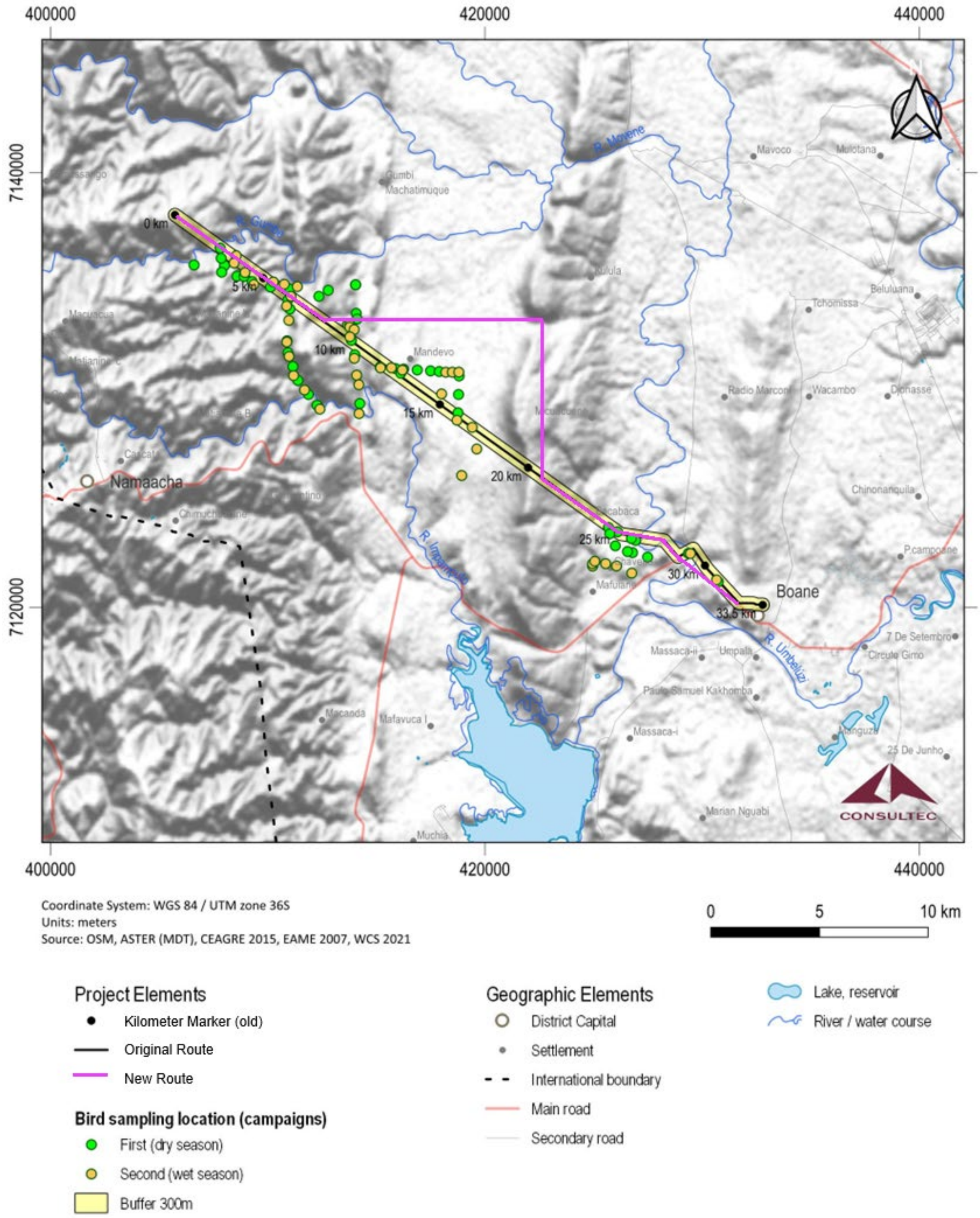


Figure 40: Birds sampling points (winter/dry and summer/wet seasons)

Species Density

At each listening point, an imaginary circle with a maximum radius of 100 meters was established. Birds heard within 30 meters of distance were considered as being within the listening radius, while birds heard outside the 30 m range were considered as being outside the listening radius. This exercise was performed at two different times, that is, in winter (dry season) and summer (wet season).

With the collected information it was possible to calculate the density of each species. Density calculation was based on the following formula:

$$D = \ln\left(\frac{n}{n^2}\right).\left(\frac{n}{m(\pi r^2)}\right)$$

- n = total number of birds counted
- n^2 = number beyond the fixed radius
- m = total number of counts
- r = fixed radius

Species richness index

Bird species richness index is calculated using the following formula (Ludwing & Reynolds, 1988):

$$R^2 = \frac{S}{\sqrt{n}}$$

- R^2 = Menhinick Index
- S = total number of species in the community
- n = total of individuals observed

Birds of prey

Birds of prey were sought throughout the entire length of the transmission line project. In each observation, the name of the species and the geographical position it occupies was recorded with the aid of GPS. This information was used to map each species observed throughout the range affected by the project. Some species of birds were not recorded during this survey, but they were considered in others studies all that were carried out in the same region.

6.2.1.2. Methodology for Flora Survey and Vegetation Mapping

When selecting a method for 2024 vegetation mapping conducted by Dr. G. Coombs, the following aspects were considered:

- Large sampling areas
- Several vegetation types present that require different sampling methods
- Accessibility of vegetation (Dense D. cinerea patches are practically impenetrable
- Limited time and labour available

Based on these considerations, the following plotless sampling methods were selected:

- Point Centre Quarter method – Estimating tree density and species composition.
- Linear transects with point distance measurements - Tree density and species composition.
- Linear transects with circular distance measurements – Tree density and species composition.
- Point to tuft distance measurements – Grass and forb composition and density.
- Diversity – Species composition and richness.
- Tree morphometrics – to gain understanding of the relationship between important tree

Not all vegetation types could be sampled with the same methods as this proved too time consuming, therefore appropriate methods were selected in different areas to enable covering a large enough area during field surveys.

Tree density and demography - Point Centre Quarter method

The point center quarter technique provides a practical method for determining an estimate of tree density in a variety of habitats. Its use in this project was to determine the tree density in certain areas. Tree density and species richness is considered a good indicator of habitat quality.

This method involves choosing a random point on the ground and then placing an orthogonal cross over this to divide the surrounding area into 4 quarters, thereby distributing the sampling space equally. The distance to the nearest tree in each quarter is then measured and the average distance calculated which is used in the equation below to estimate the tree density. The density was then converted to density per hectare.

Density = $1/ 2.778 *(D_2)^2$

D_2 = Average distance of the four measured trees from the center point.

Plotless methods can produce biased results when vegetation has a non-random distribution, which is often the case. Therefore, it is recommended to use two techniques such as a PCQ distance combined with nearest neighbour distance to explore different estimates of tree density. Thus, in addition to recording the nearest tree distances the distance between each nearest tree per quarter and its nearest neighbor (NN distance) in the same quarter was also recorded. Several studies have found that this nearest neighbor distance can provide a more accurate measure of tree density in certain habitats.

The NN tree density is then calculated.

Density = $1/ 4* (D_2)^2$

D_2 = Average distance of the four measured trees from the center point.

Both these methods were then used to calculate estimates of tree density and derive the frequency of different tree species. In some cases, a combination of the frequency data of both PCQ and NN distance was inspected as this increases the sample size.

Moving from the footprint starting point near Namaacha, PCQs were completed by placing 5 circular quadrats in a linear line and then the next group of 5 within either another obvious vegetation strata or at least 100 m further along the transect. Owing to the vegetation density, a rough measure of the radius was made by pacing approximately 40 meters to the next PCQ midpoint. To avoid repeat sampling the same trees, the PCQ method was confirmed to a radius of 20m (i.e. 40 meter in diameter). Inspection of GPS trails showed that this method reliably created sampling distances of 35 – 40 meters between PCQ centers. The PCQ method was the most often used method for tree density estimation throughout the project.

Linear transects with point distance measurements

This technique consists walking in a straight line and recording simple point distance measurements at intervals of 10 paces. This technique is similar to the PCQ technique but only measures one distance instead of four.

Linear transects with circular distance measurements

Another technique that proved more time efficient and capable of covering large distances to walk along an imaginary transect line (guided by the direction of the OHL footprint) and select a point at ten pace intervals. At each point I randomly identified four tree species nearest to the point that were within intervals of either 0 - 3m and 3 - 5 meters. This provided a rapid estimate of tree species composition and density, particularly in areas with high density thorny trees and shrubs.

Point to tuft distance measurements – Grass and forb composition and density

The simplest, practical method to determine grass density and abundance is to establish a 100m transect line and measure intertuft distances. Grass species composition and density was estimated using a standard point to tuft method. Dr. Coombs walked along each transect and at 2m intervals, randomly placed the point of a 1m spike on the ground and measured the distance from the metal point to the nearest grass.

The grass species was recorded to estimate the abundance of different grass species. If a herb or forb was present it was simple recorded as a forb. The data is then expressed as the relative frequency of different grass species.

6.2.1.3. Methodology for High-level Reconnaissance Survey

The reconnaissance survey conducted along the alternative routes considered (See Section 5 for more details) included a high-level assessment of biodiversity sensitivities. This survey consisted of visual observations of habitat features, evidence of sensitive fauna and flora species along the route. The visual observations were taken using a combination of walkover and drive over observations as detailed in the table below.

Table 26: Reconnaissance survey coverage

Alternative Route (T-Line Alt)	Total area (desktop estimate – m)	Area Covered* by Car (m)	Area Covered through Walk (m)	Total Area Covered (m)	Area Covered (%)	Number of Days
Active Military Land	821	-	821	821	100%	0.5
Boane Option 1	4 103	3 107	996	4 103	100%	1.5
Mabanja Option 1	1 357	-	1 296	1 296	96%	0.5
Mabanja Option 2	297	-	297	297	100%	
Namaacha Option 1	10 442	2 056	3 118	5 174	50%	0.5
Namaacha Option 2	19 459	10 506	2 779	13 285	68%	1
Namaacha Option 3	27 330	8 039	4 991	13 030	48%	1

6.2.2. Vegetation and Habitat Types

This section supersedes Section 6.2.2 and 6.2.6 from the original EIS Report.

6.2.2.1. Habitat Types

The vegetation habitat mapping conducted by Dr. Gareth Coombs for the transmission line noted the following habitat types:

Southern Lebombo Bushveld - The most common vegetation throughout the site. Tree species vary and include *Dichrostachys cinerea, Combretum apiculatum, C. molle, C. zeyheri, C. imberbe, Senegalia erubescens, S. nigrescens, Vachellia karroo, Sclerocarya birrea, Vachellia davyi, Lannea discolor, Pavetta edentula, Senegalia schweinfurthii, S. erubescens*, *Ziziphus mucronata, Peltophorum africanum, Senegalia burkei, Galpinia transvaalica, Commiphora harveyi, Ficus glumosa, Cussonia natalensis, Cussonia spicata, Pavetta schumannii, Searsia gueinzii*, *Vachellia swazica* (only certain parts), *Ormocarpum trichocarpum, Flueggea virosa, Mundulea sericea, Heteropoxys natalensis Erythrina humeana* (occasional, not common*), Euclea undulata, E. natalensis* and *Tarconanthus trilobus* var. *galpinii*. Succulents include *Aloe marlothii* subsp. *marlothii*, *Aloe spicata, Aloe pienaarii, Hypoxis hemerocallidea, Kalanchoe paniculata* and *Crassula* spp. Common grasses were *Panicum maximum, Themeda triandra, Cymbopogon plurinodis* and *Eragrostis curvula*.

Southern Lebombo Bushveld (Higher density)- Same species composition as described above, but trees typically denser. Often present on north facing hill slopes, could be less harvesting and livestock pressure.

Forest – Forest confined to river and tributary valleys. Common trees include *Afzelia quanzensis, Breonadia salicina, Tabernaemontana ventricosa (toad tree), Celtis africana, Cordia caffra, Sideroxylon inerme, Ptaeroxylon obliquum, Scolopia zeyheri, Ozoroa engleri, Canthium inerme* (upper reaches of valleys and isolated pockets), *Ficus sycamorus, Ficus glumosa, Croton gratissimus, Uvaria* spp., *Capparis tomentosa, Trichilia emetica, Flueggea virosa, Antidesma venosum, Strychnos madagascariensis, Bauhinia galpinii, Berchemia zeyheri, Zanthoxylum capense* and *Clausena anisata*. Smaller succulents include *Sansevieria hyacinthoides* and *Cissus rotundifolius*. Larger *Euphorbia* species include *Euphorbia cooperi* and *Euphorbia confinalis* that are associated with dense clumps of *Aloe spicata* and occasionally *Aloe pienaari*. Creepers and lianas include *Hippocratea africana* var. *richardiana*. A single orchid species was located. Forests often adjoin rocky outcrops which are often well populated with both *Xerophyta retinervis* and *Pachypodium saundersii* throughout the site.

Forest edges have a species mixture of Lebombo bushveld and forest species including *Croton gratissimus, Canthium ciliatum* (similar), *Diospyros dichrophylla, Euclea undulata, Combretum hereroense, C. imberbe, Senegalia erubescens* and *Vachellia karroo.* Common species along the forest edges are *Sclerocarya birrea, Combretum molle, Combretum apiculatum* and *Vangueria infausta*. *Cyphostemma barbosae* is often found adjacent to forest pockets.

Sensitive areas – These are areas with unique vegetation that should be minimally disturbed and include rocky outcrops, forests, forest edges and buffer zones as well as rivers and riparian zones.

Agromosaic – Vegetation is a mixture of small agricultural lands divided by patches of indigenous vegetation that have been transformed to various degrees. The main large indigenous trees are *Sclerocarya birrea, Trichilia emetica, Vachellia xanthophloea* and *Ficus sur*. Smaller trees and shrubs, particularly *Maclura africana, Vangueria infausta, Gossypium herbaceum, Combretum molle* and *Dichrostachys cinerea are present*. Fire is common here, and dense stands of *D. cinerea* often burnt for clearing.

Disturbed Agro-Mosaic – This consists of larger tracts of cleared agricultural lands with modern, brick buildings.

Urban areas/villages – Modern buildings and infrastructure as part of the town Boane of small villages.

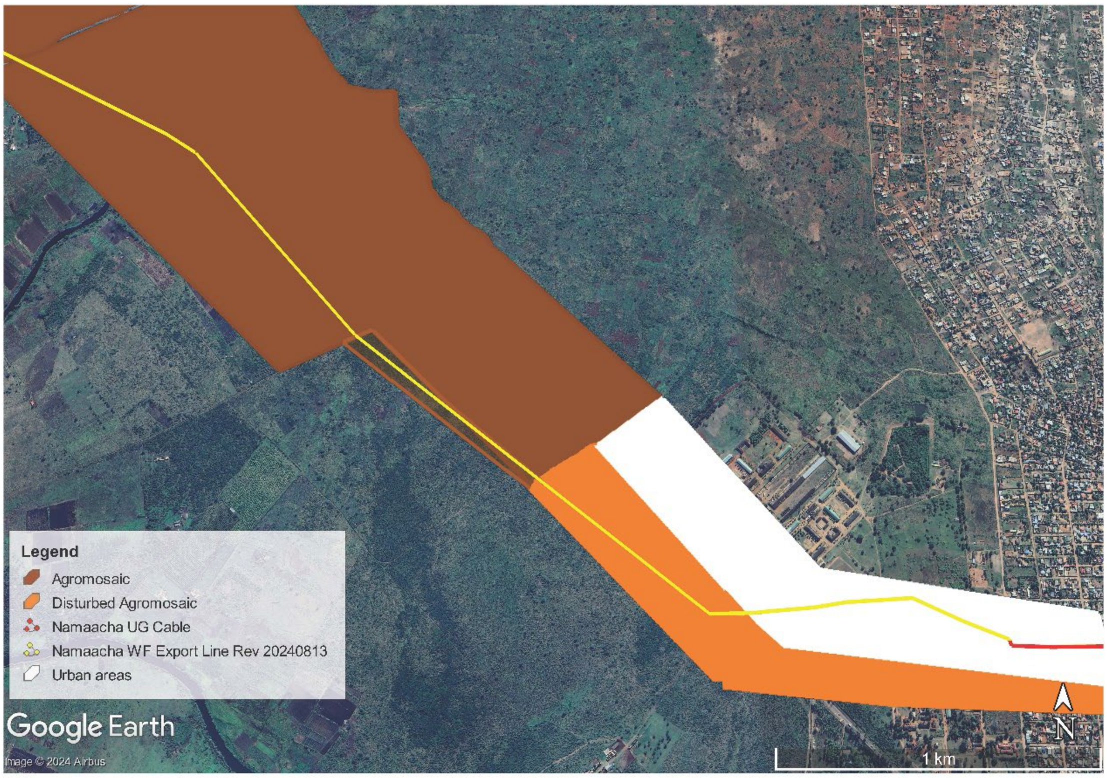
The composite habitat mapping for the entire route is presented in Figure 40 - Figure 44.

Because the habitat mapping conducted by Dr. Coombs was conducted on the original transmission line route, the proposed revision to the route now means that there is an additional 18.8 km of transmission line route not covered by this previous mapping. For these sections, this assessment relies on the reconnaissance survey conducted by Consultec and Globeleq's Biodiversity Manager in August 2024 to evaluate habitat type and biodiversity sensitivities. The general observations of this reconnaissance survey were that the habitat types identified for the wider transmission line also applied to the new areas of the transmission line route.

For the new 0.5 km section of transmission line route in Boane District not previously covered by the habitat mapping, the reconnaissance survey confirmed that this land would still be considered part of the surrounding agromosaic area identified during the original habitat mapping.

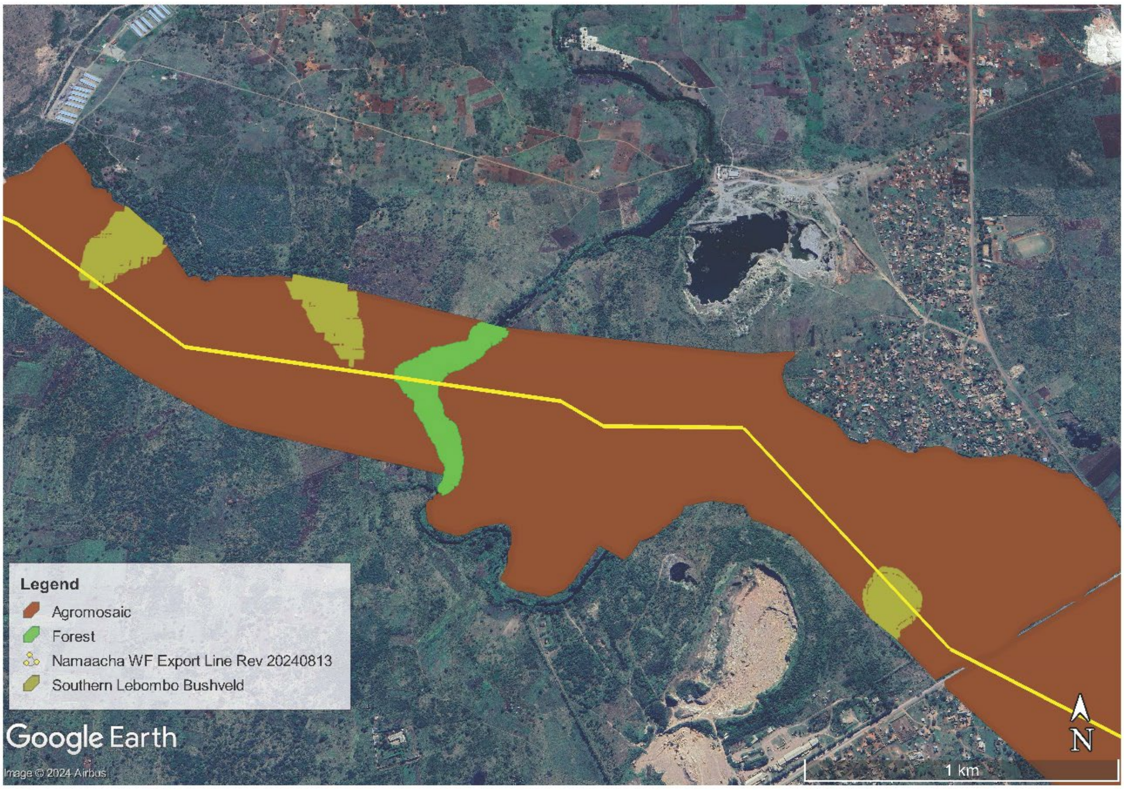
For the new 18.3 km of transmission line in Namaacha District not previously mapped, 5.96 km of this section is located in large-scale, active farms. The quality of this habitat is expected to be low (i.e. heavily modified) and similar to the agromosaic habitat type mapped elsewhere along the route.

Of the remaining 12.34 km previously unmapped, the reconnaissance team observed most to be consistent with the surrounding Southern Lebombo Bushveld habitat type based on species composition. There were also some isolated pockets of forest, as shown in Figure 42 and Figure 43.



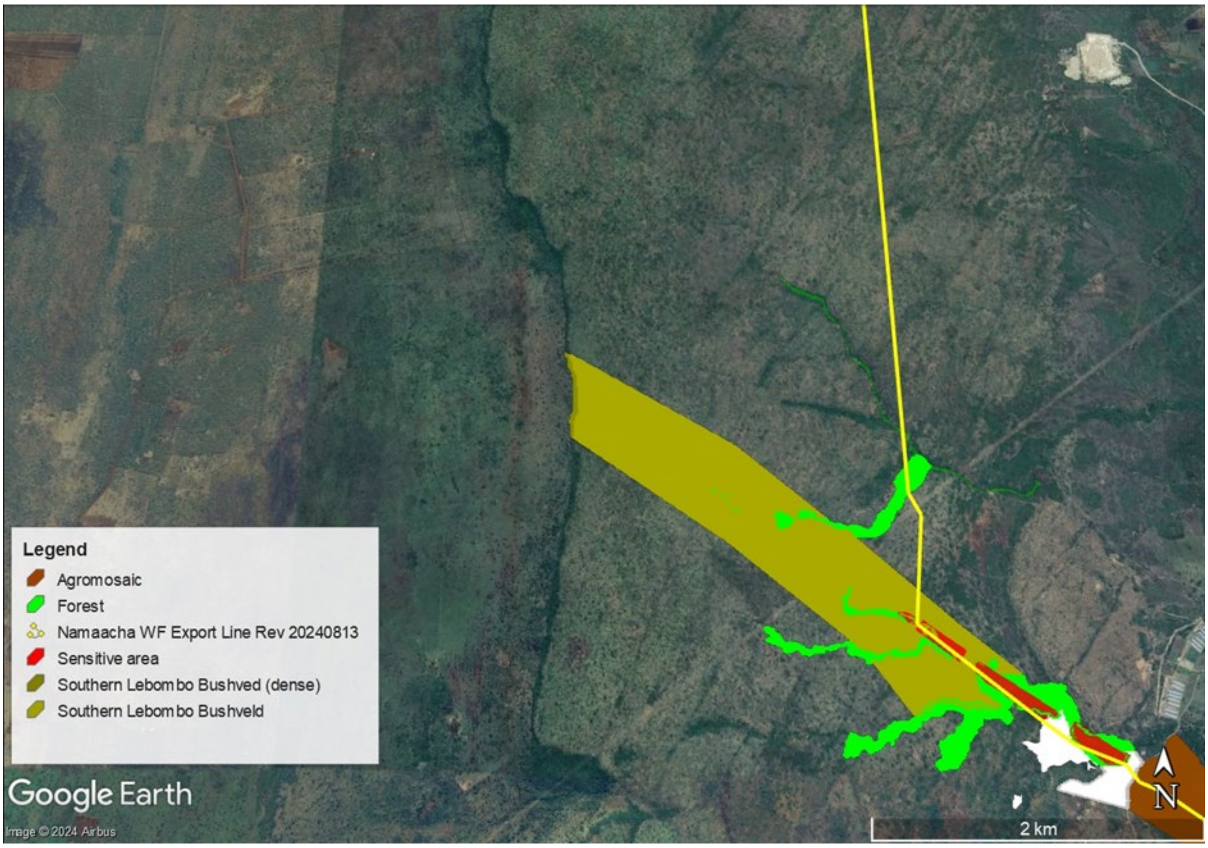
Source: Coombs (2024) (opaque layers), Consultec/Globeleq (2024) (50% tranparent layers)

Figure 41: Habitat mapping in Boane Area



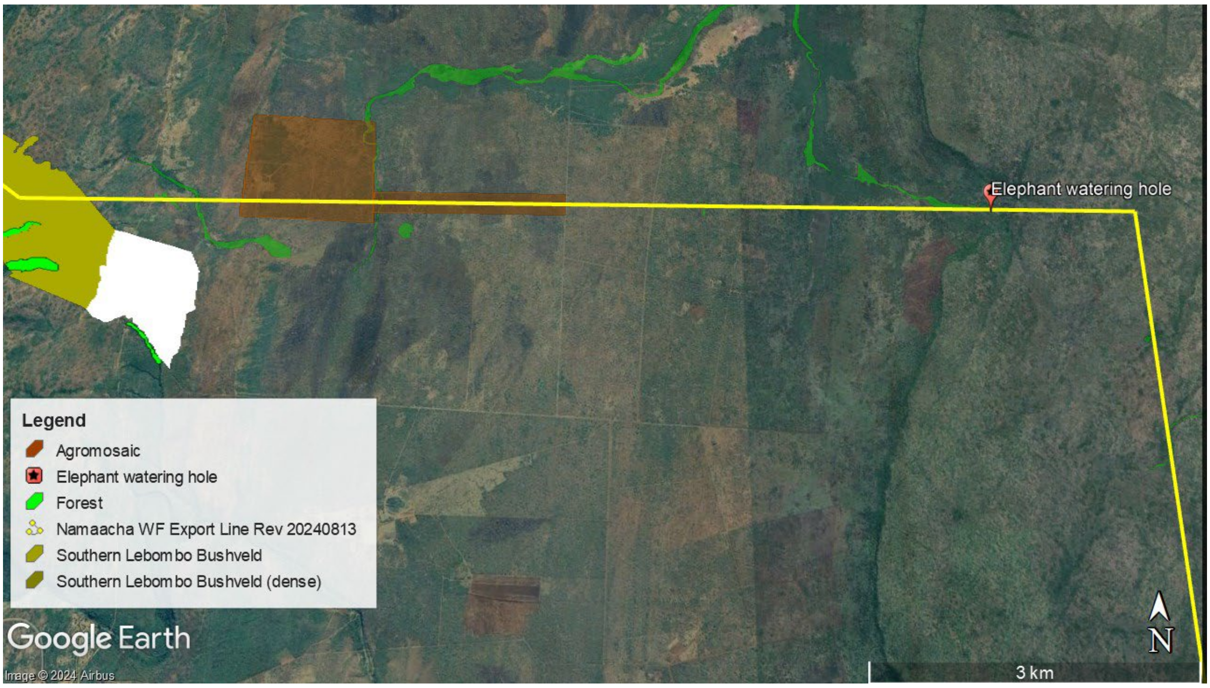
Source: Coombs (2024)

Figure 42: Habitat mapping in Mabanja Area



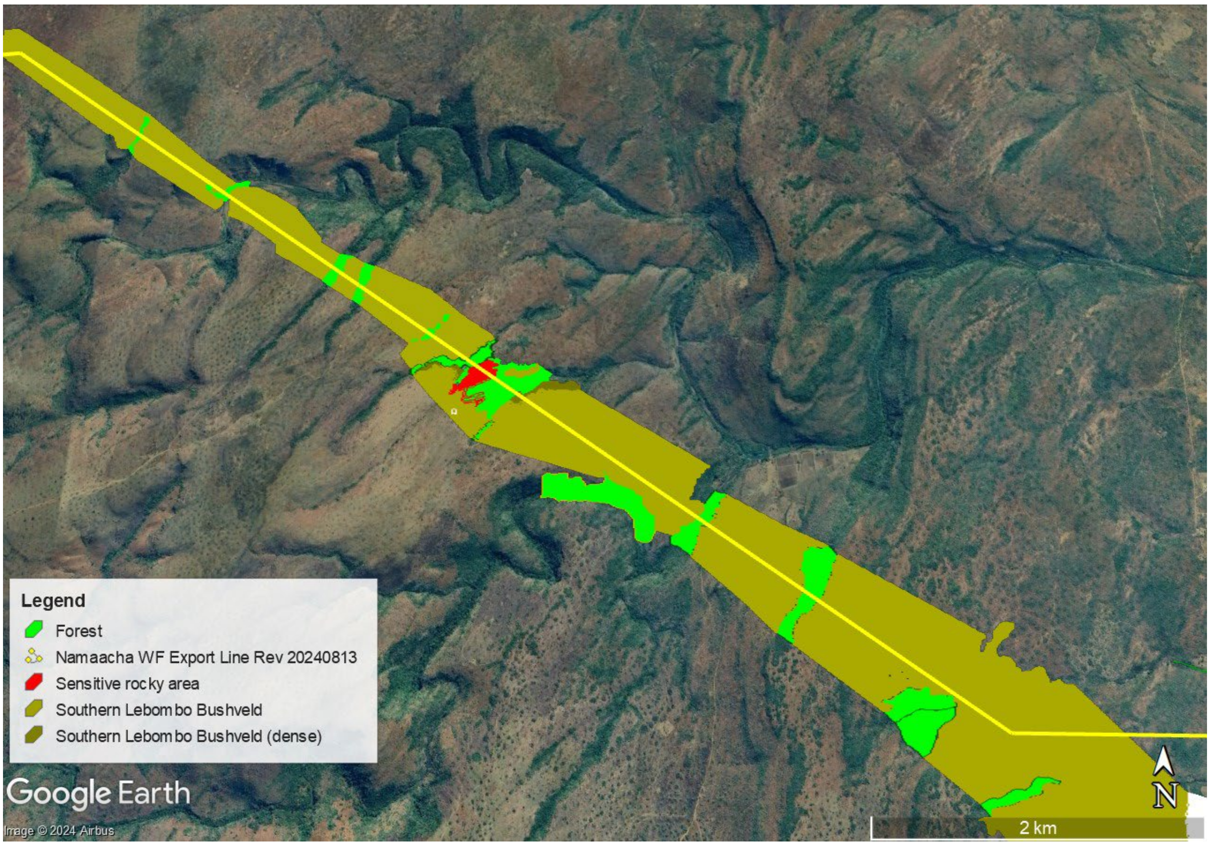
Source: Coombs (2024) (opaque layers), Consultec/Globeleq (2024) (50% tranparent layers)

Figure 43: Habitat mapping in Namaacha District (1 of 3)



Source: Coombs (2024) (opaque layers), Consultec/Globeleq (2024) (50% tranparent layers)

Figure 44: Habitat mapping in Namaacha District (2 of 3)



Source: Coombs (2024)

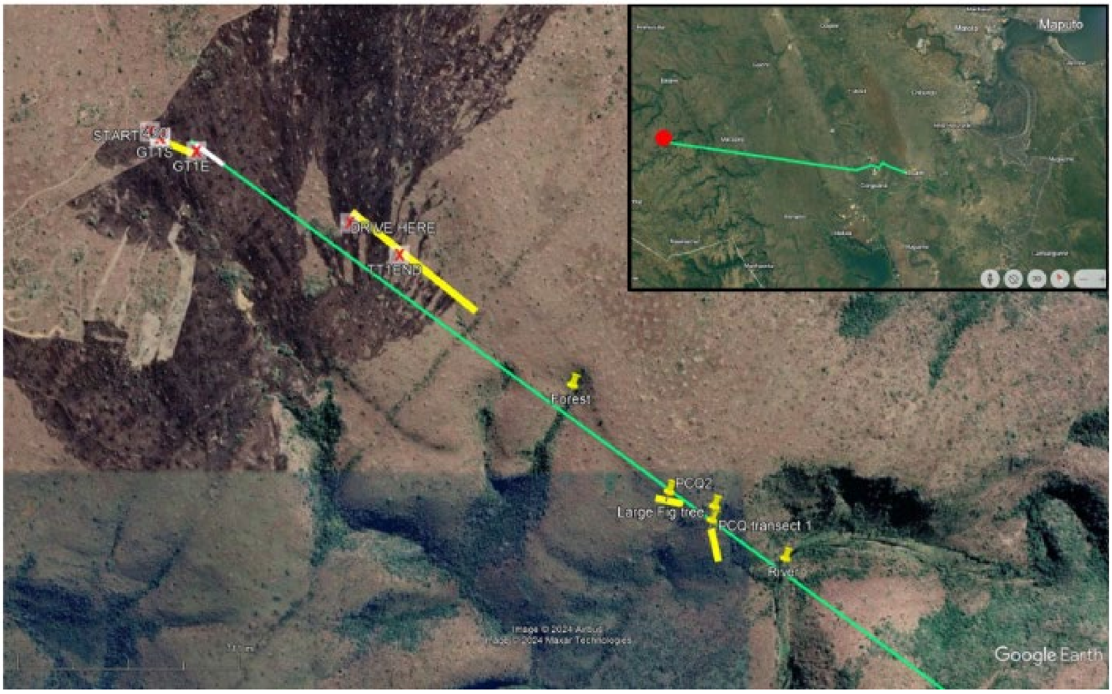
Figure 45: Habitat mapping in Namaacha District (3 of 3)

6.2.2.2. Transect Results

Following the methodology described in Section 6.2.1.2, transects flora surveys were conducted in March – April 2024 along the original transmission line route. This section includes only those transect results that apply to the revised route.

Namaacha Transect 1

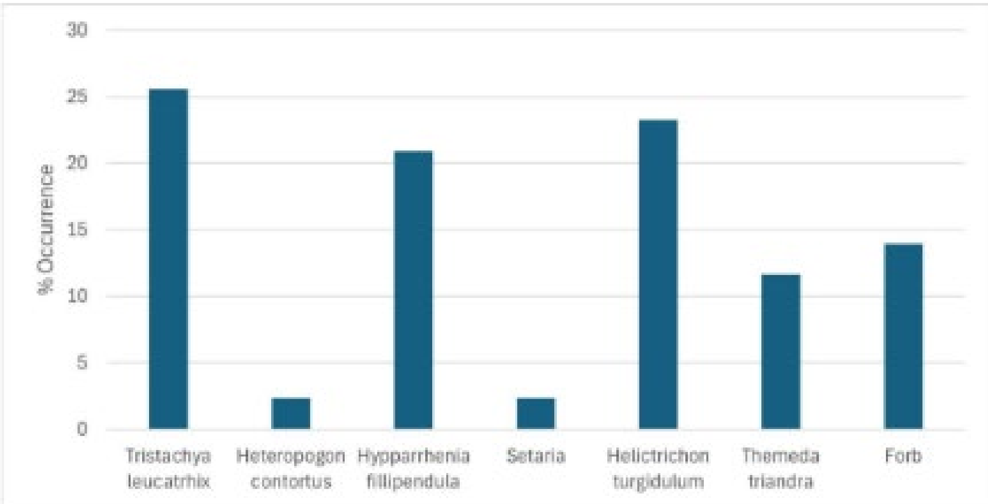
This transect was carried out nearest to the beginning point of the OHL near Namaacha (see figure below) using the simple point to distance measurements.



Source: Coombs (2024)

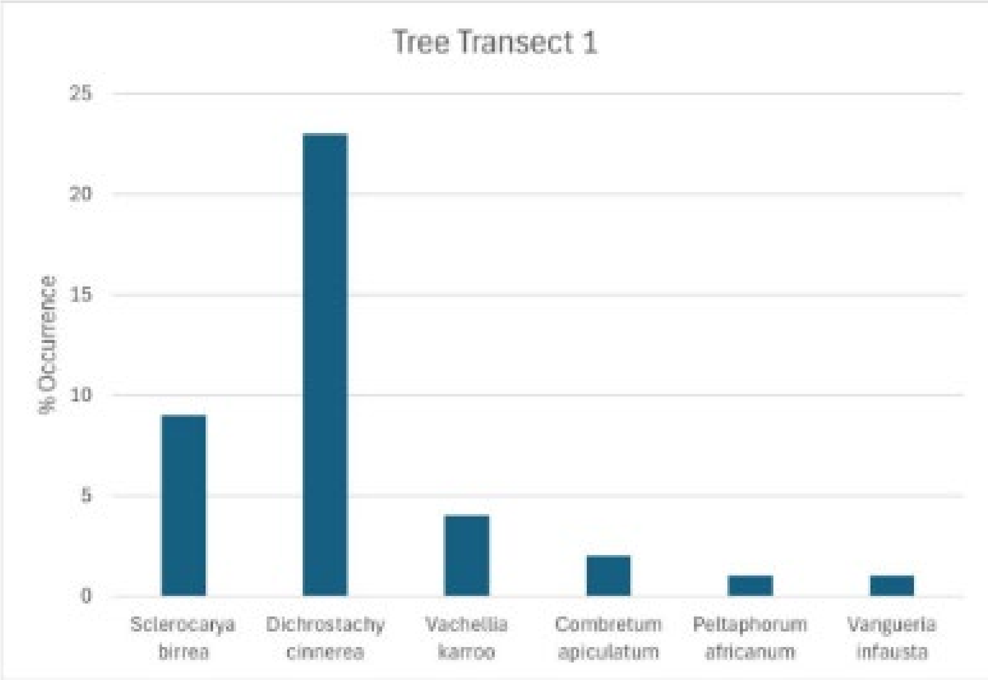
Figure 46: Location for Tree transect 1 and Grass transect 1 along the transmission line

Data for the first transect is shown in the charts below.



Source: Coombs (2024)

Figure 47: Grass composition near Namaacha transect 1



Source: Coombs (2024)

Figure 48: Tree composition near Namaacha transect 1

This area consists of a mixture of grassveld and common trees such as *Sclerocarya birrea, Vachellia karoo, Combretum apiculatum,* and *Peltophorum africanum,* found in the area. The most abundant species is *Dichrostachys cinerea* which is the most abundant tree throughout the site. Data from point to tuft measurements indicated that the grass composition is dominated by *Tristachya leucothrix, Heteropogon contortus, Setaria sphacelata* and *Hyparrhenia fillipendula.*

Herb and forbs were scattered throughout the grassland and common species include *Macledium zeyheri Hypoxis hemerocallidea, Ledebouria sp., Hibiscus sp., Gossypium herbaceum, Ledebouria zebrina, Xenostegia tridentata, Hibiscus rhodanthus, Ipomoea cairica, Scadoxus spp., Lippia javanica, Gnidia capitata, Rotheca hirsuta, Verbena spp., Melhania prostrata, Boophane disticha,* and *Gladiolus crassifolius.*

Some herb species, particularly *Melhania prostrata* are common in all areas of the footprint and offset areas. The forb layer was consistent in most areas inspected. Rocky areas contained a very characteristic and repeating plant assemblage consisting of *Aloe pienaari, Aloe spicata, Sansevieria hyacinthoides, Basananthe triloba*, and *Commelina africana.*

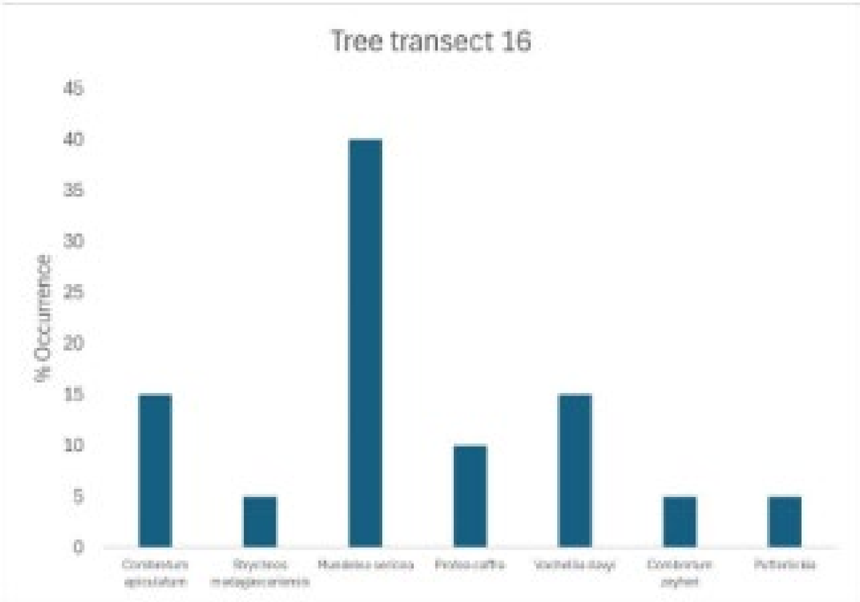
Namaacha Transects 16 and 17

These transects were located more centrally approximately 5-6 kilometers along the line in the direction from Namaacha to Boane (see figure below).

Source: Coombs (2024)

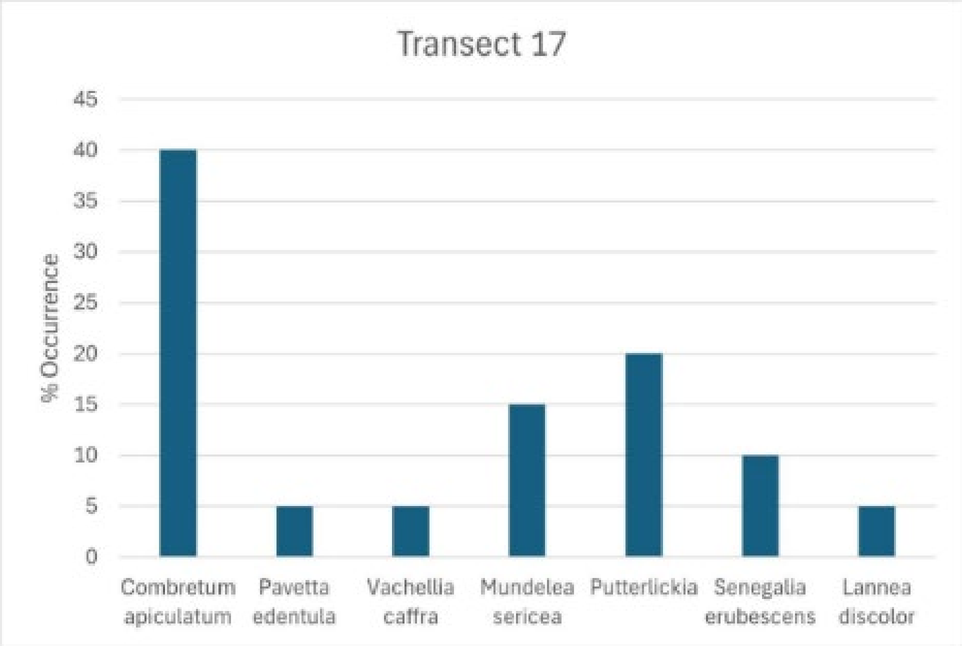
Figure 49: Location for Namaacha transects 16-17

Despite the large distance, the tree composition remained similar composing of local variation in the common species found on all other transects, including *Mundulea sericea, Combretum apiculatum, C. zeyheri, Vachellia davy*i and other species. Tree species composition is provided in the charts below.



Source: Coombs (2024)

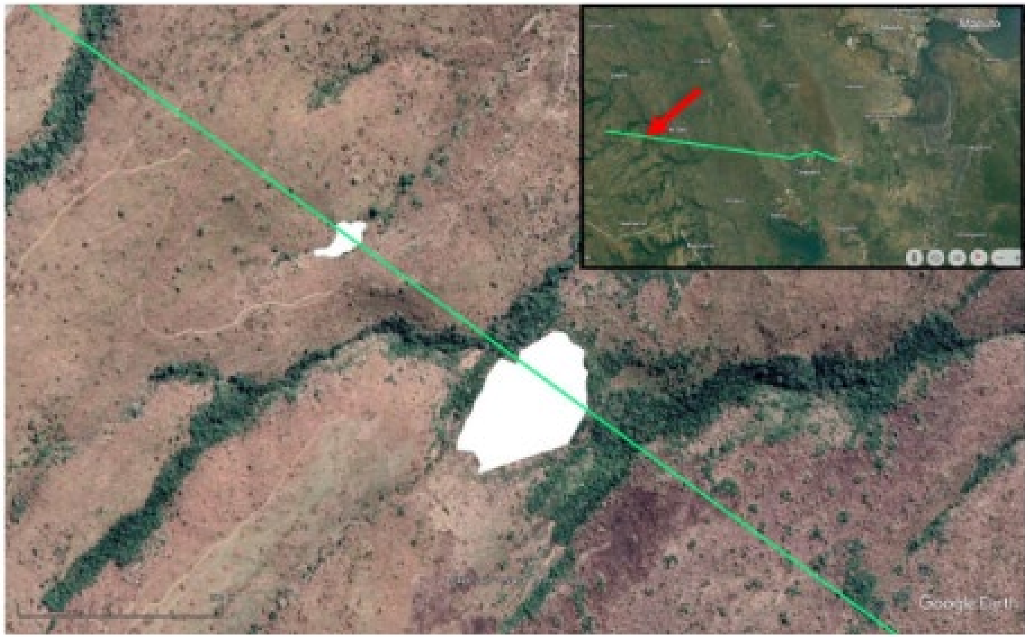
Figure 50: Tree composition near Namaacha transect 16



Source: Coombs (2024)

Figure 51: Tree composition near Namaacha transect 17

Tree transect 17 is immediately in front of a large exposed rocky habitat colonized by dense population of particularly *Euphorbia cooperi, Pachypodium saundersii, Xerophyta retinervis* and *Aloe spicata.*

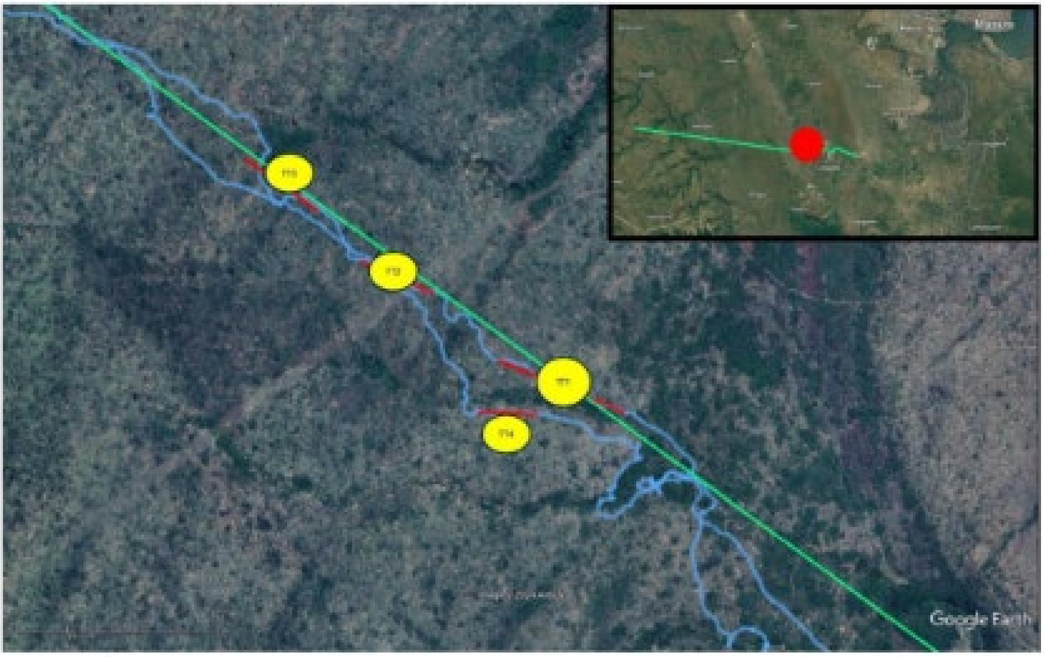


Source: Coombs (2024)

Figure 52: Sensitive area near transect -17

Boane Tree transects 1 - 4

The position locations of transects 1 – 4 is shown in the figure below and was located near Mozambique farms, approximately 9km northwest of Boane.



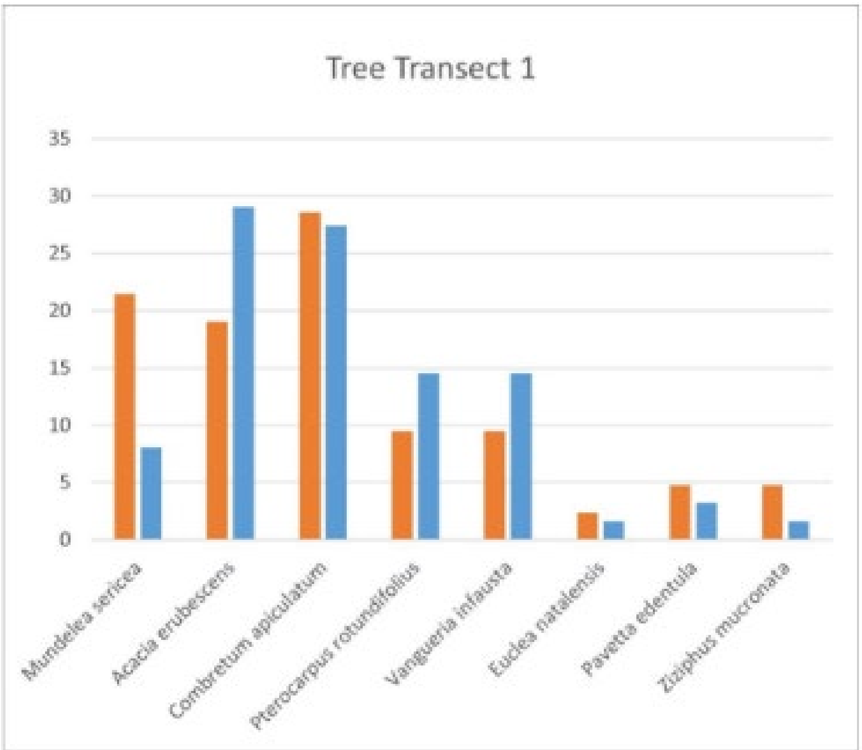
Source: Coombs (2024)

Figure 53: Location for Boane transects 1-4

The dominant species where *Senegalia erubescens, Combretum apiculatum, Mundulea sericea, Pterocarpus rotundifolius* and other common species including *Vangueria infausta, Euclea natalensis, Pavetta edentula, P. schumannii, Sclerocarya birrea, Lannea discolor, Ozoroa engleri, Cynanchum viminale, Searsia guenzii, Putterlickia* spp., *Garcinia livingstonei*, *Croton* and *Ziziphus mucronata*. Other species include *Ormocarpum trichocarpum* and *Senna petersiana*. The riparian forests have elements of KwaZulu-Natal Scarp forest including *Apodytes dimidiata, Canthium ciliatum, Ficus glumosa* and *Tabernaemontana elegans*.

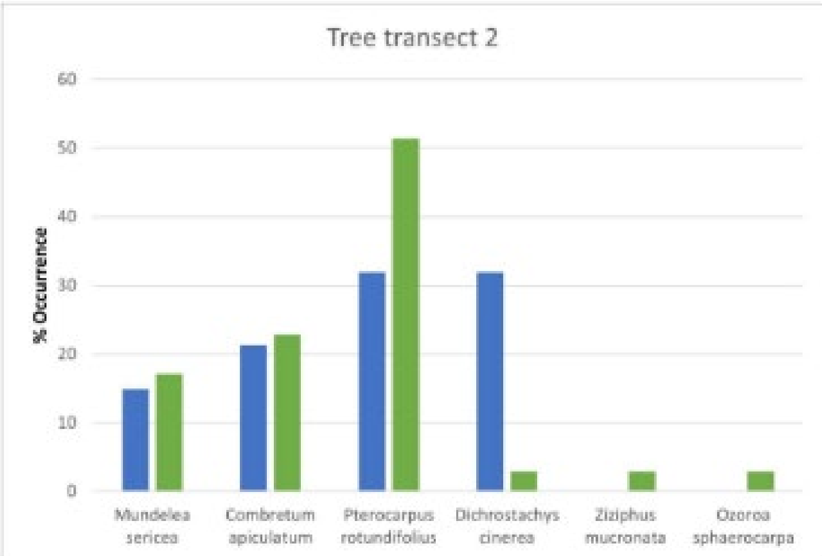
The main areas of concern in this area are the rocky outcrops within the riparian areas adjacent to the river courses. All of these rocky outcrops are densely populated particularly with *Aloe spicata, Euphorbia cooperi, Euphorbia confinalis* and other species such as *Pachypodium saundersii* and *Xerophyta retinervis*.

Disturbance and clearing in these rocky areas must be kept to a minimum required for the construction of the OHL. The same pattern of abundance of Aloes is also seen in other areas throughout the footprint. It should be noted that Aloe spicata in particular is abundant on the site and listed as a Least Concern species according to the IUCN red list.



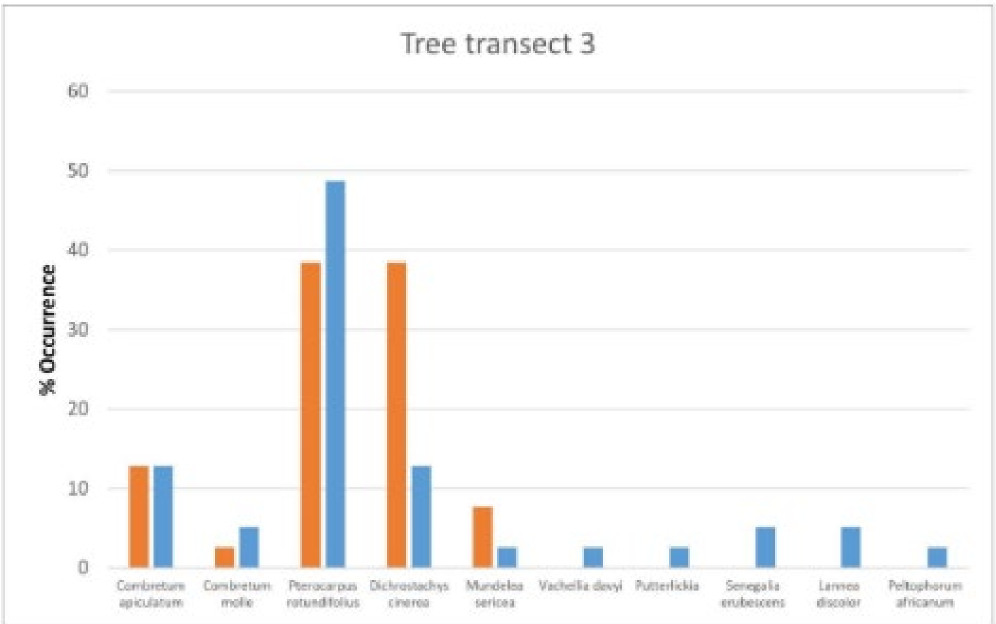
Source: Coombs (2024)

Figure 54: Tree composition near Boane transect 1



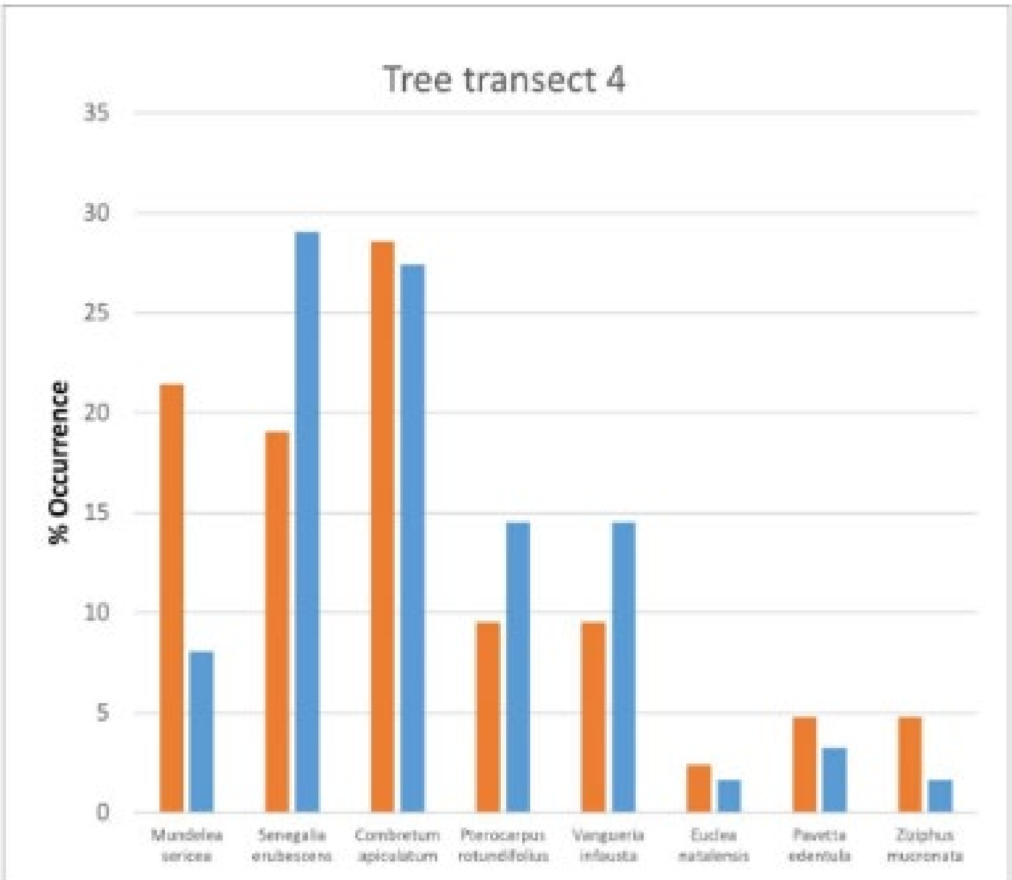
Source: Coombs (2024)

Figure 55: Tree composition near Boane transect 2



Source: Coombs (2024)

Figure 56: Tree composition near Boane transect 3

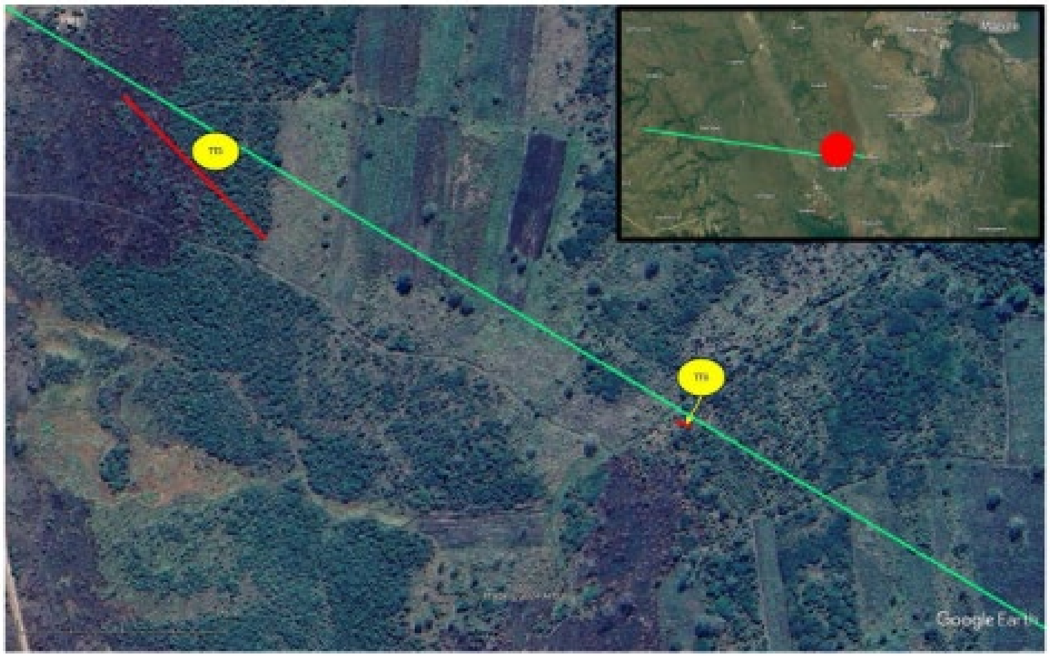


Source: Coombs (2024)

Figure 57: Tree composition near Boane transect 4

Boane Tree Transects 5 - 6

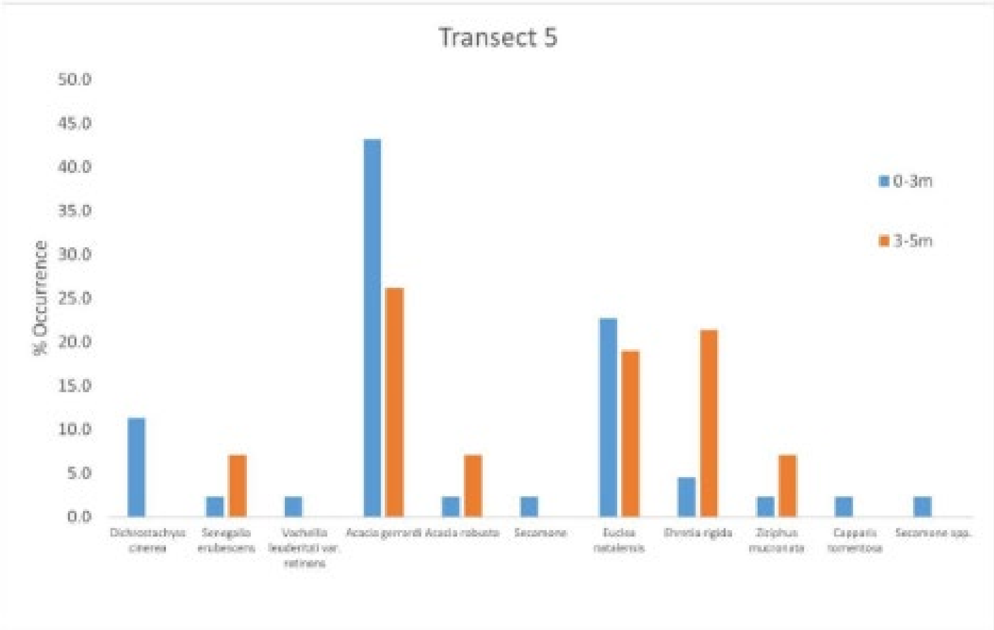
The location of tree transects 5 and 6 are shown in the figure below.



Source: Coombs (2024)

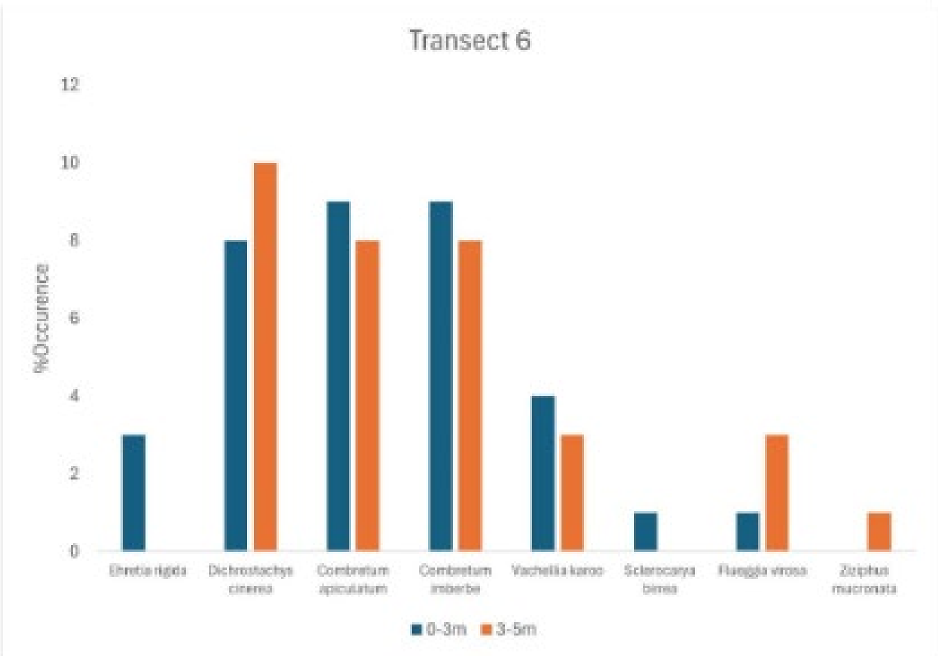
Figure 58: Location for Boane transects 5-6

The differences between these two transects illustrates the great degree of localized variation in species composition within this site. These two transects are approximately 600m apart and dominated by a different suite of species. The vegetation along this section, particularly in Transect 5 was also different than that found in transects 1 – 4, however it remains a form of Southern Lebombo bushveld. In transect 5, the vegetation was dominated by species such as *Vachellia gerrardi, Euclea natalensis, Dichrostachys cinerea* and *Ehretia rigida*. Some species of *Vachellia* were unique to this site/area and were not located on other transects, as *Vachellia gerrardi, Vachellia leuderitzii* var. *retinens* and *V. robusta*. In contrast to transect 5, Transect 6 was again dominated by *Combretum apiculatum, Combretum imberbe* and *Vachellia karroo*. Both *Combretum imberbe* and *Combretum hereroensis* tended to be more located in this area and transects 1-4 and were scarce at other sites.



Source: Coombs (2024)

Figure 59: Tree composition near Boane transect 5



Source: Coombs (2024)

Figure 60: Tree composition near Boane transect 6

A simple comparison between transects Transect 4 shows how different this vegetation patch is as Transect 4 has a higher abundance of *Pterocarpus rotundifolius*, *Combretum apiculatum* and *Senegalia erubescens*.

Much of this vegetation has however been cleared and transformed into small scale agricultural lands which is typical of this area and moving closer to Boane. As is seen throughout the site, large trees, particularly *Sclerocarya birrea*, are left standing among the crops.

6.2.2.3. Natural and Critical Habitat

A Critical Habitat Assessment was conducted by The Biodiversity Consultancy for the combined project, i.e. the wind farm and the transmission line. This is included in Appendix 4 of the Biodiversity Action Plan (BAP, revised October 2024). As part of the original assessment, two threatened ecosystems were identified that would potentially trigger critical habitat following the definition of Performance Standard 6; however, following a recent revision of the conservation status of threatened ecosystems in Mozambique, no threatened ecosystems qualify as critical habitat or are likely to be affected by the Project.

The assessment did also identify some natural habitat, as defined in Performance Standard 6, present along the transmission line. A key objective of the habitat mapping conducted by G. Coombs in March and April 2024 was to better characterise the extent of this natural habitat. As presented in the BAP, forests, shrublands and grasslands within the transmission line area of influence are considered to qualify as potentially affected natural habitat for the purposes of demonstrating no net loss under Performance Standard 6. This therefore includes much of the transmission line route, except where the habitat type is indicated as agromosaic, disturbed agromosaic, or urban/village lands in Section 6.2.2.1.

The BAP, which applies to both the wind farm project and the transmission line project, was updated in October 2024 to include a revised estimate of quality hectares of natural habitat lost. Note that this calculation used the results of the habitat mapping conducted by Dr. G. Coombs for the wind farm site and most of the transmission line route, but for the 18.3 km section of the new route through Namaacha District that was not mapped, land cover maps from ESA WorldCover 2021 were used to estimate likely natural habitat present. The tables below shows the estimated natural habitat loss for the transmission line project (see the BAP for further details).

Table 27: Estimated residual Impact target for natural habitat (parallel line section)

Habitat types	Expected 100% loss in extent & quality			Expected 50% loss in quality			Expected 25% loss in quality			Total residual impact
	Area (ha)	Quality	QH	Area (ha)	Quality	QH	Area (ha)	Quality	QH	(QH)
Forest	1.40	0.60	0.84	5.27	0.30	1.58	5.00	0.15	0.75	3.17
Open Forest	1.80	0.60	1.08	6.65	0.30	1.99	5.76	0.15	0.86	3.94
Savanna - Dry	46.76	0.60	28.06	171.57	0.30	51.47	152.87	0.15	22.93	102.46
Savanna - Moist	0.56	0.60	0.34	1.61	0.30	0.48	1.48	0.15	0.22	1.04
Savanna – Dry degraded	0.43	0.40	0.17	1.45	0.20	0.29	1.25	0.10	0.12	0.59
MH	4.44	na	na	16.69	na	na	15.46	na	na	na
Total	**50.95**	**n/a**	**30.49**	**186.55**	**n/a**	**55.82**	**166.36**	**n/a**	**24.89**	**111.20**

Source: TBC (2024)

Table 28: Estimated residual Impact target for natural habitat (single line section)

Habitat types	Expected 100% loss in extent & quality			Expected 50% loss in quality			Expected 25% loss in quality			Total residual impact
	Area (ha)	Quality	QH	Area (ha)	Quality	QH	Area (ha)	Quality	QH	(QH)
Forest	na	na	na	na	na	na	na	na	na	na
Open Forest	na	na	na	na	na	na	na	na	na	na
Savanna - Dry	na	na	na	na	na	na	na	na	na	na
Savanna - Moist	0.18	0.60	0.11	0.70	0.30	0.21	0.77	0.15	0.12	0.43
Savanna – Dry degraded	na	na	na	na	na	na	na	na	na	na
MH	5.19	na	na	20.75	na	na	26.14	na	na	na
Total	**0.18**	**n/a**	**0.11**	**0.70**	**n/a**	**0.21**	**0.77**	**n/a**	**0.12**	**0.43**

Source: TBC (2024)

The estimated total area of natural habitat affected is 111.63 ha, which is mostly comprised of dry savannah (102.46 ha). Note that the quality hectares estimated in the residual impact assessment for the BAP have been determined by assuming the following for the of the overhead transmission line route:

- a 100% reduction in habitat quality for the 5 m immediately under the transmission lines;
- a 50% reduction in habitat quality within the PPZ; and
- a 25% reduction in habitat quality within 25 m of either side of the PPZ.

Figure 61 to Figure 68 show the expected natural habitat (and modified habitat) within these three zones sequentially along the transmission line route, starting from the wind farm side.

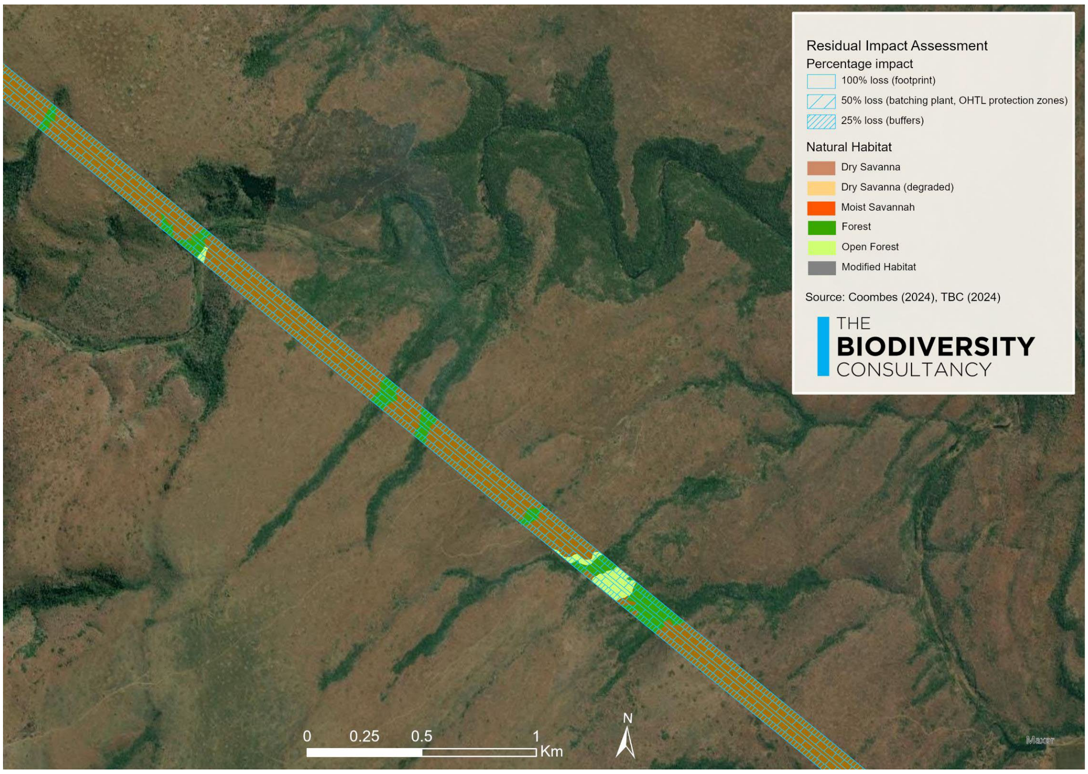


Figure 61: Natural habitat along the transmission line route (1 of 8)

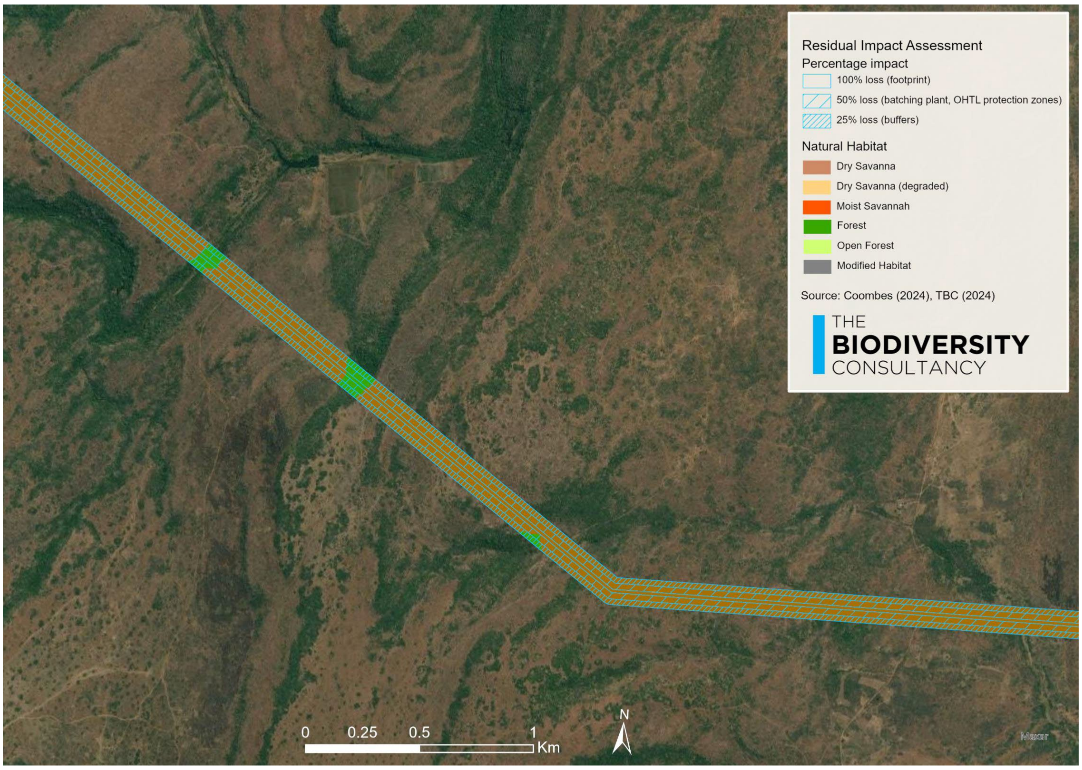


Figure 62: Natural habitat along the transmission line route (2 of 8)

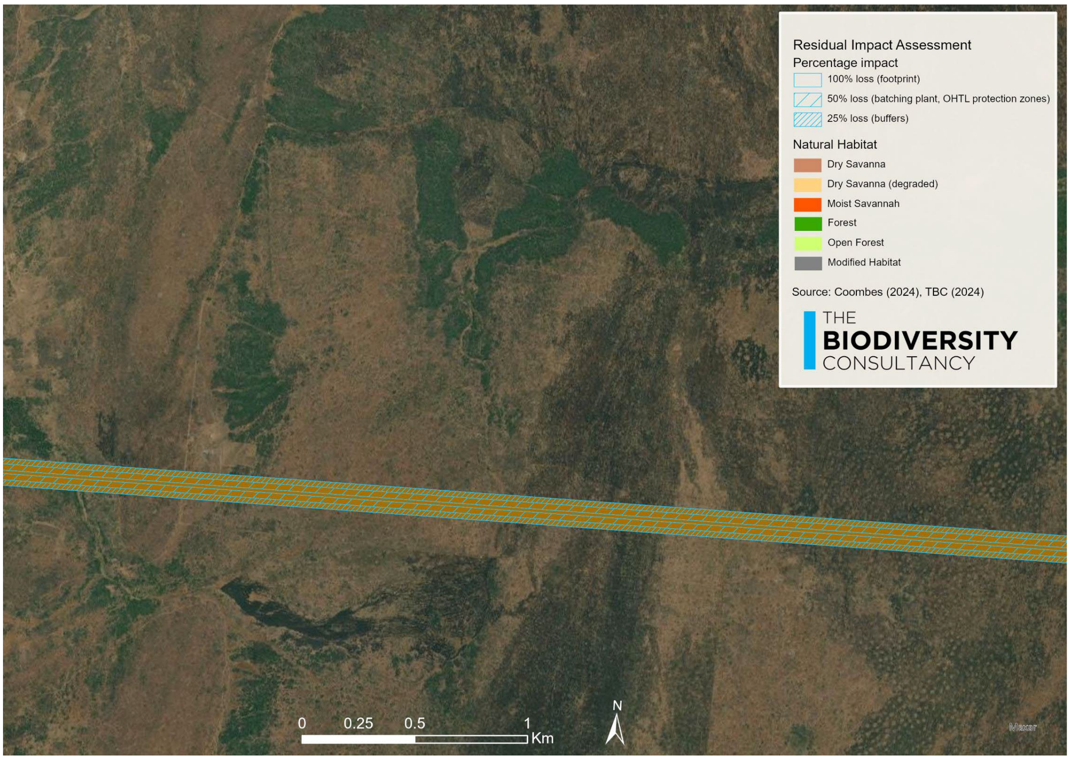


Figure 63: Natural habitat along the transmission line route (3 of 8)

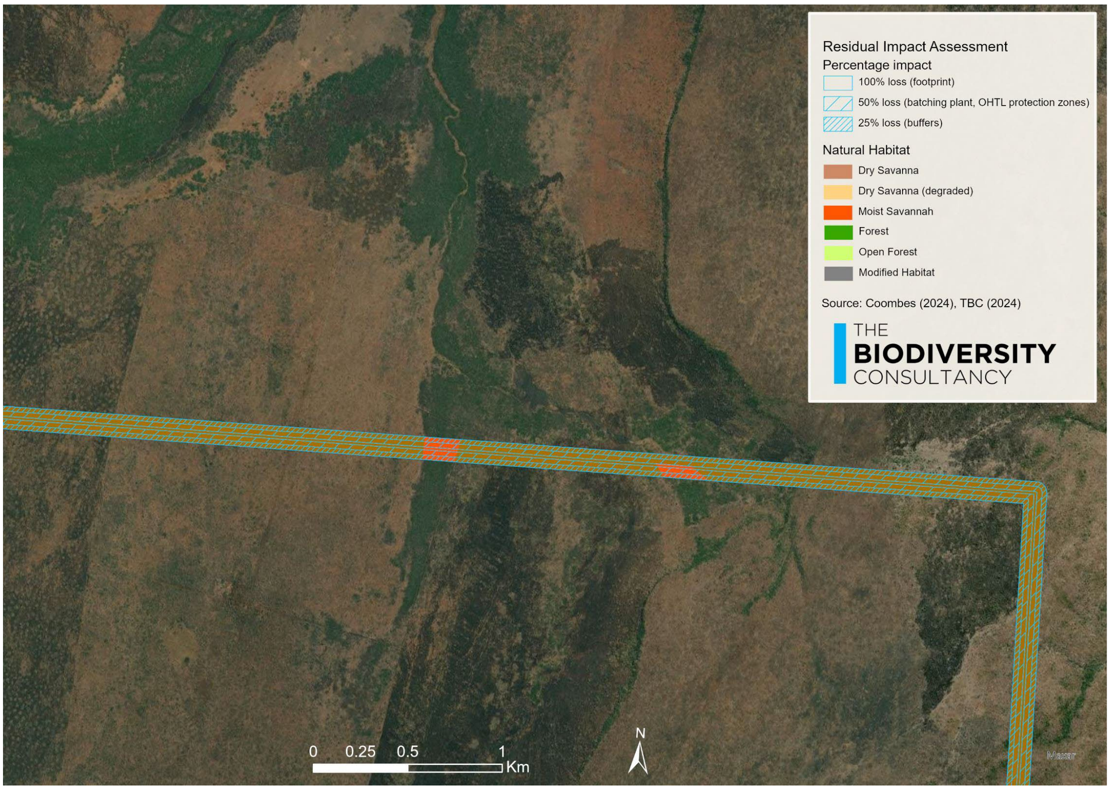


Figure 64: Natural habitat along the transmission line route (4 of 8)

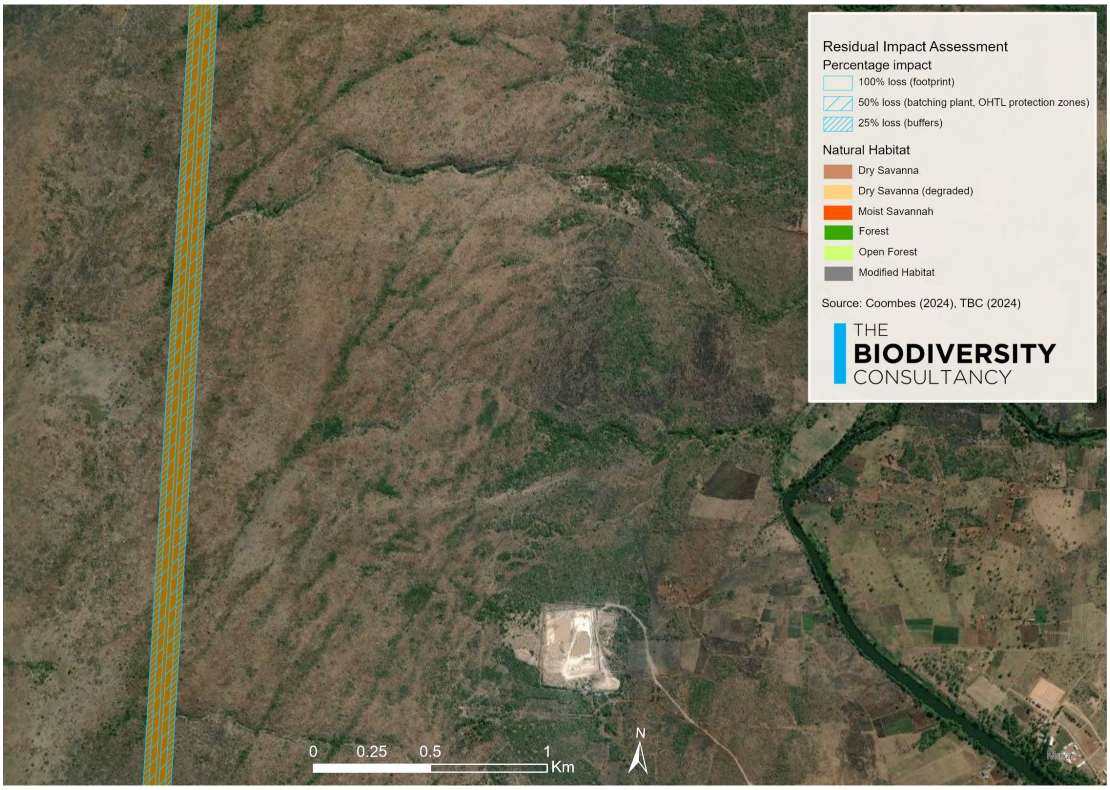


Figure 65: Natural habitat along the transmission line route (5 of 8)

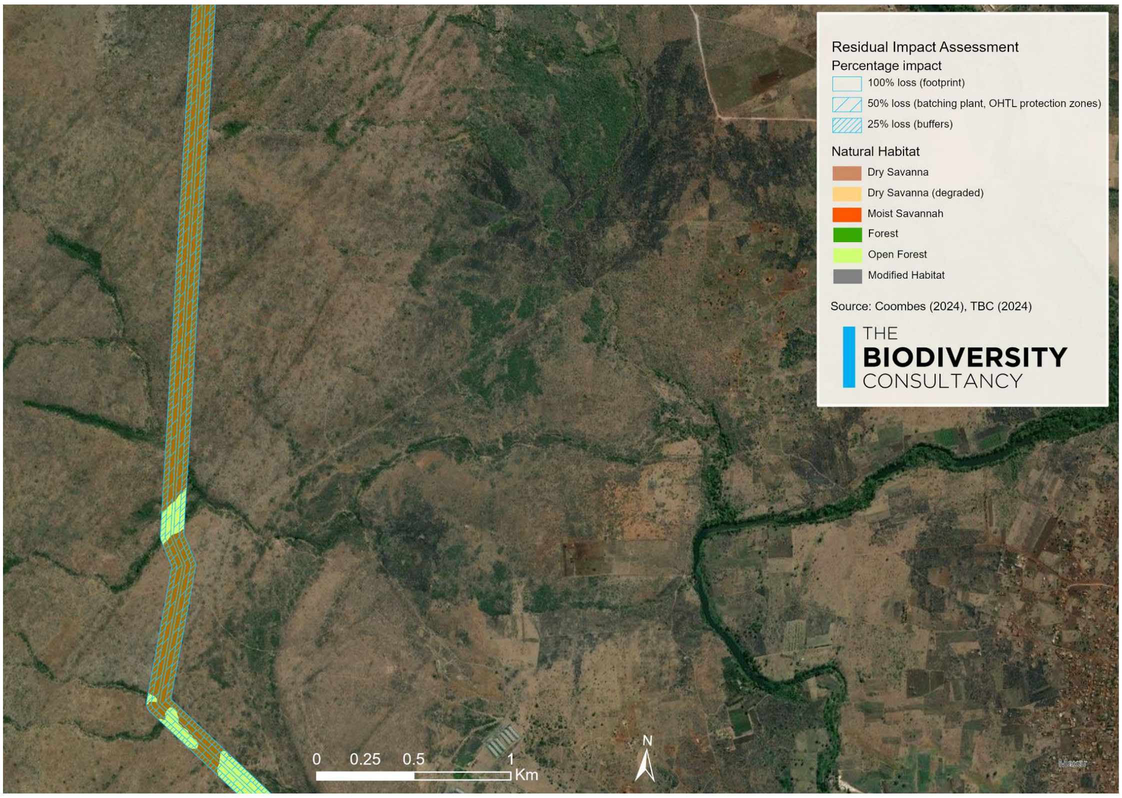


Figure 66: Natural habitat along the transmission line route (6 of 8)

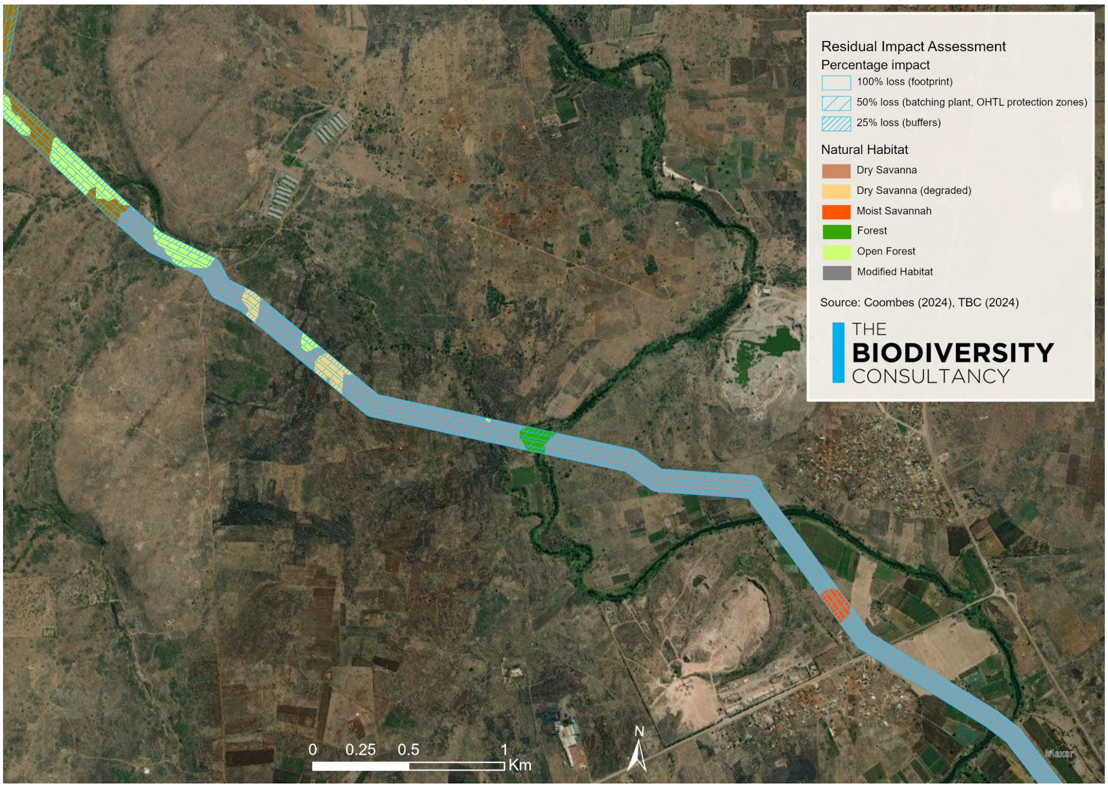


Figure 67: Natural habitat along the transmission line route (7 of 8)

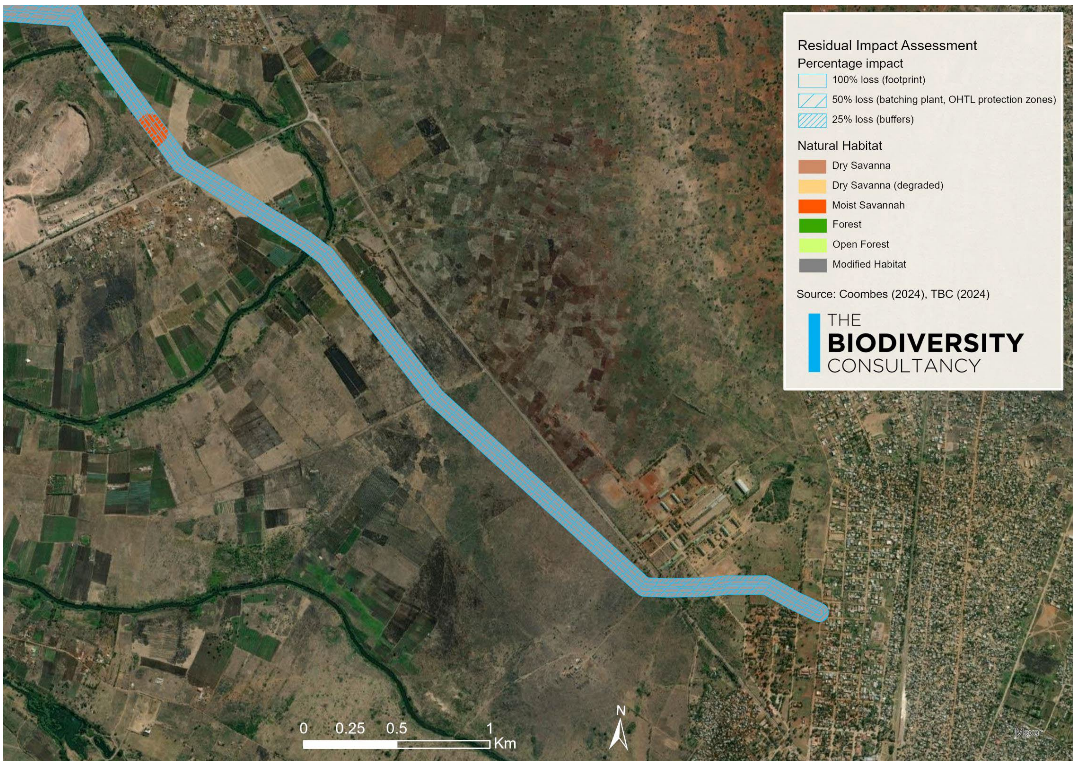


Figure 68: Natural habitat along the transmission line route (8 of 8)

6.2.3. Fauna

6.2.3.1. Avifauna

According to secondary data collected through a comprehensive literature review on birds within the project area, 240 bird species of potential occurrence have been identified in the project area. This number excludes species of birds from the families of the Passeriformes Order which, due to their size and behaviour, are not at risk from this type of projects.

The 240 potentially occurring species in the study area belong to 17 orders and 51 families.

Of the species of potential occurrence, about 31 are migratory birds, with the remaining birds being resident. About 43 species are birds of prey, including species of hawks and vultures.

In terms of birds of potential occurrence in the area, species typically associated with forest and wetlands species have a higher representation.

The project area has a moderate to high diversity of avifauna, particularly of smaller terrestrial species which are less likely to suffer collision impacts.

Bird surveys were performed in the dry season (early November 2022) and in the wet season (late March 2023).

Eighty-nine (89) bird species were observed, of which 39 were recorded in both seasons of the year. In the second campaign, 32 new species were observed, which had not been registered in the previous campaign. While 18 species recorded in the first campaign were not observed in the second. This indicates the dynamics in terms of species variation at this location throughout the year, i.e., there are many local movements between species areas, including some migrations. About 16% of the observed bird species are considered migratory in the study area, of which 7% are palearctic migrants and 9% are intra-African migrants. The other species are considered common residents in the region, that is, they are present all year round. This finding emphasizes the importance of this area for migratory birds in addition to resident birds.

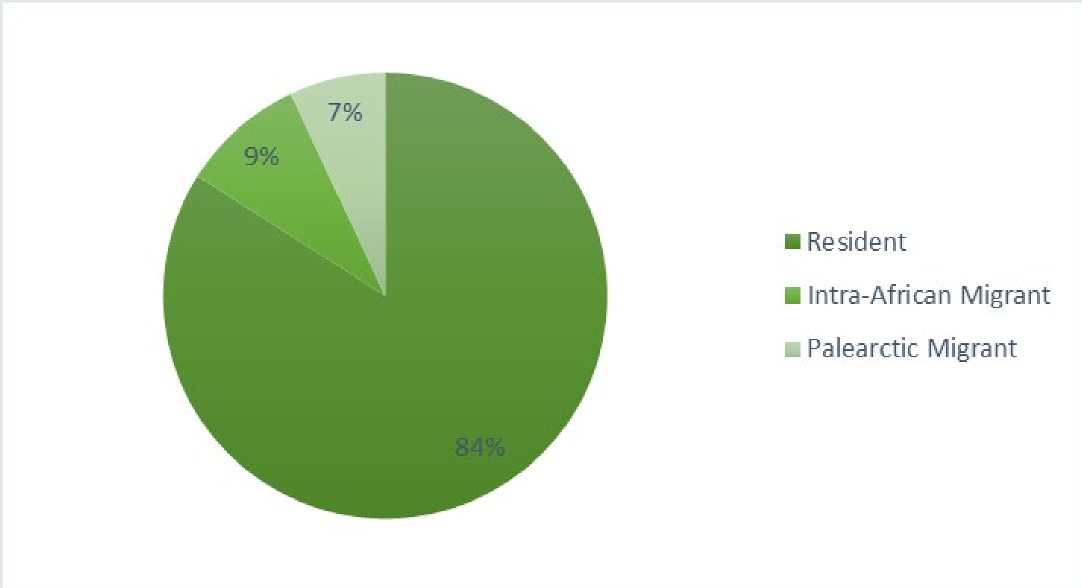


Figure 69: Percentage of common resident, African migratory, and palearctic migratory bird species observed in the study area during the two sampling seasons

All of the observed species have a Least Concern (LC) conservation status according to the IUCN red list (IUCN, 2023). Three of this species are protected by Mozambique's Forest and Wildlife Regulations (Decree No. 12/2002).

Table 29: Observed bird species

Order	Family	Species	Name	Status	Season	Comment
APODIFORMES	APODIDAE	Apus affinis	Little Swift	Common Resident	Wet/Dry	
CHARADRIIFORMES	GLAREOLIDAE	Glareola pratincola	Collared Pratincole	Common Resident	Wet/Dry	
CICONIIFORMES	PLATALEIDAE	Bostrychia hagedash	Hadada Ibis	Common Resident	Wet/Dry	
COLIIFORMES	COLIIDAE	Colius striatus	Speckled Mousebird	Common Resident	Wet/Dry	
COLIIFORMES	COLIIDAE	Urocolius indicus	Red-faced Mousebird	Common Resident	Wet/Dry	
COLUMBIFORMES	COLUMBIDAE	Streptopelia capicola	Cape Turtle Dove	Common Resident	Wet/Dry	Protected
COLUMBIFORMES	COLUMBIDAE	Streptopelia decipiens	Mourning Collared Dove	Common Resident	Wet/Dry	
COLUMBIFORMES	COLUMBIDAE	Streptopelia semitorquata	Red-eyed Dove	Common Resident	Wet/Dry	
COLUMBIFORMES	COLUMBIDAE	Treron calva	African Green Pigeon	Common Resident	Wet	
COLUMBIFORMES	COLUMBIDAE	Turtur chalcospilos	Emerald-spotted Wood Dove	Common Resident	Wet/Dry	Protected
CORACIIFORMES	ALCEDINIDAE	Halcyon albiventris	Brown-hooded Kingfisher	Common Resident	Wet/Dry	
CORACIIFORMES	BUCEROTIDAE	Lophoceros alboterminatus	Crowned Hornbill	Common Resident	Wet/Dry	
CORACIIFORMES	BUCEROTIDAE	Tockus leucomelas	Southern Yellow-billed Hornbill	Common Resident	Wet/Dry	
CORACIIFORMES	CORACIIDAE	Coracias caudata	Lilac-breasted Roller	Common Resident	Wet	
CORACIIFORMES	MEROPIDAE	Merops persicus	Blue-cheeked Bee-eater	Palearctic migratory	Wet/Dry	
CORACIIFORMES	MEROPIDAE	Merops pusillus	Little Bee-eater	Common Resident	Wet/Dry	
CUCULIFORMES	CUCULIDAE	Centropus burchellii	Burchell's Coucal	African migratory	Wet/Dry	
CUCULIFORMES	CUCULIDAE	Chrysococcyx klaas	Klaas's Cuckoo	African Migratory	Wet/Dry	
CUCULIFORMES	CUCULIDAE	Clamator jacobinus	Jacobin Cuckoo	African Migratory	Wet/Dry	
CUCULIFORMES	CUCULIDAE	Cuculus clamosus	Black Cuckoo	African Migratory	Wet/Dry	
CUCULIFORMES	CUCULIDAE	Cuculus solitarius	Red-chested Cuckoo	African Migratory	Wet/Dry	
CUCULIFORMES	MUSOPHAGIDAE	Corythaixoides concolor	Grey Go-away-bird	Common Resident	Wet/Dry	

CUCULIFORMES	MUSOPHAGIDAE	Crinifer concolor	Grey Go-away-bird	Common Resident	Wet	
CUCULIFORMES	MUSOPHAGIDAE	Tauraco livingstonii	Livingstone's Turaco	Uncommon Resident	Wet/Dry	
FALCONIFORMES	ACCIPITRIDAE	Circaetus pectoralis	Black-chested Snake Eagle	Uncommon resident	Wet/Dry	
FALCONIFORMES	ACCIPITRIDAE	Polyboroides typus	African Harrier-Hawk	Common Resident	Wet/Dry	
GALIFORMES	NUMIDIDAE	Numida meleagris	Helmeted Guineafowl	Common Resident	Wet/Dry	Protected
GALIFORMES	PHASIANIDAE	Coturnix coturnix	Common Quail	Palearctic Migratory	Wet	
GALIFORMES	PHASIANIDAE	Pternistis afer	Red-necked Spurfowl	Common Resident	Wet/Dry	
PASSERIFORMES	ALAUDIDAE	Mirafra rufocinnamomea	Flappet Lark	Common Resident	Wet/Dry	
PASSERIFORMES	DICRURIDAE	Dicrurus adsimilis	Fork-tailed Drongo	Common Resident	Wet/Dry	
PASSERIFORMES	DICRURIDAE	Dicrurus ludwigii	Common Square-tailed Drongo	Common Resident	Wet/Dry	
PASSERIFORMES	ESTRILDIDAE	Estrilda astrild	Common Waxbill	Common Resident	Wet/Dry	
PASSERIFORMES	ESTRILDIDAE	Lagonosticta rubricata	African Firefinch	Uncommon Resident	Wet/Dry	
PASSERIFORMES	ESTRILDIDAE	Lonchura cucullata	Bronze Mannikin	Common Resident	Wet/Dry	
PASSERIFORMES	ESTRILDIDAE	Lonchura cucullata	Bronze Mannikin	Common Resident	Wet	
PASSERIFORMES	ESTRILDIDAE	Uraeginthus angolensis	Blue Waxbill	Common Resident	Wet/Dry	
PASSERIFORMES	FRINGILLIDAE	Crithagra mozambica	Yellow-fronted Canary	Common Resident	Wet/Dry	
PASSERIFORMES	FRINGILLIDAE	Crithagra sulphurata	Brimstone Canary	Common Resident	Wet	
PASSERIFORMES	FRINGILLIDAE	Emberiza tahapisi	Cinnamon-breasted Bunting	Common Resident	Wet/Dry	
PASSERIFORMES	HIRUNDINIDAE	Cecropis abyssinica	Lesser Striped Swallow	African Migratory	Wet/Dry	
PASSERIFORMES	HIRUNDINIDAE	Hirundo rustica	Barn Swallow	Palearctic Migratory	Wet/Dry	
PASSERIFORMES	HIRUNDINIDAE	Hirundo spilodera	South African Cliff Swallow	African Migratory	Wet/Dry	
PASSERIFORMES	HIRUNDINIDAE	Riparia riparia	Sand Martin	Palearctic Migratory	Wet/Dry	
PASSERIFORMES	MALACONOTIDAE	Chlorophoneus sulfureopectus	Orange-breasted Bushshrike	Common Resident	Wet/Dry	
PASSERIFORMES	MALACONOTIDAE	Dryoscopus cubla	Black-backed Puffback	Common Resident	Wet/Dry	

PASSERIFORMES	MALACONOTIDAE	Laniarius ferrugineus	Southern Boubou	Common Resident	Wet/Dry	
PASSERIFORMES	MALACONOTIDAE	Tchagra australis	Brown-crowned Tchagra	Common Resident	Wet/Dry	
PASSERIFORMES	MALACONOTIDAE	Tchagra tchagra	Southern Tchagra	Uncommon Resident	Wet/Dry	
PASSERIFORMES	MALACONOTIDAE	Telophorus viridis	Gorgeous Bushshrike	Uncommon Resident	Wet/Dry	
PASSERIFORMES	MUSCICAPIDAE	Batis fratrum	Woodward's Batis	Common Resident	Wet	Endemic
PASSERIFORMES	MUSCICAPIDAE	Batis molitor	Chinspot Batis	Common Resident	Wet/Dry	
PASSERIFORMES	MUSCICAPIDAE	Batis soror	Mozambique Batis	Unconfirmed	Wet	Endemic Does not occur in southern Moz. May have been the Chinspot Batis.
PASSERIFORMES	MUSCICAPIDAE	Terpsiphone viridis	African Paradise Flycatcher	Common Resident	Wet/Dry	
PASSERIFORMES	NECTARINIIDAE	Chalcomitra amethystina	Amethyst Sunbird	Common Resident	Wet	
PASSERIFORMES	NECTARINIIDAE	Chalcomitra senegalensis	Scarlet-chested Sunbird	Common Resident	Wet/Dry	
PASSERIFORMES	NECTARINIIDAE	Cinnyris bifasciatus	Purple-banded Sunbird	Common Resident	Wet	
PASSERIFORMES	NECTARINIIDAE	Cinnyris mariquensis	Marico Sunbird	Common Resident	Wet/Dry	
PASSERIFORMES	NECTARINIIDAE	Cinnyris talatala	White-bellied Sunbird	Common Resident	Wet	
PASSERIFORMES	NECTARINIIDAE	Cinnyris venustus	Variable Sunbird	Unconfirmed	Wet/Dry	Never been recorded in southern Mozambique or Swaziland. May have been the similar looking Collared Sunbird.
PASSERIFORMES	NECTARINIIDAE	Hedidypna collaris	Collared Sunbird	Common Resident	Wet	
PASSERIFORMES	PLOCEIDAE	Euplectes ardens	Red-collared Widowbird	Common Resident	Wet/Dry	
PASSERIFORMES	PLOCEIDAE	Euplectes capensis	Yellow Bishop	Common Resident	Wet	
PASSERIFORMES	PLOCEIDAE	Passer griseus	Northern Grey-headed Sparrow	Unconfirmed	Wet	Not documented to occur in southern Mozambique. May have been the Southern Grey-headed Sparrow.
PASSERIFORMES	PLOCEIDAE	Ploceus ocularis	Spectacled Weaver	Common Resident	Wet/Dry	

PASSERIFORMES	PLOCEIDAE	Ploceus velatus	Southern Masked Weaver	Common Resident	Wet/Dry	
PASSERIFORMES	PYCNONOTIDAE	Andropadus importunus	Sombre Greenbul	Common Resident	Wet/Dry	
PASSERIFORMES	PYCNONOTIDAE	Chlorocichla flaviventris	Yellow-bellied Greenbul	Common Resident	Wet/Dry	
PASSERIFORMES	PYCNONOTIDAE	Nicator gularis	Eastern Nicator	Common Resident	Wet/Dry	
PASSERIFORMES	PYCNONOTIDAE	Phyllastrephus terrestris	Terrestrial Brownbul	Common Resident	Wet/Dry	
PASSERIFORMES	PYCNONOTIDAE	Pycnonotus tricolor	Dark-capped Bulbul	Common Resident	Wet/Dry	
PASSERIFORMES	STURNIDAE	Lamprotornis corruscus	Black-bellied Starling	Uncommon Resident	Wet/Dry	
PASSERIFORMES	SYLVIIDAE	Apalis flavida	Yellow-breasted Apalis	Common Resident	Wet/Dry	
PASSERIFORMES	SYLVIIDAE	Camaroptera brachyura	Green-backed Camaroptera	Common Resident	Wet	
PASSERIFORMES	SYLVIIDAE	Cisticola chiniana	Rattling Cisticola	Common Resident	Wet/Dry	
PASSERIFORMES	SYLVIIDAE	Cisticola galactotes	Rufous-winged Cisticola	Common Resident	Wet/Dry	
PASSERIFORMES	SYLVIIDAE	Prinia subflava	Tawny-flanked Prinia	Common Resident	Wet/Dry	
PASSERIFORMES	SYLVIIDAE	Sylvietta whytii	Red-faced Crombec	Unconfirmed	Wet/Dry	Does not occur south of central Mozambique. May have been the Long-billed Crombec which is common in southern Mozambique.
PASSERIFORMES	TIMALIIDAE	Turdoides jardineii	Arrow-marked Babbler	Common Resident	Wet/Dry	
PASSERIFORMES	TURDIDAE	Cercotrichas leucophrys	White-browed Scrub Robin	Common Resident	Wet/Dry	
PASSERIFORMES	TURDIDAE	Cossypha heuglini	White-browed Robin-Chat	Common Resident	Wet	
PASSERIFORMES	TURDIDAE	Cossypha natalensis	Red-capped Robin-Chat	Common Resident	Wet	
PASSERIFORMES	TURDIDAE	Saxicola torquata	African Stonechat	Palearctic Migratory	Wet	
PASSERIFORMES	VIDUIDAE	Vidua macroura	Pin-tailed Whydah	Common Resident	Wet	
PASSERIFORMES	ZOSTEROPIDAE	Zosterops anderssoni	Southern Yellow White-eye	Uncommon Resident	Wet/Dry	

PICIFORMES	LYBIIDAE	Lybius torquatus	Black-collared Barbet	Common Resident	Wet/Dry	
PICIFORMES	LYBIIDAE	Pogoniulus bilineatus	Yellow-rumped Tinkerbird	Common Resident	Wet/Dry	
PICIFORMES	LYBIIDAE	Trachyphonus vaillantii	Crested Barbet	Common Resident	Wet/Dry	
PICIFORMES	PICIDAE	Dendropicos fuscescens	Cardinal Woodpecker	Common Resident	Wet	
STRIGIFORMES	STRIGIDAE	Glaucidium capense	African Barred Owlet	Uncommon Resident	Wet/Dry	

Source: Consultec (2023)

Species Density

During the first campaign, the species that had the highest density were the following: *Merops persicus, Cisticola chiniana, Turtur chalcospilos, Prinia subflava, Andropadus importunes, Pycnonotus tricolor, Crithagra mozambica, Laniarius ferrugineus*, etc. In general, during the second campaign, the dominant species were almost the same, changing only the hierarchical order between them.

Table 30: Observed bird species density

Scientific Name	Common Name	Density (dry)	Density (wet)	Status
Merops persicus	Blue-cheeked Bee-eater	0,001165	0,000121	Palearctic Migratory
Cisticola chiniana	Rattling Cisticola	0,000892	0,000276	Common Resident
Turtur chalcospilos	Emerald-spotted Wood Dove	0,000821	0,000044	Common Resident
Prinia subflava	Tawny-flanked Prinia	0,000754	0,000242	Common Resident
Andropadus importunus	Sombre Greenbul	0,000453	0,000691	Common Resident
Pycnonotus tricolor	Dark-capped Bulbul	0,000446	0,000297	Common Resident
Crithagra mozambica	Yellow-fronted Canary	0,000434	0,000257	Common Resident
Laniarius ferrugineus	Southern Boubou	0,000423	0,000129	Common Resident
Uraeginthus angolensis	Blue Waxbill	0,000302	0,000388	Common Resident
Tchagra australis	Brown-crowned Tchagra	0,000293	0,000079	Common Resident
Dryoscopus cubla	Black-backed Puffback	0,000259	0,000049	Common Resident
Euplectes ardens	Red-collared Widowbird	0,000259	0,000010	Common Resident
Lagonosticta rubricata	African Firefinch	0,000219	0,000200	Common Resident
Tauraco livingstonii	Livingstone's Turaco	0,000196	0,000024	Common Resident
Hirundo rustica	Barn Swallow	0,000178		Palearctic Migratory
Urocolius indicus	Red-faced Mousebird	0,000173	0,000146	Common Resident
Chlorophoneus sulfureopectus	Orange-breasted Bushshrike	0,000173	0,000049	Common Resident
Ploceus ocularis	Spectacled Weaver	0,000159	0,000010	Common Resident
Mirafra rufocinnamomea	Flappet Lark	0,000151	0,000010	Common Resident
Chalcomitra senegalensis	Scarlet-chested Sunbird	0,000134	0,000079	Common Resident
Lamprotornis corruscus	Black-bellied Starling	0,000129		Uncommon Resident
Bostrychia hagedash	Hadada Ibis	0,000110		Common Resident
Nicator gularis	Eastern Nicator	0,000110		Common Resident
Apalis flavida	Yellow-breasted Apalis	0,000089	0,000041	Common Resident
Centropus burchellii	Burchell's Coucal	0,000089	0,000010	Common Resident
Cuculus solitarius	Red-chested Cuckoo	0,000089		African Migratory
Dicrurus ludwigii	Common Square-tailed Drongo	0,000089		Common Resident
Ploceus velatus	Southern Masked Weaver	0,000086	0,000079	Common Resident
Lonchura cucullata	Bronze Mannikin	0,000084		Common Resident
Phyllastrephus terrestris	Terrestrial Brownbul	0,000065	0,000074	Common Resident

Cercotrichas leucophrys	White-browed Scrub Robin	0,000065	0,000041	Common Resident
Chrysococcyx klaas	Klaas's Cuckoo	0,000065	0,000034	African Migratory
Merops pusillus	Little Bee-eater	0,000065	0,000020	Common Resident
Batis molitor	Chinspot Batis	0,000053	0,000034	Common Resident
Cecropis abyssinica	Lesser Striped Swallow	0,000053		African Migratory
Lybius torquatus	Black-collared Barbet	0,000048	0,000024	Common Resident
Cisticola galactotes	Rufous-winged Cisticola	0,000045	0,000058	Common Resident
Pogoniulus bilineatus	Yellow-rumped Tinkerbird	0,000045	0,000010	Common Resident
Turdoides jardineii	Arrow-marked Babbler	0,000045	0,000010	Common Resident
Colius striatus	Speckled Mousebird	0,000045		Common Resident
Dicrurus adsimilis	Fork-tailed Drongo	0,000045		Common Resident
Pternistis afer	Red-necked Spurfowl	0,000045		Common Resident
Streptopelia capicola	Ring-necked Dove	0,000045		Common Resident
Streptopelia decipiens	Mourning Collared Dove	0,000045		Common Resident
Telophorus viridis	Gorgeous Bushshrike	0,000045		Common Resident
Terpsiphone viridis	African Paradise Flycatcher	0,000045		African Migratory
Estrilda astrild	Common Waxbill	0,000043		Common Resident
Lophoceros alboterminatus	Crowned Hornbill	0,000027	0,000059	Common Resident
Chlorocichla flaviventris	Yellow-bellied Greenbul	0,000027		Common Resident
Tchagra tchagra	Southern Tchagra	0,000027		Common Resident
Tockus leucomelas	Southern Yellow-billed Hornbill	0,000027		Common Resident
Circaetus pectoralis	Black-chested Snake Eagle	0,000011	0,000010	African Migratory
Crinifer concolor	Grey Go-away-bird	0,000011	0,000010	Common Resident
Emberiza tahapisi	Cinnamon-breasted Bunting	0,000011	0,000010	Common Resident
Polyboroides typus	African Harrier-Hawk	0,000011	0,000010	Common Resident
Zosterops anderssoni	Southern Yellow White-eye	0,000011	0,000010	Common Resident
Apus affinis	Little Swift	0,000011		Common Resident
Chalcomitra amethystina	Amethyst Sunbird	0,000011		Common Resident
Cinnyris mariquensis	Marico Sunbird	0,000011		Common Resident
Clamator jacobinus	Jacobin Cuckoo	0,000011		African Migratory
Cuculus clamosus	Black Cuckoo	0,000011		African Migratory
Glareola pratincola	Collared Pratincole	0,000011		Palearctic Migratory
Glaucidium capense	African Barred Owlet	0,000011		Common Resident
Halcyon albiventris	Brown-hooded Kingfisher	0,000011		Common Resident
Numida meleagris	Helmeted Guineafowl	0,000011		Common Resident
Petrochelidon spilodera	South African Cliff Swallow	0,000011		African Migratory
Riparia riparia	Sand Martin	0,000011		Palearctic Migratory
Streptopelia semitorquata	Red-eyed Dove	0,000011		Common Resident
Trachyphonus vaillantii	Crested Barbet	0,000011		Common Resident

Treron calvus	African Green Pigeon		0,000100	Common Resident
Vidua macroura	Pin-tailed Whydah		0,000073	Common Resident
Camaroptera brachyura	Green-backed Camaroptera		0,000059	Common Resident
Cinnyris bifasciatus	Purple-banded Sunbird		0,000049	Common Resident
Cossypha heuglini	White-browed Robin-Chat		0,000024	Common Resident
Saxicola torquatus	African Stonechat		0,000024	Palearctic Migratory
Lonchura cucullata	Bronze Mannikin		0,000020	Common Resident
Cinnyris talatala	White-bellied Sunbird		0,000010	Common Resident
Coracias caudatus	Lilac-breasted Roller		0,000010	Common Resident
Cossypha natalensis	Red-capped Robin-Chat		0,000010	Common Resident
Coturnix coturnix	Common Quail		0,000010	Palearctic Migratory
Crithagra sulphurata	Brimstone Canary		0,000010	Common Resident
Dendropicos fuscescens	Cardinal Woodpecker		0,000010	Common Resident
Euplectes capensis	Yellow Bishop		0,000010	Common Resident
Hedydipna collaris	Collared Sunbird		0,000010	Common Resident
Batis fratrum	Woodward's Batis		0,000009	Common Resident
Note: Excludes bird species identified in preceding table as suspect for area.				

Source: Consultec (2023)

Species richness index

Comparing the richness between the two campaigns, it was higher in the rainy season compared to the dry season. This difference is indicative that the study area is visited by different species throughout the year whose numbers of the respective populations vary. This difference is indicative that the study area is visited by different species throughout the year whose numbers of the respective populations vary.

Birds of Prey

Birds of prey were observed several times in both sampling campaigns. Observations were obtained during the points count and also from free observations throughout the study area. The highlight goes to the following species: *Elanus caeruleus, Milvus aegyptius, Circaetus pectoralis, Polyboroides typus, Aquila wahlbergi* and *Buteo rufofuscus.*

6.2.3.2. Bats and other mammals

During the original EIS study, only 21 species of mammals, from 16 families were identified. Given the similar habitat and level of human development present for the revised transmission line route, it has been assumed that the baseline study for the original route is representative of the conditions along the revised route as well for bats and other mammals.

Five species were found in the dense thickets that cover ravines and the remaining species were recorded in upland grasslands. Seven mammal species are protected by Law in Mozambique (Decree no 12/2002 of June 6th).

Six species of bats were documented using a combination of methods (observation and interviews). Two species of bats were confirmed by direct observation, namely Wahlberg's Epauletted Fruit-bat (dry and wet season) and Yellow house bats (wet season). All are of least conservation concern at global level and are not protected by law in Mozambique.

Evidence of elephants was found in the east-west section of the new route footprint (see Figure 62) near a seasonal watercourse. Note that evidence of elephants being present in the Project area was identified in the original EIS Report as well. As part of the Focus Group Discussions held with local communities, multiple communities (i.e. Gumbe, Madevo, Kalula) confirmed the occasional presence of elephants throughout the region. Local communities speculated that the elephants were visiting from Kruger National Park or the Maputo Elephant Reserve. The African elephant is classified as Endangered by IUCN (2022), which suggests a declining abundance or shrinking distribution of this species.

Note that the Project rerouted the proposed transmission line to avoid directly passing through the watering hole identified in the reconnaissance survey to avoid destruction of any habitat on which the elephants may be dependent.

Figure 70: Evidence of elephants along route

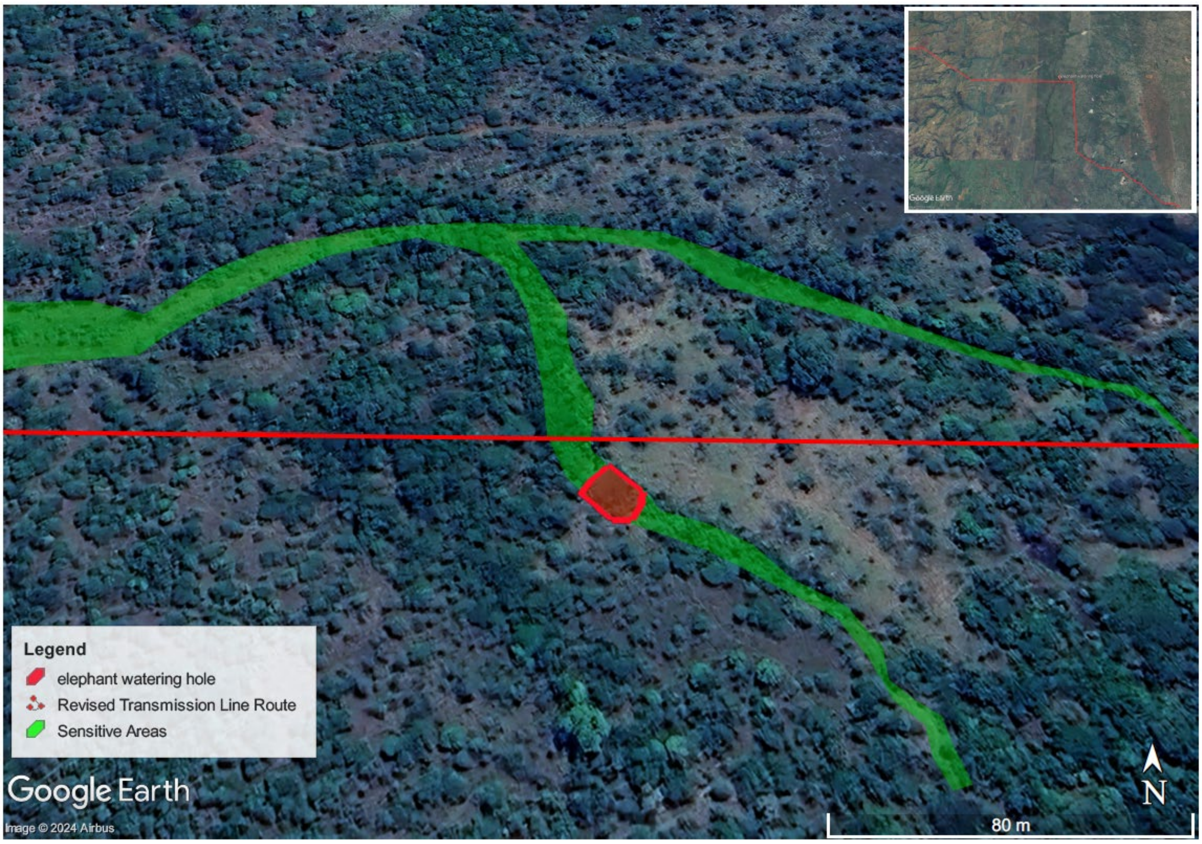


Figure 71: Location of elephant presence

The remaining species noted in the study area were of least conservation concern worldwide, which suggests that the populations of these species are widely distributed and abundant.

***Source**: Consultec, 2023*

Figure 72: From left to right: feeding signs of vervet monkey, droppings of common duiker, scrub hare, red veld rat captured by local people's mouse trap, porcupine quill and chacma baboon skull and droppings of bushpig

6.2.3.3. Reptiles

At least 27 species of reptiles potentially occur in the project area (Branch, 1998). During the dry season field survey for the original EIS study 14 species from nine families were recorded. Only one reptile species identified is protected by Law in Mozambique (Decree no 12/2002, of June 6th). The findings suggest that these species are widely distributed and abundant. Given the similar habitat and level of human development present for the revised transmission line route, it has been assumed that the baseline study for the original route is representative of the conditions along the revised route as well for reptiles.

Table 31: Checklist and conservation status of reptiles recorded in the study area

Family	Scientific Name	Common Name	Habitat type	IUCN Red List	National status
Agamidae	Agama armata	Peter's Ground Agama	Upland grasslands	Least concern	
Agamidae	Acanthocercus atricollis	Southern Tree Agama	Dense thicket in the ravines and upland grasslands	Least concern	
Boidae	Python natalensis	Southern African Python	Upland grasslands	Least concern	Protected
Chamaeleonidae	Chamaeleo dilepis	Flap-necked Chameleon	Upland grasslands	Least concern	
Colubridae	Psammophis mossambicus	Olive Grass Snake	Upland grasslands	Least concern	
Colubridae	Thelotornis capensis		Dense thicket in the ravines	Least concern	
Elapidae	Dendroaspis polylepis	Black mamba	Upland grasslands	Least concern	
Elapidae	Naja mossambica	Cobra-cuspideira-moçambicana	Upland grasslands	Least concern	
Gekkonidae	Lygodactylus capensis	Common dwarf gecko	Dense thicket in the ravines and upland grasslands	Least concern	
Scincidae	Trachylepis depressa	Eastern Coastal Skink	Upland grasslands	Least concern	
Scincidae	Trachylepis varia	Variable Skink	Upland grasslands	Least concern	
Scincidae	Trachylepis quinquetaeniata	Rainbow Skink	Upland grasslands	Least concern	
Viperidae	Bitis arietans	Puff adder	Upland grasslands	Least concern	

Source: Consultec (2023)

6.2.3.4. Amphibians

According to Carruthers (2001) at least 20 species of amphibians occur in the project area. During field survey for the original EIS study seven species were recorded from six families. The five species are widely distributed in Mozambique and in Southern Africa (Carruthers, 2001). There is no information on the conservation status of amphibian species in Mozambique due to lack of data on species occurrence, distribution and abundance. Globally, the recorded species are of least conservation concern and have stable or increasing populations (IUCN 2021). Given the similar habitat and level of human development present for the revised transmission line route, it has been assumed that the baseline study for the original route is representative of the conditions along the revised route as well for amphibians.

Table 32: Checklist and conservation status of amphibians recorded in the study area

Family	Scientific Name	Common Name	Habitat type	IUCN Red List	National status
Bufonidae	*Bufo gutturalis*	Guttural Toad	Upland grassland	Least concern, population increasing	
Bufonidae	*Schismaderma carens*	Red toad	Upland grassland	Least concern, population trend unknown	
Hyperoliidae	*Hyperolius marmoratus*	Painted Reed Frog	Marsh	Least concern, population increasing	
Microhylidae	*Phrynomantis bifasciatus*	Banded Rubber Frog	Upland grassland	Least concern, stable population	
Pipidae	*Xenopus* sp.		Marsh	Least concern, stable population	
Ranidae	*Ptychadena mossambica*	Broad-banded Grass Frog	Upland grassland	Least concern, stable population	
Rhacophoridae	*Chiromantis xerampelina*	Foam Nest Frog	Dense thickets in the ravines	Least concern, stable population	

Source: Consultec (2023)

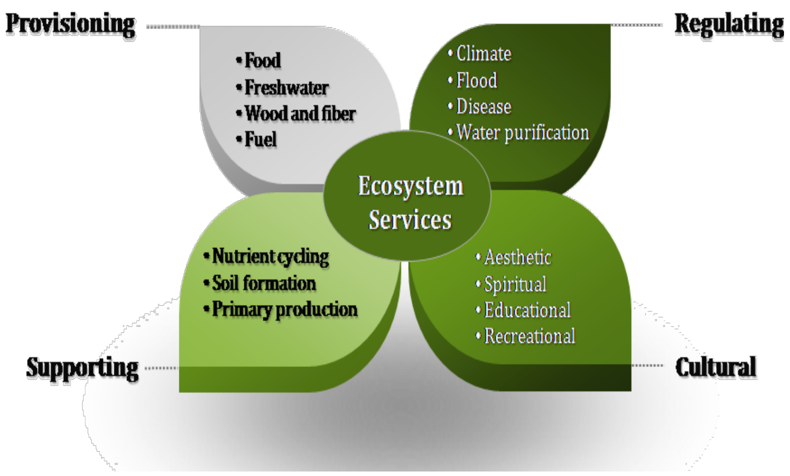
6.2.3.5. Ecosystems Services

Identification of ecosystem services

An ecosystem is defined as a dynamic complex of plants, animals, micro-organisms and non-living components interacting as a functional unit. Human communities are an integral part of ecosystems and are beneficiaries of many goods and services they provide. These benefits are recognised as Ecosystem Services (ES). The benefits that local communities obtain from local natural and modified habitats are crucial for their well-being. ES provided by the project-potentially impacted habitats or ecologically associated with these habitats, have been assessed at a high-level.

ES are grouped into four categories:

- Supply services: which refer to products people obtain directly from ecosystems (e.g. agricultural products, plants to eat, game, medicinal plants, fresh water, biofuel, timber, etc.). Inside the project area, the forest mosaics and aquatic habitats provide natural resources that are used by local communities. The main supply services are agricultural production, livestock and forage resources, foods, traditional medicine, fuelwood and fisheries;
- Regulating services: which are the benefit local communities obtain from the regulation of ecosystem processes (e.g. climate regulation, waste decomposition, purification of water and air, etc.);
- Cultural services: which refer to the non-material benefits people obtain from ecosystems (e.g. sacred and spiritual sites, ecotourism, education, etc.). It may be materialised by the presence of sacred sites or sacred species protected by communities. The social baseline assessment conducted during the EIS will provide more information on the presence of these elements within the Namaacha project site;
- Supporting services: which are the natural processes that maintain the other services (e.g. nutrient cycling, genetic production and genetic exchange channels, etc.).



Source: adapted from MEA (2005)

Figure 73: A conceptual model of connection types regarding ecosystem structure, processes, services and benefits

Supporting ecosystem services

Supporting ecosystem services are the ones necessary to produce all other ecosystem services, including soil formation, photosynthesis, primary production, nutrient cycling, and water cycling. All other ecosystem services (ES) depend on, and develop on, supporting ES. All habitats except the urban areas (these areas cannot be considered relevant sinks of ES) are related to these services. The relative importance of each habitat for the ES is ranked as H - High importance; M - Medium importance; L - Low importance; and NA – Non Applicable.

Table 33: General appraisal on the relative importance of each supporting service at the vegetation unit level

Supporting ecosystem services	Primary production and photosynthesis	Soil Formation	Nutrient and water cycling
Acacia woodlands	H	H	H
Undifferentiated woodland	M	M	M

Riparian Vegetation	H	H	H
Farmed areas	H	L	H
Urban areas	NA	NA	NA

Given the relatively small land take for the Project compared to the wider ecosystems, impacts to supporting ecosystem services are scoped out for further detailed assessment.

Provisioning ecosystem services

Provisioning services include the products that are obtained from ecosystems, such as food, fibre, fuel, genetic resources, biochemicals, natural medicines, pharmaceuticals, ornamental resources, and fresh water. The most relevant habitats for these services are: Acacia woodland, undifferentiated woodland, and farmed areas. The relative importance is ranked as H - High importance; M - Medium importance; L - Low importance; and NA – Non-Applicable.

Table 34: General appraisal on the relative importance of each provisioning service at the vegetation unit level

Provisioning ecosystem services		Acacia woodlands	Undifferentiated woodland	Riparian Vegetation	Farmed areas	Urban areas
Food Production	Hunting	H	L	L	M	NA
	Natural food foraging	M	L	L	M	NA
	Fishing	NA	NA	H	NA	NA
	Livestock and husbandry	M	L	NA	H	M
	Agriculture	NA	NA	M	H	M
	Honey production	H	H	L	M	M
Endogenous Natural	Freshwater	L	L	H	M	L
Endogenous Forest Products	Wood (e.g. charcoal)	H	H	NA	H	NA
	Other Forest non-woody materials	M	H	NA	M	NA
	Resins	M	H	NA	M	NA
Plant and Animal Resources	Genetic Resources	M	M	M	L	L
	Medicinal and well-being	M	M	M	H	L

Food Production

Hunting is a common practice in rural areas, with people hunting antelopes in general, monkeys, warthogs/bush pigs, and hares. Mostly people hunt for food, although it is normal to sell the surpluses. At local markets only meat from domestic animals was for sale, and from interviews to local populations, wild animals' stock for food seems to be not very abundant in the region.

Most people eat wild fruits in villages, but only a restricted number of them, such as masala (*Strychnos spinosa*), malambe (*Adansonia digitata*) and tamarind (*Tamarindus indica*). In villages, the sale of mango (*Mangifera indica*) is common.

In the study area, all villages have livestock, mostly goats, pigs, and chicken, normally in small numbers. More rarely, cows and ducks are also kept.

The dominant agricultural crop in the study area (in "machambas") is maize; other frequently produced products are cassava, rice, tomato, "nhemba" beans, lettuce, onion, and cabbages. Other products found mostly in villages or nearby are mango, papaya and banana.

Besides food sources, ecosystems provide also drinks and beverages, such as the beverage produced form malambe.

Natural Resources

The main freshwater sources are wells and pumps.

Forest Products

Charcoal is an important resource for local people since for many in the only energy source available and it is also sold very frequently along N2 road and in the villages.

Other forest non-woody materials are used, such as palm tree fronds, grass, and sisal. Tendrils from grasses and palm trees can be found in the villages; these are sometimes use for roof covering, doors, and windows.

Regulating ecosystem services

Regulating services correspond to the benefits obtained from the regulation of ecosystem processes, including air quality regulation, climate regulation, water regulation, erosion regulation, water purification, disease regulation, pest regulation, pollination, and natural hazard regulation. The most relevant habitats for these services are Riparian Vegetation, and Acacia woodland. The relative importance is ranked as H - High importance; M - Medium importance; L - Low importance; and NA – Non Applicable.

Table 35: General appraisal on the relative importance of each regulating services at the vegetation unit level

Regulating ecosystem services		Acacia woodlands	Undifferentiated woodland	Riparian Vegetation	Farmed areas	Urban areas
Cycles (processes)	Soil protection and formation	H	M	H	H	NA
	Water Regulation	M	L	H	M	L
	Nutrient Regulation	M	L	H	H	L
	Pollination	H	M	L	H	L

	Local climate regulation	H	L	H	M	NA
Depuration	Soil bioremediation	M	L	H	M	L
	Pollution and contaminant treatment	M	L	H	M	L
	Water Purification	M	L	H	M	L
	Air quality	H	M	H	M	L
Prevention	Flood prevention/ control	M	M	H	M	L
	Wildfire prevention/ control	L	L	H	M	H
	Pest and disease prevention/ control	M	L	M	L	L
	Invasive species control	L	L	M	H	L
Habitats	Habitats Maintenance	M	M	H	L	L
	High Conservation Value Areas	M	L	H	L	NA

Given the relatively small land take for the Project compared to the wider ecosystems, impacts to regulating ecosystem services are scoped out for further detailed assessment.

Cultural ecosystem services

Cultural services refer to the non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences – thereby taking account of landscape values (MEA, 2005). The most relevant habitats for these services are the Riparian Vegetation, followed by Acacia woodland. The relative importance is ranked as H - High importance; M - Medium importance; L - Low importance; and NA – Non-Applicable.

Table 36: General appraisal on the relative importance of each cultural service at the vegetation unit level

Cultural ecosystem services	Human Well-Being		Educational	
	Recreation Activities	Tourism	Education	Scientific Research
Acacia woodlands	M	M	M	H
Undifferentiated woodland	L	L	M	L
Riparian Vegetation	H	H	H	M
Farmed areas	M	L	M	L
Urban areas	L	L	L	L

6.2.3.6. Protected or Internationally Recognized Areas

This section supersedes Section 6.2.4 and 6.2.5 from the original EIS Report.

The Project does not overlap with any Legally Protected and Internationally Recognized Areas as per IFC Performance Standard 6 and IUCN definitions. It is located close to the boundaries of the following designated areas:

- The **Lubombo Biosphere Reserve**[5] that covers an area of 294,020 ha in Eswatini. This reserve covers parts of three biomes, the Lowveld Savannah, the Lubombo Plateau Forest Biomes and the Riparian zone. It is located in a highly endemic zone, especially for plants.
- The **Namaacha KBA**[6] extends over 6,854 ha in Eswatini and 39,626 ha in South Africa. It has been classified based on the presence of threatened species of fauna and flora. Furthermore, it holds importance for several plant species that have not yet been globally Red-List-assessed but have been assessed as threatened at the regional / national scale.
- The **Hlane - Mlawula Complex KBA**[7] occupies 31,482 ha in Eswatini and 3,078 ha in South Africa. The legacy criterion for classification of this area was the presence of threatened fauna and flora. Additionally, the KBA holds importance for several plant species that have not yet been globally Red-List-assessed but have been assessed as threatened at the regional / national scale.

Additionally of note is the Lubombo Transfrontier Conservation Area (LTCA)[8] spans across Mozambique, Eswatini and South Africa. It comprises a number of legally protected areas and internationally recognised areas, but is not classified as a protected area as a whole. The Project is not located within this area.

The Project overlaps with the Namaacha Tropical Important Plant Area (TIPA)[9], see figure below, an area that holds botanical significance due to presence of undisturbed forest patches along rocky slopes and rivers, together with the occurrence of succulent species, including Aloe and Euphorbia species, in rock outcrops. According to Mozambican national environmental authorities, this TIPA is likely to be classified in the future as KBA. A total of 22.63 km of the revised route crosses through the TIPA. This is an increase from the original route, which only crossed through the TIPA for 15.08 km.

[5] https://en.unesco.org/biosphere/africa/lubombo
[6] https://www.keybiodiversityareas.org/site/factsheet/49182; https://www.keybiodiversityareas.org/site/factsheet/49181)
[7] https://www.keybiodiversityareas.org/site/factsheet/6887; https://www.keybiodiversityareas.org/site/factsheet/49180
[8] https://www.peaceparks.org/tfcas/lubombo/
[9] Namaacha - Tropical Important Plant Areas Explorer (kew.org)

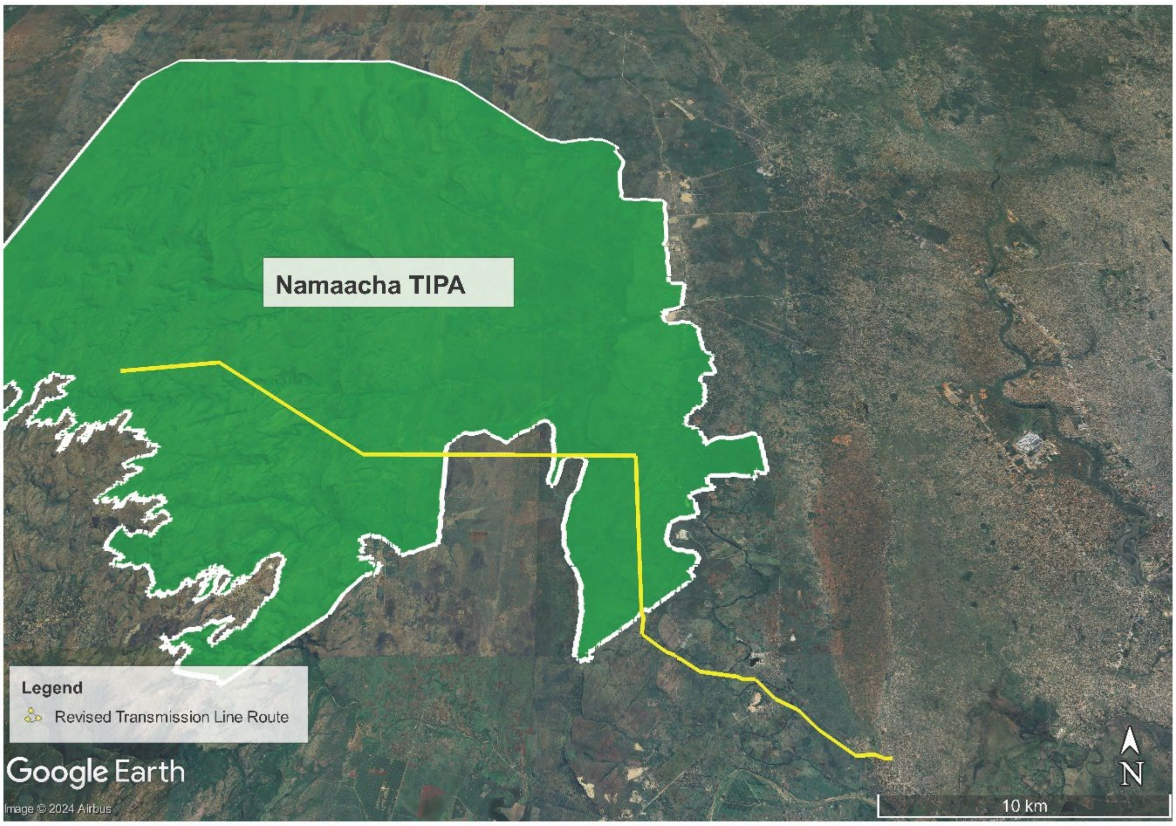


Figure 74: Location of Namaacha Tropical Important Plant Area

6.3. Socioeconomic Environment

6.3.1. Introduction

This section presents the socioeconomic baseline characterization of the Project area, at Maputo Province and Boane and Namaacha Districts level and a characterization of the households (HH) and Infrastructures (IF) potentially affected by the transmission line`s protection zone. The socio-economic baseline provides a broad overview of the project's areas of influence, allowing the subsequent impact assessment.

6.3.2. Methodology

The socioeconomic baseline assessment utilized both secondary and primary baseline data.

6.3.2.1. Secondary Data

The secondary data included data from the IV General Census of Population and Housing (RGPH) of 2017 from the National Statistics Institute (INE), several documents on Maputo Province and Namaacha and Boane District, the provincial and district level Economic and Social Plan and Budget, and other relevant studies for the study area.

6.3.2.2. Primary Data

Primary data collected and analysed includes:

- Initial socio-economic field surveys for the original EIS Report (March - May 2023)

- Interviews with locality chiefs and community leaders of all the communities crossed by the transmission line route, as well as interviews with local education and health professionals (March – May 2023);
- Engagement with mining concession holders identified in the original EIS Report, including some signed Memorandums of Understanding (MoUs) with these parties for the Project's access of the land;
- field reconnaissance survey conducted in August 2024 by Consultec, EDM, Globeleq, and Source Energia to document environmental and social sensitivities along the alternative routes considered (See Annex 2 for more details);
- A review of DUAT (land deed) holders along the route (August – September 2024); and
- A resettlement scoping survey conducted by Acer Africa (September 2024).

Note that the household (HH) survey data referenced in this section was collected for the original route, and as such includes both HHs affected by the revised transmission line route and HHs that are no longer affected following the revision to the route. As the same communities are directly affected by the revised route as assessed in the original EIS Report, the HH survey data collected for the original route is considered to be representative of the socio-economic profile of the new PAPs affected by the revised route as well. Detailed census data will be collected to inform the design and implementation of the RAP for the revised line. This data collection is planned to commence at the end of October 2024.

6.3.3. Administrative Division and Governance

6.3.3.1. Maputo Province

Administratively, Mozambique is divided into 11 provinces, among which, the capital of the country, Maputo City, which has the status of a province. Each province is subdivided into a variable number of districts, which in turn are subdivided into administrative posts, and these are further subdivided into localities. The proposed Project is located in Maputo Province and in the Districts of Boane and Namaacha.

Maputo Province is situated in the extreme south of Mozambique and has an area of approximately 22,693 km² (2.8% of the country´s total surface). It is limited to the South by the Republic of South Africa (Kwazulu-Natal Province), to the West by the Republic of South Africa (Mpumalanga Province) and Eswatini, to the North by Gaza Province and to the East by Maputo City and the Indian Ocean. The province´s capital is Matola City, located 10 km west of the country's capital, Maputo City. Maputo Province is divided into eight districts (Matola City, Boane, Magude, Manhiça, Marracuene, Matutuíne, Moamba and Namaacha), four municipalities (Matola City, Boane Village, Manhiça Village and Namaacha Village), 29 administrative posts and about 111 localities and neighbourhoods.

In administrative terms, to perform its administrative and territorial development function, the governmental structure is ensured at local level (provinces, districts, administrative posts, localities, communities, and villages), through the so-called Local Organs of the State (OLE). Law No. 8/2003 of 5 May, commonly known as the Law on Local Organs of the State (LOLE), establishes principles and norms for the organisation and functioning of local organs of the State at the Province, District, Administrative Post and Locality levels. At the District level, it is composed of Administrative Posts and Localities. Administrative Posts are the basic territorial units of the State's local administration organization. Localities, on the other hand, comprise communities and other population settlements within their territory.

Maputo Province, just as all other provinces in the country, has a provincial government divided into 2 bodies: (1) The Provincial Council of State Representation headed by the Secretary of State, representing the Central Government at the Provincial level, and appointed by the President of the Republic; and (2) the Provincial Executive Council headed by the Governor, who acts as a political figure elected by popular vote.

The Governor and the Governor's Office are supported and assisted by the Head of the Governor's Office and the Provincial Directors of Agriculture and Fisheries, Transport and Communication, Industry and Commerce, Health, Education, Labor, Culture and Tourism, Territorial and Environmental Development, and Infrastructure. The Secretary of State is assisted by the Head of Office the Provincial Secretary of State`s office, and by the Provincial Services Directors. The latter oversee areas such as Economy and Finance, Economic Activities, Social Affairs, Infrastructure, Justice and Environment. These all represent the national level ministries.

In addition to the departments in line ministries, the province also has a Prosecutor General and a Provincial Police Commander. There are also other relevant public institutions at the provincial level, such as the Institute for Social Action (INAS) and the Provincial AIDS Council - *National Council for the Fight against HIV/AIDS* (CNCS).

As previously mentioned, the province is administratively subdivided, mainly into districts and municipalities. The municipal councils are run by the municipal president and the municipal assembly, which is an elected body. As for districts, they are governed by district administrators who are supported by district services and by the heads of the various administrative posts and localities.

The table below shows the basic administrative structure of the provinces, districts and municipalities.

Table 37: Basic administrative structure of the provinces, districts and municipalities

<table>
<tr><td>Province</td><td colspan="3">Secretary of State for the Province (assisted by the respective Head of Office);
Governor of the Province (assisted by the respective Head of Office);
Provincial Services of State Representation;
Provincial Directorates.</td></tr>
<tr><td>Districts</td><td>District Administrator
Permanent Secretary
Head of Administrative Post
Head of Locality
Traditional or local leadership:
○ Highest rank - 1st Level (traditional leaders);
○ 2nd rank - 2nd level (village secretary);
○ 3rd rank - 3rd level (block secretary).</td><td>Municipalities</td><td>Municipal President
Councillors
Traditional Leaders
Suburban or Neighbourhood Secretaries
Unit Secretaries
Block Chiefs</td></tr>
</table>

The figure below illustrates the administrative division of Maputo Province.

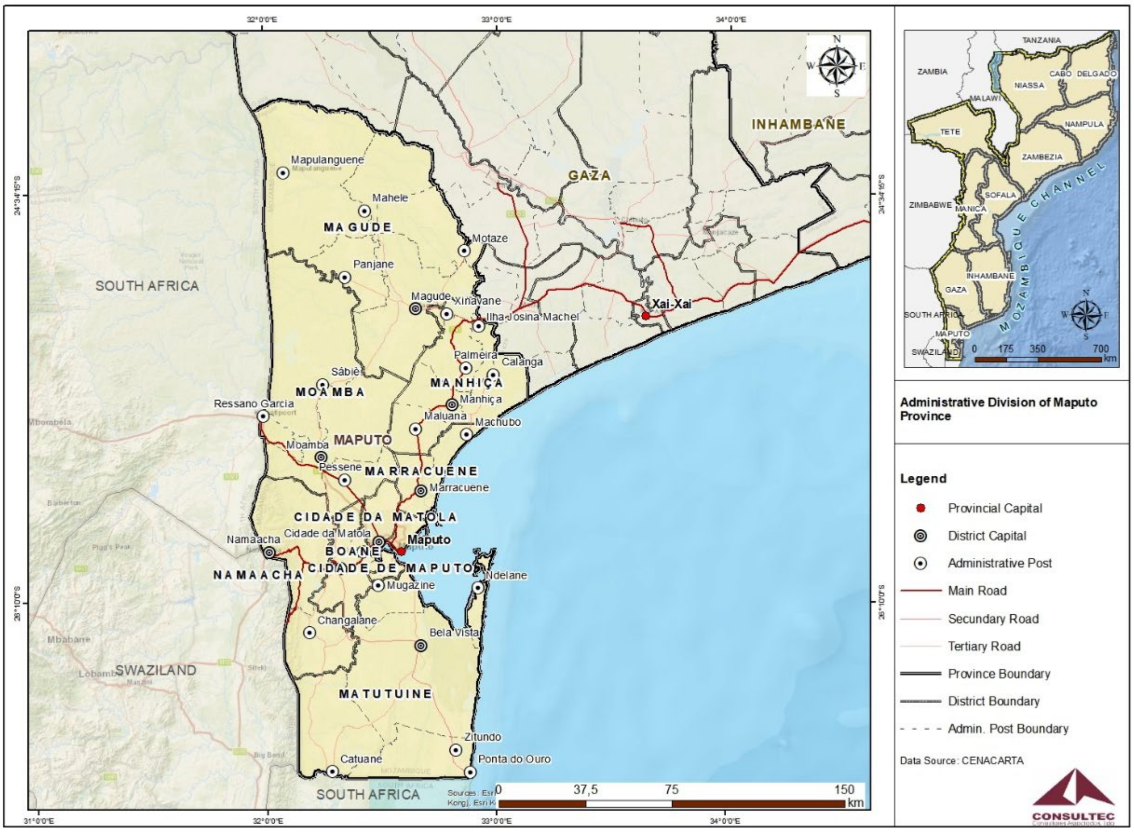


Figure 75: Administrative Division of Maputo Province

6.3.3.2. District Government

The districts are managed by a District Administrator who is appointed by, and reports to, the Provincial Governor. The administrator is supported by the Permanent Secretary and a number of district services, including Economic Activities; Planning and Infrastructure; Education, Youth and Technology; Health, Women and Social Welfare; the District Directorate of the National Institute for Social Welfare; the Civil Registry and Notary Services; and the District Command of the Police of the Republic of Mozambique. In addition to these institutions, the State Information Services, the Public Telecommunications Company, the Court, and the Administration of State Assets, are all subordinate to the district government. The figure below illustrates the basic structure of the district administration.

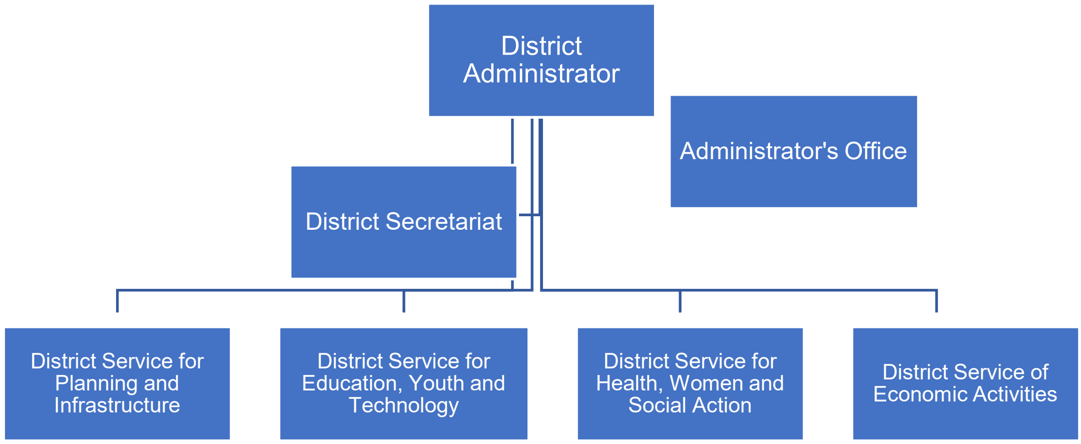


Figure 76: Basic structure of the district administration

In terms of governance structure, the relevant formal district leadership includes the heads of the lower-level administrative units - Administrative Post and Locality, as well as local community leaders/authorities and traditional authorities who manage community participation in local government at the local level.

A locality is made up of communities and villages. The term "community" is used to define a village, or sometimes groups of villages. At the community level, authority is exercised by various "community" authorities such as the neighborhood secretaries, unit chiefs or block chiefs, who in peri-urban neighborhoods are also assisted by community leaders. There are other structures that support the secretaries and traditional leaders in running the neighborhoods and these include the community police, traditional doctors, community judges, production chiefs, and community advisors who help the village leader resolve any conflicts that arise within the community. In rural areas, these structures report directly to the village secretary.

Traditional authority and associated structures are recognized by law through Decree No.15/2000, of June 20th, and Decree No.11/2005, of June 10th. These decrees recognize the role of community leaders as legitimate authorities in their respective communities. As such, villages/communities and localities generally have a bifurcated governance structure, where local leaders are appointed by the state, and traditional leaders, "Elders and Queens" and the "Chief / Community Leader" inherit their positions or are directly chosen by community members.

In terms of hierarchy within the districts, the community chief reports to the community secretary, who in turn reports to the chief / community leader, who reports to the Locality Chief, who reports to the Head of the Administrative Post, who finally reports to the District Administrator.

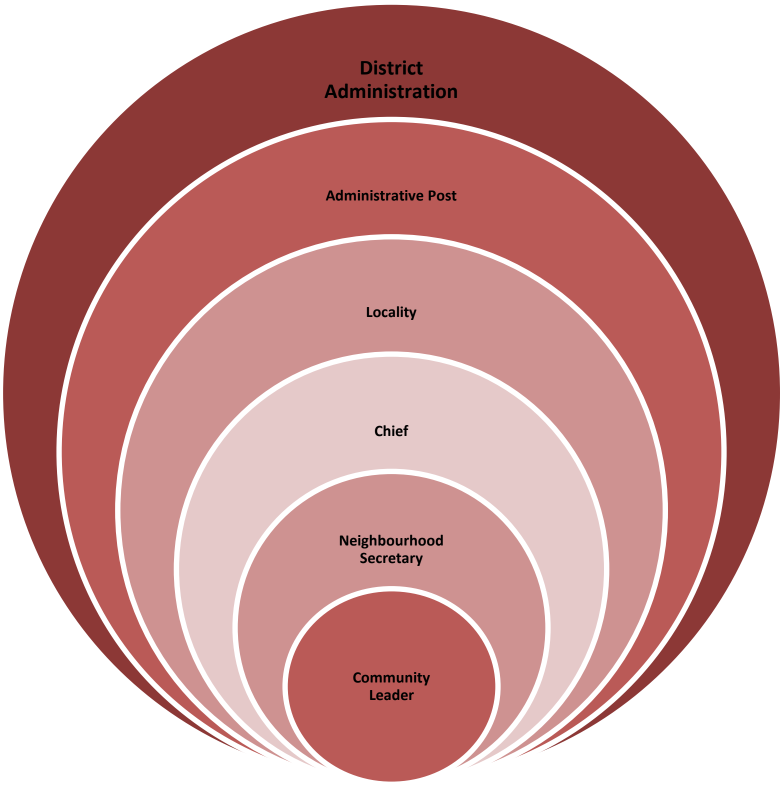


Figure 77: District authority hierarchy

While local authorities play an important role in mobilizing people in relation to district planning sessions and communication with the state, etc., their primary role is to maintain a form of social order and to resolve individual or social conflicts at the community level, prior to any potential escalation to the formal court system. Community leaders play an additional and extremely important role in the allocation and management of land used by community members and new individuals and families seeking land for subsistence. This role is based on the national land policy (Resolution No. 10/95, October 17th) which aims to guarantee access to land for all communities, families and individuals. Additionally, the Land Law (Law no. 19/1997) recognizes customary rights to land without a formal land title (DUAT). Community leaders are also responsible for disseminating information to community members, informing the higher-level government authority of community decisions, any conflicts or issues in the community that cannot be resolved at the local level, and assisting in the implementation of any government-supported project.

This seemingly simple governance structure is in reality very complex due to several different intersecting and often overlapping power foundations. First, the district directorates (health, education, youth and technology, etc.) are formally linked and accountable to the various ministries of their respective sectors at the provincial and central levels of government, while also being administratively accountable to the district administrator. There is a public sector reform process regarding decentralization, but the de facto dependency between the central, provincial and district levels of government vary considerably between the different directorates and their departments.

District planning follows a hierarchical process in which economic and social development plans and activities are developed based on policies and guidelines provided from the central (PES - economic and social plan) and provincial (PESOP) levels. Emanating from these policies, the districts produce their own economic and social plan (PESOD), which are then reported back to the provincial economic and social plan, which in turn is reported to the annual national plan. This process, and the community participation that is an integral part of it, is facilitated by the current governance structure that includes community and traditional leadership. Furthermore, advisory councils have been established at the administrative post and locality levels to enhance and strengthen participation within these planning processes.

The figure below illustrated the regional context of the Project with the 66 kV transmission line crossing the Namaacha Sede and Boane Sede administrative posts in Namaacha and Boane Districts respectively.

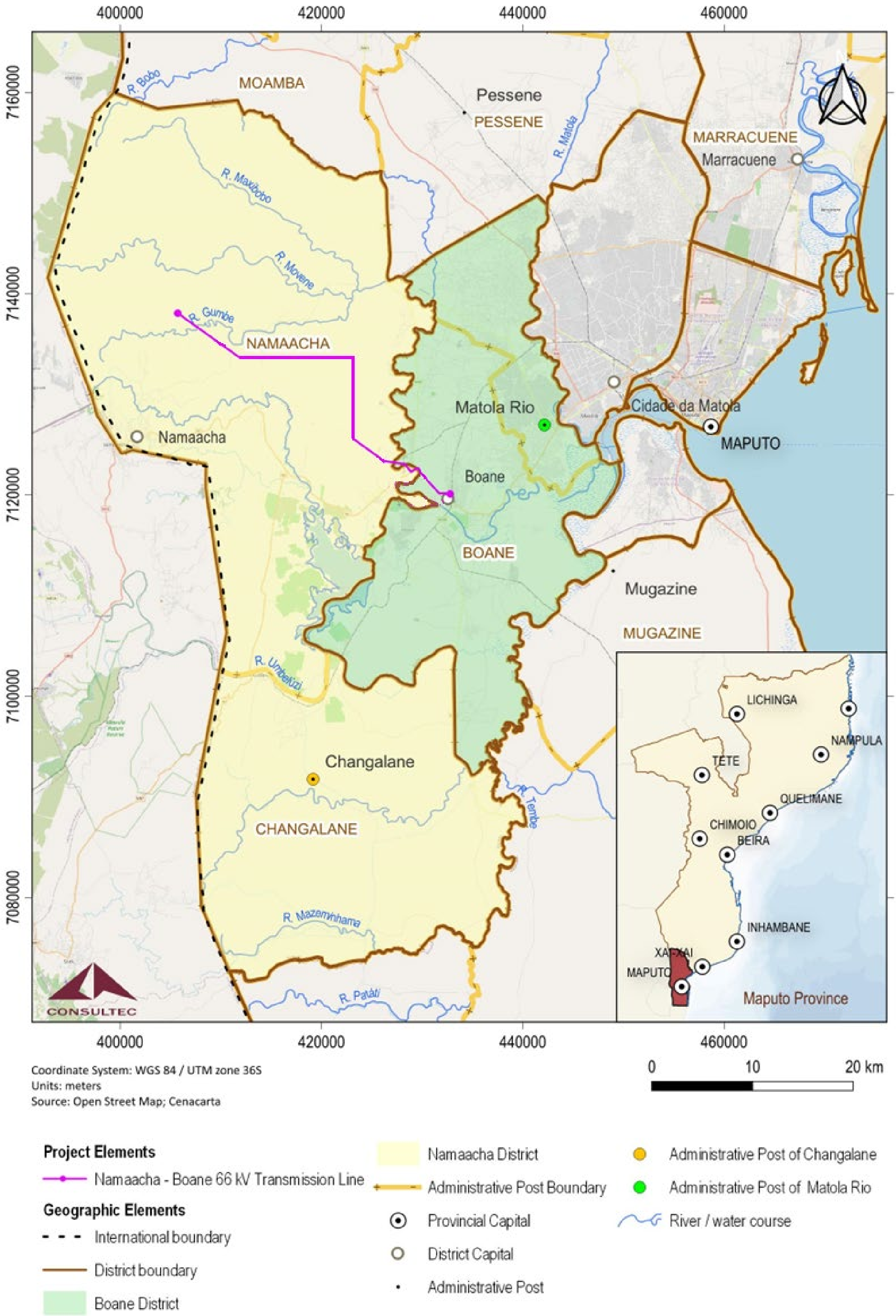


Figure 78: Regional context of the 66 kV transmission line

6.3.3.3. Municipal Council

As previously mentioned, in municipalities, administrative bodies are elected within the provinces and are administered by an elected municipal president who is accountable to the Municipal Assembly, which is also composed of elected municipal advisors. Municipal councils are responsible for services in a similar way to districts, and as such, they are responsible for the following:

- Housing and Urban Planning;
- Roads and Urban Transportation;
- Education and Culture;
- Economic Activities and Services;
- Youth and Sports;
- Social Welfare and Civil Society;
- Markets and Fairs;
- Public Works;
- Administration and Municipal Revenues; and
- Waste, Environment, Parks and Municipal Gardens Management

As with the districts, the municipal governance structure is complex and the management and delivery of services such as health, education, criminal justice, social welfare, etc. are officially the responsibility of the various line ministries at the provincial and central levels of government. Municipalities currently have limited direct revenues and are primarily responsible for the management of waste, water and sanitation, municipal roads, housing and urban planning.

6.3.4. Namaacha District

Namaacha District is located on the western border of Maputo Province, with an area of 2,156km² (representing 9.5% of the province´s surface). The district is limited to the North by Moamba District, to the South by Matutuine District, to the West by the eSwatini Kingdom, the Republic of South Africa, and to the East by Boane District. The district with its headquarters in Namaacha Town, is divided into two administrative posts (AP) and eight localities.

The district headquarters of Namaacha is a Municipal Town and its Municipal Council assume the territorial management covered by the Town.

The following table presents the administrative division of Namaacha District.

Table 38: Administrative division of Namaacha District

Administrative Post	Localities
Namaacha Sede	Namaacha Town, Kala-Kala, Impaputo, Mafuiane e Matsecanha
Changalane	Changalane, Goba, Mahelane e Michangulene

The following table presents the administrative division of the communities found on the project´s surroundings.

Table 39: Communities on the project´s surroundings - Namaacha District

District	Administrative Post	Communities
Namaacha	Namaacha Sede	Livevene (no direct socio-economic impacts) Gumbe Mandevo (no direct socio-economic impacts) Kalula (no direct socio-economic impacts) Micacuene (no direct socio-economic impacts) Baca Baca 1 Baca Baca 2

6.3.5. Boane District

Boane District is located in the southeast of Maputo Province and covers an area of 820 km^2 (representing 3.5% of the province's surface). The district is limited to the north by Moamba District, to the south and east by Namaacha District and to the west by Matola Municipality of and Matutuine District. The district has its headquarters in Boane Town. The District of Boane is divided into two Administrative Posts (PA) and five Localities. Boane district headquarters is a Municipal Town with the Municipal Council assuming the territorial management covered the Town.

The communities found on the project´s right-of-way and surrounding areas are located in Boane Administrative Post. The following table presents the administrative division of the communities found on the project´s surroundings.

Table 40: Communities on the project´s surroundings - Boane District

District	Administrative Post	Communities
Boane	Boane Sede	Mabanja, Bairro 1 and Bairro 6

6.3.6. Population and Demographics

According to the results of the IV General Census of Population and Housing (RGPH) released by the National Statistics Institute (INE) in 2017, the population of Mozambique was 26,899,105 inhabitants and of Maputo Province 1,908,078 inhabitants (INE, 2018).

The same source indicates the existence of 452,051 households in Maputo province with an average household size of 4.2 members per household. Unlike most provinces in Mozambique, a large part of the population of this province has urban characteristics, i.e., about 71% of its population.

In 2021, the population growth in Maputo Province was higher than at the national level and the illiteracy rate in the province was considerably lower than in Mozambique, where 39% of country´s population over five years old cannot read or write.

The demographic indicators of Maputo Province are better placed than at the national level, having, for example, a higher coverage on the education and health sectors. Both global and infant mortality rates, as well as the birth rate in Maputo Province are lower than at the national level.

Fertility is one of the main factors in the natural growth of the population. The global fertility rate was lower in Maputo province than at the national level, being at 3.4 children per woman. Life expectancy at birth was higher in Maputo province (62.7 years) than in Mozambique, which was placed at 55.3 years in the same period. The table below presents the main demographic indicators in Mozambique and Maputo Province in the year 2021.

Table 41: Demographic Indicators (2021)

Description	Province	National
Population Growth Rate (%)	3.8	2.5
Illiteracy rate (%)	13.3	39
Child Mortality Rate (per thousand live births)	46.6	66.2
Mortality Rate (per 1000)	8.8	12.1
Birth Rate (births/1000 inhabit)	29.2	37.2
Global Fertility Rate (children/woman)	3.4	4.7
Life Expectancy at Birth (years)	62.7	55.3

Source: INE, (2022d, 2022e)

Boane District is one of the most populous districts in Maputo Province. In the last general population census conducted in 2017, it had a population of 210,367 inhabitants corresponding to 11% of the province's total population. In the same period, it had the third highest population density after Matola City and Marracuene Districts, being higher than the population density at provincial and national level. On the other hand, Namaacha District had in the same period 47,129 inhabitants, being the district with the lowest number of inhabitants in the province representing about 2% of the province´s total population.

Boane District presents a considerably high population density, which is in line with the high levels of urbanization and with the population growth observed in recent years, with 256.5 inhabitants/km^2, which constitutes a population density seven, three and eleven times higher than that of Mozambique, Maputo province and Namaacha District, respectively. In turn, the population density of Namaacha district is about 21.9 inhabitants/km^2, which is lower than the population density of Mozambique, Maputo province and Boane district.

To note that Boane´s population is mostly urban with an urbanization rate of 60% while in Namaacha District it is mainly rural (30%). Both districts have an urbanization rate lower than the province´s (71%). The total population and population density of Mozambique, Maputo Province and Namaacha and Boane Districts is shown in the table below.

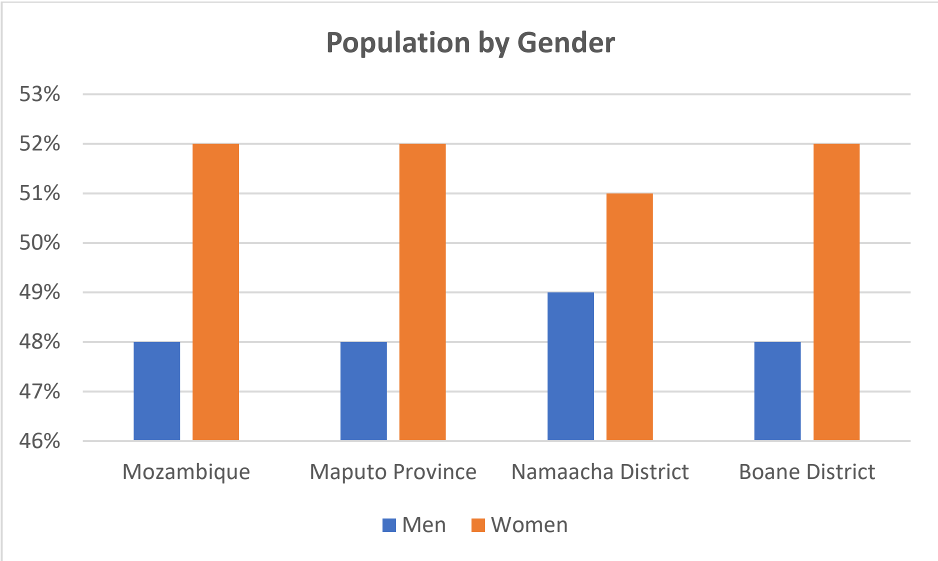
Table 42: Population density of the Country, Province, and districts, 2017

Location	Total Area (km^2)	Total Population	Population Density (inhabit/km^2)
Mozambique	799,380	26,899,105	33.6
Maputo Province	26,058	1,908,078	73.2
Namaacha District	2,156	47,126	21.9
Boane District	820	210,367	256.5

Source: INE (2018)

In terms of gender balance / distribution, Maputo Province has a gender balance in line with the rest of the country, with 995,143 (52%) women and 912,935 (48%) men. Both Boane and Namaacha Districts show a similar gender balance trend to the country and to the province itself, that is, with a slightly higher number of women. Namaacha District has the most equitable gender balance, with 49% men and 51% women.

The figure illustrates the population by gender in Mozambique, Maputo Province and in Namaacha and Boane Districts.



Source: INE (2018)

Figure 79: Population by gender (2017)

The age distribution in the province and covered districts is typical of developing communities, where there are a large majority of young people and fewer elderly. This is partly due to the existing low life expectancy rate as well as a high birth rate. Almost half of the population of Mozambique, Maputo Province and Namaacha and Boane districts, is under 15 years of age at all administrative levels, being about 46% at national level, 38% at provincial level and 39% in both districts. On the other hand, the percentage of working age population (15 to 64 years of age) corresponds to half of the population of Mozambique and to more than half in the province and districts under analysis.

The dependency ratio measures the potentially inactive population contingent, which must be supported by the potentially productive portion of the population. A high dependency ratio represents a very high demographic dependency burden.

Maputo Province has a dependency ratio (70%) lower than that of Mozambique (100%), Namaacha District (77%) and Boane (72%) District. These figures reflect a considerable proportion of working aged people in the province and districts. The table below shows the distribution of the population by age groups.

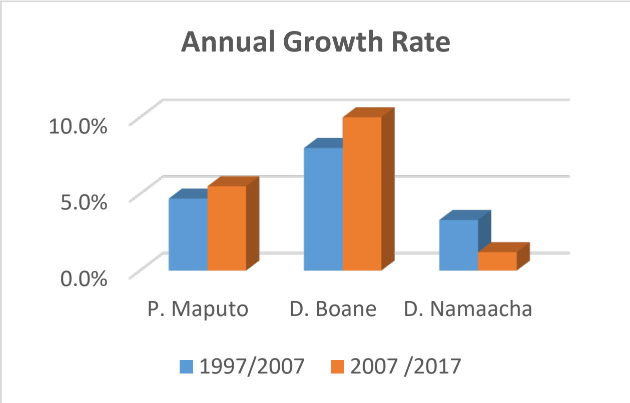
Table 43: Population by age groups (2017)

Location	Age Groups (%)			
	0-4 years	5-14 years	15-64 years	³ 65 years
Mozambique	17	29	50	3

Location	Age Groups (%)			
	0-4 years	5-14 years	15-64 years	³ 65 years
Maputo Province	12	26	59	3
Namaacha District	12	27	57	5
Boane District	13	26	58	3

Source: INE (2018)

The data presented in the figure indicates that there was a considerable increase in the annual growth rate for both Maputo Province and Boane District in the periods between 1997/2007 and 2007/2017. Boane district's annual growth rate was higher than that of the province in both the 1997/2007 decade and the 2007/2017 decade. Namaacha district showed an opposite trend with a decrease in the annual growth rate in the last decade, being in both decades under study lower than the province and Boane district.

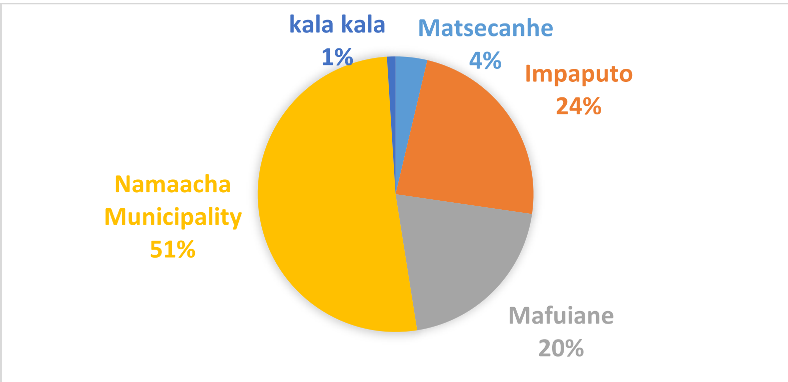


Source: II, III and IV RGPH

Figure 80: Annual growth rate in the province and covered districts

Namaacha Administrative Post has 31.279 inhabitants which corresponds to 66,4% of the total district´s population and Boane Administrative Post has 105.879 inhabitants corresponding to about half (50,3%) the population living in Boane district (INE, 2018).

As shown in the following figure, the population living in the different localities of Namaacha Administrative Post are unevenly distributed, with Namaacha town municipality having about half the total population (51%) and both Kala-kala and Matsecanhe localities having only 5% of its inhabitants.



Source: INE (2018)

Figure 81: Population in the localities of Namaacha Administrative Post

The transmission line route in Namaacha District crosses the Namaacha Sede Administrative, Kalakala, Impaputo and Mafuiane Localities, and the communities of Bacabaca, Micacuene, Livevene, Mangava and Gumbe. As seen in Figure 72: above the three localities crossed by the project have 45% of the Namaacha administrative post´s population. To note that the locality of Kalakala has much less inhabitants corresponding to 1% of this administrative post.

According to information given by local authorities and presented in the figure below, the communities in Mafuiane locality are more populated with Bacabaca having 735 inhabitants and Macacuene 406 inhabitants. Livevene in Kalakala is the least populated with only 58 inhabitants. To emphasize that there are no inhabitants in Mangava having though a considerable number of coal pits and pastures for the animals belonging to Gumbe and Livevene households.

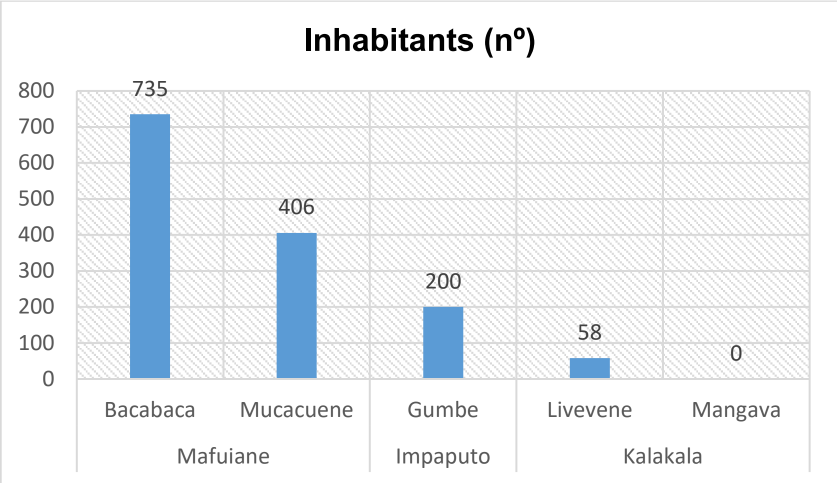
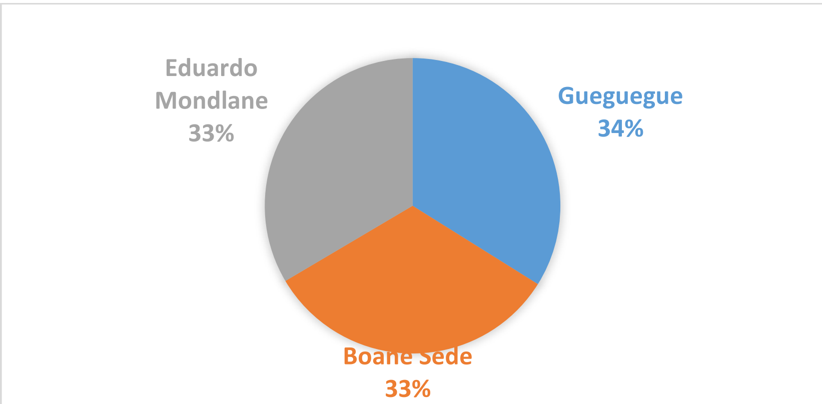


Figure 82: People living in communities crossed by the line in Namaacha (2023)

According to information collected locally by the field team there are presently 60, 45 and 31 houses in Macacuene, Gumbe and Livevene respectively.

Differently from the previous scenario, the population living in Boane Sede Administrative Post are evenly distributed by its three localities, namely Gueguegue, Eduardo Mondlane and Boane Municipality as shown in the figure below.



Source: INE (2018)

Figure 83: Population in the localities of Boane Administrative Post

In what concerns the covered communities in Gueguegue Locality Bairro 1 has the highest number of inhabitants and Mabanga the lowest. When comparing with the number of inhabitants in the communities in Namaacha district stands out that the communities in Boane have a much higher number of inhabitants being in line with the typical urban context in which these are set in.

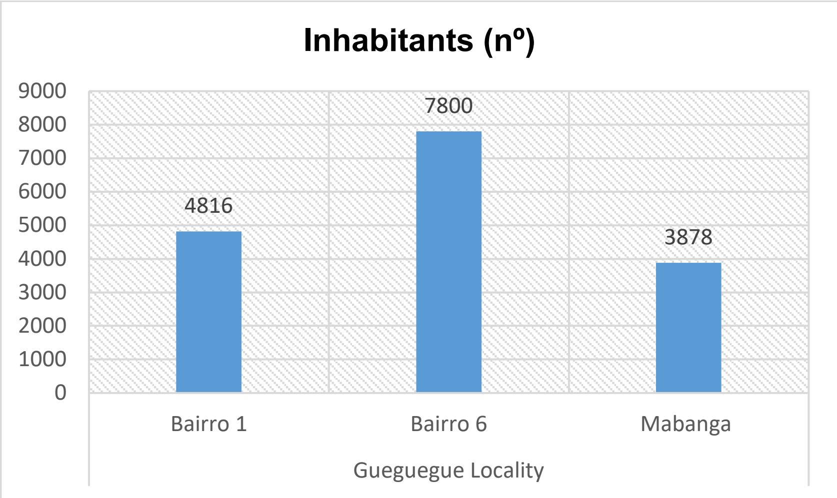
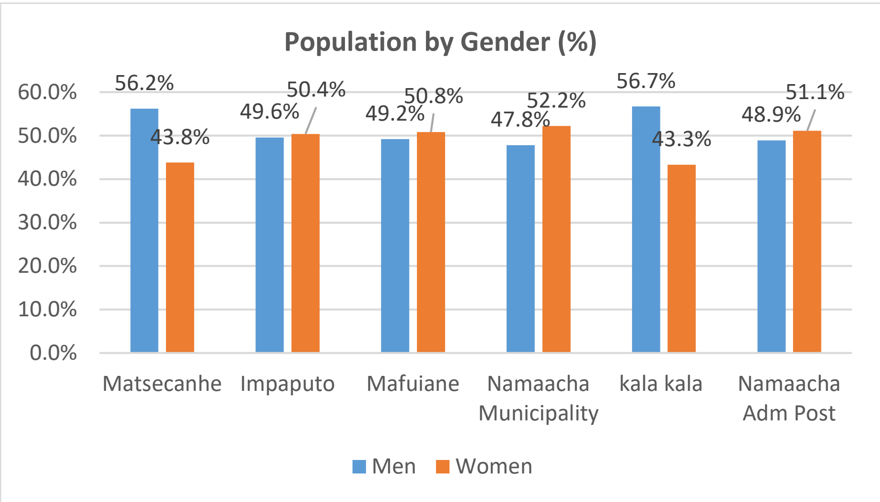


Figure 84: People living in communities crossed by the line in Boane, 2017

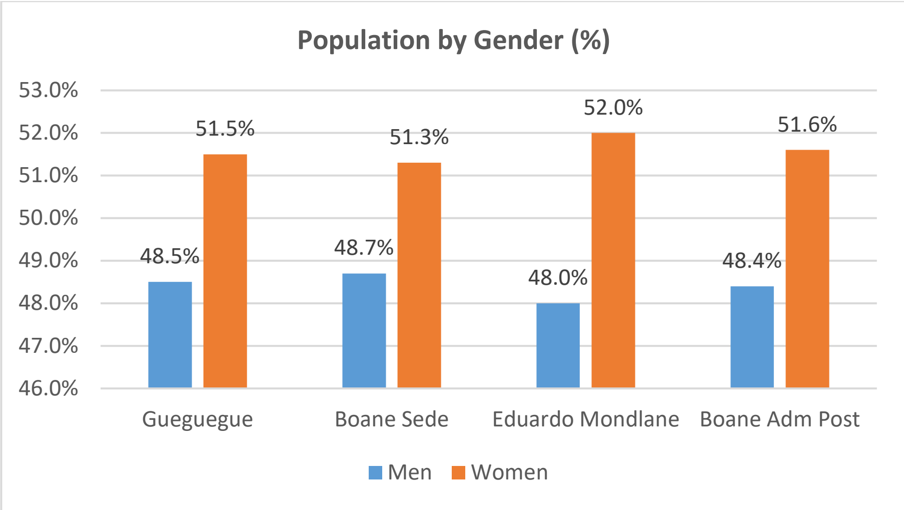
Gender distribution in the localities included in the Namaacha administrative post, can be observed in the figure below. The localities of Impaputo, Mafuiane and Namaacha Municipality follow the same trend of the administrative post with a gender balance of slightly more women than man, whereas Matsecanhe and Kala Kala localities have more male inhabitants with 56,2% and 56,7% respectively.



Source: INE (2018)

Figure 85: Gender distribution in Namaacha Administrative Post

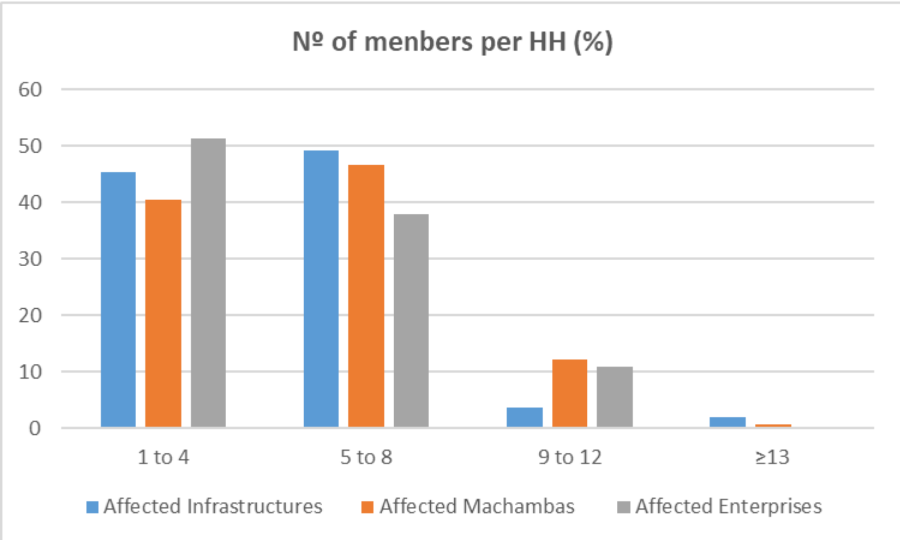
As shown in the figure below the population living in the localities of Boane Administrative Post are composed by more women than men, varying from 51,3% in Boane Sede to 52% in Eduardo Mondlane locality.



Source: INE (2018)

Figure 86: Gender distribution in Boane Administrative Post

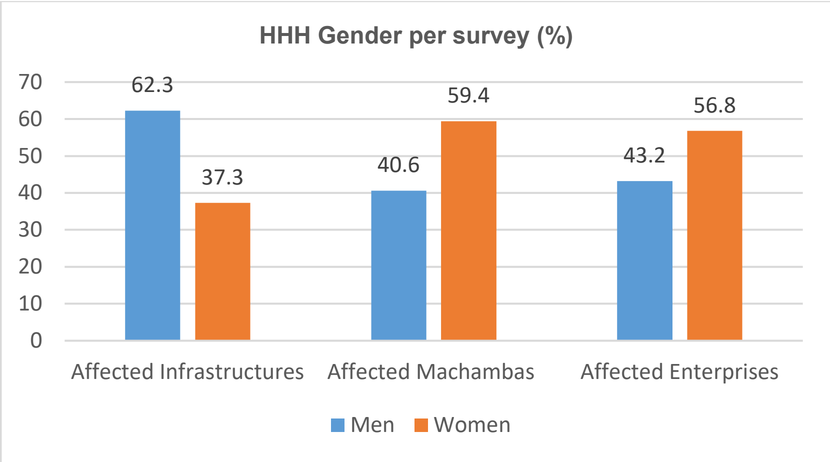
The survey results concerning the numbers of members per household stands out that those who run small to medium enterprises have smaller households with more than half (51,4%) with 1 to 4 members and not having households (HH) with 13 or more members which might well be related to a slighter higher living condition.



Source: Consultec (2023)

Figure 87: Number of HH members per survey

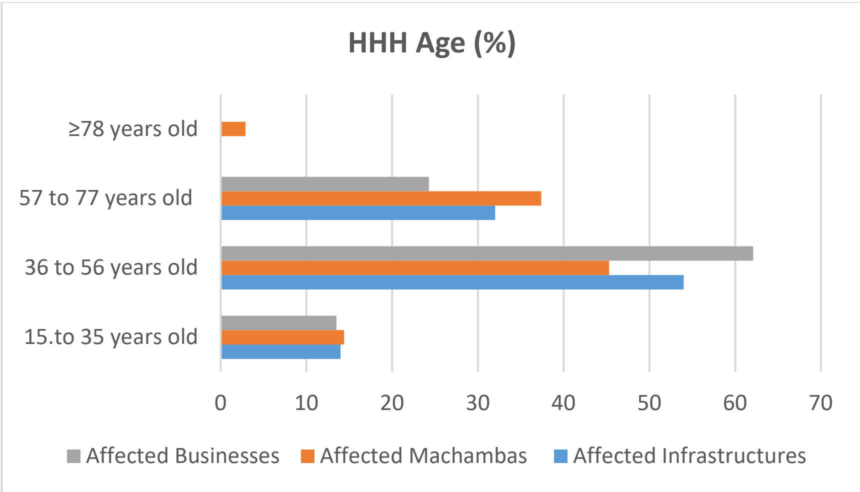
Regarding the gender of the Head of the Household (HHH), most HHH in the surveyed affected infrastructures are men (62,3%) while the HHH of the surveyed machambas and enterprises are mostly women. In the specific case of business owners, this data is in line with the growing female entrepreneurship that has been observed in other similar realities in the country.



Source: Consultec (2023)

Figure 88: HHH gender per survey

As for the age of HHH, in all the surveys the majority of HHH were between 36 and 56 years old and about 14% were young. Only in the farm surveys there were HHH over 78 years old corresponding to 2.9%.



Source: Consultec (2023)

Figure 89: Age intervals of HHH

6.3.7. Culture and Cultural Heritage

6.3.7.1. Regional

The definition of Cultural Heritage is that expressed in Law No. 10/88 of December 22, which determines the legal protection of tangible and intangible assets of Mozambican Cultural Heritage. According to this Law, Cultural Heritage: “is the set of tangible and intangible goods created or integrated by the Mozambican people throughout history, with relevance for the definition of Mozambican cultural identity.”

The name Namaacha comes from Lomahacha, the name of an ancient sovereign (régulo) who ruled the region of Pequenos Libombos before the settlers arrived. Fearless and brave, Lomahacha conquered the neighbouring territories by taking over the cattle, which were taken to the pastures of the royal family near Lagoa Makonko in Mozambique, which he often visited, having some calves slaughtered on these occasions to grace the local shepherds and guards. To gain more respect, he rarely appeared in public, except for the great feasts at the end of the harvest, which were called "Liphusibele". The most practised traditional dances in this region are Ngalanga, Xingomana, Mutimba and Xigubo.

The Namaacha cave, given the similarities with Cova da Iria in Portugal, was considered the Fátima of the Catholic community in Mozambique, and the waters from the fountains of the cascades were considered miraculous for those who drank them. Currently, this area continues to be the stage of the annual pilgrimage on May the 13th, for Our Lady of Fátima (MAE, 2012a).

The main recognized cultural heritage sites in Namaacha district are:

- Mount Mponduine where ceremonies related to traditional cults are carried out and are performed by the local ruler /Régulo: Filimone Mahlalela);
- Sanctuary of Our Lady of Fátima, where Catholic pilgrims make an annual pilgrimage on every 13th May;
- Daimani Cave in Changalane, where slaves were hidden and died; and
- Monument of those killed for the fatherland in Goba.

According to the SDEJT Namaacha (2022) The main cultural expressions in the district are:

- Ngalanga - dance of a social nature with a focus on tribal unity and to claim the common loyalty of its members to their respective chief;
- Xigubu – is a cultural and traditional practice that symbolizes colonial resistance in the country, especially in the southern region of Mozambique;
- Xingomana - traditionally a dance of joy danced by girls and young women when agricultural crops are good;
- Makwayela – it is a dance of struggle, of longing, and also of joy and festivity when returning home,
- Muthimba (dance practiced at traditional weddings),
- Muthini (dance practiced at traditional weddings),
- Marrabenta – urban dance resulting from the fusion of traditional dances Magika, Xingombela and Zukuta and western influence rhythms;
- Religious and community choral groups,
- Theatre groups, and
- Musical groups

According to the same source there are approximately 15 Cultural groups of traditional music and dance registered in Boane district distributed by the following cultural expressions: Makwaela tradicional (3), Xigubo (4), Ngalanga (2), Xingomane (3), Muthini (1), Muthimba (1) and Marrabenta Band (1). There is also an Art and Culture Makers Association (ADFAC) in which man many of the cultural groups and individual artists are associated.

The traditional authority in the entire District of Boane belongs to the Matsolos (expansion of the family Hanhane-Matsolo), with some villages where the Matsolos conferred the power of heads of land or village to other people close to them, as is the case of the Cuambes in some villages of Matola-Rio Administrative Post. In Boane, as in other parts of the country, cultural manifestations that occur refer to the daily life events of the families, such as: births, deaths, puberty phase, initiation rites, food, religion, languages spoken and others. The populations and traditional authorities of this area preserve the traditional ceremonies of the opening and closing periods of the canhu season (February-March), a traditional drink much appreciated in the south of the country.

The most practiced traditional dances in this district are Chigubo, Chingomana, Makuaela and Muthimba. The most common traditional dishes are the Tihovhe, Xiguinha, Uswa, Cacana, among others, being the peanut a very important condiment in the local cuisine (MAE, 2012b).

The main recognized cultural heritage sites, including monuments and sanctuaries in Boane District (SDEJT Boane, 2022) are as follows:

- Hindu temple in Mazambanine;
- Post office building, Mozambican railway station, 1916 Mozambican railway house, Beata Anuarite Church and bell iron of Boane primary school;
- Fiche family cemetery, and
- Site for Canhú [10] inauguration ceremonies in Mulotana.

The main cultural expressions in the district are:

- Choral singing
- Traditional dances - Xingomana, Xikwakwakwa, Mutimba, Makwaela, Xigubo, Mapiko, Nyau, Ngalanga, Nonje, libomdo, Ziquire and Libomdo;
- Capoeira;
- Musical bands including marrabenta;
- Poetry and theatre; and
- Fine arts, ceramic and handicraft.

There are 43 cultural groups registered in the district comprising: coral singing (8), capoeira (1), Xingomana (2), muthimba (1), xikwakwakwa (1), music bands (23), makweala (1), xigubo (1), mapiko (1), libomdo (1) and Nyau (1). There are also the Umbeluzi cultural association (nagalanga and marrabenta), and Armed Forces Seargent School group that practice choral singing and a series of traditional dances (Xigubo, Ziquire, Limbondo, Mapiko, Nonje, Nyau, Makwaela, Ngalanga).

In what regards artistic expressions, there are two theatre groups, two poets, five plastic artists, one ceramist and nine registered handicraftsmen.

6.3.7.2. Community level cultural heritage

According to information collected locally in the communities crossed by the line’s route in Namaacha, all the communities are inhabited since the eighties, and the people living in these communities are a mix of natives from Namaacha and people from former Swaziland and other provinces such as Gaza, Inhambane or Zambézia.

[10] The canhu season occurs in the end of January each year where people get together to celebrate and drink canhu. Canhu is a traditional drink made of fruit from the Marula Tree (Sclerocarya birrea).

Gumbe has two community cemeteries and the communities of Livevene, Macacuene, Bacabaca have one community cemetery each

None of the communities have sacred sites. Although in Livevene, for instance, have been mentioned that the traditional ceremonies are held by the region`s Traditional Ruler (“Régulo”). Have also been mentioned the celebrations held on the opening the canhu season comprising among other rituals the performance of local dances.

Leaders of the affected communities in Boane District have mentioned that these settlements exist for quite some time, specifying that Bairro 6 was created 40 years ago and Mabanja about 60 years ago. People from Bairro 6 and Mabanja are mostly native to the area while those who have settled in Bairro 1 come mainly from Maputo city and Gaza Province.

There are no cemeteries in these communities. Communities from Bairro 1 and 6 use the municipal cemetery located at about 4 km, and those living in Mabanja Zona A use the cemetery located in Zona D also at about 4 km. There was one grave recorded within the PPZ (this is a reduction from the 8 graves along the original route).

In these communities there are no communal sacred places and their inhabitants do not perform ceremonies to their ancestors. Funeral ceremonies follow the most common custom followed by urban or semiurban populations with urban characteristics, carrying out the wake at home or in the church and burial in the cemetery. One private spiritual house was identified within the PPZ in Baca baca 2.

As far as local festivities and dances are concerned, the only ceremony mentioned was the annual canhu festival where people dance and drink the traditional canhu beverage.

Where the proposed transmission line crosses the military camp in Boane, there are two important cultural heritage sensitivities near the line route: a sacred tree and the adjacent ceremonial parade yard for the military (see Figure 81). In interviews with the military in July 2024, officials confirmed that the overhead line could pass over the parade yard, but that no pylons should be located within this area. Similarly, they noted that while branches could be trimmed of the sacred tree, it should not be removed.

Figure 90: Chanfuta – sacred tree

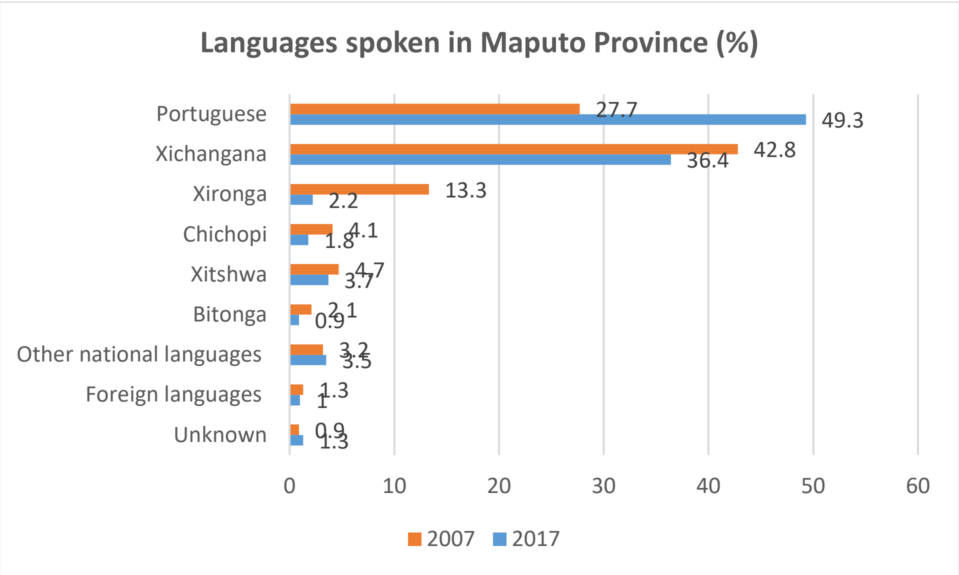
6.3.8. Ethnicity, Language and Religion

6.3.8.1. Ethnicity and Language

Linguistic diversity is one of the main cultural characteristics of Mozambique, with Portuguese being the official language. Emakhuwa is the most spoken mother tongue in the country, according to the results of the last population censuses. In 1997, Xichangana was the second most spoken language, and in the two following censuses it was replaced by Portuguese, with an increasing trend, rising from 10.7% in 2007 to 16.6% in 2017 (INE 2019a).

The main ethnic group in Maputo Province, including Boane District is the Tsonga, from the Shangana-Matswa-Ronga clan. This group follows a patriarchal lineage system. However, due to the location of Maputo and Matola in relation to South Africa, and due to the continuous industrial and service growth that has taken place over the last few years, both cities have become centres of attraction for people looking for jobs and better opportunities. As a result, there are a considerable number of other ethnic groups and nationalities, such as the Chopes, Bitongas, Portuguese and South Africans, among others. The main language spoken is Tsonga, although Portuguese is widely spoken in urban and semi-urban areas. Other languages spoken are Chope, Bitonga and Xitswa, reflecting the multi-ethnic character of the area.

The figure below shows the distribution of Maputo Province´s most spoken languages where stands out that the number of Portuguese speakers have increased considerably between 2007 and 2017. During the same period there has been a decrease of the tsonga languages spoken in southern Mozambique with particular emphasis to Xironga, a language traditionally spoken in southern Maputo Province.



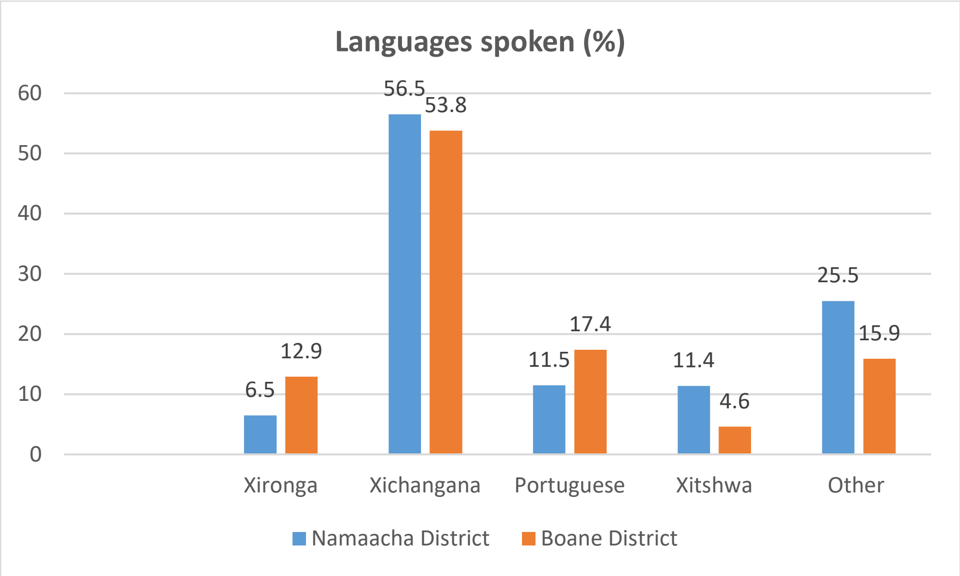
Source: III and IV RGPH

Figure 91: Languages spoken in Maputo Province

The languages most spoken by the population in Namaacha District region were mainly Swazi and Xironga. Currently, with the settlement of the population coming from other regions, it has changed a multilingual population pattern.

In what concerns the ethnolinguistic division of Boane District, the population of this district belongs mainly to the Changana ethnic group, which is part of the Tsonga population group. Besides the Changana, other ethnic groups live in the district, namely, the Ngunis, historically linked to the Zulus of the Kwazulu/Natal region; the Matswas, from the centre-north of Inhambane province; and the Rongas, from the southern part of Maputo province.

The language spoken by the vast majority of both Namaacha and Boane districts is Xichangana being spoken by 56,5% and 53,8% of its inhabitants respectively. Followed by Portuguese, Xironga and Matshwa in both districts. Other Mozambican and foreign languages are also spoken by a considerable number of people in both districts, especially in Namaacha (25,5%) which is an expected figure as it borders two neighbouring countries.



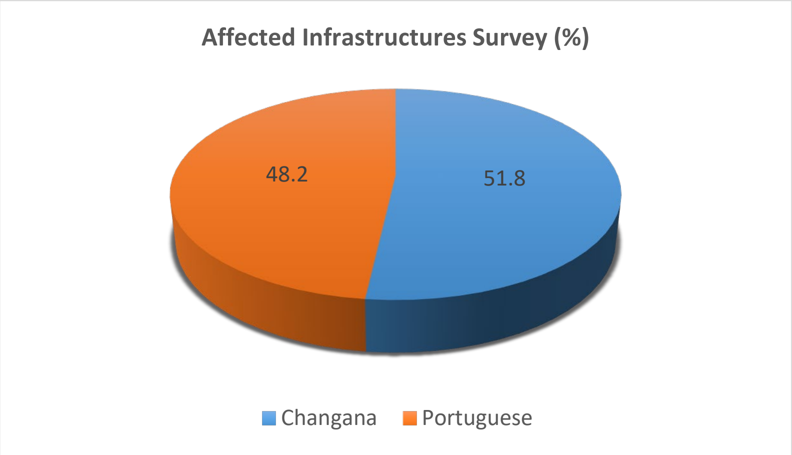
Source: III RGPH

Figure 92: Languages spoken on covered districts

The communities in Mafuiane locality speak mostly Portuguese, Changane and Swazi, and the majority living in Gumbe and Livevene speak Changane, Matswa and Swazi.

Regarding the languages most spoken by the communities in Boane District have been stated by Bairro 1 and 6 leaders that they mostly speak Portuguese and Changana and that those living in Mabanja speak mostly Ronga, Portuguese and Changana.

The results of the survey conducted to the head of households of the affected infrastructures indicate that slightly more than half (51%) speak Changana and the remaining speak mostly Portuguese.



Source: Consultec (2023)

Figure 93: Languages spoken by the affected IF surveyed HH

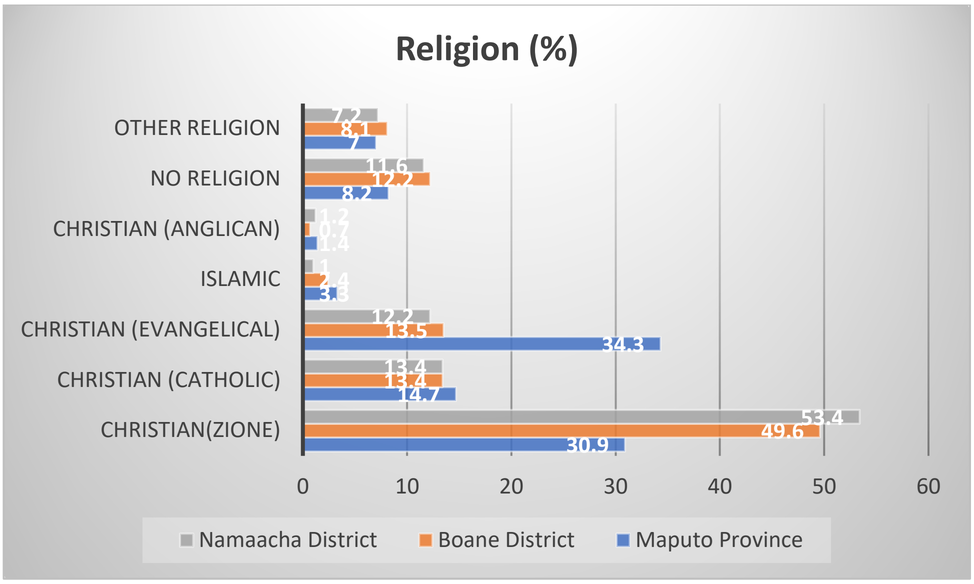
6.3.8.2. Religion

Mozambique has a great cultural diversity, with different beliefs and taboos throughout the country, and it is necessary to strengthen the promotion of national unity and valorisation of the cultural mosaic for a successful integration of new practices. About a third of the Mozambican population is Christian (mainly Roman Catholic), a fourth is Muslim (mainly in the North) and about half practise's animism (often associated with Christianity).

The province multiethnicity is expressed in the great diversity of religions professed both in Maputo Province and in Namaacha and Boane Districts. The most professed religions by the inhabitants of Maputo Province and Namaacha and Boane districts are Sion/Zione, Evangelical and Catholic (Figure 85). To note that Sion/Zione is the predominant religion professed by 30.9%, 53.4% and 49.6% of the population in Maputo Province and Namaacha and Boane Districts respectively.

The figure below shown the distribution of households according to the religion professed, in Maputo Province (2017) and in Namaacha and Boane District (2007 [11]).

[11] The national statistics institute (INE) has not released data from the last census for the districts.



Source: INE (2010 e 2018)

Figure 94: Distribution of households by religion

A Catholic church and a Zion church in the covered districts are shown in the figure below.

Catholic Church, Namaacha

Zion Church, Boane

Source: Consultec (2023)

Figure 95: Places of worship in the covered districts

The main religions practiced in the affected communities in Namaacha district are Christian beliefs, such as Protestant, Ten Apostles, Zione, Old Apostles, Anglican, Assembly of God, and United Naftal of Mozambique. In these communities there are twelve religious temples including six zione churches, three apostolic, one Assembly of God, one Anglican and one from United Naftal of Mozambique Church.

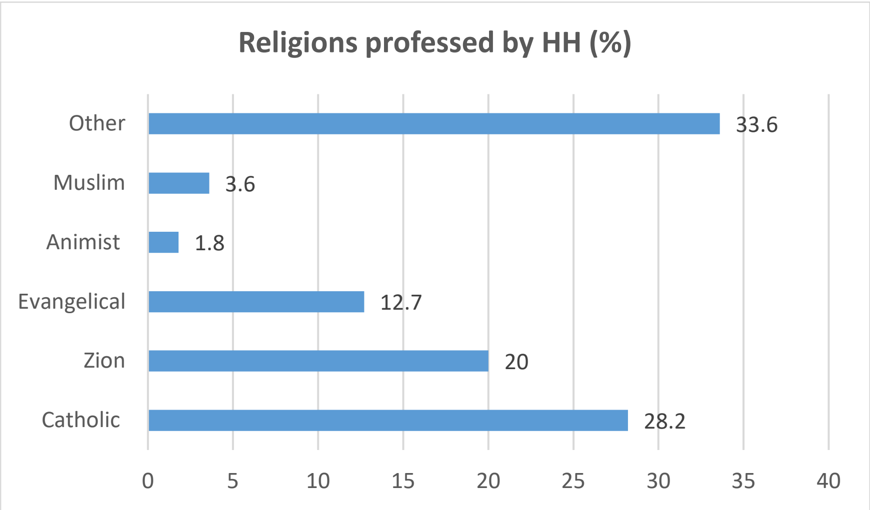
During the interviews held with Bairro 1, Bairro 6 and Mbanja communities in Boane, have been mentioned Cristian beliefs including Old Apostles and the Ebenezer Baptist Church. There are eleven religious temples in these communities, four in Bairro 1 and Bairro 6 and three in Mbanja.

In the following figure are shown a Zione Church in Gumbe in Namaacha District (Left) and a God Assembly Church in Bacabaca community in Boane District (Right).

Source: Consultec (2023)

Figure 96: Religious temples in Bacabaca (Boane) and Gumbe (Namaacha)

As shown on the chart below from the survey conducted to the households with affected infrastructures located on the buffer resulted that the majority of those who mentioned the religion they follow are from the Catholic belief (28,2%) followed by Zion with 20% of the respondents. Animists count with 1,8%, although some of those who have not specified their religion might fall under this category.



Source: Consultec (2023)

Figure 97: Religions professed by surveyed households

All the religious temples inside the power line buffer or located on its immediate vicinity are illustrated on the map shown on the figure above.

6.3.9. Education

Education is considered a priority sector for the government at both national and provincial levels in Mozambique. Over the past decade, Mozambique has made significant progress in increasing the number of children attending school. Much of this progress is due to the abolition of school fees in 2004, educational reforms, and major investments in the construction of schools and recruitment of teachers.

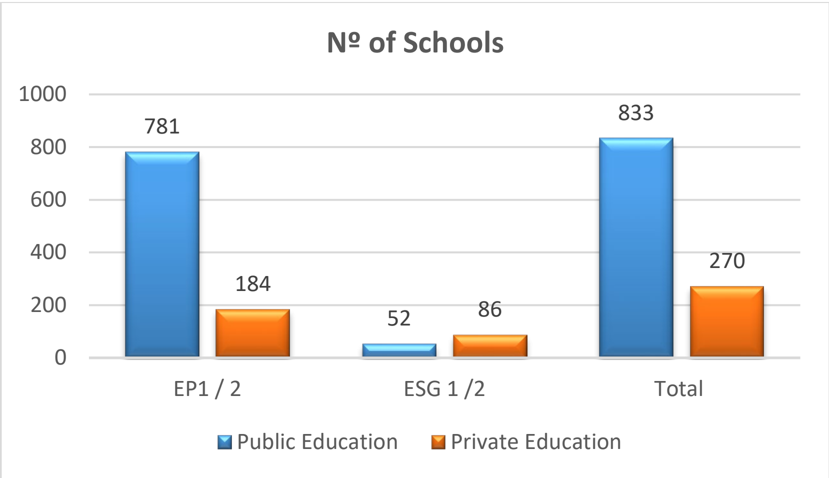
According to the Mozambican Education Ministry, the education system in the country is divided into three subsystems:

Pre-School Education – kindergarten (*creches*);
School Education – That is divided into:

- 1st Level Primary School (EP 1) – 1st to 4th Grade;
- 2nd Level Primary School (EP 2) – 5th to 7th Grade;
- 1st Level Secondary School (ESG 1) – 8th to 10th Grade;
- 2nd Level Secondary School (ESG 2) – 11th to 12th Grade;
- Technical and Professional Education - this is taught in technical schools and institutes, offering courses that cover three major areas (industrial, commercial and agricultural) at elementary, basic and medium level; and
- Higher Education - University and higher education institutes.

Extra School Education – This is the literacy and education of people outside the school system. The education system in Maputo Province and Namaacha and Boane districts follow the same trend as the rest of the country, with a focus on Primary Education, as illustrated by the significantly higher number of primary schools than secondary schools, vocational technical education, teacher training schools or higher education institutions.

The province of Maputo had in 2021 a public-school network of 833 educational establishments of which 781 were 1st and 2nd grade primary schools and 52 were 1st and 2nd cycle secondary schools. In the same period, the province had a private school network of 270 educational establishments, of which 184 were 1st and 2nd grade primary schools and 86 were 1st and 2nd cycle secondary schools. To note that the difference on the number of primary and secondary schools is much accentuated on the public education system.



Source: INE (2022d, 2022e)

Figure 98: Number of schools per type and level (2021)

The province also has 14 professional and technical schools and eight higher education institutions.

The illiteracy rate represents the percentage of the population over 15 years of age who can neither read nor write. The results presented in Table 41: show that the percentage of people who can neither read nor write in Mozambique and Maputo Province has been decreasing over time, from 44.9% in 2014/5 to 39.9% and 13.3% in 2019/20 in Mozambique, and from 19.3% in 2014/5 to 13.3% in 2019/20 in Maputo Province.

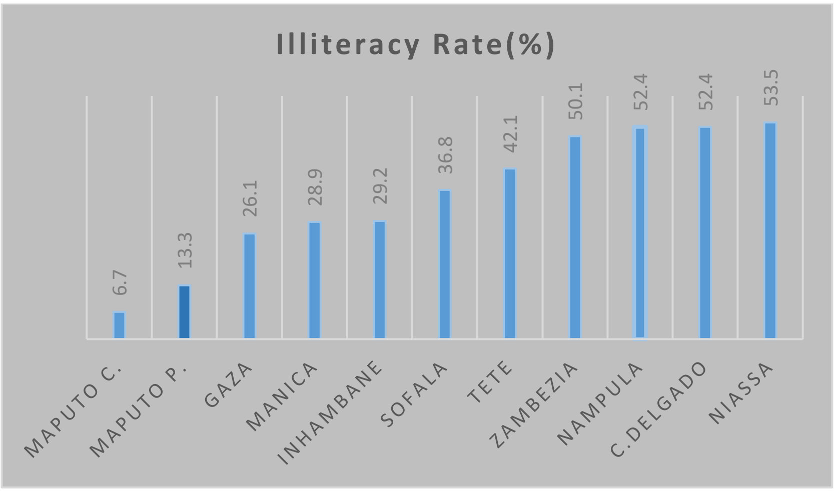
Although there has been a reduction in the illiteracy rate for both genders in the period under review, this was more accentuated among women in Maputo Province (8.8 percentage points) than among men (2.6 percentage points). Nevertheless, the percentage of women who can neither read nor write remains high (17.8%) when compared to men (7.9%).

Table 44: Illiteracy rate in Mozambique and Maputo Province, 2014/5 and 2019/20

Level	2014/15			2019/20		
	Total	Men	Women	Total	Men	Women
Mozambique	**44.9**	30.1	57.8	**39.9**	27.4	51.0
Maputo Province	**19.3**	10.5	26.6	**13.3**	7.9	17.8

Source: INE (2021c).

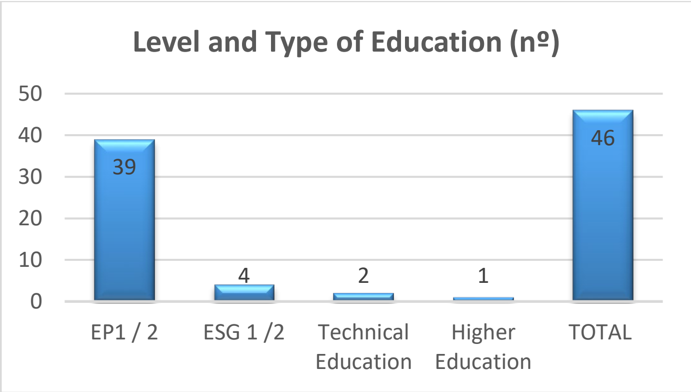
The level of schooling and literacy remains extremely low in Mozambique, although illiteracy rates have been declining in recent years. When compared to the other provinces of Mozambique, Maputo Province currently has the second lowest illiteracy rate in the country, (13.3%) after Maputo City Province (6.7%), as illustrated in the following figure.



Source: INE (2021b)

Figure 99: Illiteracy rates by province

The Educational establishments in Namaacha District follow the same trend, that is, there are considerably more primary education establishments than secondary education establishments. The district has currently 46 general education establishments and three public and private vocational training institutions, namely, Teachers Training Institute (IFP), Namaacha Agricultural Institute (IAN) and the Higher Institute of Education and Technology (ISETT). Figure 91: shows the number of educational establishments currently existing in Namaacha District by level and type.



Source: GDN (2022)

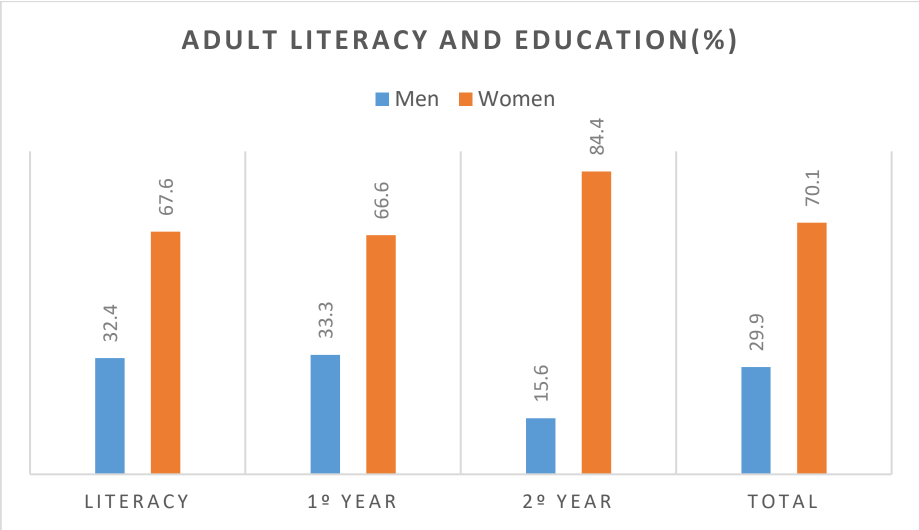
Figure 100: Education establishments in Namaacha District (2022)

The photograph shows a primary school built of conventional materials located in Namaacha Town, the Namaacha District´s headquarters.

Source: Consultec (2023)

Figure 101: Primary School in Namaacha District

Regarding the Youth and Adult Literacy and Education (AEJA) and as illustrated in Figure 93 below, 495 adults were enrolled in the regular programme of which 347 (70.1%) are women, subdivided by level of education. This significantly higher number of women enrolled in AEJA, and similarly to other districts in the country, is mainly motivated by the need of these women to become literate and educated in adulthood, being a direct consequence of lack of opportunities at schooling age.



Source: GDN (2022)

Figure 102: Number of Adults in AEJA by level and gender

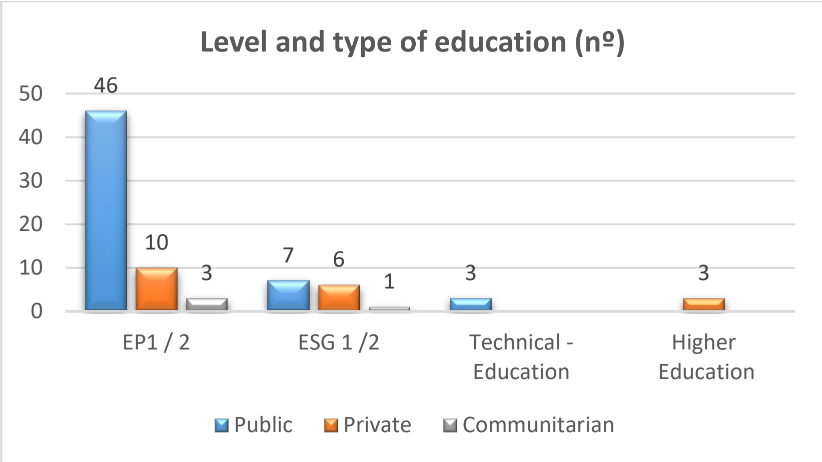
According to data made available by the education sector and presented in the table below, the total number of students enrolled in general education increased from 2020 to 2021. As for technical-vocational education there was a slight reduction of enrolments and in the same period there was a slight improvement in the education indicators regarding students per teacher and students per class ratios.

Table 45: Education sector indicators, 2020-2021

Designation	2020	2021
General Education (nº)	15.731	16.239
Technical-Vocational Education	366	359
Student/Teacher Ratio	29	28
Student/Class Ratio	36	35

Source: INE (2022)

In Boane District there are 59 primary schools, 46 of which are public, three communitarian and 10 private schools. There are 14 secondary schools of which seven are public, six private and one run by the community. The district also has three private institutions of higher education and three technical public institutions (SDEJT Boane, 2022). Figure 94: shows the existing educational establishments in Boane District by level and type of education.



Source: SDEJT Boane, 2022

Figure 103: Education establishments in Boane District (2022)

As shown in the figure below, and similar to what was observed in Namaacha District, there was a significant predominance of women attending adult education and literacy centres in Boane District, having increased from 67% to 83% between 2020 and 2021.

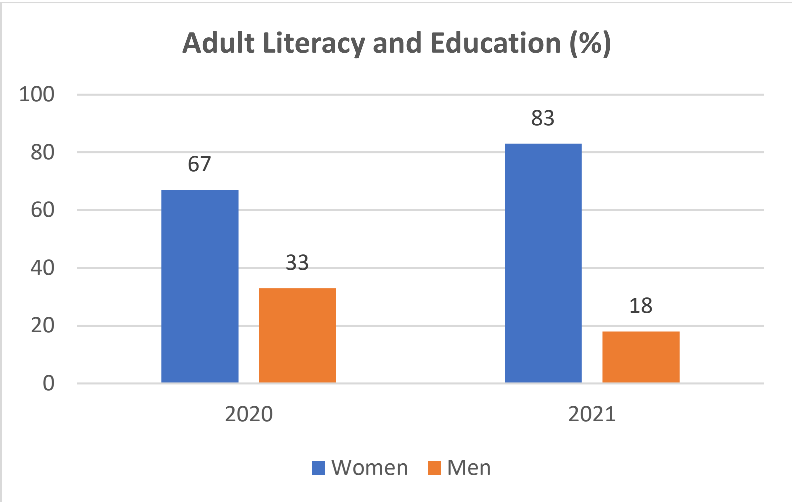


Figure 104: Adult literacy and education by gender (2020 – 2021)

In global terms the number of students per class and per teacher in Boane District is high, these indicators are much higher in the public sector than in the private sector. Of the total number of students in Boane District, 93.2% and 6.8% attend the public and private education respectively. As for the proportion of girls, they constitute 51.2% of the total number of students, representing in turn, 51.3% and 49.9% of the total school population in the public and private education respectively.

Table 46: Education sector indicators (2022)

Indicator	Public	Private	Global
Number of students / classes	54.9	17.4	47.9
Number of students /teachers	55.2	13.9	46
Number of girls (%)	51.3	49.9	51.2
Total number (%)	93.2	6.8	100

Source: GDB (2022)

According to SDEJT Namaacha (2022) in Namaacha Administrative Post there are a total of 24 schools corresponding to 57% of the existing schools in the district. As shown in Figure 96: below Kala kala has 11 schools (45,8%), Impaputo six (25%), Mafuiane four (16,7%), and the locality of Matsecanhe with three schools corresponding to 12,5%.

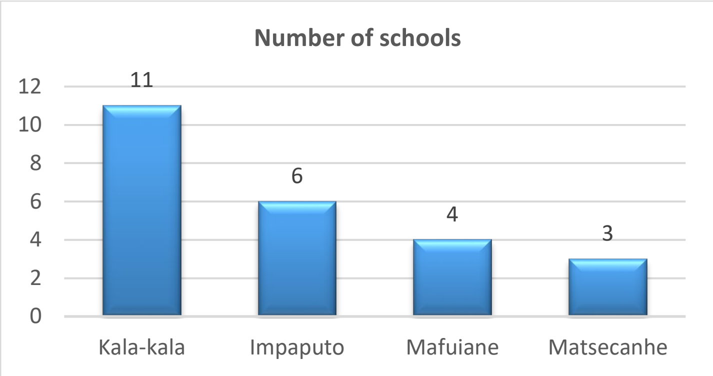


Figure 105: Number of schools per locality in Namaacha AP

Concerning access to education in the communities covered by the project in Namaacha Mucacuene and Livevene have no primary school but while children from Mucacuene can go to neighbouring Bacabaca primary school children from Livevene do not have any in the vicinity either. The education sector professional from Bacabaca who has been interviewed reported that a considerable number of students go to EPC Mafuiane as well, also because EPC Bacabaca lectures only to the 6th grade. In fact, the later has a much higher number of students.

Table 47: Schools attended by covered communities in Namaacha

Locality	Community	School in the Community	Number of students	Number of Teachers	School in the Vicinity	Number of students	Number of Teachers
Mafuiane	Bacabaca	EPC Bacabaca	74	5	EPC Mafuiane	864	28
	Mucacuene	No school			EPC Bacabaca	74	5
Impaputo	Gumbe	EPC Gumbe	40	3	EP1 7 de Abril	No data	No data
Kalakala	Livevene	No school			No school		

Schools located in the localities within Boane Sede Administrative Post comprise 64% of the total number of Boane district´s schools as illustrate in the following figure.

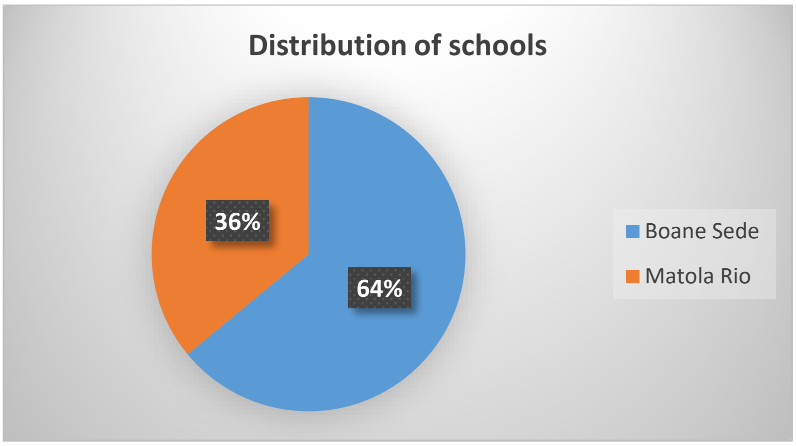


Figure 106: Schools per administrative post

All the communities covered by the project in Boane have a primary school. EPC Boane Sede in Bairro 1 has the highest number of students and teachers. When compared with the rural context of the communities in Namaacha the schools in these urban communities have considerably more students and teachers.

Table 48: Schools attended by covered communities in Boane

Locality	Community	School in the Community	Number of Students	Number of Teachers
Gueguegue	Bairro 1	EPC Boane Sede	1290	34
	Bairro 6	EP1 José Macamo	822	17
	Mabanja	EPC Mabanja	616	21

The photos below shows the EPC Gumbe with the roof destroyed and children having classes outside under a tree.

Figure 107: Gumbe Primary School in Impaputo Locality

The table below presents the last or higher level of education concluded by the surveyed heads of households which indicates that most of the respondents had the primary school level. More than half of machambas HHH have primary education (56,1%) and 45,9 % of the business owners. 21,8% and 16,2% of surveyed HHH of affected infrastructures and businesses respectively have a university level education. To note that 18.3% of surveyed machambas HHH do not have any concluded schooling level.

Table 49: Higher level of education of surveyed HHH

Level of education	Affected Infrastructures	Affected Machambas	Affected Businesses
Primary school	33,6	56,1	45,9
Secundary School	28,2	21,1	21,6
Tecnnical -professional education	2,7	2,2	5,4
University	21,8	2,2	16,2
None	10	18,3	8,1
Other	3,6		2,7

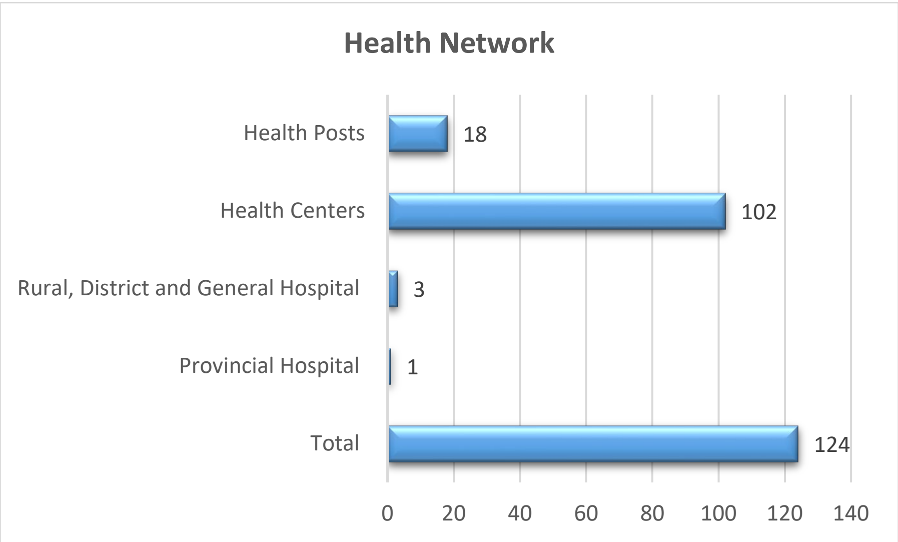
The number of heads of households who attend school is low, having been 4,5% for the affected infrastructures survey and 4,4% for the machambas survey. In addition, the respondents have mentioned that members from their households usually walk or take a minivan (Xapa) to go and return from school.

Figure 108: Social infrastructures along the project route

6.3.10. Health

The National Health System (SNS) in Mozambique focuses mainly on primary health care services. However, there are several types of health facilities, each providing a specific type of service. These include health posts, health centres (urban and rural), and hospitals (district, rural, provincial, and central). Important to note that some facilities are better equipped than others, depending on their location and on the number of users.

In 2021 the health network of the province was composed of 124 health units, of which 120 are of the primary level (102 health centres and 18 health posts), three of the secondary level (one rural, one district and one general hospital), and one is of the tertiary level (a provincial hospital). Of the 103 existing health centres, 12 are urban health centres and 90 are rural health centres.



Source: MISAU (2022)

Figure 109: Health network in Maputo Province, 2021

Despite the increase in the number of health units in recent years, there has been an increase in the ratio of inhabitants per health unit both at national and provincial level between 2020 and 2021 which falls short of the international recommendation (10,000 inhabit./HU). The number of beds per thousand inhabitants in the Mozambican territory has remained stable during this period while there was a slight reduction of this ratio for Maputo province.

The average distance that inhabitants living further away must travel to access a Health Unit reduced from 12.1 km in 2020 to 12.0 km in 2022 at national level, on the other hand, this ratio has slightly increased in the province. During this period, there was a positive evolution on ratio of inhabitants per health technician both at national and at the Maputo Province level.

Table 50: National and provincial level NHS indicators (2020 – 2021)

Indicator	Year	National	Provincial
Inhabitants / Health Unit	2020	17.219	17.875
	2021	17.419	18.572
Beds /1000 inhabitants	2020	0,72	0,78
	2021	0,72	0,76
Theoretical Range of Action	2020	12,1	8,18
	2021	12,0	8,2
Inhabitants / Health Technicians	2020	909	1.055
	2021	902	808

Source: MISAU (2022)

Regarding the epidemiological profile in Maputo Province, malaria and diarrhoeal diseases continue to be the main causes of demand for health services, with a downward trend in the number of deaths in recent years. Preventive actions, with particular emphasis on intra-household spraying, distribution of mosquito nets and intermittent presumptive treatment for pregnant women, are activities that will continue to merit the attention of the health units. Another public health problem in the province is tuberculosis. The national strategy is centred on the control of the disease and the intention is to concentrate efforts on improving the screening rate of the disease. There is also a need to strengthen integration between the Tuberculosis and HIV/AIDS Programmes, considering the data collected that indicates that about half of all TB patients are HIV positive.

Namaacha District has 11 health units classified as Type I and II Health Centres, for the provision of basic services and primary and curative care. Of the total number of health units, six are in Namaacha Administrative Post and five in Changalane Administrative Post. The ratio of inhabitants per health unit is 4,284 inhabitants per health unit, within the parameter recommended by WHO (10,000 inhabitants/HU), and therefore better than the national and provincial levels.

Table 51: Health units in Namaacha District

Health Unit	Type	Administrative Post	Locality
Namaacha Health Centre	I	Namaacha Sede	Namaacha Sede
Mundavene Health Centre	II		Impaputo
Odete Mechisso Health Centre	II		Impaputo

Health Unit	Type	Administrative Post	Locality
Mafuiane Health Centre	II		Mafuiane
Kuluka Health Centre	II		Mafuiane
Matsequenha Health Centre	II		Matsequenha
Changalane Health Centre	II	Changalane	Changalane sede
Ndinviduane Health Centre	II		Changalane sede
Warmongo Health Centre	II		Mahelane
Mahelane Health Centre	II		Mahelane
Goba Health Centre	II		Goba

Source: SDSMAS Namaacha (2022)

Primary health care focuses on preventive medicine and includes the following programmes: National Malaria Control Programme, Vaccination Expanded Programme (PAV); Mental Health Programme, Epidemiological Surveillance Programme, Nutrition Programme, Mother and Child Health Programme (SMI), National Programme for the Fight Against Tuberculosis; and the National Programme for the Control of Sexually Transmitted Infections (STI) and HIV/AIDS. The figure below is illustrated the Namaacha Type I Health Centre located in Namaacha Town.

Source: Consultec (2023)

Figure 110: Type I Health Centre in Namaacha Town

According to the Namaacha District Health Service, the coverage of institutional deliveries is encouraging, showing a positive evolution. Namaacha district had 63% of institutional deliveries in 2021. Both the number of children and adults starting Antiretroviral Treatment (ART) has reduced in the period under review which may indicate a downward trend in the incidence of new cases of HIV/AIDS. The health professional per inhabitant ratio remained stable and the ratio of doctors per inhabitant increased during this period.

The main health indicators in Namaacha District are presented in the table below.

Table 52: Health indicators (2020-2021)

Indicator	2020	2021
Number of institutional deliveries	1426	1477
Number of children starting ART	40	32
Number of adults starting ART	677	595
Health professional per inhabitant ratio	296	296

Doctor per inhabitant ratio	16.887	18.963

Source: GDN (2022b)

The epidemiological profile of the district, between 2019 and 2021, was mainly dominated by diarrhoea, dysentery, and malaria, which together represent almost all the cases of notifiable diseases. During this period, a considerable number of cases of canine bite were reported. There were no confirmed cases of Acute Flaccid Palsy, as well as no cases of cholera, meningitis, whooping cough and tetanus in new-borns in the last 5 years. According to information obtained from the Health, Women and Social Affairs District Service (SDSMAS), arterial hypertension has been a disease of greatest concern at the district level, followed by acute respiratory diseases and HIV/AIDS.

Table 53: Epidemiological profile in Namaacha District (2019 – 2021)

Disease	Number of cases		
	2019	2020	2021
Measles	53	44	31
Malaria	2009	1772	1777
Febrile Syndrome	1298	1406	1497
Diarrheal Diseases	2323	1870	1610
Canine bite	141	114	92
Dysentery	151	27	21

Source: (SDSMAS Namaacha, 2022).

Boane District has 16 health facilities (Table 51:), of which one is classified as Type I Health Centre, nine as Type II and six of Type III, for the provision of basic services and primary and curative care. Of the total number of health units, 12 are in Boane Sede Administrative Post and four in Matola Rio Administrative Post. In addition to these health infrastructures, there are three private clinics, two pregnant women waiting houses and five health committees. Of all the health units in the district, 12 have maternity and 14 have antiretroviral treatment (ART) services. The health units more distant from the district headquarters are Josina Machel Health Centre and Mulotane Health Centre.

Table 54: Health units in Boane District

Health Unit	Type	Administrative Post	Distance from headquarters
Boane -Sede Health Centre	I	Boane Sede	0 km
Mahubo Health Centre	II	Boane Sede	14 km
Massaca Health Centre	II	Boane Sede	8 km
Picoco Health Centre	II	Boane Sede	6 km
Casa do Gaiato Health Post	III	Boane Sede	11 Km
Mabanja Health Centre	II	Boane Sede	7 km
Tchonissa Health Centre	III	Boane Sede	11 km
Águas de Moç. Health Post	III	Boane Sede	5 km
Josina Machel Health Centre	II	Boane Sede	60 km
Militar Health Post	III	Boane Sede	1 km
Libombos Health Post	III	Boane Sede	14 km
Mahanhane Health Centre	II	Boane Sede	16 km
Baleluane Health Centre	II	Matola-Rio	30 km

Health Unit	Type	Administrative Post	Distance from headquarters
Campoane Health Centre	II	Matola-Rio	13 km
Mulotana Health Centre	II	Matola-Rio	50 km
Matola-Rio Health Centre	III	Matola-Rio	22 km

Source: SDSMAS (2022a)

The ratio of inhabitants per health unit in Boane District is 15,274 inhabitants per health unit, which falls short of the WHO ´s recommendation (10,000 inhabitants/US), being however, closer to the recommended value than at national and provincial levels.

According to Boane´s SDSMAS, the main health programmes developed in the district are; namely, Mother and Child Health Programme (SMI), Nutrition, Expanded Vaccination Programme (PAV), Community Involvement, Preventive Medicine, Environmental Health, Oral Health, HIV/AIDS, Tuberculosis, Malaria, Nursing, School Health, Mental Health, Traditional Medicine, Social Action, Epidemiological Surveillance, and the Gender Based Violence Programme (GBV).

The images in figure below are allusive to child vaccinated the polio vaccination campaign within the Expanded Programme on Immunization (PAV) and outpatient waiting area in Boane Health Centre.

Source: Consultec (2023)

Figure 111: Child vaccinated and outpatient yard

As presented in the table below and as mentioned above the ratio of inhabitants per health unit is fall short the recommended ratio. Similarly, the ratios of inhabitants per doctor and per nurse are also above the WHO recommendation, i.e., one doctor per 10,000 inhabitants and one nurse per 3,000 inhabitants.

Table 55: Main heath indicators in Boane District

Indicator	2020
Ratio Inhabitant per health unit	15.274
Ratio inhabitant per doctor	32.947
Ratio inhabitant per nurse	8.237
Ratio inhabitants per hospital bed	2.777

Source: SDSMAS Boane (2022a) and INE (2021c)

Boane district´s epidemiological profile has been dominated mainly by diarrheal diseases, dysentery, and malaria, which together represent almost all reported cases of compulsorily notifiable diseases.

Table 56: *Boane District Epidemiological profile (2019 – 2021)*

Disease	Number of cases		
	2019	2020	2021
Measles	51	62	51
Malaria	6348	5353	4138
Febrile Syndrome	7928	4535	3881
Diarrheal Diseases	5086	3034	1843
Canine bite	315	212	114
Dysentery	666	525	352
Acute Flaccid Paralysis (AFP)	7	3	3

Source: SDSMAS Boane (2022a)

None of the communities located in Namaacha have a health unit and Type II Mafuiane Health Center and Type I Namaacha Health Center are those used by these communities. Specially those living in Mucacuene and Livevene communities must walk long distances to reach the nearest health unit.

Regarding the covered communities in Boane, both Bairro 1 and Mabanja have a health unit and the people living in Bairro 6 go either to Type I Boane Health Center or Type III Military Health Post. Although there is a health unit in Mabanja which is in Bairro B, the communities interviewed and therefore directly impacted by the line´s right-of- way, live or have their impacted assets in Bairro A which is about one hour walk to the health centre.

Table 57: *Health units used by affected communities*

<table>
<tr><th>District</th><th>Locality</th><th>Comunity</th><th>Health Unit</th><th>Nearest Health Unit</th><th>Distance walking</th></tr>
<tr><td rowspan="4">Namaacha</td><td rowspan="2">Mafuiane</td><td>Bacabaca</td><td>no</td><td>Mafuiane Health Center</td><td>30 minutes</td></tr>
<tr><td>Mucacuene</td><td>no</td><td>Mafuiane Health Center</td><td>2 hours 30m</td></tr>
<tr><td>Impaputo</td><td>Gumbe</td><td>no</td><td>Mafuiane Health Center
Namaacha Helath Center</td><td></td></tr>
<tr><td>Kalakala</td><td>Livevene</td><td>no</td><td>Namaacha Health Center</td><td>2 hours</td></tr>
<tr><td rowspan="3">Boane</td><td rowspan="3">Gueguegue</td><td>Bairro 1</td><td>Boane Health Center</td><td></td><td>10 minutes</td></tr>
<tr><td>Bairro 6</td><td>no</td><td>Boane Health Center
Military Health Post</td><td>30 minutes</td></tr>
<tr><td>Mabanja</td><td>Mabanja
HealthCenter</td><td></td><td>1 hour</td></tr>
</table>

According to information provided by local health professionals the communities using Boane Type I Health Center have access to a greater range of services and primary health care programmes such as outpatient consultation, maternity, vaccination expanded programme, mother and child health; HIV/AIDS services, ophthalmology, laboratory, minor surgery, physiotherapy and stomatology, while those that mostly use Mabanja Health Center have access to services or programmes such as, Outpatient consultation, maternity, expanded vaccination program, mother and child health and HIV/AIDS services.

With regard to Namaacha District, the services offered at Mafuiane Health Center are: maternity, outpatient consultations, paediatric and psychiatry internment, laboratory, adolescent and youth-friendly services and programs such as an extended vaccination program and maternal and child health. In more remote communities such as Gumbe and Livevene in the locality of Kalakala, or Mucacuene in the locality of Mafuiane in the district of Namaacha, there are elementary multipurpose agents who serve as a link between health units and communities to support them in minor first aid and in disseminating information and education on primary health care.

In the figure below is shown the working place of the Elementary Multipurpose Agent (APE) in Gumbe community where he gives support in the treatment of minor injuries, emergency deliveries or distribution of prescribed drugs for malaria for example.

Figure 112: Workplace of the Elementary Multipurpose Agent (APE) in Gumbe

In general, the most common illnesses reported by health professionals and local leaders were malaria, respiratory infections, diarrheal diseases, HIV/AIDS, scabies, joint diseases, among others. While the main cause of death reported in children were malaria, respiratory infections and diarrheal diseases, the main causes of mortality in adults were mentioned to be malaria, hypertension, and HIV/AIDS related diseases.

The figure below indicates the HU used by the survey respondents, Boane Health Centre was mentioned by almost 70% followed by Mabanja health centre (50,4%) and Military health post (21,8%). Maputo Central Hospital or Maputo Military Hospital are also used by 3,6% a 0,9% of the surveyed respectively. To note that 3,6% search for medical care in private clinics.

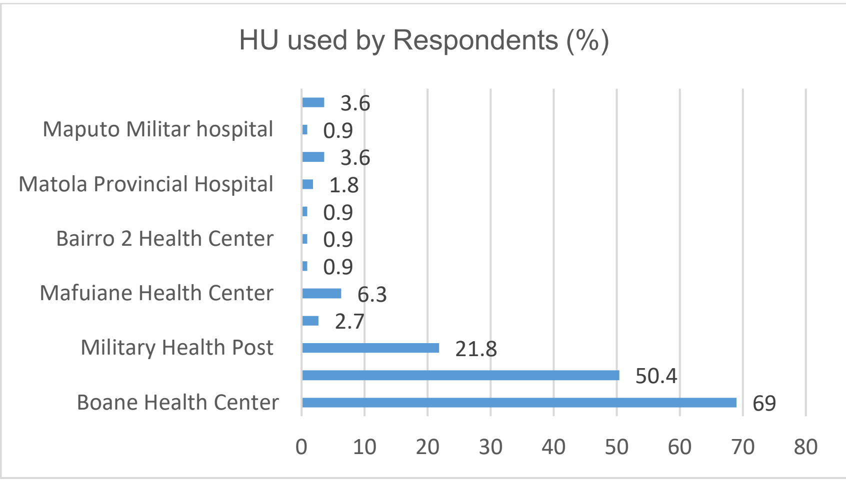


Figure 113: Health units used by the infrastructures survey HHH

When asked if there was anyone in the HH with a chronic illness, 43.6% said yes and the remaining responded negatively. Reported chronic diseases were hypertension, HIV/AIDS, diabetes, asthma, sinusitis, cancer, epilepsy, hepatitis among others.

The figure below shows the illnesses reported by the HHH has having occurred on the households. Malaria and respiratory diseases were the most frequent having been mentioned by 44,5 % and 31,8% of those surveyed. Tuberculosis (1,8%) and diarrheal diseases (0,9%) were reported by much less respondents.

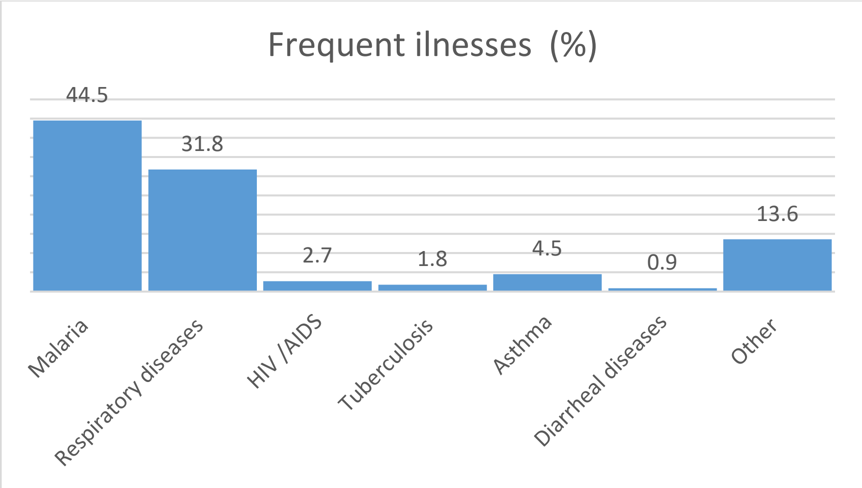
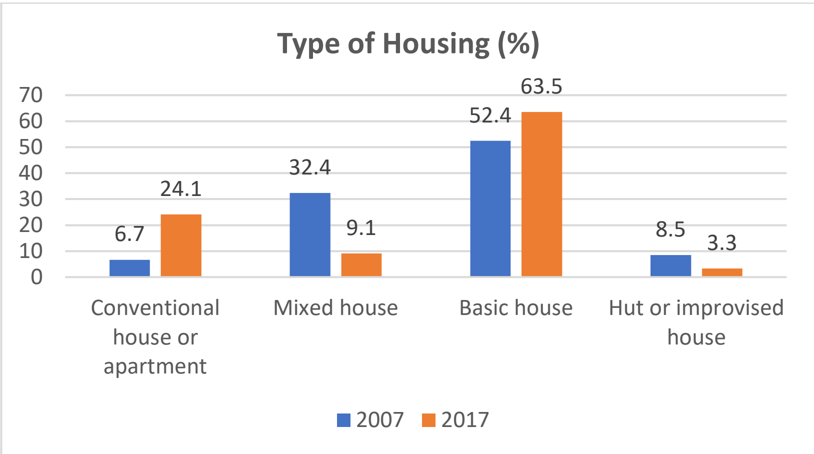


Figure 114: Illnesses suffered by the surveyed HH in the last year

6.3.11. Housing and Living Conditions

The physical characteristics of housing, especially the material used in its construction and access to basic water, sanitation, and energy services, are important indicators of the standard of living of households. The characteristics of the housing stock of a society are a very relevant indicator of the level of socio-economic development.

As presented below, between 2007 and 2017 there was an increase of about 17.4% of households living in conventional houses in Maputo Province, indicating some improvement in the living conditions of this portion of the province´s inhabitants. There was also an increase in basic houses and a noteworthy reduction in the number of households living in mixed houses and huts or improvised houses.



Source: III and IVRGPH

Figure 115: Type of housing in Maputo Province (2007-2017)

At the time of the III RGPH, most of the population of Maputo Province and covered districts lived in self-owned dwellings. The majority of the population of Maputo Province lived in basic houses (52.4%) and mixed houses (32.4%), and the minority in conventional houses or flats (6.7%) or in huts (8.5%). At the district level, about half lived in mixed houses (48%) in Namaacha and in basic houses (50.3%) in Boane. However, families living in huts constitute almost a quarter in Namaacha District (23%) and in Boane District 9.7% of the total housing stock.

Table 58: Type of housing in the province and covered districts

Type of Housing	Maputo Province (%)	Namaacha District (%)	Boane District (%)
Conventional house or apartment	6.7	5	6.8
Mixed house	32.4	48	33.2
Basic house	52.4	24	50.3
Hut, improvised houses and others	8.5	23	9.7

Source: III RGPH

The images below show the type of conventional housing (left) and basic housing (right).

Conventional House, Boane

Basic House, Namaacha

Source: Consultec (2023)

Figure 116: Types of housing in the covered districts

In the following figures, a comparison was made between the construction material of the walls, roofs and floors of the houses in Namaacha and Boane Districts (INE, 2012)[12] and Maputo Province (INE, 2018). The most used type of wall construction material in Boane is cement block (53%) and reed / sticks / bamboo (22.1%), which is in line with the more urban characteristics of Maputo Province, where 82.2% of the house walls are built with cement blocks. The most used material in Namaacha is reed/ sticks or Bamboo (34,2%) followed by cement block (26,7%) and sticks and adobe (26,5%) thus indicating a higher proportion of households living in a more rural environment. As for Maputo Province (91%), the predominant type of roofing material in Namaacha (67,5%) and Boane District (83,9%) is zinc sheeting. Other commonly used roofing material for houses is straw, thatch or palm leaves comprising 25,3% of Namaacha HH and 8,2% of Boane HH. The predominant type of flooring material used in Boane District (62.1%) and Namaacha District (44,3%) is cement, which is consistent with the material most used in Maputo Province (80.3%). The second most used flooring material is adobe for Namaacha (32,1%) and Boane (15,4%) while in Maputo Province is Mosaic/Tile (11,3%).

According to information collected during the field work, there is a distinct difference on the type of housing found on the communities crossed by the transmission line on both districts. On the one hand, we have communities such as those living in Bairro 1 and Bairro 6 (near the Boane substation) where the houses are all made of conventional masonry materials and mostly have several rooms. On the other hand, we have remote communities such as Mucacuene, Gumbe, or Livevene, where the houses are almost all made of precarious materials. Bacabaca and Mabanja communities have a mix of both conventional and precarious materials used for building their houses.

The figures below illustrate a house built of conventional materials in Bairro 6 of Boane District (left) and an house built in Livevene (right) in Namaacha District.

Figure 117: Housing types found on the line´s RoW

The results of the infrastructures survey conducted with the households indicated that the majority of the respondents said that the house where they live is self-owned dwellings (98,2) while 0,9% said to rent the house and the remaining 0,9 % have inherited the house.

From the survey also resulted that the number of building infrastructures found on the household plot ranged from one to 15 structures. As shown on the figure below about half the households

[12] INE has not yet released data from the IV RGPH (2017) regarding housing data at the district level.

(50,9%) have one to four built infrastructures on the housing plot, 42,7% have five to eight, 5,5% have nine to 12, and 0,9% have 13 or more built infrastructures on their household.

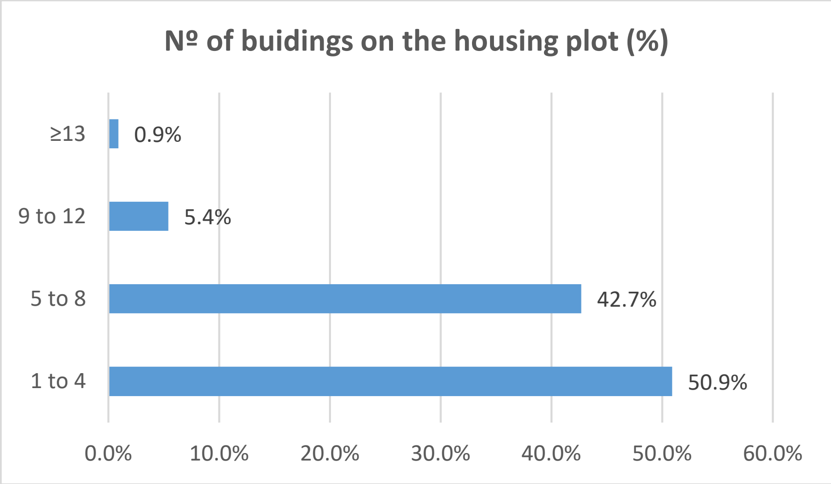


Figure 118: Number of built infrastructures on the housing plot

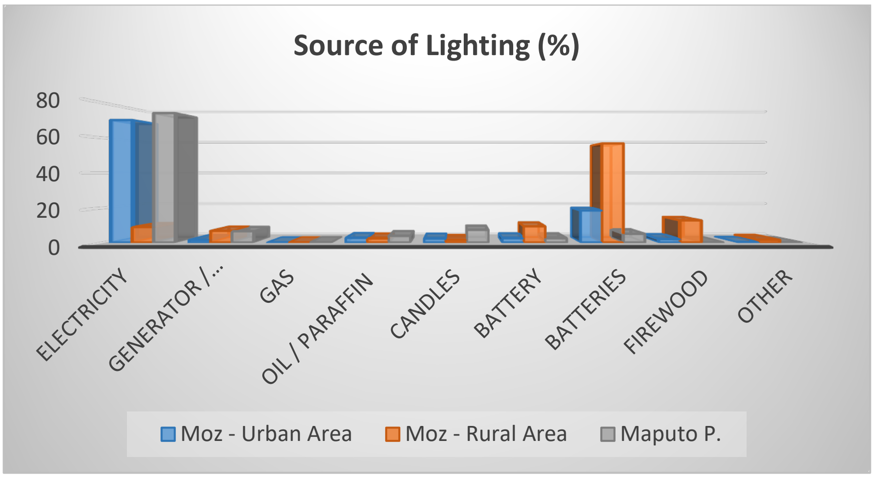
6.3.12. Energy, water and sanitation

6.3.12.1. Energy

Mozambique has undertaken significant efforts in recent years to electrify the country. The electrification rate has increased from 5% in 2001, to 24% in 2017 and to 38.1% in 2021. Access to electricity, however, remains low and is mainly concentrated in urban areas. In 2019, 72% of the urban population had access to electricity compared to 5% of the rural population. This imbalance represents a major challenge to achieving the electrification of the country by 2030, considering that the vast majority (63% in 2019) of Mozambique's population lives in rural areas.

According to the Economic Social Plan and Budget for 2020 (GoM, 2021), one of the main objectives regarding the energy sector in Mozambique is to electrify 77 administrative post headquarters through a combination of national grid connection options and autonomous generation and distribution systems.

As illustrated in the figure below**,** the main source of lighting in the rural area continues to be the battery (56.9%) and followed by firewood (12.7%), while in the urban area, the main source of lighting for most households is electricity from the public grid (70.1%) and followed by the battery (18.4%). In Maputo Province, the main source of power or fuel for lighting is electricity (74.3%) from the public grid, followed by the battery (7.3%) being in line with the urban areas in Mozambique.



Source: INE (2021b)

Figure 119: Main sources of lighting - Maputo Province

As shown in the table below there has been an increasing trend in the number of electricity consumers in Maputo Province in recent years. When comparing the profile of domestic consumers and the medium and high voltage consumers, there is also an increase in the number of consumers.

Table 59: Electricity consumption in Maputo Province (2020 – 2021)

Description	2020	2021	Var (%)
Domestic consumers (no.)	336,249	372,150	10.6
Medium and high voltage consumers (no.)	1,147	1,188	3.5
Distributed energy (Kwh)	1,194,756	1,225,088	2.5
Domestic tariff (MT / kwh)	3,9	3,9	0
New connections (no.)	38,545	43,441	12.7

Source: INE (2022b)

All administrative posts and localities in Namaacha District have access to electricity except in Matsecanhe locality where there is no electricity connection (SDPI Namaacha, 2022).

In this district 444 new electrical energy connections were made in 2021, against to 327 in 2020 which represents an increase of 35.8% (GDN, 2022b). According to the same source, the Government of Namaacha District plans to continue to privilege partnerships with EDM in order to expand the electricity network to the villages of Matianine A, Mugudo, Livivene, Bemassango in the Locality of Kala Kala; 12 de Outubro, Gumbe, Mutocomelene in Impaputo; Micuacuene, Zone F, Zone G in the Locality of Mafuiane: Bairro Novo in Goba Locality, Gerencia in Michangulene Locality; Cassimate, Munucua, Xigubuta B in Mahelane Locality: Mussuquelane, Mugungulhovo, Mazimunhama and Estatuene in Changalane Sede Locality.

Presently Boane is provided by electricity supplied by EDM, benefiting Matola Rio and Boane Sede Administrative Posts. The district has 1,997 km of electrical grid, of which 519 km of medium voltage and 1,478km of low voltage, with 595 transformer stations (PT's), of which 279 are public and 316 are private. Of the total 8,000 new connections planned for 2022, 3,810 new connections were made in the first half of 2022, totalling 57,071 electricity consumers (SDPI Boane, 2022). According to the same source the district's electricity coverage rate is around 80%.

According to last data released by INE, the main source of energy was petroleum /paraffin and kerosene, used by 64% and 61,5 % of the households in Boane and Namaacha respectively. Followed by electricity and candles in both districts. Firewood was only mentioned by 1% and 3.4% of Boane and Namaacha households respectively.

Table 60: Main energy source used by HH (2007)

Energy Source	Boane District (%)	Namaacha District (%)
Electricity	24.0	21.0
Generator/Solar Panel	0.4	0.5
Gas	0.1	0
Petroleum / paraffin / kerosene	64.0	61.5
Candles	10.0	12.6
Batteries	0.2	0.1
Firewood	1.0	3.4
Others	0.3	0.7

Source: INE (2012)

Only Bacabaca community have some houses and a factory connected to the national power grid all the other communities found along the project alignment in Namaacha District have no connection to EDM`s electricity grid, using as main solar panels, petroleum, batteries, and candles as the main forms of lighting. To standout that many households in these communities have been adopting alternative energy packages from solar panels offered by a company with growing demand. The solar panels and other equipment provided by the company become the property of the users after the completion of its payment in monthly instalments over a period of five years.

For Boane District, on the other hand, all the covered communities have access to the national electricity network, having also been mentioned the usage of petroleum and candles as sources of lighting.

From the Household survey on impacted infrastructures resulted that 81,8% use electricity as a source for lighting followed by other sources that include solar panels (10%) and lanterns or torches with 4,5% of the respondents. Regarding energy sources used for cooking the most frequently mentioned was gas (36,4%), charcoal (21,8%) and firewood (20,9%).

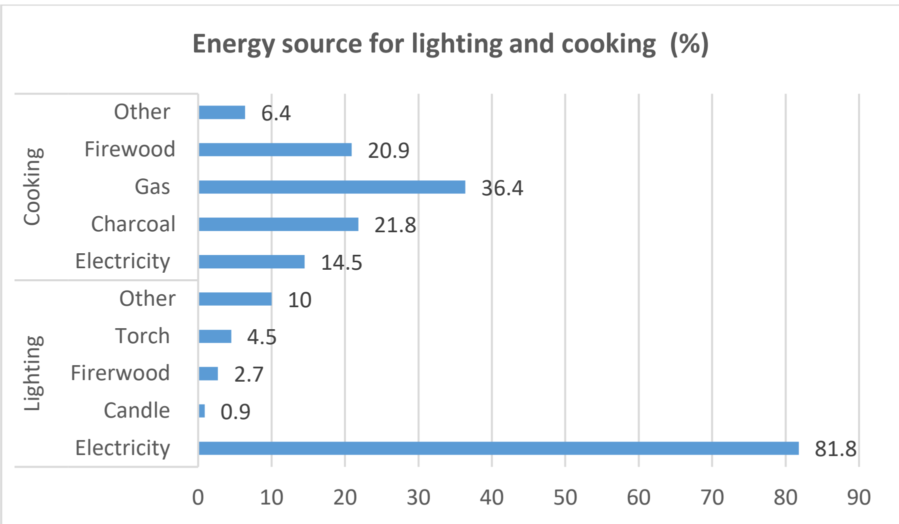


Figure 120: Type of energy source used for lighting and cooking

From the survey conducted on the potentially impacted businesses resulted that 59,5% are connected to the national power grid and 40,5% do not, which is also an indication of the considerable quantity of stalls and small improvised shops built with mixed or precarious materials present on the communities along the power line route.

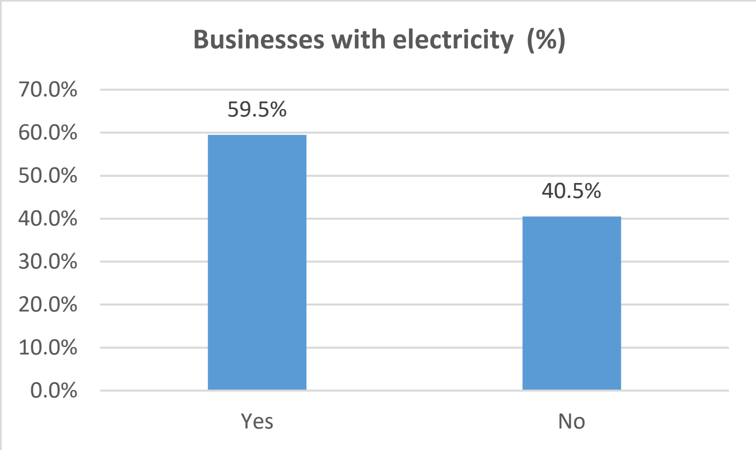


Figure 121: Electricity connection of surveyed businesses

6.3.12.2. Water Supply

In Namaacha District there are five small water supply systems (Namaacha Town, Mafuiane, Changalane, Goba and Michangalene), and 161 dispersed water sources, of which 85 in Namaacha Sede and 76 in Changalane Administrative Post. The safe water access rate in the district is good covering about 88% of its inhabitants. Table 58 presents the water supply sector indicators in Namaacha District.

Table 61: Water sector Indicators – Namaacha District

Indicator	2020	2021
Rate of access to safe water	88	88.7
Number of water sources constructed/rehabilitated	22	18
Number of water sources	-	161
Number of household connections	-	1,558

Source: SDPI Namaacha (2022ª), GDN (2022b)

In Namaacha municipality there were in 2019 about 26 water boreholes, of which, 18 manual boreholes, three electro pumps, three pedestal pump boreholes and two hand pump boreholes. The management of these pumps is done by the management committee that charges the users monthly (the fee has been previously agreed upon when the borehole was opened) and the amount collected is used to cover the expenses of the maintenance of the pumps (CMN, 2019). According to the same source there are about 400 household connections that benefit about 1263 people within the municipal area. Pictured below are the water tanks of the municipal water supply system in Namaacha town (left) and a borehole in Boane district.

Water tanks, Namaacha

Borehole, Boane

Figure 122: Water supply infrastructures

Boane District is equipped with a public water supply network, provided by Águas da Região de Maputo and the Investment Fund for Water Supply (FIPAG). In rural areas, water supply is usually provided from sources connected to the general water supply network, as well as from boreholes, wells and even from direct consumption from rivers and lakes. In Boane District there is also the Pequenos Libombos Dam, a vital infrastructure built with the intention of guaranteeing the provision and supply of water to the region of Maputo and Matola cities. Part of Boane District is supplied by a large water supply system, under management of the company Águas da Região de Maputo, which supplies water to Maputo, Boane and Matola. The vast majority of people in the district have access to drinking water and the water from wells or rivers is mainly used for washing clothes, dishes etc., except in Saldanha community in Eduardo Mondlane Locality which has difficulties to access to drinking water (SDPI Boane, 2022b).

The district´s coverage rate is currently 58% for rural water and 71% for urban water. The dispersed sources are 108 in total, of which 89 are operational and 19 are inoperative. In addition to these infrastructures, there are 18 Small Water Supply Systems (PSAA), 12 elevated tanks and a large water supply system, managed by Águas da Região de Maputo, which supplies water to Boane and Matola regions. As shown in Table 60, the number of small systems and dispersed water sources has been progressively increasing in recent years. Likewise, there is an increasing trend in urban and rural water coverage rates in the district.

Table 62: Water sector indicators – Boane District

Indicator	2018	2019	2020	2021
No. of Water Sources	53	55	105	108
No. of water supply systems	1	1	1	1
Nº of small water supply systems (PSAA)	13	13	16	18
Urban Coverage Rate	67,8	68,3	68,3De	71
Rural coverage rate	57	57,4	57,4	58

Source: SDPI Boane (2022a), INE (2020a, 2021c)

From the information collected through interviews and by direct observation on water sources in communities affected by the transmission line, it was found that none of the communities located in Namaacha have access to piped water on their homes and having as main water source water from boreholes. Except for Livevene where people said to have as the only water source water collected from rain puddles. All covered communities located in Boane district instead have piped water as main water source, except for Mabanja community where a considerable part of its inhabitants collect water from boreholes or from the Movene river.

Table 63: Main water sources in crossed communities

District	Community	Main Water Sources	Water Supply Network	Nº of Boreholes
Namaacha	Bacabaca	Boreholes and standpipe on the Huku factory	no	3 operational
	Mucacuene	Borelholes	no	2 operational 1 non operational
	Gumbe	Borelholes and Gumbe river	no	2 operational 1 non operational
	Livevene	Rain puddles	no	None
Boane	Bairro 1	piped water and standpipes	yes	None
	Bairro 6	Pipped water	yes	None
	Mabanja	Pipped water, boreholes and Movene river	yes	2 operational 1 non operational

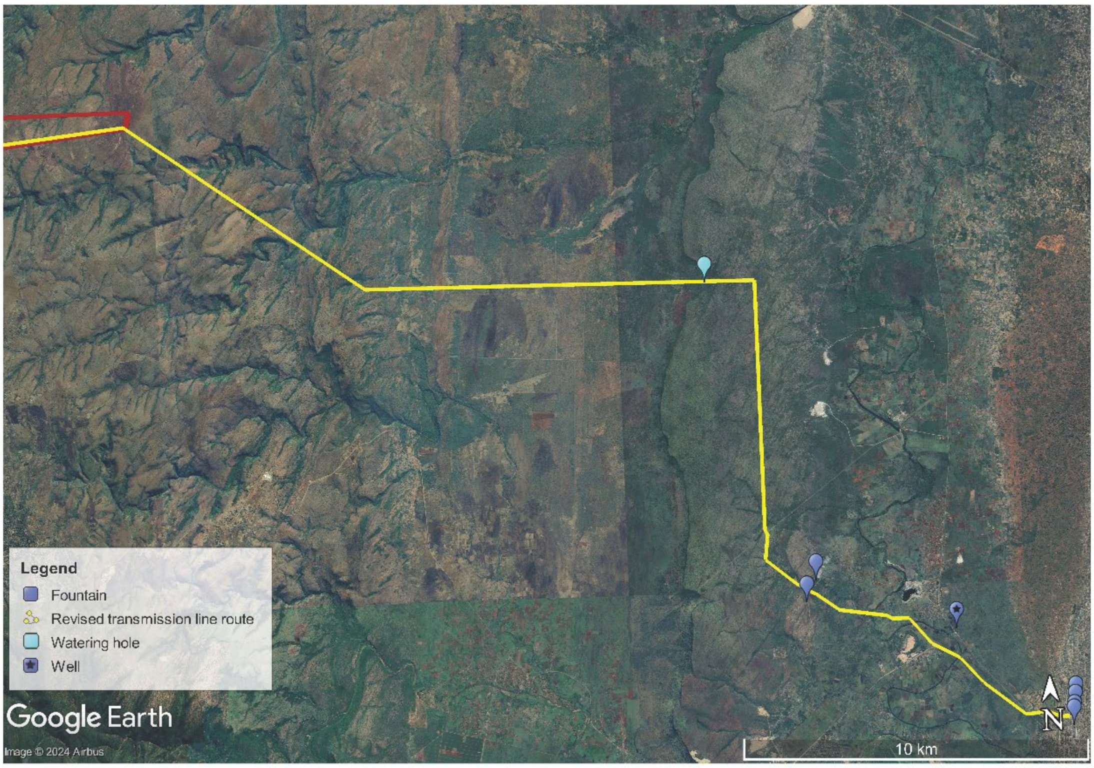
Source: Consultec (2023)

Pictured below are a borehole in the mountainous area of Gumbe (left) and in Bacabaca community (right).

Source: Consultec (2023)

Figure 123: Boreholes found in Gumbe and Bacabaca

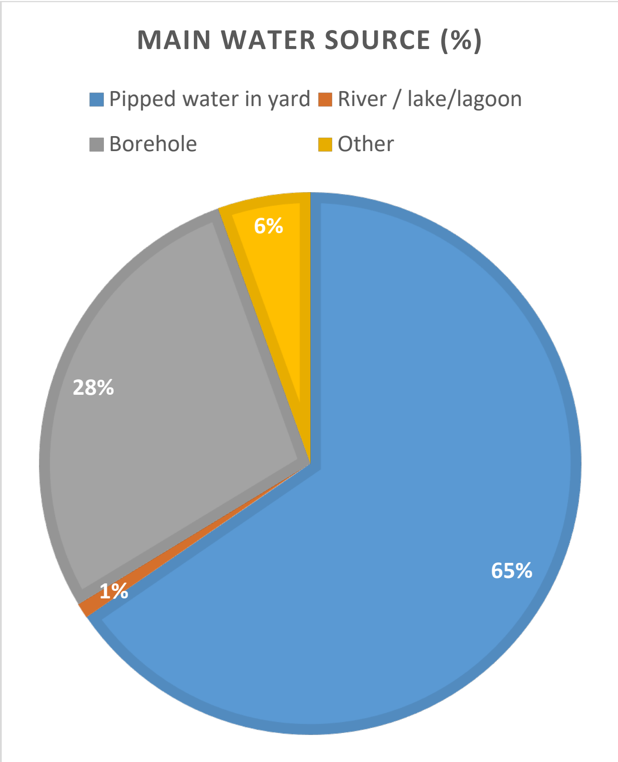
The figure below shows the water sources found inside the transmission line buffer zone and on the immediate surroundings.

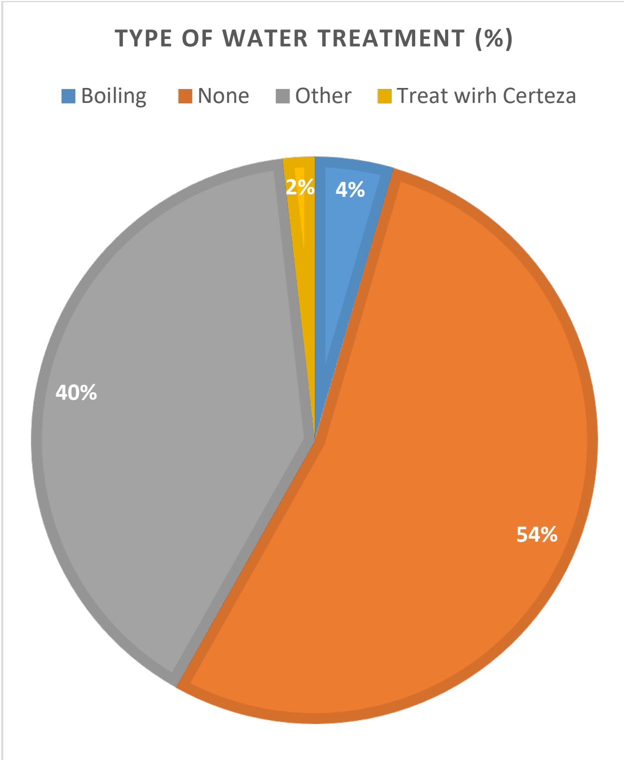


Source: Consultec (2023) Consultec (2024

Figure 124: Water sources along the line buffer and vicinity

As presented in Figure 34 below the results from the household survey indicate that the main water source is piped water on the backyard (65%) and water from boreholes (28%). Regarding treatment given to water 54% do not treat the water and only 4% and 2% boil or treat with Certeza respectively. Among the 40% who fall into the other group are those who drink bottled mineral water.





Source: Consultec (2023)

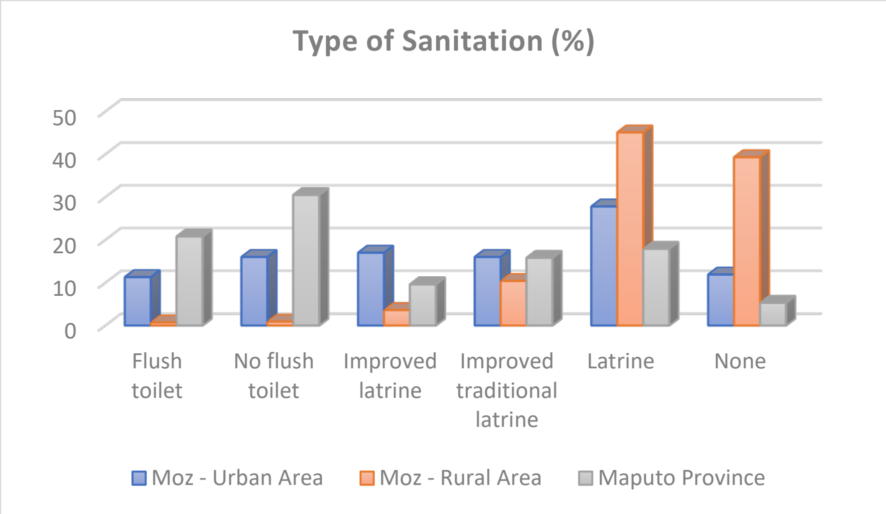
Figure 125: Main water source and water treatment on surveyed household

6.3.12.3. Sanitation

Another goal of the sustainable development objectives in Mozambique is achieving access to adequate and equitable sanitation and hygiene for all, and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations by 2030 (INE, 2020c).

Regarding sanitation in Mozambique, in 2019/20 in the rural area, most households in the country used unimproved latrine (45.1%), followed by traditional improved latrine (10.4%). Likewise in the urban area, i.e., most households use unimproved latrine (27.8%), followed by improved latrine (16.0%). Households without toilet/latrine or using the bush in the rural area account for 39.3%, compared to 12.0% in the urban area.

As for Maputo Province, 20.8% of its population used in the same period a flush toilet and 30.5% a non-flush toilet, making up to 51.3% of households with access to toilet sanitation. As with the main source of water, the sanitation characteristics in the province are better than those in urban areas of all country, where the unimproved latrine (27.8%) is the main type of sanitation used, followed by the use of flush and non-flush toilet (27.3%). In relation to the province, note that 9.6%, 15.8% and 17.9% of households use the improved, traditional improved and unimproved latrines respectively.



Source: INE (2021c)

Figure 126: Type of sanitation in the country and Maputo province

As shown in the table below, unimproved latrine is the most common type of sanitation used by 55,3% and 49,6% of households in Boane and Namaacha respectively. followed by those who declared not to use any sanitation system in Namaacha (27,2%) and by those who use improved latrines in Boane District (13,5%). Only a small part of the families in Namaacha (5.7%) and Boane (8,4%) use a toilet connected to a septic tank.

Table 64: Type of sanitation used by households

Sanitation	Boane District (%)	Namaacha District (%)
Toilet connected to septic tank	8.4	5.7
Improved latrine	13.5	9.8
Improved traditional latrine	10.5	7.7
Unimproved latrine	55.3	49.6
Without toilet /latrine	12.3	27.2

Source: MAE (2012)

According to information given by the SDPI from Namaacha, the collection of solid waste is made in the main town and its deposit in a dump at the district headquarters. Regarding the other localities, a site has been requested for the creation of a landfill to deposit the solid waste produced in those localities, but currently in these places the solid waste is still burned or buried.

With regards to sanitation in Boane District, the urban and peri-urban areas have an individual (household) septic tank system. In more rural areas most of the population uses traditional or improved latrines. According to the PESOD Report (GDB, 2020), 4,318 improved latrines were constructed in 2019, with the number of improved latrines in the district increasing from 18,108 in 2018 to 22,426 in 2019 which represents an increase of around 23.8%. There has been an effort by SDPI regarding awareness campaigns in the communities for promoting the construction and use of improved latrines.

Solid waste collection in Boane is done at the level of the most significant settlements and outside the municipality, such as the markets and commercial areas, being then transported to a dumpsite within the municipal area (former borrow pit). There was another dumpsite in Matola, but it was closed down. There are some private companies in the district that collect the waste through the payment of a fee (SDPI, 2022b).

6.3.13. Transport, road network and communication

6.3.13.1. Transport

The main types of transport systems used in Maputo Province are road, railway, and maritime transport. The most common type of transport in the province is the road transport. The main means of road transport being buses or minibuses (*chapa 100*), which is quite consistent with the means of transport used in the rest of the country. The Maputo Port, also called the Maputo - Matola port complex, is a set of port terminals located in Maputo and Matola cities. It is situated in Maputo Bay, on the north bank of the *Espírito Santo* estuary which is separated from the Mozambique Channel by the Inhaca and Portuguese Islands and by the Machangulo peninsula. It is the largest port complex in the country, ranking as the second largest on the East African coast, in addition to being the main import and export terminal for long-haul cargo in the nation.

In its area of influence can be found the main industries of Mozambique. It is also the busiest Mozambican port, surpassing all other major national ports, namely: Beira (Sofala), Nacala (Nampula), Quelimane (Zambezia) and Pemba (Cabo Delgado). The Port is the terminal for three railway lines: Goba, Limpopo and Ressano Garcia, carrying products from South Africa, Eswatini and Zimbabwe. Another important transport link is the N1 National Road. It is a fundamental part of the logistic complexes of the "Maputo Corridor", "Limpopo Corridor" and "Libombo Corridor".

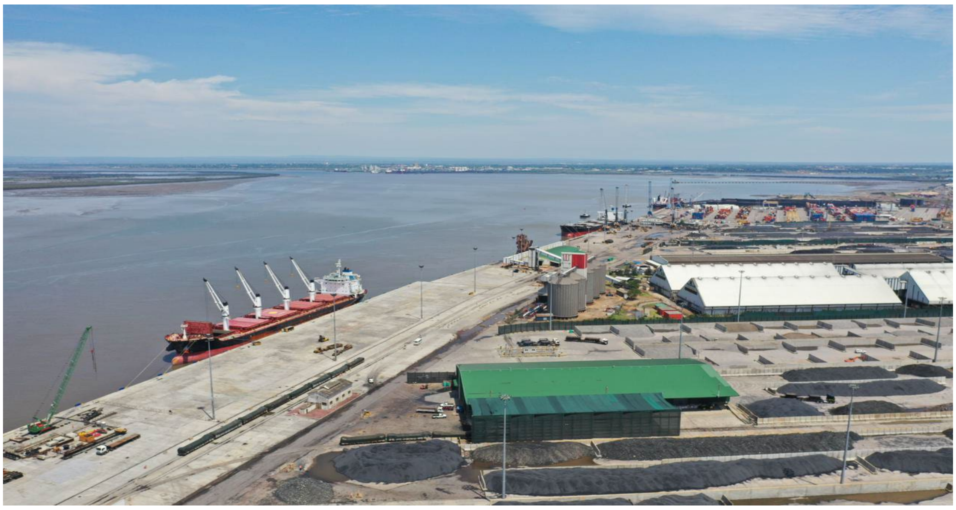
As shown in the table below, there was an increase of about 17% on the volume in cargo handled between 2020 and 2021. This growth reflects a post-COVID market recovery but also of the efficient usage of the rehabilitated berths 7, 8 and 9, along with an expanded ferro slab footprint and dedicated rail siding. Similarly, there was an increase of about 3,4% in ship movements during the same period. Regarding railway activity, there has been an increase of 7,7% and 0,5% in passengers carried, and cargo transported respectively.

Table 65: Rail-port activity in Maputo Province (2020 – 2021)

Activity	2020	2021
Port Activity		
Cargo handled (million tons/Year)	18.3	22.2
Ship movement (nº)	743	776
Rail Activity		
Rail network (km)	827	827
Passengers carried (10^3 nº)	2.484	2.293
Cargo transported (10^3 TON)	7.815	7.851

Source*: INE (2022d)*

The following picture below shows a berth of Maputo port with the Espírito Santo Estuary in the background.



***Source**: Portmaputo.com (2022)*

Figure 127: Maputo port and the Espírito Santo Estuary

In Namaacha District there is rail and road transport. The railway line that connects downtown Maputo and Goba also transports cargo and passengers, with connections to the Kingdom of eSwatini. The most common type of transport infrastructure in this district is road transport. The district is crossed by the EN2 (main road), which connects to the cities of Maputo and Matola and to Boane town and giving access to the Kingdom of eSwatini.

Public transport is mainly done by minibuses (chapas) and buses (*machibombos*), used by most of the population. There are four public transport buses, three mixed vehicles (*Agência Metropolitana*) and 119 semi-collective vehicles in operation, which run on the routes Namaacha/Baixa, Namaacha/Boane, Boane/Kukuka, Boane/Goba, Boane/Mundavane, Boane/Mafuiane, Municipal Village/Macuacua and Municipal Market/Border (SDPI Namaacha, 2022).

The existing transport systems in Boane District include road and rail transport. The railway line that connects Maputo city and Goba passes through the district, and which has been used to transport passengers and cargo to different places in the district as well as for product export through the port of Maputo. There are 375 public transport vehicles, of which 50 buses distributed on 34 routes, of which 24 in Boane sede administrative post and 10 in Matola Rio administrative post. There are also three licensed taxi operators in the district. (SDPI Boane, 2022). The following pictures show typical means of transportation in Namaacha and Boane districts.

Inter-district transport , Namaacha

Local Xapa, Boane

Source: Consultec 2023.

Figure 128: Public transport in covered districts

Except for Bacabaca 1 which is located on the edge of the N2 Road and therefore with access to public transport all the other covered communities in Namaacha have no access to public transport. Nonetheless, Bacabaca 2 in the upper mountain area located on the line route have no access to public transport as well. On these communities very few people have private transport being restricted to some bicycles or motorcycles. Some households on the highlands rely on donkeys for transportation. Both Bairro 1 and Bairro 6 in Boane have access to different means of transport, from minivans (xapa), buses to train. Mabanja have access to minivans and buses. A considerable number of households have their own means of transport such as cars, motorbikes, or bicycles. In summary, communities in Namaacha lack access to classified roads, while those in Boane have access to various types of roads.

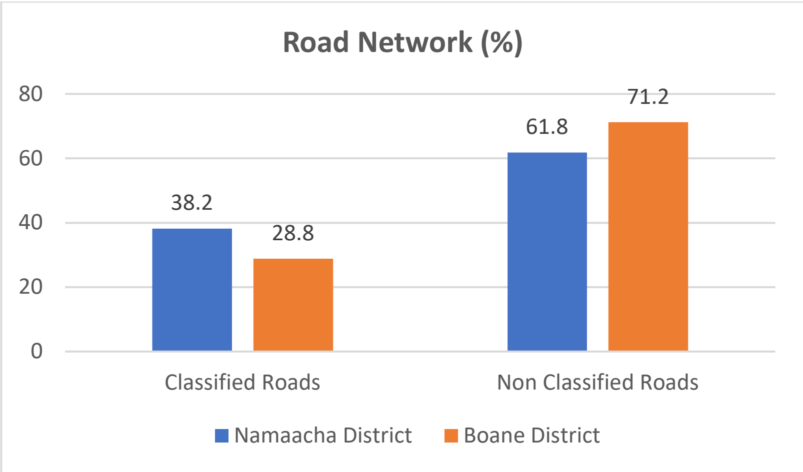
As previously mentioned, the access routes to the Namaacha `s highland communities are non-classified unpaved dirt roads. As shown in the figure below the road access to Gumbe community (left) is particularly difficult and the access to Livevene (right) is characteristic of this mountainous area with a very rocky pavement.

Source: Consultec 2023.

Figure 129: Access roads to Gumbe and Livevene communities

6.3.13.2. Road Network

Namaacha District Road network is comprised by 429.2 km, of which 164 km are of classified roads and 265.2 km of unclassified roads. On the other hand, the road network in Boane District consists of 308.9 km, with 89.2 km of classified roads (28.8%), and 219.7 km (71.1%) of unclassified roads. The road network in both districts is mainly made up of unclassified roads (see figure below), covering a greater proportion of the road length in Boane than in Namaacha.



Source: SDPI (2022)

Figure 130: Road network in Namaacha and Boane districts

Examples of classified roads in Namaacha and Boane districts are shown in Figure 122.

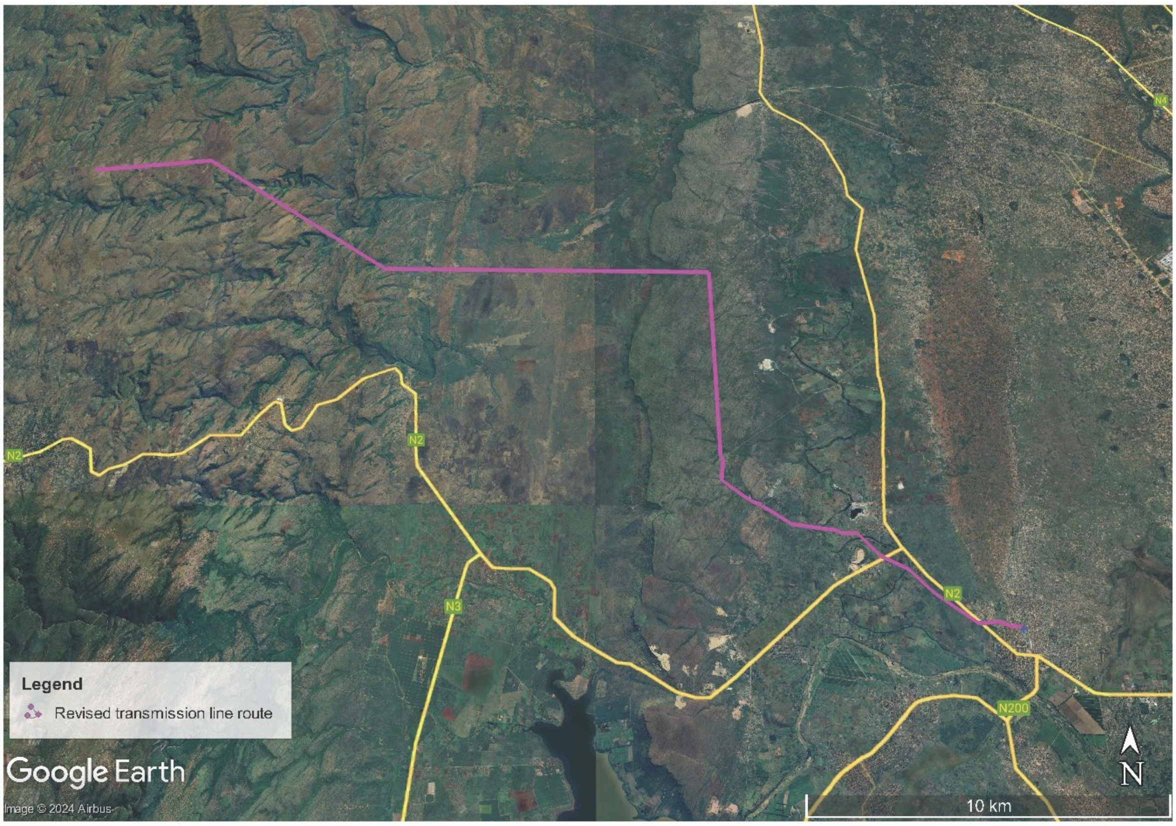
Primary road, Namaacha

Vicinal road, Boane

Source: Consultec (2022)

Figure 131: Classified roads in the covered districts

The figure below shows the regional context of the road and railway network with particular emphasis on Namaacha and Boane districts. On this map can be seen that, except for the line route within Boane District, the line route is far away from any classified road.



Source: Google Earth, 2024

Figure 132: Regional context of the road network

The proposed transmission line route crosses National Road N2 in two locations (on the outskits of Boane and in Mabanja). A required by the Land Law, a minimum of 30 m should be maintained around national roads to allow for future expansion (Land Law, Law No. 19/97, dated October 1st, and its Regulation, Decree 66/98, dated December 8th). It was determined through discussions with district authorities that the future expansion plans for N2 near Boane are planned for the military base side of the road (i.e. NE side). As such, no pylons for the transmission line will be located within 30 m of this side of the national road.

6.3.13.3. Communication

The communications sector in the province is divided into mobile communication, fixed-line telecommunication and national post service. Post office and fixed-line telecommunication services in the province are limited to the cities and district capitals and to areas with larger population numbers. On the other hand, mobile communication has experienced exponential growth in the province in recent years and most administrative posts and localities within the province are now covered by one or more of the country's mobile phone operators. Internet services in the province are provided by mobile and fixed-line telephone companies.

According to the National Culture Yearbook (INE, 2022c), most of the radios registered in Maputo Province in the year 2021 were represented by communitarian radios (55,6%) the remaining were comprised by public (11,1%) and private (33,3%) radios.

Like the provincial level, the district communication sector is divided into mobile communication, fixed telephone network and post office services. Fixed-line services and postal services are generally non-existent outside the district headquarters. There is a branch office of the Mozambique Post Office in both district headquarters.

In Namaacha District there is the community radio Cascata, and according to local official sources both Radio Mozambique and community radio are the main source of information. Communication through community leaders is mainly used in more remote areas of the district. Television and radio are the main source of information used by the inhabitants of Boane District.

Regarding the access to durable assets, such as possession of a radio or television, a considerable part of the households in the districts covered have access to durable assets used by the media for communication and spreading information, however in both districts there are slightly less HH with this type of durable assets than in the province of Maputo.

Table 66: Access to media communication assets (2021)

Administrative division	Radio (%)	TV (%)
Boane District	44,6	57
Namaacha District	41	40.3
Maputo Province	**46,3**	**61**

Source: (INE, 2022c)

6.3.14. Economic Activities

6.3.14.1. Economy and employment

The Gross Domestic Product (GDP) in Mozambique is composed of the agriculture, livestock, fishing and related activities sectors, which represent the largest portion, at 22.5%; the transport and related activities, storage, and information and communications sectors correspond to 12.2%; trade and maintenance services correspond to 11.3%; the manufacturing industry represents 8.6%; real estate and business services represent 6.7%; the education sector represents 7.5%; and other sectors combined represent 31.3%. The main export products are coal and aluminium. Economic growth has been primarily driven by mega-projects in the energy and natural resources sectors, but this has not generated enough job opportunities for the Mozambican population. Recent discoveries of coal and gas reserves bring the potential for the country to become a relevant global player in the energy sector (OIT, 2019).

The current economic situation points to the need to increase domestic production through the processing of local raw materials and by taking advantage of the comparative advantages that Maputo Province has; improvement of the business environment for the growth of the private sector; promotion of initiatives that generate employment; and strengthening of the state's capacity to provide essential public services (GPM, 2021).

Regarding the macro-economic indicators of Maputo Province, in 2019, it had a Gross Domestic Product (GDP) per capita estimated at 1,272 USD, and in 2020 the GDP per capita was estimated at 1,246 USD, which corresponds to a decrease in the order of about 10%. Although there was also a decrease in the national GDP it was much less accentuated for the same period, being at 1,9%. INE (2019b e 2022b).

According to the 2019/2020 Household Budget Survey (INE, 2021b), the monthly income per capita and per household in Maputo Province was 3,859 MT and 16,717 MT respectively, presenting average monthly incomes higher than the national average of 1,946 MT per capita and 8,916 MT per household.

According to the same source, the employment rate of the population aged 15 or older in Mozambique is 74%, being slightly higher among men (75.5%), than among women (72.8%). Maputo Province has an employment rate of 54.9%, being higher among men (62.8%) than among women (48.3%), and both being lower than the national average.

Also, according to the 2019/20 HBS, more than 65% of the population aged 15 or older is employed in the agriculture, forestry and fisheries sectors (except in Maputo Province and Maputo City, where the majority is employed in the trade, finance, and other services sectors). Only 20.2% of the employed population in Maputo Province is engaged in the agriculture, forestry, and fisheries sector.

It is important to note that those working in the informal sector, who constitute the bulk of the province's working population, are extremely vulnerable to external shocks and have no access to legal protection, social security, and/or pension benefits. Due to the informal nature of their businesses, they also lack access to formal forms of finance, and face great difficulties in recruiting skilled labor. All these factors contribute to limiting their ability to expand their activities, thereby also contributing to poor economic growth, and therefore meaning that their businesses are somewhat precarious.

The economy and livelihoods in Boane District are similar to those in other coastal districts of the province. Although Boane District has a higher population density, and its district headquarters being a municipality with a fast-developing economy, communities in this district are mostly self-employed in informal trade, subsistence agriculture or artisanal fishing. According to the District Secretariat of Boane (GDB, 2020b), the main economic activities in Boane District are commerce, and industrial and agricultural production. Regarding Namaacha District it has in comparison a lower population density and not as fast developing economy. Nonetheless, given its location, the region benefits from good market integration and possibilities of access to non-agricultural income-generating activities, namely the considerable number of emigrants from South Africa and Eswathini, informal and border trade, the soap making and the sale of firewood, charcoal, alcoholic beverages, and pottery products.

As shown in the table below, and in line with the mentioned above, the number of formal jobs created are much higher in Boane than in Namaacha, as well as having also had a much higher growth from 2020 to 2021.

Table 67: Number of jobs created in the Private and Public Sector

District	2020	2021	Growth (%)
Namaacha	592	615	3.9
Boane	5.579	6.773	28.4

Source: GDN (2022b) and GDB (2022b)

As shown in the table below, agricultural and animal husbandry activities are common to all communities. Fishing was referred by the local leaders of Mucacuene, Gumbe and Mabanja as important for their livelihoods. Charcoal production and sale were referred to in Mucacuene, Gumbe and Livevene. To note that Mangava serves as an important area of charcoal production for the neighbouring communities of Gumbe and Livevene. Commercial activity is more extensive and active in the communities of Boane District and members of households with formal employment were particularly mentioned in Bairro 1 and Bairro 6.

Table 68: Main economic activities on the covered communities

District	Community	Main Economic Activities
Namaacha	Bacabaca	Agriculture and livestock
	Mucacuene	Agriculture, livestock, fishing, and charcoal production and sale
	Gumbe	Agriculture, livestock, fishing, and charcoal production and sale
	Livevene	Agriculture, livestock and charcoal production
Boane	Bairro 1	Agriculture, livestock, commercial activities and formal jobs
	Bairro 6	Agricultural activities, livestock, commercial activities and formal jobs
	Mabanja	Agricultural, livestock, fishing and commercial activities

Regarding the profession or occupation reported by surveyed HHH on the different quantitative surveys, the table below indicates that from the HH survey resulted that most of the respondents work on the public sector (22,7%) or in commerce (16,4%). More than half of machambas survey HHH have has main occupation to work on the crop fields (57,2%). From surveyed businesses households resulted that 48,6% of HHH have as main occupation commercial activity (48,6%) followed by those employed on the public sector.

Table 69: Professions / occupations reported on quantitative surveys

Profession /occupation	Infrastructures Survey (%)	Machambas Survey (%)	Businesses Survey (%)
Farmer/Silviculture/Fishing	15,5	57,2	2,7
Industry	2,7	0,6	
Construction	2,7	1,7	
Commerce	16,4	2,2	48,6
Services	5,5	2,2	5,4
Charcoal burner	0,9		
Transport		1,7	
Public sector	22,7	5	21,6
Self-employment	10,9	6,7	5,4
Unemployed	5,5	8,3	8,1
Student	1,8	2,8	2,7

Other	14,5	11,7	5,4
NA	0,9		

Other professions or occupations referred to were as follows:

- Household survey – Mechanic, Pastry, mason, mason assistant and locksmith
- Machambas survey – Livestock production
- Businesses survey – mechanic, locksmith, brick production, house renting, selling of charcoal and agricultural products and tailor.

6.3.14.2. Agriculture

The economy in Mozambique is mainly based on agriculture, which accounts for approximately a quarter of GDP, followed by the manufacturing sector (around 15%) and services (10%). Agriculture also employs most of the labour force (over 75%), with the remainder split between the second and third sectors (UN Habitat, 2018).

Agriculture in Maputo Province is practiced with two main objectives. The first is to produce crops such as maize, cassava, sweet potatoes, cowpeas, rice, and peanuts to ensure household food security and for sale in the cases of surplus of production. The second objective is the production of crops to supply the market in Maputo city, specifically fruits and vegetables such as tomatoes, onions, cabbage, carrots, potatoes, peppers, French beans, cucumbers, eggplant, cabbage, lettuce, and others. Most of the population practices rainfed production, but there is also the irrigation component; although not fully functioning, it does create the conditions for vegetable production.

The crop with the highest agricultural production in Maputo Province in the period under review (Table 67) was sugar cane, followed by vegetables and roots and tubers. Exception for cereals, there was an increase in the production of the various crops between 2019 and 2021.

Table 70: Agricultural production by crop in Maputo province, 2019 – 2021

Crop / group of crops	2019	2020	2021
Potato (Ton)	30.902	25.672	30.951
Sugar Cane (Ton)	2.183.441	2.412.135	2.436.036
Cereals (Ton)	316.997	313.375	308.170
Fruits (Ton)	328.791	344.420	399.152
Vegetables (Ton)	688.949	709.987	754.550
Legumes (Ton)	61.790	60.670	62.262
Roots and tubers (Ton)	483.653	485.418	521.573

Source: INE (2022d)

In general, agriculture in Namaacha District is practised in household crop fields of one hectare in average and in a regime of crop consociation based on local varieties, and in some regions the families use animal traction and tractors to support agriculture.

The main crops cultivated in Namaacha district are maize, cassava, sweet potato, potato, beans and various types of vegetables such as tomato, pepper, green beans and lettuce. As for cash crops, and because they are defined as those produced essentially for sale, in addition to macadamia nuts, fruits, are considered one of the great potentials of the district, with strawberries, lychees, avocados, bananas and some vegetables standing out (SDAE, 2022).

The family sector is dedicated to the cultivation of maize, peanuts, beans, sweet potatoes, bananas, and cassava, with the promotion of sunflower and oil production in Changalane Administrative Post. In the irrigated area of Mafuiane, farmers also grow vegetables, fruit trees (citrus, banana, avocado, strawberry, litchis), beans, peanuts, and maize. Agricultural production and commercialisation are very important as agriculture is the main economic activity of the population.

Source: Consultec 2023.

Figure 133: Banana trees and multi crop production in Mafuiane

As for agricultural production in Namaacha (Table 68), 261,668.4 tons of different crops were harvested in the first half of 2022, representing a growth of 8.1% compared to the same period of the 2020/21 Agrarian Campaign (243,031.2ton). During the period in analysis there was an increase in the production of all food and cash crops, with emphasis on the production of vegetables which has had an increase of 44.3%.

Table 71: Agricultural production in Namaacha district (2021-2022)

Crop	Production - 1st Semester 2021 (ton)	Production - Total 2021 (ton)	Production - 1st Semester 2022 (ton)	Growth (%)
Cereals	38748.9	34213.1	42055.1	8.5
Legumes	5700.8	6941.7	6057.7	6.3
Roots and tubers	14,615.70	13,151.73	15,344.90	5.0
Total food crops	59,065.4	54,306.5	63,457.7	7.4
Fruits	165,803.9	221,036.2	173,298.4	4.5
Vegetables	17,162.0	50,308.5	24,760.9	44.3
Total cash crops	182,965.9	275,870.7	198,210.7	8.3
GRAND TOTAL	242,031.2	330,177.2	261,668.4	8.1

Source: GDN (2022a)

Boane District also has a considerable agricultural activity, and the Umbelúzi Agricultural Station, a branch of the Mozambique Agricultural Research Institute, founded in 1909, is located here. During 2021, there was significant rainfall that contributed to the increase and availability of water in the Pequenos Libombos Dam and main weirs, thus ensuring irrigation in the agricultural production fields and watering of livestock. This period was characterised by good levels of food production (vegetables and tubers), accelerating the economy, which contributed to stabilising food security and the prices of goods, services, and fuel (GDB, 2022b).

Table 69 shows the agricultural production in Boane district, with an increase of 5.9% of the total production in relation to the same period of the previous year, highlighting the production of cereals and root and tuber crops in food crops and of vegetables in cash crops.

Table 72: Agricultural production in Boane District (2021-2022)

Crops	Production - 1st Semester 2021 (ton) Prod (ton)	Production - 1st Semester 2022 (ton) Prod (ton)	Growth (%)
Cereals	81,052.2	88,805.4	9.6
Legumes	1,297.5	1,545.9	19.1
Roots and tubers	66,290.8	7,1307.4	7.6
Total food crops	148,640.5	161,658.7	8
Vegetables	59,058.7	60,308.2	2.1
Fruits	45,176.4	45,814.5	1.4
Total cash crops	104,235.1	106,122.7	1.2
GRAND TOTAL	252,875.6	267,781.4	5.9

Source: GDB (2022a)

According to what has been mentioned by the interviewed local leaders the main crops in the districts are listed in the table below. The average size of crop fields varies from 0,5 to 3 hectares and from 1 to 4 hectares in Namaacha and Boane districts respectively.

Table 73: Main crops and location and size of crop fields

District	Main crops	Average crop field size	Location of crop field
Namaacha	Maize, cassava, okra, pumpkin, peanuts and Nhemba beans	0,5 - 3 hectares	In the community
Boane	Cucumber, maize, tomato, okra and lettuce	1 - 4 hectares	Bairro 1 and Bairro 6 outside the community Mabanja in the community

Source: Consultec (2023)

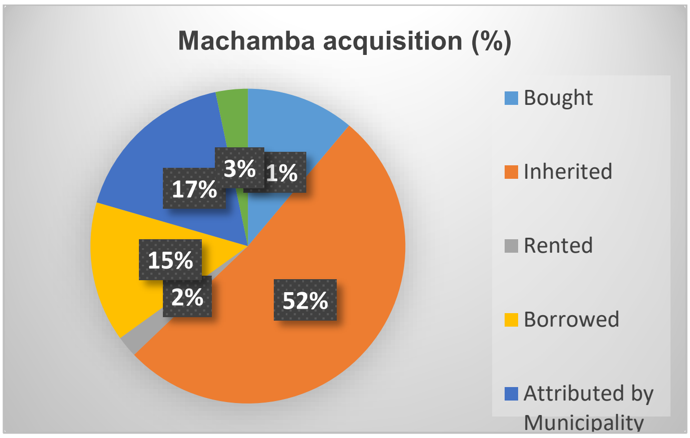
There are a mix of farming types across the transmission line route. This includes:

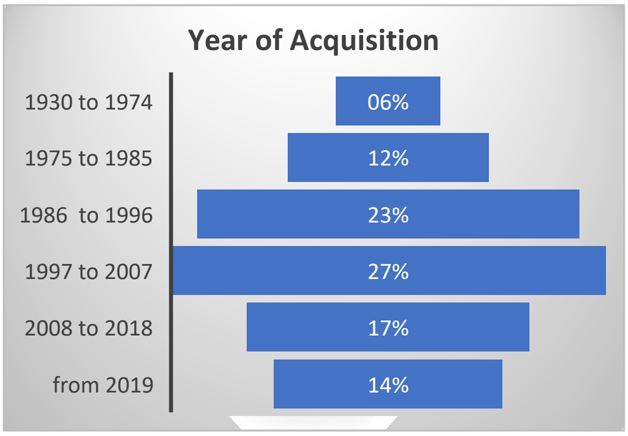
- owners of machambas directly working on the fields themselves;
- machambas being rented or borrowed by non-owners; or
- large-scale farms where workers are employed to tend the land on behalf of owners.

There are also many trees of economic value used by local communities along the transmission line route. In Namaacha district species surveyed include: natal mahogany, lychee tree, black plum, lemon tree, orange tree, sugar apple tree, avocado tree, banana tree, mango tree, marula tree and paw-paw tree. In Boane district species surveyed include: mango trees, banana trees, paw-paw trees, natal mahogany and marula tree.

To inform the original EIS, a survey was conducted of representative households (HH) along the transmission line route in 2023. From this survey, 82,8% of HHs reported having one machamba, while 17,2% reported having more than one (Consultec, 2023). When asked if they had a cultivated parcel on other area rather than on their own community, 40% replied positively and 60% of the respondents said to have their machambas inside their own communities. Furthermore, 5,6% stated to have a land title regarding the right to use and benefit from the land (DUAT) and a considerable number of respondents (47,8%) said to use agricultural inputs on their crop fields.

In this same survey, HHs were questioned to understand how their machambas had been acquired and the year of acquisition. See the figure below for a detailed breakdown.





Source: Consultec 2023.

Figure 134: Form and year the surveyed machambas HHH have acquired the machamba

A detailed census is planned to commence for the revised transmission line from the end of October 2024. The results of this census will be used to inform the design and implementation of the Revised RAP for the Project.

The resettlement scoping survey conducted for the revised route in September 2024 was used to estimate the expected economic resettlement impacts along the route, including for agriculture. The table below summarises these findings.

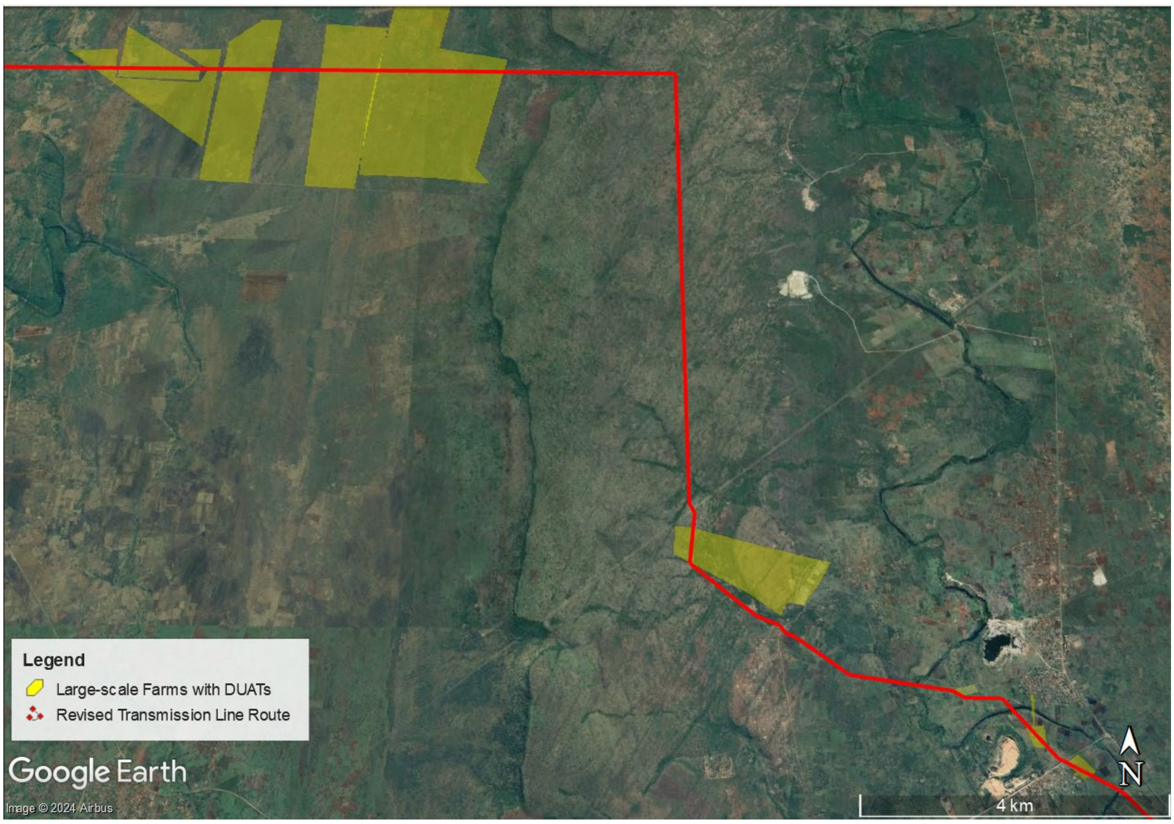
Table 74: Expected economic resettlement related to agriculture

Aspect	Value
Total area of arable/productive land to be lost (ha)	~182 ha
Number of households losing their crops and/or source of revenue	45, plus households associated with the 9 commercial-scale farms
Number of PAPs to be economically displaced	252 plus PAPs associated with the 9 commercial-scale farms
Estimate of agricultural revenue loss[1]	Total – USD 595,691 Annual crops - USD 581,040 Tree crops - USD 14,651
Number of tree crops lost[1]	Cultivated fruit trees = 39 Beneficial indigenous trees = 193 Trees of economic importance = 20 Subtotal = 252
Notes:	

[1]Excluding the 9 commercial-scale farms. Access was not granted on the commercial-scale farms during the scoping stage to perform preliminary estimates of assets and PAPs. As such, this detail data will be collected during the census.

Whilst not included in the table above, there are people who collect firewood throughout the region to produce charcoal. Wood is collected opportunistically and is not cultivated. As such, it is assessed as an ecosystem service instead of an agricultural activity.

It is important to note that the revised transmission line route in Namaacha District now passes through an area dominated by large-scale farms that have a very different socio-economic profile than most of the farming conducted along the rest of the transmission line route. These commercial-scale farms are not expected to include vulnerable PAPs, although this will be confirmed through the detailed census process. The locations of these large-scale farms are shown in the figure below.



Source: Source Energia 2024

Figure 135: Locations of large-scale farms with DUATs

6.3.14.3. Livestock breeding

In addition to agriculture, in recent years Maputo Province has seen considerable growth in the livestock component, essentially cattle rearing, to such an extent that the province's strategic plan considers livestock as a priority area.

As indicated in Table 72, there was an increase in the registered livestock numbers of most livestock species in the period from 2019 to 2021, with the considerable number of cattle in this province standing out. Except for goat rearing that had a decrease of about 6,7% from 2020 to 2021.

Table 75: Livestock numbers in Maputo Province (2019 – 2021)

Species	2019	2020	2021
Poultry	467.223	869.036	990.599
Cattle	367.921	378.710	385.241
Goats	309.300	315.771	294.612
Sheep	58.610	61.638	65.650
Pigs	46.958	47.875	49.295

Source: INE (2022d)

Livestock breeding development in Namaacha District is still insufficient, although this district has a tradition in cattle breeding and in the use of animal traction, particularly in the areas of Mafuiane and Changalane. At the family level, techniques of cheese production from goat cattle have been introduced, although its impact is not yet visible, because these cattle are still in the reproduction phase, and families are asking for more livestock development. The limitations of livestock production identified in the area are animal diseases, insufficient rural extension services and the household´s poor monetary capacity to buy stock. Along the transmission line route, large-scale livestock herding is present in Namaacha district, particularly in the higher elevation areas where land is not as airable.

Despite the mixed context, the population of Boane District has agriculture as its main form of subsistence complemented by cattle, sheep, pig and poultry breeding and trading. In Boane, private commercial agriculture is strongly present, occupying large areas of land and with great impact on the absorption of local labour. Particularly in relation to cattle there has been a reduction tend of its stock in recent years due to the increasing reduction of pasture areas, which makes some breeders opt to transfer their animals to the surrounding districts such as Namaacha, Matutuine and Moamba, but on the other hand, the stock of small species of animals has been growing. Poultry production is significant in the district with more than 400 poultry farmers, about 60% of the total registered poultry farmers are broiler breeders and the rest in the rearing of laying hens for egg production.

Like the province and as presented in Table 73, between 2019 and 2021, there has been a growing increase in the registered livestock numbers of the main livestock species reared in Namaacha District. Except for poultry numbers, the numbers of the other livestock species reared in Boane District are considerably inferior to those of Namaacha. Table below also shows that in Boane there was a decrease in all ungulated species in 2020 followed by an increase in 2021.

Table 76: Livestock numbers in covered districts (2019 – 2021)

Species	Namaacha District			Boane District		
	2019	**2020**	**2021**	**2019**	**2020**	**2021**
Cattle	60 273	64.872	66.863	9.129	8.716	9.936
Goats	31 505	31.604	21.501	6.917	2.919	3.425
Sheep	17 463	19.012	20.592	2.510	936	1.113
Pigs	8 823	9.817	10.578	3.786	859	1.375
Poultry	62172	67.324	73.805	46.462	209.629	249.471

Source: INE, (2021b, 2022d), GDB (2020), SDAE Namaacha (2022) and SDAE Boane (2022).

According to information provided by the local leadership of both districts the animal species most found in the covered communities are chicken, ducks and goats. People also mentioned to have sheep, pigs, and cattle. These are all for own consumption or for selling, although pigs, goats and cattle have been more often mentioned to be for sale.

Details on animal husbandry affected by the project will be included in the detailed census for the transmission line to inform the design and implementation of the Revised RAP.

6.3.14.4. Fisheries and aquaculture

Fishing has not been reported on conducted interviews as a major livelihood activity on covered communities. Only the communities of Mabanja in Boane and Bacabaca, Mucacuene and Gumbe in Namaacha mentioned fishing among the livelihood activities they perform. The information provided on fishing activity is presented in Table 74.

Table 77: Fishing activity on covered districts

District	Community	Where they fish	Fish species	Where they sell
Namaacha	Bacabaca	Movene river	Catfish and tilapia	on the community
	Mucacuene	Movene river	Tilapia	on the community
	Gumbe	Gumbe and Mabanga river	Catfish and tilapia	on the community

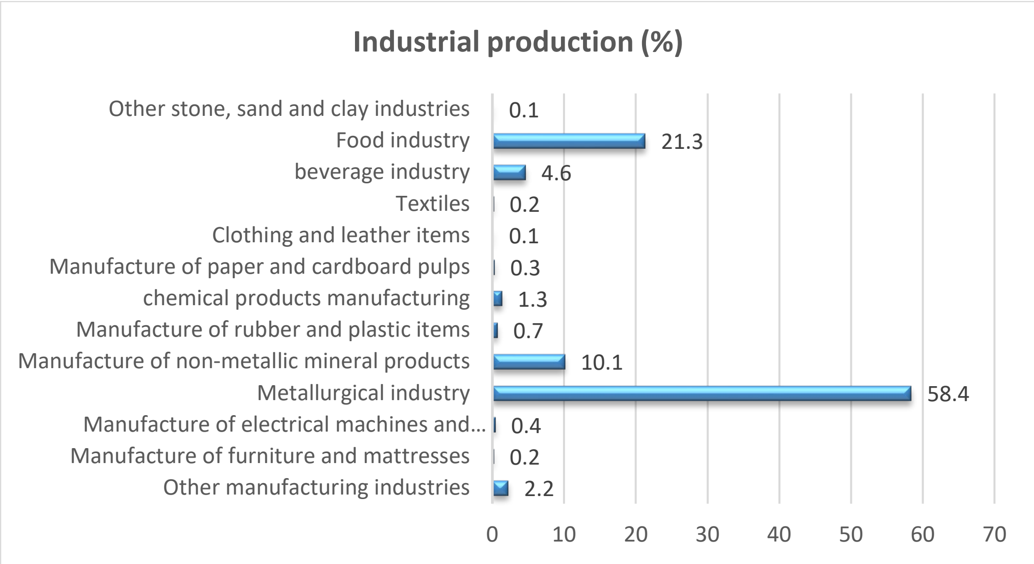
Source: Consultec (2023)

The initial household surveys conducted in 2023 by Consultec indicated that only 6.4% of households surveyed practice fishing.

6.3.14.5. Industry

Mozambique is a country in the process of revitalizing its industry, with considerable industrial production indices. Despite the various conjunctural factors that have not been contributing in a very favourable way to the industrial development, production in the manufacturing industry grew from 70.8 billion Meticais (2014) to 89.4 billion (2018). Industry also grew by 4.7% in 2019. For the recorded growth, the extractive and manufacturing industry sectors accounted for 39.0% and 61.0% of the production value attained in 2019 respectively (INE, 2020b).

Industrial production in Maputo Province in 2021 (Figure 127) is dominated by the metallurgical industry (58.4%), followed by the food industry (21.3%) and the manufacture of non-metallic mineral products (10.1%).



Source: INE (2021b)

Figure 136: Industrial production in Maputo province by activity sector (2020)

According to Namaacha SDAE (2022), there are a total of 85 small and micro industries in the district (Table 75), 61 of which are in Namaacha Sede and 24 in Changalane Administrative Post. highlighting the manufacture of blocks, quarries and companies producing banana, macadamia, and water bottling.

Table 78: Industry establishments in Namaacha District (2022)

Category	Administrative Post	
	Namaacha Sede	Changalane
Metalworking	1	3
Carpentries	2	4
Block manufacture	20	4
Bakeries	4	2
Mills	8	8
Quarries	10	-
Bitumen production company	1	-
Water bottling company	4	1
Banana production company	9	2
Macadamia production company	2	-
Total	61	24

Source: SDAE Namaacha (2022)

Boane District holds the largest number of industries in the province, boosting the growth of local Small and Medium Enterprises (SMEs) while creating employment opportunities. The Beluluane Industrial Park (PIB) Complex and the Beluzone Free Zone, with 700 hectares, is considered the main industrial zone in the country and aims to become a privileged location in Southern Africa for export-oriented companies. The Beluluane Industrial Park was created by the impact of the implementation of the Aluminium Smelting Industry - Mozal, which in turn generates other national and foreign companies and industries.

The district currently has an accumulated number of 395 industries (mostly small scale) of which 45 are operating in the Beluluane Industrial Park. The Mozal Aluminium Smelter factory is the most prominent in the Industrial Park. However, some autonomous factories have emerged, such as Capital Star Steel, an export-oriented factory of piping for oil and gas pipelines, contributing to improve the competitiveness of Mozambican products in the international market. Other important factories in the BIP are Midal Cables International, Dendustri Mozambique, Godrej Group, Duys Engineering Group, Matola Gas Company, Hytec, Sunshine Nut Company and Cimento Nacional. Boane District also has several stone and sand quarries, important sources of resources for the construction sector in Maputo Province and Maputo City.

During the qualitative data collection industrial activity has not been referred by local authorities as of relevance for the covered communities. Nonetheless on surveys conducted to the affected infrastructures and machambas resulted that 2,7% and 0,6% respectively work on the industrial sector.

6.3.14.6. Commerce

Trade plays an important role in the national economy, being one of the main sources of income for rural populations, a mechanism to link production and market between rural and urban areas, and a tool to induce agricultural productivity. In agricultural trade there is an increasing involvement of various agents and players in the process, but there are challenges ahead, such as bringing policies closer to small retailers, higher quality of production and conservation, and controlling the informal sector.

There has been an increase in the number of licensed commercial establishments in Maputo Province in recent years, corresponding to a growth in the order of 26.5% (2018), 5.7% (2019), 6.8% (2020) and 15,1% in 2021 (Table 76). 820 agricultural trade fairs were held in the province in the same year, of which 17 were in Boane District and five in Namaacha district.

Commercial activity has been growing at a significant rate in Boane District, in part due to its internal growth, its location, the industrial base, and to some extent, also due to farming activities. The informal and border trade is characteristic of the district and has a significant impact on the population and economy of the district. In the town of Boane, along the main road (N2), and on the secondary and tertiary accesses, there is a dense occupation of informal commercial premises and considerable movement of people. The arrival of more immigrants making commercial activity more dynamic, and besides being one of the areas that generates most employment at the district level. Commercial activity in the district includes specifically the activities in markets (stalls), grocery stores, supermarkets and warehouses.

Border trade is one of the activities that most moves the inhabitants of Namaacha. Linked by ethnic and linguistic (and often family) ties with the population that lives on the side of Eswatini, the population transits between the two territories to improve their economic situation through trade. The town of Namaacha, due to its location on the border with Eswatini, was the place where a very characteristic border commercial practice emerged along the territorial limits of southern Mozambique (including in relation to South Africa): the so-called “Mukhero”.

Boane district is one of the districts with the highest number of annual issued licenses in the province after Matola and Marracuene districts, and on the other hand, Namaacha district is one of the districts with the less licensed establishments.

Table 79: Commercial network (2019-2021)

Location	Commercial Establishments (nº)		
	2019	**2020**	**2021**
Maputo Province	2.339	2.510	2.953
Boane District	228	226	180
Namaacha District	31	31	24

Source: INE (2022d)

Below are illustrated examples of existing formal and informal commerce in the districts crossed by the project.

Formal Commerce, Namaacha

Informal Commerce, Boane

Figure 137: Formal and informal commerce in the covered districts

Both in the interviews carried out and in the surveys on the infrastructures and companies located in the right of way of the line, the difference in terms of commercial activity between the communities located in Namaacha District and those located in Boane was material.

In Bairro 1, Bairro 6 and Mabanja in Boane district there is a very active commercial activity, both formal and informal, from stalls to grocery stores. Formal trade is carried out in masonry infrastructures that offer a wide range of services and products sold from materials to food and beverages. In Namaacha district, there are not even informal stalls (Livevene and Gumbe) or there are some informal commerce and a few conventional built small groceries (Bacabaca and Mucacuene).

Figure 138: Commercial activity in Mucacuene (left) and Bairro 6 (right)

During the business survey conducted by Consultec in 2023, the HHs were asked on how they acquired their business and how long they have been in operation. See the figures below for detailed responses. When asked if they have a property title (DUAT) of their business, 18,9% said they have a DUAT and the remaining 81,1% do not have one.

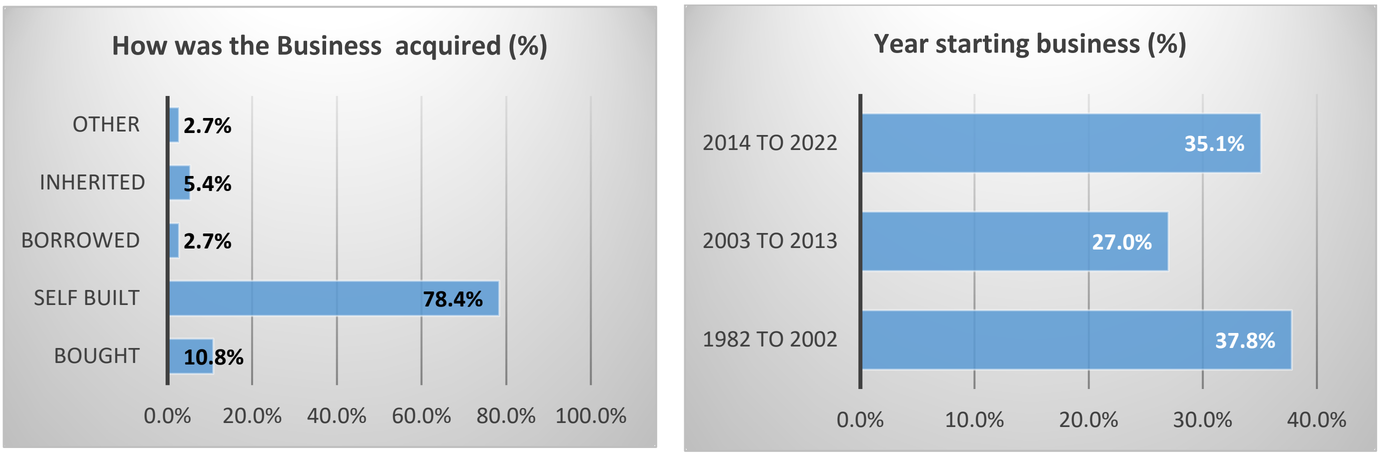


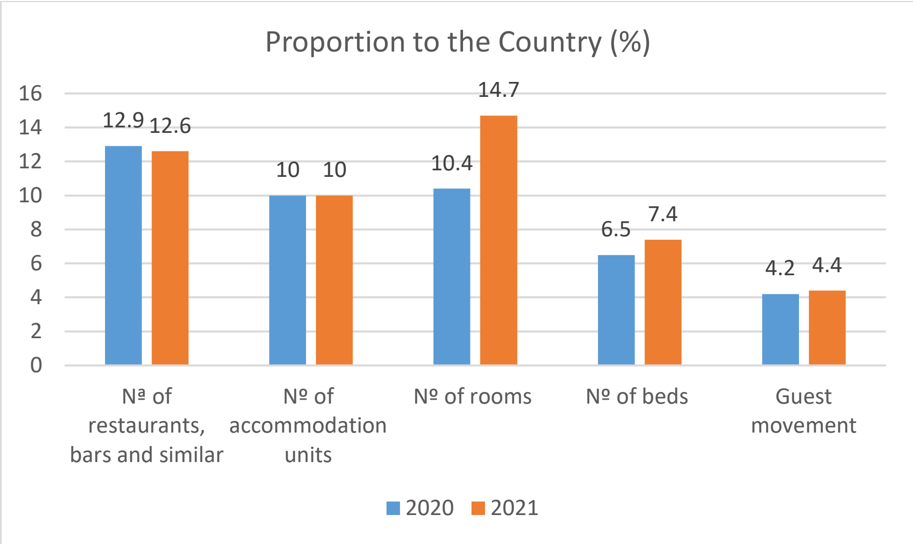
Figure 139: Type and year of business acquisition

6.3.14.7. Tourism

Mozambique, a developing country ranked among the poorest countries, has interesting economic potentialities. International tourism, playing the role of a development engine, is of interest for its economic and social contributions, namely the most evident and most direct: job creation, the possibility for inhabitants to increase their income and standard of living, and for the secondary gains over other sectors. It is essentially a tourism of proximity, since the bulk of the influxes come from neighboring countries, such as South Africa, from where, in fact, the bulk of the investments in the sector come from (Silva, 2019).

Tourism by its nature covers all economic and social activities. This sector acts as a catalyst for transport activities, stimulates some activities such as agriculture, fixes investment to the land by catalysing civil construction. It also inspires the evocation of cultural values and art as elements of the tourism product. Maputo Province has a wide range of natural and cultural tourism potentialities, characterized by beautiful beaches, natural reserves, monuments, and historical sites. This gives it a prominent place per excellence, being considered Mozambique´s fifth tourist destination.

Figure 131 below shows some of the province´s tourism indicators in relation to all those existing in the Mozambican territory. The number of restaurants, bars and other catering units have slightly decreased, the proportion of accommodation units have remained stable, and the number of rooms and beds have both increased in the same period. In what concerns guest movement Maputo province has had a small proportion of tourists when compared to provinces such as Nampula, Inhambane, Gaza or Maputo City.



Source: INE (2022f)

Figure 140: Maputo Province´s tourism indicators

According to the Provincial Directorate of Culture and Tourism, in 2020 there were in the province 51 hotel and restaurant establishments among these 19 hotels, 21 guesthouses, five lodges, and 339 restaurant establishments.

Regarding tourism, Namaacha District has a well-known natural interest site, the Namaacha Waterfall, as well as benefiting from its proximity with the Kingdom of eSwatini. Other sites of interest are Mount M'Ponduine of cultural interest, the Church of Our Lady of Fatima a place of pilgrimage for Catholic believers, the Damiano cave in Changalane and the war monument in Goba.

According to SDAE Namaacha (2022), there are two hotels, four guesthouses, seven medium-sized restaurant establishments, and two wildlife farms (MHMexotic Parque Nature Conservation and AAA Enterprise). The rehabilitation of the SunShine Libombos Hotel and Spa is also underway in Namaacha town.

There has been a gradual and continuous growth in the number of licensed hotels and restaurants in Boane District in recent years. Between 2014 and 2021 there was an increase of about 40% in the number of tourism establishments, which can easily be associated with the population growth, and the increasing urbanization rate that has characterized this district in recent years.

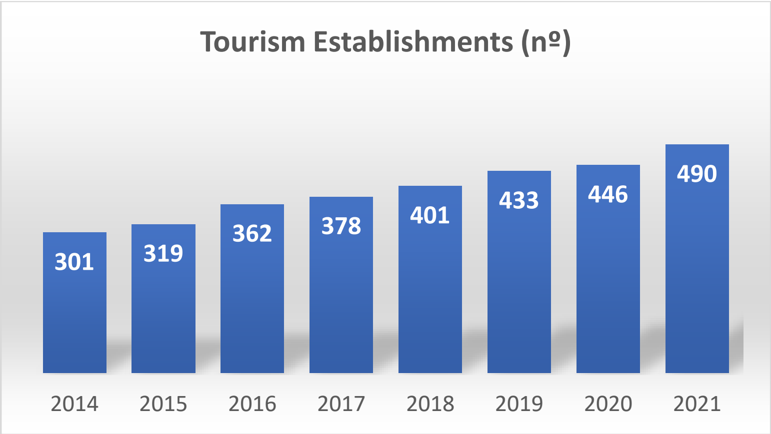


Figure 141: Tourism establishments in Boane District, 2014-2021

In what regards places of touristic interest in Boane District, such as those of Mahanhane and Massaca in Boane Sede Administrative Post, where Pequenos Libombos reservoir is located, have potential for the development of this activity, because it is a place endowed with beautiful landscapes associated with the characteristics of the relief, weather conditions and the existence of rivers. Regarding areas with potential to explore, can be highlighted Ambrosio, Saldanha, Chinonanquila and Matola - Rio.

Tourism activity was not mentioned in any of the interviews carried out with the leaders of the communities under consideration as being of relevance to the livelihood of their inhabitants, however, when surveying business establishments, four companies linked to the tourism sector were identified, this is three renting room houses and guesthouse all located on the transmission line´s right-of-way in Bairro 6 in Boane. The guesthouse in Bairro 6 is pictured below.

Figure 142: Pérola guesthouse on the Line´s RoW

6.3.14.8. Other

In addition to the economic activities listed in the immediately preceding subsections, there are also some ecosystem services that are also economic activities (e.g. charcoal production). See section 6.2.3.5 for more details.

7. Impact Assessment and Mitigation Measures

7.1. General Considerations

This Chapter provides an assessment of the potential biological, physical, and socio-economic impacts, both direct and indirect, positive, and negative, that will result from the implementation of the Project.

Potential impacts of the Project are assessed for each component of the biological, physical, and socio-economic environment, whose baseline is described in Chapter 6, ~~for~~ which relevant impacts were identified. Impact identification was based on the preliminary impact scoping developed in the Environmental Pre-Feasibility and Scope Definition Study (EPDA) and was updated considering the findings of the specialist studies and other more detailed analysis undertaken for the Environmental Impact Study (EIS).

It should be noted that the impact assessment is based on the specialists' understanding of the Project to be implemented and the environmental and socio-economic aspects, as per the Project Description provided in Chapter 4.

Impact identification and assessment was carried out for the construction [13], and operational [14] phases based on the EIA team's professional judgement and experience, as well as field work, public participation, and desktop analysis.

The significance of potential impacts that may arise from the proposed Project has been determined to support decision-making process (typically by a designated authority or state agency, but in some instances, also the proponent).

For each identified impact, an impact description is provided, and its significance is assessed according to a standardized impact assessment methodology, as described in Section 7.1.1. below. If the impact assessment confirms that impacts are associated with the implementation of the project, mitigation measures and actions to avoid, minimize, compensate for, or offset, potential adverse impacts, or to enhance positive or beneficial impacts will be put in place. As a general principle, for significant environmental and social impacts, a program of actions or measures will apply a mitigation hierarchy which focuses on measures to prevent or avoid these impacts from occurring in the first place, as opposed to minimization, mitigation, or compensation. Where avoidance or prevention is possible, significant impacts will be minimized through environmental and social measures/treatments/design. Acceptable options to minimize or mitigate will vary from abatement, rectification, repair, to restoration of impacts as appropriate. Where avoidance, minimization or mitigation measures are not effective, compensatory, or offset measures for

[13] The term 'construction' phase covers site preparation, installations, fabrication, site construction, commissioning, and start-up.
[14] In this document, impact assessment for the decommissioning phase is carried out at high level basis. Detailed impact assessment for decommissioning phase will be carried out during the operation phase.

residual impacts will be defined. It should be noted that these compensatory or offset measures do not eliminate the need to identify potential residual impacts of the Project.

The significance of each potential impact is also rated after the application of mitigation/enhancement measures, to assess the residual impact significance. The impact assessment for each impact is summarized in table format, including the pre-mitigation assessment, the key proposed mitigation measures, and the residual impact assessment.

Mitigation, enhancement, and monitoring measures resulting from the impact assessment are then organized in thematic programs in Environment Management Plan (EMP) (see Annex 1).

7.1.1. Impact Assessment Methodology

This section provides a detailed methodology to be used for the assessment of the significance of potential environmental and social impacts in the EIS. This methodology allows for the identified potential impacts to be analysed in a systematic manner, with significance rating (from *insignificant* to *very high*) assigned to each potential impact, thus helping to minimize the subjectivity inherent to impact assessment.

Impact identification and assessment will be carried out for the construction and operational phases based on the EIA team's professional judgement and experience, as well as field work, public participation, and desktop analysis.

7.1.1.1. Types of Impacts

An impact is any change, or perceived change, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products, or services (as defined in ISO 14001:2004). Any project can generate a wide range of potential impacts, of different types. The following table lists the different types of impacts that will be identified and assessed.

Table 80: Types of Impacts

Type of Impact	Description
Direct	Impacts that result from the direct interaction between a project activity and the receiving environment (e.g., dust generation which affects air quality).
Indirect	Impacts that result from other (non-project) activities but which are facilitated as a result of the project (e.g., in-migration of jobseekers, which places additional demands on natural resources) or impacts that occur as a result of subsequent interaction of direct project impacts within the environment (e.g., the clearance of the RoW may facilitate the expansion of invasive alien flora species).
Cumulative	Impacts that act together with current or future potential impacts of other activities or proposed activities in the area / region that affect the same resources and / or receptors (e.g., combined effects of vegetation clearance from several power lines in the region). [15]

[15] One project which is expected to have cumulative impacts with the transmission line is, logically, the CEN Project (Namaacha Wind Power Project), from which the 66 kV lines depart. IFC's Cumulative Impact Assessment (CIA) approach will be followed.

7.1.1.2. Impact Significance Assessment

The purpose of the impact assessment is to inform what kind of mitigation / enhancement is required to reduce the residual effect of a negative impact to acceptable levels or to maximize the benefits of a positive impact.

The significance of an impact is defined as a combination of several impact criteria, which assess the temporal and spatial scale of the impact, the sensitivity, resilience or importance of the affected receptors / resources and the intensity of the imposed changes on those receptors / resources.

The **significance** of an impact is defined as a combination of its **consequence** with the estimated occurrence **probability**. The criteria that will be used to determine impact consequence are presented in the table below. The impact assessment methodology and impact classification were described in the EPDA submitted to MTA in January 2023.

Table 81: Criteria used to determine the Consequence of the Impact

Rating	Definition of Rating	Score
A. *Extent* – *the area over which the impact will be experienced*		
Local	Confined to Project or study area or part thereof (e.g., site)	1
Regional	The region, which may be defined in various ways, e.g., cadastral, catchment, topographic	2
(Inter) national	Nationally or beyond	3
B. ***Intensity*** – *the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources*		
Low	Site-specific and wider natural and/or social functions and processes are negligibly altered	1
Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way	2
High	Site-specific and wider natural and/or social functions or processes are severely altered	3
C. ***Duration*** – *the timeframe over which the impact will be experienced and its reversibility*		
Short-term	Up to 2 years	1
Medium-term	2 to 15 years	2
Long-term	More than 15 years	3

The combined score of these three criteria corresponds to a **Consequence Rating**, as follows:

Table 82: Method used to determine the Consequence Score

Combined Score **(A+B+C)**	3 – 4	5	6	7	8 – 9
Consequence Rating	Very low	Low	Medium	High	Very high

Once the consequence is derived, the probability of the impact occurring is considered, using the probability classifications presented in the table below.

Table 83: Probability Classification

***Probability**– the likelihood of the impact occurring*	
Improbable	< 40% chance of occurring
Possible	40% - 70% chance of occurring
Probable	70% - 90% chance of occurring
Definite	> 90% chance of occurring

The overall **significance** of impacts is then determined by considering consequence and probability using the rating system prescribed in the table below.

Table 84: Impact significance ratings

		Probability			
		Improbable	Possible	Probable	Definite
Consequence	Very Low	**INSIGNIFICANT**	**INSIGNIFICANT**	**VERY LOW**	**VERY LOW**
	Low	**VERY LOW**	**VERY LOW**	**LOW**	**LOW**
	Medium	**LOW**	**LOW**	**MEDIUM**	**MEDIUM**
	High	**MEDIUM**	**MEDIUM**	**HIGH**	**HIGH**
	Very High	**HIGH**	**HIGH**	**VERY HIGH**	**VERY HIGH**

Finally, the impacts are also considered in terms of their nature (positive or negative impact) and the confidence in the ascribed impact significance rating. The prescribed system for considering the nature of the impacted confidence (in assessment) is laid out in the table below.

Table 85: Impact status and confidence classification

Status of impact	
Indication whether the impact is adverse (negative) or beneficial (positive).	(+) - positive – a 'benefit'
	(-) - negative – a 'cost'
Confidence of assessment	
The degree of confidence in predictions based on available information, Consultant's judgment and/or specialist knowledge.	Low
	Medium
	High

There is no statutory definition of 'significance' and its determination is therefore necessarily partially subjective. Criteria for assessing the significance of impacts arise from the following key elements:

- Status of compliance with relevant local legislation, policies and plans, any relevant or industry policies, environmental standards or guidelines and internationally accepted best practice;

- The consequence of the change to the biophysical or socioeconomic environment (e.g., loss of habitats, decrease in water quality) expressed, wherever practicable, in quantitative terms. For socioeconomic impacts, the consequence must be viewed from the perspective of those affected, by taking into account the likely perceived importance of the impact and the ability of people to manage and adapt to the change;
- The nature of the impact receptor (physical, biological, or human). Where the receptor is physical (e.g., a water resource) its quality, sensitivity to change and importance must be considered. Where the receptor is biological, its importance (e.g., its local, regional, national, or international importance) and its sensitivity to the impact must be considered. For a human receptor, the sensitivity of the household, community or wider societal group must be considered along with their ability to adapt to and manage the effects of the impact; and
- The probability that the identified impact will occur. This is estimated based upon experience and / or evidence that such an outcome has previously occurred.

The impact significance rating also reflects the need for mitigation. While low significance impacts may not require specific mitigation measures, high significance negative impacts demand that adequate measures be put in place, to reduce the residual significance (impact significance rating, after mitigation), as described in the following table.

Table 86: Impact Significance and Mitigation Requirements

Significance rating	Description
Insignificant to Low	No specific mitigations measures required, beyond normal environmental good practices and industry standard control measures.
Medium	Specific mitigation measures should be devised, to reduce the impact significance to an acceptable level.
High	Specific mitigation measures should be devised, to reduce the impact significance to an acceptable level. If avoidance or minimization is not possible, compensation measures should be considered.
Very High	Specific mitigation measures should be identified and implemented, to reduce the impact significance to an acceptable level. If such mitigation is not possible, very high negative impacts should be considered in the project's authorisation process.

7.1.1.3. Mitigation

Mitigation/enhancement is a critical phase of the EIA process: when potential impacts have been identified, the aim of this is to avoid or minimize as much as reasonably practicable of the negative ones, while enhancing those that are positive.

The basic principle of mitigation is to avoid any negative impact in the first place, rather than trying to remedy its negative effect later. Where impacts cannot be avoided, the objective then becomes to reduce them to an acceptable level, such that no major residual impacts are left.

The table below shows the mitigation hierarchy applied.

Table 87: Mitigation Hierarchy

Level of mitigation	Description
Avoid	Re-design the project to remove the potential impact due to the project's feature.
Minimize	Design control systems and implement off-site measures to reduce impacts.
Remedy	Repair any residual damage to natural and human environment by restoration activities or appropriate interventions.
Offset	Compensate for significant residual impacts if other mitigation measures are not feasible or cost-effective, or are already fully implemented

For each impact, mitigation and enhancement measures are recommended, and impacts are rated in the prescribed way for both pre- and post-mitigation / enhancement scenarios.

A summary impact assessment table will be provided for each impact assessment. To visualise the nature (positive/negative) and the significance rating of the assessed environmental and social impacts, the impact summary table is colour-coded as shown in Table 88.

Table 88: Colour code of impact nature and significance

Negative Impacts (Significance)	Positive Impacts (Significance)
Insignificant	**Insignificant**
Very Low	**Very Low**
Low	**Low**
Medium	**Medium**
High	**High**
Very High	**Very High**

7.2. Climate and Climate Change

7.2.1. General Remarks

The objective of this Greenhouse Gas (GHG) assessment is to provide a qualitative greenhouse gas emissions associated with the development of the Project, and to identify actions for mitigating or reducing these emissions. Where sufficient information is available regarding emission sources likely to be significant for this Project, a quantitative assessment has been undertaken.

Pollution prevention and control technologies and practices to reduce and mitigate GHG emissions consistent with international good practice are here proposed such those suggested by IFC Environmental, Health, and Safety (EHS) General Guidelines regarding the reduction and control of GHG.

The IFC General Environmental, Health and Safety (EHS) Guidelines (IFC, 2007a) advise that greenhouse gases emissions should be evaluated for projects where emissions are estimated to be more than 100,000 tonnes CO2. IFC's EHS Guidelines for electric power transmission and distribution (IFC, 2007b) does not provide any specific guidance on greenhouse gases emissions associated with the construction or operation of transmission and distribution projects, although it does note that the use of sulphur hexafluoride (SF6) in insulating high-voltage equipment should be minimised where possible as SF6 is a potent greenhouse gas if it escapes to atmosphere.

The World Bank Energy and Mining sector board discussion paper named “Impacts of Transmission and Distribution Projects on Greenhouse Gas Emissions. Review of Methodologies and a Proposed Approach in the Context of World Bank Lending Operations” (Madrigal, 2010) proposes specific methodologies for GHG account from electrical Transmission and Distribution projects, which were adopted as baseline method in this assessment.

GHG emissions resulting from electric transmission line projects are considerably low when compared with other fossil fuel energy-based projects. Transmission lines have emissions in a maximum order of magnitude of tens of kg CO2/MWh. Given that typical oil and coal power stations would have life-cycle emissions reaching 870–1335 kg CO2/MWh (DeLuchi, 1991), all the transmission line GHG sources are likely to represent less than 10 percent of typical power generation emissions, although land clearing, is the most representative GHG source. Land clearing emissions are highly variable since they depend on local land conditions (due to the variable amount of vegetation to be cleared) by contributing to an increase in the overall emissions computation.

GHG emissions generated by this project will be associated mainly with the construction phase, although minor -level emissions can also occur during the project’s operational phase. The estimation of the Project’s GHG emissions will include the emissions from fuel use during construction phase (from internal combustion construction vehicles and machinery operation), but also those resulting from land clearing activities. These emissions are classified as direct non-generation GHG emissions (Madrigal & Spalding-Fecher, 2010).

During the operational phase, Sulphur hexafluoride (SF6) fugitive emissions may occur, and Nitrous oxide (N2O) could be potentially released due to Corona effect but is foreseen that both will be of no significancy due to the power rate of this transmission line, as further detailed bellow in dedicated sections of this assessment.

In summary, theoretically, the main GHG emissions sources from transmission projects include:

Construction phase:

Energy use during the construction phase of the project - fuel used in construction machinery and vehicles are the main source of CO2 emission in this stage of the project’s development. These are considered only when there are sufficient project data on fuel usage in the construction phase. Nevertheless, it is expected that this is likely to represent a significant source of GHG emissions.

Land clearing emissions - land clearing can be a significant source of emissions, depending on the vegetation type intercepted by the RoW of the project. The area to be cleared and the carbon density of the biomass to be cleared is assessed based in the flora stratums intercepted by the ROW alignment and converted to CO2 emissions.

Operational phase:

Sulphur hexafluoride (SF6) fugitive emissions – SF6 is used in insulation and current interruption applications in energy transmission systems (IPCC, 2006c). SF6 may escape as fugitive emissions during the manufacturing, installation, use, maintenance, and disposal of this equipment. These emissions are generally small but could be significant for projects that install new high-voltage equipment. However, these are very lower in lower voltage power lines. Abnormal releases may arise during maintenance of circuit breakers contained within the Boane substation although this are considered of no significance to overall GHG emissions.

N2O emissions resulting from the corona effect – high-voltage transmission lines can create nitrous oxide (N2O) from an effect called "corona discharge". Corona is a phenomenon associated with all energized transmission lines. Under certain conditions, the localized electric field near an energized conductor can be sufficiently concentrated to produce a tiny electric discharge that can ionize the air close to the conductors and promote N2O releases. The electric discharge is called corona discharge. Production rates of this gas are heavily dependent on weather conditions and transmission line voltage.

GHG emissions from maintenance activities - Emissions associated with routine maintenance of the towers are short-term and intermittent and therefore expected to be negligible.

7.2.1.1. Methodology and Data Sources

Methodologies and databases consulted for the Project's GHG evaluation were retrieved from the following data sources:

World Bank Energy and Mining sector board discussion paper, paper nº 21, 2010. "Impacts of Transmission and Distribution Projects on Greenhouse Gas Emissions. Review of Methodologies and a Proposed Approach in the Context of World Bank Lending Operations".
Dones, R., et al, 2007. Life Cycle Inventories of Energy Systems: Results for Current Systems in Switzerland and Other UTCE Countries. Final report EcoInvent data v2.0, No. 5. Dübendorf: EcoInvent Swiss Centre for Life Cycle Inventories. www.ecoinvent.ch
WRI Greenhouse Gas protocol Tools. Greenhouse Gas Protocol Tools, 2021. https://ghgprotocol.org/calculation-tools.
U.S. EPA, 2006. (U.S. EPA (Environmental Protection Agency). 2006. Global Anthropogenic Non-CO2 Greenhouse Gas Emissions: 1990–2020. Washington.

Other data sources included:

IFC Carbon Emissions Estimator Tool (IFC 2014), this tool includes a section on land clearing that can be applied for any project type. Land clearing emissions were calculated as the product of the estimated total area to cleared and biomass density (mainly above ground) converted to Carbon. This tool also includes a table of emission factors (aboveground biomass density) for a large variety of vegetation types, sourced from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.
WRI, 2021. Mozambique Total GHG including LUCF, https://www.climatewatchdata.org, accessed February 2022.

These methodologies were applied in the present project with the purpose to calculate GHG emissions (CO2eq) and to estimate the Project's impact, in the context of Mozambique's total GHG emissions.

7.2.1.2. Greenhouse Gas Accounting Principle

The GHG inventory developed in this assessment was based on the principles outlined in the Greenhouse Gas Protocol (World Business Council for Sustainable Development and the World

Resource Institute). Specifically, the GHG Protocol advocates defining a reporting boundary for an inventory, and then segmenting the GHG sources within that boundary, according to their scope. For the present GHG inventory, only emissions from the scope 1 are to be considered, for the project's construction and operation phase. The scopes of these GHG emissions are:

- Scope 1 GHG emissions are those produced directly from construction and operation of the Project such as combustion of fuel, gas venting/flaring and fugitive emission sources.
- Scope 2 GHG emissions arise from purchased electricity, heat or/and steam from external providers. However, these emissions are generated outside of the project boundary.
- Scope 3 GHG emissions are those that result of activities from assets not owned or controlled by the Project or as a result of consumption of products, embodied emissions from construction materials or value of chains of the project. The scope 3 GHG emissions are not assessed in this document.

These project GHG emission sources contribution is detailed in the following sections and subsequently quantified based on the available information.

7.2.2. Construction phase

7.2.2.1. Embodied emissions from construction materials

The construction of power transmission projects consumes mainly considerable quantities of aluminium, steel, concrete and other building materials, but at a minor scale. These materials have embodied emissions resulting from the energy used to produce them, meaning that the implementation of the new transmission line project will create some upstream GHG emissions due to the materials used in the construction phase of the project. Note that Scope 3 GHG emissions are those that result of activities from assets not owned or controlled by the Project or as a result of consumption of products, construction materials or value of chains of the project. As mentioned above the scope 3 GHG emissions are not assessed in this document.

7.2.2.2. Land clearing emissions

The construction of a long-distance transmission line will have an effect over the carbon stored in biomass and soils. Vegetation clearing within the Power Evacuation RoW path will be required for this long-distance transmission line, which would result in a one-time release of the carbon stored in the vegetation that can be converted and translated to annualized CO_2e emissions according with the IPCC Land Use Change & Forestry proposed methodology.

A 50 m corridor (25 m outwards each of the two parallel power lines, plus the 20 m spacing between lines, totalling 70 m) will be established as the transmission line PPZ. The PPZ is required to protect the system from windfall, contact with trees and branches and other potential hazards that may result in damage to the system, power failures or forest fires. The PPZ will also be utilized to access, service and inspect the transmission line.

Large trees and other large vegetation may need to be cropped, cut back or removed from the PPZ whichever applies best, if it constitutes a risk to the power line. The PPZ will also be utilized to access, service and inspect the transmission Line. It is envisaged that all construction works will be undertaken within the area identified for the permanent PPZ.

It must be noted that vegetation clearance shall not be done by bulldozing or other mechanical equipment, to minimize soil compaction and erosion. Care shall be taken to avoid unnecessary removal of topsoil.

In terms of vegetation clearance, during the operation phase, the minimum standards to be used for clearance are indicated in the table below.

Table 89: Standards for vegetation clearance within the OHL PPZ

Item	Construction clearance	Operational maintenance
Centreline (minimum clearance strip)	Clearance of all vegetation in a 5 m corridor (area directly under the line to be cleared). This strip of land shall be completely cleared of all trees, scrub, and undergrowth by felling not more than 150 mm above ground.	Re-growth inside the same 5 m corridor cleared during construction shall be cut within 150 mm of the ground and maintained through manual labour, as necessary.
Vegetation within the RoW (outside the minimum clearance strip)	Selective trimming or cutting down of trees interfering or posing threat to the integrity of the power line. This includes clearing or selective trimming of trees, by ensuring that any tree after falling will not be less than 2.5 m clear of the tower outermost conductor.	Selective trimming to maintain 6 m between the top of trees and the conductor cables (at resting position).
Tower sites	Clear all vegetation within the proposed tower position and within a maximum radius of 6 m around the position.	Re-growth shall be cut within 150 mm of the ground and maintained through manual labour, as necessary.

The impact associated with CO_2 emissions from land clearing becomes more significant when transmission lines cross areas with high forest cover, that is, areas with highly dense carbon stock which is not the case. It is important to notice that some of the biomass will grow back after the construction, although the amount and density would depend on the climate and maintenance procedures for the line (it is anticipated that regrowth vegetation will be cut as necessary), as well as on how high the line is.

According with the natural habitat calculations presented in section 6.2.2.3 and the habitat maps presented in section 6.2.2.1, it is estimated that the overhead transmission line will cross along its total distance of 38.2 km roughly 7.11 ha of natural forest, 82.07 ha of cropland area and 104.09 ha of grassland. [16]

The IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4, Table 4.12 (Natural Forest and Plantation Forest) and Table 5.1 (Cropland), indicates an above ground biomass content of 32.9 ton C per hectare for Mozambican natural forest scrubland, a cropland biomass content of 4.7 ton C/ha and 2.48 ton C/ha for grassland.

To estimate the change in the carbon stocks impacted by the land use change, i.e, CO_2 releases from land clearing, emissions are expressed in CO_2 per unit area of land change being the biomass content expressed in units of tonnes of carbon dioxide per hectare (tons CO_2e /ha), according with the following general expression:

$$PELC =(A_{def} \times BD_{Forest} \text{ X } 44/12) + A_{def} \times BD_{crop} \text{ X } 44/12 + A_{def} \times BD_{grass} \text{ X } 44/12$$

Where,

[16] Note that the areas and land types listed here are not the same as the natural habitat are not

PELC=Direct non-generation CO2 emissions from land clearing (tCO2)

Adef= Area of land deforested (ha)

BD= Biomass density per unit area (aboveground) expressed as (tC/ha)

Based on the expected vegetation coverage, the PELC would be 858 (forest) + 1414 (crops) + 947 (grass) or 3219 tCO2. Note that this is a reduction from the original EIS Report because 1) a more refined estimate of the vegetation cover is now available from the 2024 vegetation mapping and 2) the footprint now crosses through more cropland in Namaacha district, which has a lower biomass density.

7.2.2.3. Fuel consumption emissions

Greenhouse gases will be emitted mainly during the construction phase of this project. The fuel requirements during the operational phase will be negligible, as they will be limited to the vehicles used for RoW inspections.

The main sources of GHG emissions associated with the construction phase of this project will be originated during construction phase such as operation of heavy machinery, materials and personnel transportation vehicles to and from site and the use of diesel power generators.

The construction phase will include land-based activities such as the site preparation/clearance for installations of temporary construction camp, new access opening, earth moving for tower foundations, crane operations, etc. therefore the main GHG emission sources from the construction phase are associated with:

- Electricity consumptions for general construction activities based in the use of diesel fuel in temporary power generators;
- Transportation activities (diesel fuel consumption associated with transportation of materials to site by Heavy trucks);
- Personnel transportation by bus.
- Diesel fuel consumption on-site heavy machinery operation.

The construction phase will use common civil construction equipment. The table below presents an estimate of the main construction equipment typologies to be used in the different activities associated with the power evacuation line construction.

Table 90: Expected construction equipment usage

Construction Activities	Construction Equipment	Quantity	Activity Duration
Pioneer works and Camp setup Transmission Line construction & Associated activities	Excavators (TLB) (50 tons)	2	10 months
	Dumper/tipper truck (50 tons)	2	10 months
	Excavators (30 tons)	2	10 months
	Dumper/tipper truck (30 tons)	2	10 months
	Roller/Compactor (15 tons)	1	8 months
	Blader/graders	1	6 months
	Diesel generators (8kW)	4	12 months (over 18 months)
	Mobile crane (30/50 tons)	2	10 months
	Access platform (cherry picker)	2	10 months

Mobile transportation	Pick-Up trucks (4X4)	5	12 months
Mobile Transportation (workers)	Transportation Bus (Personnel)	3	12 months
Mobile transportation (Containers)	Heavy Duty Articulated Truck	400 Containers	2 months (estimated)

It was assumed that construction works will be carried out during 6 days per week with a maximum of 10 hours/day. 8 kW diesel generators will work 6 hours/day. 400 containers will be transported from Maputo Port to Boane over a total distance estimated and not exceeding 60 km.

A total consumption 498.1 m3 of diesel will be required to operate both the construction machinery and mobile vehicles during all the construction phase. Fuel will be sourced from commercial entities in the national market.

Scope 1 GHG emissions for the construction phase were estimated using the default GHG emission factors for fuels given by the WRI GHG Emission Factors Compilation and EMEP/EEA Air Pollutant Emission inventory guidebook (2019) - Non-road mobile sources and machinery non-road mobile machinery sources.

The adopted method for GHG emissions quantification from diesel combustion was to multiply its volume (in kilolitres or kL) of by the respective GHG emission factors: 2.676 kg CO2e/L; 1,11 E-05 kgCH4/l and 1,16 E-4 kg N2O/l, as given in EMEP/EEA Air Pollutant Emission inventory guidebook 2019.

Table 91: GHG emissions from Diesel combustion

Activity	Quantity (kL)	GHG Emission Factor (kg CO_2/ L)	GHG Emission Factor (kg CH_4/ L)	GHG Emission Factor (kg N_2O/ L)	TOTAL Emissions (Tons CO_2.e)[1]
Diesel fuel consumption associated with pioneer camp and camp setup	498.1	2.676	1.11 E-5	1.16 E-4	**1,348.2**
Diesel fuel consumption associated with mobile transportation (workers)					
Diesel fuel consumption associated with onsite material transportation (400 containers)					
Diesel fuel consumption associated with Transmission line construction heavy duty machinery operation					
Diesel fuel consumption for temporary power generators within the construction camp					

7.2.2.4. Impact assessment

Impact: Greenhouse gas emissions during construction phase

Impact Assessment

The construction phase of the Project is expected to account for a total emission of 19 402.6 tonnes of CO_2e, as per the assessment provided below. Most of this impact is from land clearing activities with a smaller proportion, accounted as a conservative estimate as direct emissions from fuel combustion associated with construction machinery and transportation activities. The table below summarizes the total direct and indirect GHG emissions expected from the construction phase of the project.

Table 92: Greenhouse gas emission estimative in the construction phase

Emission Source	GHG Total Emission (CO2e tons)
Land Clearing (based on LULC*)	5 626
Fuel Consumption	1 348
TOTAL	6 974

*Map of Land Use and Cover, Maputo province: Magalhães (2018).

The total impact from land clearing can be annualised based on the 35 years expected lifetime of the project leading to a total equivalent impact per year from the land clearing calculated as 161 tCO_2e/year. Fuel consumption during construction activities will generate total emission of 1348.2 tCO_2e in the first year of construction works.

This represents a neglectable fraction of Mozambique's current national emissions (as discussed in the baseline section), and a value very low also if compared to emissions from other energy sources such as those based in fossil fuel power generation which would have emissions an order of magnitude far extent per year.

Given the short-term duration of the construction phase, CO_2 emissions arising during the construction phase of this project will have a negligible effect to the Mozambican global climate change at a regional or national level, thus the impact generated from GHG in the construction phase is thus rated as negative, direct, of short-term duration, regional extent and low intensity, resulting in a very low significance.

Mitigation measures

As the key impacts on greenhouse gas emissions are mostly confined to the construction phase, potential measures to reduce those impacts are important in improving performance. The mitigation measures presented in this section focus on:

- Sourcing as much as possible materials from sustainable sources such as environmental certified companies;
- Use materials from local sources as much as possible;
- Minimize, as feasible, distance from construction camps to work fronts;
- Adopt measures to minimize fuel consumption such as adopting low velocities and turning off vehicles and equipment's while at idle;
- Promote proper and regular maintenance of vehicles and other internal combustion-based equipment;
- Ensuring efficiency in construction and planning including siting of construction camps, laydown and other work areas; and

- Using materials which can be easily reused.

Impact Summary

The impact assessment summary is provided in the table below. The proposed mitigation will reduce the overall GHG impact, but the residual significance is not changed, remaining very low.

Impact: GHG emissions during the construction phase					
Criteria	Pre-mitigation assessment		Key Mitigation Measures	Post-mitigation assessment	
Nature	Negative		Promote proper and regular maintenance of vehicles and other motorized equipment per manufacturers' guidance.	Negative	
Type	Direct			Direct	
Extent	Regional	2		Regional	2
Intensity	Low	1		Low	1
Duration	Short-term	1		Short-term	1
Consequence	Very Low	4		Very low	4
Probability	Probable			Probable	
Significance	Very Low			Very Low	
Comparison to Original EIS: No change.					

7.2.3. Operational phase

7.2.3.1. General remarks

Direct impacts of greenhouse gas emissions in the operation phase are anticipated to be negligible. Possible SF6 fugitive emissions may occur, eventual N2O release due to the Corona discharge and fuel consumption from traffic movements associated with routine maintenance of the lines and substations are the sources of GHG that can be expected but are anticipated to be insignificant. The following subsections analyse in detail each of these potential emissions sources during the operation phase of the project.

7.2.3.2. Nitrous oxide (N2O) emissions

High-voltage transmission lines may generate nitrous oxide (N2O) due to an effect called "corona discharge". In certain meteorological conditions, such as rain or fog, and due to the very high voltage values passing through the transmission line cables, there's a current leakage to the surrounding air that becomes ionized. In this specific condition, the electric field turns higher, and all the electricity driver appears surrounded by a bluish light halo, which produces noise and releases N2O gas. This phenomenon is called the corona discharge effect. Dones et al. (2007) suggest that N2O emissions of the electricity high voltage transmission due to corona effect are about 5 kg N2O/GWh. Considering that the N2O GWP is 210, so this is equivalent to 1.05 kg CO2e/MWh.

As 350 GWh is the average annual electricity evacuated through this transmission line, thus this is equivalent to a 'potential' annual GHG emissions of 367,5 ton CO_2e/year.

It is important to notice that nitrous oxide emissions are not entirely directly proportional to electricity transmitted. Corona discharge depends on a variety of site-specific factors, from voltage levels to the specific technical characteristics and shape of components so the previous cited emission factor must be faced as an estimate and a conservative maximum value only. High-voltage transmission lines can create nitrous oxide (N_2O) from an effect called "corona discharge". They are only present on the highest voltage lines, and thus would not be applicable to distribution investments or many transmission lines. Therefore, GHG associated with nitrous oxide emissions arising from a 66 kV Power evacuation can be considered as improbable.

7.2.3.3. Sulphur Hexaflouride (SF6) emissions

Sulphur hexafluoride is a gas used in insulation and current interruption applications in both T&D systems (IPCC, 2006c). SF_6 is used in gas-insulated switchgear and substations, gas circuit breakers, and can also be used in high-voltage gas-insulated lines. SF_6 may escape as fugitive emissions during the manufacturing, installation, use, maintenance, and disposal of this kind of equipment's. Transmission equipment often requires periodic refilling and so has higher fugitive emissions during use. The amount of SF_6 emissions during operation and decommissioning is related with the equipment voltage rating, to the number and type of equipment used, as well as to the maintenance and recycling procedures. This source of emissions is dependent on the type of equipment installed, refurbished or maintained. The magnitude of SF_6 emissions depends on what equipment is used, how it is maintained, and operational factors of the transmission line itself.

At a national level, countries report SF_6 emissions from the power sector in their national emissions inventories, so this provides one approach for estimating their magnitude.

U.S. EPA, 2006. Global Anthropogenic Non-CO_2 Greenhouse Gas Emissions: 1990–2020. Washington, estimates the total SF_6 emissions from the power sector by country and region throughout the world. This estimate includes all transmission line components, as well as SF_6 from manufacturing and disposal of transmission line equipment's.

Considering that a medium voltage equipment (38-100 kV) accounts for 25 percent of the SF_6 fugitive emissions from T&D, (Madrigal, 2010) the average emissions of SF_6 for power lined in Africa countries is 2.45 kgCO_2e/MWh X 25% ~0.61 kgCO_2e/MWh.

As 350 GWh is the average annual electricity flow through the transmission line from Namaacha Wind power to Boane Substation this is equivalent to a potential total GHG emissions of 214,4 tons CO_2e/year.

7.2.3.4. Maintenance activities

Emissions associated with routine maintenance of the towers and RoW may arise from fuel consumption during access and/or to eventual towers repairs activities. The fuel requirements during the operational phase will be negligible, as they will be limited to the use of vehicles used for RoW inspections and the eventual need to use a diesel generator. Emissions arising from these activities are short-term and intermittent in nature and therefore not expected to be significant in what concerns global GHG emissions.

7.2.3.5. Impact assessment

Impact: Greenhouse gas emissions during operation phase

It can then be concluded that the project's operational phase will have no significant direct impacts, in what regards greenhouse gases emissions as these would be less than 600 tons CO2e /year (581,9 tons) if assuming that Corona Discharge is to be accounted for.

However, this Transmission Line project implementation can enable the development of new power generation in Mozambique. It can be foreseen that this would be a mix of renewable and fossil fuel-based power such as new hydropower and natural gas power projects. In the case of the potential export of electricity to neighbouring countries such as South Africa this project could have a positive contribution to greenhouse gas emissions by potentially supplying renewable energy.

7.3. Air Quality

7.3.1. Construction phase

7.3.1.1. Impact-generating activities

During the construction phase of the transmission line, air emissions will be mainly generated by the operation of construction vehicles and machinery and from the activities carried out in each specific work front. The main construction activities likely to generate the most relevant emissions include:

- Access roads opening – Dust emissions associated with the new access opening and road construction are to be expected. Land preparation and vegetation's clearing (site enabling), machinery operations and transportation activities are due to generate particulate matter emissions.
- Clearance of Right-of-Way (RoW) – vegetation in the RoW will be mowed or cut using adequate equipment like mowers and/or chainsaws.
- Erection of transmission towers – transmission towers are constructed by first using a standard drill rig to bore a hole to the required depth. Concrete trucks carry concrete to the boreholes to construct the tower's foundations. Cranes then erect the towers on the foundations. Finally, the wire is strung between towers using large pulleys.
- Construction camp site – Fugitive dust and air pollutants emissions (combustion gases) are expected to be generated from the construction camp erection since the different land construction activities are to be expected, such as vegetation clearing, land preparation, levelling, fencing. Once in operation machinery parking and vehicle movements to and from the construction may generate temporary dust emissions due to dust entrainment.
- Movement and operation of vehicles and machinery associated with the construction activities – the movement of vehicles and the operation of machinery will be a source of atmospheric pollutants emissions, due to the exhaust gases from the internal combustion engines. Fugitive dusts emission due to vehicle entrainment can be also expected during transportation operations.

It is expected that overhead transmission towers and other materials will be delivered by road by means of heavy truck vehicles. The truck journeys associated with the transmission line installation and other equipment and materials will result also in temporary exhaust emissions with consequent adverse impacts on local air quality.

Ground works will involve the use of excavators, front-end loaders, rippers, dozers, graders, rollers, water trucks and dump trucks that will operate in the construction sites. The construction activities and equipment operation will both result in temporary dust emissions and combustion gas exhaust releases. However no significant adverse impacts on local air quality are to be expected, in what regards the transmission line construction works, since the operations will take place away from residential areas, for the vast majority of the transmission line alignment.

Air quality impacts are likely to be most relevant near the Boane substation considering that several sensitive receptors are located in close proximity giving way to potential dust annoyance to occur.

Considering the discussed above, the key air pollutants of interest include:

- Particulate matter emissions, arising from construction activities; and
- Combustion gases emissions, including nitrogen oxides (NOx), carbon monoxide (CO), sulphur dioxide (SO2) and carbon dioxide (CO2), associated with the operation of fuel-based equipment, and from the circulation of light and heavy vehicles;

The significance of the Project's air quality impacts is assessed below, taking into consideration the proximity of sensitive receptors to the different construction sites.

7.3.1.2. Impact assessment

Impact: Increase of dust emissions near sensitive receptors

Impact Assessment

The most common impact on air quality resulting from civil works is the emissions of particulate matter (dust) that may result in an increase of the atmospheric concentrations of particulate matter near existing sensitive receptors. Civil construction activities that involve vegetation clearing and earth movements result in this type of emissions, which can be significant during the dry season if no control measures are put in place. The intensity of these emissions is a function of several parameters, such as:

- The nature of the specific construction activity under way (construction methodology, number and type of vehicles and equipment in operation, etc.);
- The duration of the activity.
- The size of the work front.
- Meteorological conditions during the activity (wind speed and direction, rain events);
- The proximity of sensitive receptors to the work site.
- Adequacy of the control measures in place.
- The sensitivity of the receptors to the emitted pollutants.
- The magnitude of the impacts of each specific work front will thus be dependent of the parameters listed above.

Dust emissions are expected essentially during site preparation works such as vegetation clearance, soil disturbance for tower foundation works, excavation for buried cable and the movement and transport of soil and other materials by heavy vehicles. These impacts, however, will only be relevant for sensitive receptors located in the immediate vicinity of the RoW, which are scarce along the selected Power Evacuation corridor.

The construction of access roads also has the potential to result in high dust emissions, mainly because of road opening activities, acquisition of material from borrow pits, transportation of materials on unpaved roads and road consolidation works.

Given the expected amounts of particulate emissions over the construction period and the location of the closest sensitive receptors, the global air quality impact associated with dust emissions is rated as negative, direct, of short-term duration, with a local extent and with an expected medium intensity, resulting in a very low significance in the non-mitigated scenario.

Mitigation Measures

Despite the very low significance expected, dust emissions may promote some degree of annoyance to the surrounding communities. As such, mitigation measures are recommended to reduce efficiently the potential nuisance effects caused by dusts on nearby receptors.

In particular, it is recommended that dust control measures are implemented in the construction area throughout the construction phase, namely by good environmental management practices, of standard application to any major civil construction works, should be followed, namely:

Circulation of construction heavy vehicles (such as trucks used in the transportation of materials) should be adequately planned to minimize limited to pre-approved construction routes.

Speed limits should be set for construction heavy vehicles (such as trucks used in the transportation of materials) for all construction circuits, since the emission of dusts by vehicle entrainment increases linearly with speed. This speed limit should not exceed 30 km/h in critical segments, such as when near residential areas.

Heavy trucks transporting granular construction materials (such as sand, soil and gravel, etc.) should not be loaded to full capacity. A free edge of approximately 0.2 m should be kept to avoid spills during transportation;

Vegetation clearing and earthworks should be minimized as much as possible and limited to the strictly needed areas.

Trucks carrying dusty materials should have the load conveniently covered, preventing the emission of particulate matter and fugitive dusts.

All the unpaved surfaces where vehicle movement is to be expected near residential areas, should be kept moist (e.g., through a water sprinkler truck), in particular, during dry and windy conditions, to minimize the dust emitted by vehicle entrainment.

Stockpiles of granular materials should be regularly sprinkled with water, to minimize windborne dust.

Impact Summary

With the application of the proposed mitigation, the impact’s intensity is reduced to low, resulting in a very low residual significance. The table below summarises impact classification due to the potential increase in dust emissions from construction activities.

<table>
<tr><td colspan="6">Impact: Increase in dust emissions near sensitive receptors</td></tr>
<tr><td>Criteria</td><td colspan="2">Pre-mitigation assessment</td><td>Key Mitigation Measures</td><td colspan="2">Post-mitigation assessment</td></tr>
<tr><td>Nature</td><td colspan="2">Negative</td><td rowspan="8">Vegetation clearing and earthworks should be minimized as much as possible and limited to the strictly needed areas.

All the unpaved surfaces where vehicle movement is to be expected should be kept moist (e.g., through a water sprinkler truck), in particular during dry and windy conditions, to minimize the dust emitted by vehicle entrainment.

Speed limits for construction heavy vehicles should not exceed 30 km/h in critical segments, such as when near residential areas.

Circulation of construction heavy should be limited to pre-approved construction routes.

Heavy trucks transporting construction materials should not be loaded to full capacity. A free edge of approximately 0.2m should be kept avoiding spills during materials transport.

Trucks carrying dusty materials should have the load conveniently covered, preventing the emission of particulate matter and fugitive dust.

Stockpiles of granular materials should be regularly sprinkled with water, to minimize windborne dust.</td><td colspan="2">Negative</td></tr>
<tr><td>Type</td><td colspan="2">Direct</td><td colspan="2">Direct</td></tr>
<tr><td>Extent</td><td>Local</td><td>1</td><td>Local</td><td>1</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>2</td><td>Low</td><td>1</td></tr>
<tr><td>Duration</td><td>Short-term</td><td>1</td><td>Short-term</td><td>1</td></tr>
<tr><td>Consequence</td><td>Very Low</td><td>4</td><td>Very Low</td><td>3</td></tr>
<tr><td>Probability</td><td colspan="2">Probable</td><td colspan="2">Possible</td></tr>
<tr><td>Significance</td><td colspan="2">Very Low</td><td colspan="2">Very Low</td></tr>
<tr><td colspan="6">Comparison to Original EIS: No change.</td></tr>
</table>

Impact: Increase in atmospheric concentrations of exhaust gases from vehicle and equipment operation

Impact Assessment

The construction works of the transmission line and substations are projected to occur in mainly scarcely inhabited areas. Nevertheless, in the locations where several construction activities may occur at the same time, such as is the case of the future substation location, a slight increase of atmospheric pollutant concentrations may occur.

It is estimated, conservatively, that several hundred litres of gasoline and diesel fuel will be required on a monthly basis to operate all the required construction machinery and vehicles. The construction machinery and vehicles associated will then inevitably emit pollutant gases due to the exhaust gases releases from the internal combustion engines operation. These pollutant gases will include CO, NOx (NO e NO2), SO2, VOCs and particulates, among other residual pollutants, such as heavy metals, aldehydes and other minor organic compounds.

It will be expected a release of combustion gases from construction equipment such as cranes, generators, concrete mixers, and light and heavy vehicles as well. Other important gas emissions source is to be associated with the construction traffic over local roads during material and equipment transport activities. For reference purposes, the table below lists typical emission factors of common construction equipment.

Table 93: Average air pollutants emission factors of civil works equipment

Equipment	Equipment Horsepower	Load Factor	CO	VOC	NOX	SOX	PM10
	(BHP)	(%)	(g/hr)	(g/hr)	(g/hr)	(g/hr)	(g/hr)
Air Compressor	37	48	88,5	16,3	145,2	16,3	8,2
Backhoe	79	47	249,9	49,9	366,5	33,1	16,8
Compactor	99	58	180,5	51,7	516,7	51,7	25,9
Concrete Mixer	11	56	28,1	5,4	67,1	5,4	2,7
Crane	194	43	340,7	113,4	870,5	75,8	56,7
Dozer	103	59	303	54,9	633,2	54,9	27,7
Front End Loader	147	47	341,1	62,1	713,1	62,1	30,8
Gas Welding Machine	19	51	6501	237,2	8,6	2,7	0,9
Generator	22	74	81,2	15	132,9	15	7,3
Grader	157	58	326,6	122,5	857,8	81,6	40,8
Hand Vibrator Plate	8	43	3183,4	1399,8	0,9	0,9	13,2
Pile Hammer	161	62	905,4	135,6	1086,8	90,7	68
Roller	99	58	180,5	51,7	516,7	51,7	25,9
Rubber Tire Loader	147	54	396	72,1	828,3	72,1	54
Scraper	267	66	878,6	79,8	1517,3	159,7	119,8
Truck Mounted Vertical Drill	209	75	1422	213,2	1706,4	142,4	106,6
Vibrator /compactor	99	58	180,5	51,7	516,7	51,7	25,9
Well Driller	209	75	1422	213,2	1706,4	142,4	106,6

Source: South Coast Air Quality Management District CEQA Air Quality Handbook, November 1993, Tables A9-8-B, A9-8-C and A9-8-D, Adapted.

The pollutant gases emissions generated by the construction equipment will be dependent of several variables, such as the maintenance status of that equipment, their technical specifications, the number of hours of operation and the number of equipment working simultaneous in a specific work front. However, considering that the expected number of machines needed in simultaneous operation will not be very high, it is expected that the emissions of SO2, NOx, CO and VOCs will result in a minor increase of the concentration of these pollutants during a limited period. As such, this impact is rated as negative, direct, of short-term duration, local extent and low intensity, probable resulting in a very low significance.

Mitigation Measures

Some good environmental practices during construction activities should still be observed, namely:

- All internal combustion machinery and equipment should be kept in good maintenance conditions, in order to minimize combustion gases exhaust emissions. This should include preventive maintenance of machines, equipment and vehicles and operator training, as well as internal monitoring program of proper maintenance of vehicles.
- Select traffic construction routes that minimize the crossing of residential areas and optimize fuel consumption as much as feasible possible.

- Speed limits should be set for construction heavy vehicles. This speed limit should not exceed 30 km/h when near residential areas.
- Internal combustion equipment should be turned off when not in operation. Avoid maintaining equipment in idle when not being used.

Impact Summary

The table below lists the impact classification regarding exhaust gas emissions from vehicle and equipment operations.

<table>
<tr><td colspan="6">Impact: Increase in atmospheric concentrations of exhaust gases from vehicle and equipment operation</td></tr>
<tr><td>Criteria</td><td colspan="2">Pre-mitigation assessment</td><td>Key Mitigation Measures</td><td colspan="2">Post-mitigation assessment</td></tr>
<tr><td>Nature</td><td colspan="2">Negative</td><td rowspan="8">All internal combustion machinery and equipment should be kept in good maintenance conditions, in order to minimize combustion gases exhaust emissions. This should include preventive maintenance of machines, equipment and vehicles and operator training, as well as internal monitoring program of proper maintenance of vehicles.

Select traffic construction routes that minimize the crossing of residential areas and optimize fuel consumption as much as feasible possible.

Speed limits should be set for construction heavy vehicles. This speed limit should not exceed 30 km/h when near residential areas.

Internal combustion equipment should be turned off when not in operation. Avoid maintaining equipment in idle when not being used.</td><td colspan="2">Negative</td></tr>
<tr><td>Type</td><td colspan="2">Direct</td><td colspan="2">Direct</td></tr>
<tr><td>Extent</td><td>Local</td><td>1</td><td>Local</td><td>1</td></tr>
<tr><td>Intensity</td><td>Low</td><td>1</td><td>Low</td><td>1</td></tr>
<tr><td>Duration</td><td>Short-term</td><td>1</td><td>Short-term</td><td>1</td></tr>
<tr><td>Consequence</td><td>Very low</td><td>3</td><td>Very low</td><td>3</td></tr>
<tr><td>Probability</td><td colspan="2">Probable</td><td colspan="2">Possible</td></tr>
<tr><td>Significance</td><td colspan="2">Very Low</td><td colspan="2">Very Low</td></tr>
<tr><td colspan="6">Comparison to Original EIS: No change.</td></tr>
</table>

7.3.2. Operational Phase

During the operational phase of the project, no significant atmospheric emissions are expected. Maintenance activities, and in particular the continued vegetation control along the RoW, will result in some dust emissions and gaseous emissions, due to fuel consumption of the heavy-duty equipment and vehicles used for those maintenance operations.

However, vehicle emissions associated with maintenance activities are expected to be intermittent and of low intensity. As such, atmospheric emissions during the operational phase can be considered to be insignificant, with negligible air quality impacts.

7.4. Noise

7.4.1. Construction phase

Impact-generating activities

The construction phase of this project will include a wide range of civil works necessary for the establishment of the projected access roads, substations construction, and overhead towers erection along the Power Evacuation Line route. Key activities involved in the construction phase include:

- Site preparation - Site preparations will include vegetation clearance where the line passes over or close to trees which could infringe safe clearances, verification of local utilities and underground services, geotechnical and ecological surveys as necessary. Intrusive works will be undertaken in accordance with archaeological chance find procedures.
- Site Enabling Works - Vehicle access to each tower site is required either via direct access road or along the right of way. Where ground conditions prevent normal access, it will be necessary to construct a temporary access road.
- Civil Works - Tower foundations are constructed first, either four or one foundations per tower depending on the final tower design. The foundations are mechanically excavated and filled with concrete. Piled foundations may be required in some areas where ground conditions are unstable. The dimensions of the excavation will differ depending on the type of tower to be installed. Concrete would be delivered by ready mixed concrete truck from batching plants strategically located along the route.
- Steel Erection - Steelwork sections for the towers will be delivered by road using a 4 x 4 lorry. The assembly of each tower at ground level would proceed as far as possible until the utilisation of a crane becomes necessary to enable the higher sections of the tower to be completed. It is normal practice to use cranes to erect steelwork, subject to good access being available. Where terrain is difficult and to minimise disturbance, steelwork may be delivered by helicopter.
- Conductor Stringing - Stringing is undertaken using a winch to pull the conductor along the towers and a 'tensioner' at the other end to keep the conductor above the ground.
- Testing of Equipment - Overhead line components including conductors, insulators, towers, joints and fittings are designed and tested to prove compliance with structural, mechanical and electrical requirements.

Other construction activities associated with this phase shall include:

- Setting up of the site camp, namely the temporary workers' accommodation, access roads construction and mobilisation of machines, equipment materials and auxiliary structures;
- Development of right of way (ROW);
- New permanent access/ maintenance roads from existing roads to the line;
- Construction of temporary access roads;
- Permanent trackway underneath the right of way.
- Development or use of borrow pits to provide aggregate and inert materials.
- Temporary storage sites at strategic locations along the route for storage of key plant equipment before delivery to worksite.

Impact Assessment

Impact: Increase of noise levels near sensitive receptors during construction

During the construction phase of the transmission line, noise will be mainly generated by the operation of heavy machinery (vehicles and machinery) to be deployed in each specific work front as detailed bellow. Typical construction equipment may include bucket trucks, cranes or digger derricks, backhoes, pulling machines, pole trailers, or dumpsters. Ground works should involve the use of excavators, front-end loaders, rippers, dozers, graders, rollers and water trucks. Heavy-duty trucks are expected to be used to haul away material that can't be stockpiled or disposed on-site and to bring in necessary construction materials.

The main construction activities likely to generate relevant noise emissions will include:

- Access roads opening – noise emissions associated with the new access opening and road construction are to be expected. Land preparation and vegetation's clearing (site enabling), machinery operations and transportation activities are due to generate intermittent noise. Sub base works, surface works, are predicted to generate the highest precepted noise levels at a given receptor located as far as 200m from the project site;
- Clearance of Right-of-Way (RoW) – vegetation in the RoW will be mowed or cut using adequate equipment like mowers and/or chainsaws.
- Erection of transmission towers – transmission towers are constructed by first using a standard drill rig to bore a hole to the required depth. Concrete trucks carry concrete to the boreholes to construct the tower's foundations. Cranes then erect the towers on the foundations. Finally, the wire is strung between towers using large pulleys.
- Development or use of borrow pits to provide aggregate for road building - Noise is generated from heavy machinery operation, from blasting, drilling and due to the associated heavy traffic movement to a from the borrow pits. Crushing operations at site are other potential source of significant noise. This noise can be mitigated by limiting the hours of operation, enforcing strict maintenance of equipment and using quieter equipment as further mentioned below.
- Movement and operation of vehicles and machinery – the movement of vehicles and machinery operation will be also an expected temporary noise source. The truck journeys associated with the overhead installation and other equipment's to be deployed may also result in temporary noise emissions.

All these construction activities and equipment operation will result in temporary noise emissions with potential annoyances to community where the construction activities take place in the vicinity human settlements. Of the construction activities with the potential to generate impacts on ambient noise, some are clearly noisier, such as the earthworks. Other activities, such as transportation of materials and the movement of heavy vehicles from the yards to the work fronts and back, will still generate noise, but of lower levels.

It is also worth noting that some activities are very limited in time and space (such as the earth works) while others will be more continuous (such as the movement of machinery and vehicle activity during the construction period). The latter, however, will not generate very high average levels of noise.

The dispersion of the sound energy from the construction activities with distance is done in a spherical geometry. Noisy equipment emits spherical sound waves, for which the decay of sound energy is inversely proportional to the square of the distance, that is to say, it decreases in 6 dB for each doubling of distance, as per the equation presented in the equation below.

$$L_{p2} = L_{p1} - 20\log\left(\frac{r_2}{r_1}\right)$$

To this attenuation effect with distance, other sound attenuation effects must be added, such as the ground attenuation of the terrain, atmospheric attenuation and the effect of the dominant winds or other effects resulting from temperature variations or atmospheric turbulence.

It should also be noted that the sound levels generated by the construction activities will depend on several other factors, such as the type and number of equipment mobilized for a construction work, the duration of their operation and the topography of the surrounding terrain. These factors could contribute to an increase or to an attenuation of the noise levels that may be felt at the sensitive receptors closer to a work front.

Given all these changing variables, the noise levels generated by the construction phase are not easily quantified, since they are subject to high variability and randomness. As such, the noise impacts of construction activities are usually assessed in a qualitative way. Nevertheless, Table 91 lists the average noise levels perceived at varying distances from typical construction equipment, like the ones required for the transmission line deployment, access roads opening, camp site construction.

Table 94: Typical sound levels at several distances from civil works equipment in dB(A)

Equipment	**Distance to noise source**					
	15 m	**30 m**	**60 m**	**120 m**	**250 m**	**500 m**
Excavators	85	81	75	67	< 58	< 52
Heavy trucks	82	78	72	64	< 55	< 49
Generators	77	73	67	59	< 50	< 44
Compressors	80	76	70	62	< 53	< 47

Source: Geosolve & Certiprojecto (2009).

The table above shows that excavators and heavy trucks generate LAeq sound levels of respectively 81 dB(A) and 78 dBA(A) at a distance of 30 m. These levels decrease to 75 and 72 dB(A) at 60 m, and to 67 and 64 dB(A) at 120 m. Note that these levels refer to sound propagation in free space, i.e., without the consideration of obstacles to sound propagation, and to a continuous operation at full power, in what regards fixed equipment, or to the recorded level when the vehicle passes by at the indicated distance, in what regard mobile machinery. However, as previously noted, normal construction activities do not usually present a continuous operation regime.

It will be expected that the generated noise will be confined to the local surrounding and the impact will be of short-term duration. The potential changes in sound quality over local roads resulting from the increased vehicle traffic during construction are not expected to be significant.

The non-mitigated noise impact is rated as being negative, direct, of short-term duration, local extent and medium to high intensity (depending on the relative proximity of sensitive receptors to the work sites), resulting in a low significance.

Mitigation Measures

Despite the expected low significance of the noise impacts, some sensitive receptors may experience annoyance effects, due to the construction noise. Best practice construction measures are therefore recommended, to efficiently reduce the potential nuisance effects caused by noise on nearby receptors. The proposed mitigation is mostly the application of good environmental management practices, of standard application to any major civil construction works such as:

- Vegetation clearing and earthworks should be minimized as much as possible and limited to the strictly needed areas.
- Operate earth moving equipment within specifications and capacity of its manufacturer (e.g., ensure machines are not overloaded).
- Circulation of construction heavy vehicles should be limited to pre-approved construction routes. These will be defined in order to avoid crossing residential areas, schools, hospitals, cultural heritage and religious facilities, whenever feasible.
- Speed limits for construction heavy vehicles should not exceed 30 km/h in critical segments, such as when near residential areas.
- Construction activities, in particular the noisier ones, should whenever possible be limited to the daytime period (between 07:00 and 22:00) during weekdays, avoiding working during the night-time and on weekends.
- The EPC Contractor should avoid, whenever possible, placing fixed equipment (such as cranes or compressors) in proximity to sensitive receptors.
- Perform regular maintenance of all equipment as per manufacturer specifications.
- Inhabitants of local communities nearby the construction locations should be previously informed by The EPC Contractor regarding the upcoming construction activities, including information on the planned start of activities, their nature and duration. This communication should also include information regarding the project nature and goals as per the Project Stakeholder Engagement Plan.
- Grievance redress mechanisms should be implemented during construction phase.

Impact Summary

Assuming the application of the proper mitigation measures, as stated above, the impact generated by the potential changes in ambient sound pressure levels is expected to be of very low significance. The residual noise impact is rated as being negative, direct, of short-term duration, local extent and medium intensity, resulting in a very low significance.

<table>
<tr><td colspan="6">Impact: Increase of noise levels near sensitive receptors during construction</td></tr>
<tr><td>Criteria</td><td colspan="2">Pre-mitigation assessment</td><td>Key Mitigation Measures</td><td colspan="2">Post-mitigation assessment</td></tr>
<tr><td>Nature</td><td colspan="2">Negative</td><td rowspan="8">Vegetation clearing and earthworks should be minimized as much as possible and limited to the strictly needed areas.

Operate earth moving equipment within specifications and capacity of its manufacturer (e.g., ensure machines are not overloaded).

Circulation of construction heavy vehicles should be limited to pre-approved construction routes. These will be defined in order to avoid crossing residential areas, schools, hospitals, cultural heritage and religious facilities, whenever feasible.

Speed limits for construction heavy vehicles should not exceed 30 km/h in critical segments, such as when near residential areas.

Construction activities, in particular the noisier ones, should whenever possible be limited to the daytime period (between 07:00 and 22:00)</td><td colspan="2">Negative</td></tr>
<tr><td>Type</td><td colspan="2">Direct</td><td colspan="2">Direct</td></tr>
<tr><td>Extent</td><td>Local</td><td>1</td><td>Local</td><td>1</td></tr>
<tr><td>Intensity</td><td>Medium/High</td><td>3</td><td>Medium</td><td>2</td></tr>
<tr><td>Duration</td><td>Short-term</td><td>1</td><td>Short-term</td><td>1</td></tr>
<tr><td>Consequence</td><td>Low</td><td>5</td><td>Very Low</td><td>4</td></tr>
<tr><td>Probability</td><td colspan="2">Probable</td><td colspan="2">Probable</td></tr>
<tr><td>Significance</td><td colspan="2">Low</td><td colspan="2">Very Low</td></tr>
</table>

Impact: Increase of noise levels near sensitive receptors during construction			
Criteria	Pre-mitigation assessment	Key Mitigation Measures	Post-mitigation assessment
		during weekdays, avoiding working during the night-time and on weekends. The EPC Contractor should avoid, whenever possible, placing fixed equipment (such as cranes or compressors) in proximity to sensitive receptors. Perform regular maintenance of all equipment as per manufacturer specifications. Inhabitants of local communities nearby the construction locations should be previously informed by The EPC Contractor regarding the upcoming construction activities, including information on the planned start of activities, their nature and duration. This communication should also include information regarding the project nature and goals as per the Project Stakeholder Engagement Plan. Grievance redress mechanisms should be implemented during construction phase.	
Comparison to Original EIS: No change.			

7.4.2. Operational phase

Impact-generating activities

During the operational phase of the project different types of noise can be produced, namely by:

- wind induced noise due to certain wind conditions acting over the transmission line components;
- noise emissions due to the corona effect occurring in the transmission cables under specific meteorological conditions; and
- induced traffic and noise during maintenance activities to be performed in the right of way of the power evacuation line

Of these noise sources, only the wind induced noises are considered as potentially significant for this project, as further discussed below.

High voltage transmission lines use conductors exposed to the atmospheric conditions. In certain conditions, such as rain and fog, when very high voltage values pass through the transmission lines conductors there's some current leakage to the air. The air, which when dry is a perfect insulator but when moist becomes a conductor itself, is then ionized. In this situation, the electric field turns higher, and it begin to appear a bright, effluvia producing a light crackle, where there are sharp edges or protrusions. From a given tension value, and when observed in the darkness, all the driver appears surrounded by a bluish light halo, which produces noise. This phenomenon is called the corona effect or corona discharge. Specific weather conditions such as rainfall or high relative humidity are likely to lead to significant variations in the intensity of the "corona discharge", but only in high voltage lines (typically as those rated above 220 kV). As the power evacuation line under evaluation is rated as 66kV noise generation due to corona effect is not likely to occur and therefore no annoyance over the populations residing in the vicinity of the transmission line is to be expected.

Operation maintenance activities will comprise the use of 4X4 vehicles and the use of occasional heavy vehicles responsible to perform vegetation control along the corridor. These vehicles will generate noise emissions, but these will be intermittent and sporadic in nature. The associated noise impact can be considered as being insignificant.

Impact Assessment

Impact: Wind-induced noise

Wind-generated noise over an overhead transmission line occurs during certain wind conditions, when wind interacts with certain components of the power transmission line (such as the supports, insulators, conductors or signalization spheres) in such a way that noise is generated. Aerodynamic forces acting on the transmission line, such as turbulent airflow and vortex shedding are one of the main sources of noise as these can create a whistling or humming noise, particularly at high wind speeds. Other common cause is the mechanical vibrations of the transmission line towers and cables, which can create noise as well.

Wind-generated noise does not depend only on the level of tension, but rather on the speed and direction of the wind, in which the different components of the line give rise to different types of noise (conductors, insulators and signalization spheres) (Union of The Electricity Industry, 2003).

Wind noise generation from high-voltage line is unusual, since the conditions under which the noise occurs are very specific, occurring only for relatively high wind speeds. Even under those conditions, the generated noise levels is rated low (that is, barely perceptible to the human ear) and rarely noticeable.

Noise generated from insulators or signalization spheres may be perceptible but will occur only under special conditions of high wind speeds (above 10 m/s), when its direction focuses on certain angles of incidence, and only to some types of insulators applied in high voltage lines.

Location signalization spheres (when installed in on top of the cable lines) for daytime aeronautic signalling may act as a source of noise.

Power transmission line induced wind noise is difficult to predict, occurring very rarely and depending on the speed of the wind. This type of induced noise is also more frequent if the conductor mounting equipment is loosened or has loosened slightly over the years. This is a maintenance issue that can be easily identified and repaired if necessary.

In the project’s region the annual frequency of high-speed winds can be considered as uncommon, reason to infer that impacts generated by the wind acting over the transmission line components can be considered as negative, direct, of long-term duration but of intermittent character, low intensity, with a low probability of occurrence leading to an impact with a low significance.

Mitigation Measures

Regular maintenance of the transmission line such as cleaning and replacing damaged components will reduce the probability of wind-generated noise.

Impact Summary

The impact summary is provided in the following table. Regular maintenance should lower the probability of the impact occurring, reducing the residual significance to very low.

Impact: Wind-induced noise					
Criteria	Pre-mitigation assessment		Key Mitigation Measures	Post-mitigation assessment	
Nature	Negative		Regular maintenance of the transmission line such as cleaning and replacing damaged components will reduce the probability of wind-generated noise.	Negative	
Type	Direct			Direct	
Extent	Local	1		Local	1
Intensity	Low	1		Low	1
Duration	Long Term	3		Long Term	3
Consequence	Low	5		Low	5
Probability	Probable			Possible	
Significance	Low			Very Low	
Comparison to Original EIS: No change.					

7.5. Geology

7.5.1. Construction and operation phases

Impact-generating activities

This section discusses potential impacts on Geology during construction and operation of the powerline and associated mitigation measures to be adopted. Following the EIA approach, the assessment is of the impact of the Project on geology rather than vice versa. There are numerous impacts of the geology and seismicity on the Project but typically these are technical constraints to the design and construction methodology which are addressed through the design process.

In terms of geology, the most important impact is the stability condition of slopes. Many aspects of the Project construction have the potential to directly impact the stability of slopes. There are secondary impacts because of the slope instability, for example: river ecology as a result of increased sediment load into the river; property damaged as a result of landslide; and local agriculture through loss of land following landslide.

Activities that can lead to potential geology impacts include excavations and site vegetation clearance (construction camp, along the RoW, towers foundations and clear storage areas) and creation of new access roads, which could lead to a reduction of slope stability and increased erosion on slopes in the project area.

The assessment of the potential impacts of these activities is provided below. There are no known positive impacts relating to the geology environment and the impacts are dominantly related to the construction phase.

Impact: Potential slope instability

Impact Assessment

The stability of a slope is determined by the balance between the forces that tend to destabilize it (such as gravity, erosion, and seismic activity) and the forces that tend to stabilize it (such as the strength and cohesion of the soil or rock). There are several factors that can contribute to instability in slopes and are summarized in the following table. These factors can act alone or in combination to cause instability in slopes.

Table 95: Causes of slope instability

Geology and soil properties	Description
Slope angle and height	The geology of a slope and the properties of its soil or rock are key factors in slope stability. Some types of rock or soil are inherently unstable and prone to sliding or slumping. The steeper the slope and the higher it is, the greater the force of gravity acting on it, making it more susceptible to instability.
Water	Water is a major factor in slope instability. It can saturate the soil and reduce its strength, or it can infiltrate the soil and create hydraulic pressure that can cause landslides
Vegetation	The presence or absence of vegetation can also affect slope stability. Vegetation can help stabilize slopes by holding soil in place and absorbing water, but it can also make slopes more prone to landslides by adding weight and reducing soil strength.
Earthquakes and other seismic activity:	Seismic activity can trigger landslides by causing the soil to liquefy or by shaking the slope, causing it to fail.
Human activity	Human activities such as excavation, construction, and mining can destabilize slopes by altering the slope's geometry or drainage patterns, or by weakening the soil or rock through blasting or other activities.

Rhyolitic ash-flow tuffs and ignimbrites are volcanic rocks (that occur in the initial area of the route with more rigorous relief - steeper slopes) that are typically highly consolidated and have a high strength, which generally makes them less prone to landslides compared to unconsolidated sediments. However, landslides can still occur in these rocks if they are weakened by fractures or faults, or if there is significant alteration or weathering that has reduced their strength.

In addition, the presence of steep slopes or cliffs at the beginning of the route can increase the likelihood of landslides in these types of rocks, particularly if there is a high amount of precipitation or seismic activity in the area. Therefore, it is always important to assess the specific geological and environmental conditions of a particular area before making any conclusions about its susceptibility to landslides, even in rocks that are generally considered to be stable.

Vegetation clearance will take place in all construction affected areas (including the RoW). The removal of vegetation will leave soils exposed to erosion as well as reducing slope stability - vegetation acts to bind soil and reduce pore water pressures.

Excavations will be required at all tower locations and may be required for road cuts (new access roads) as well as for temporary works such as quarrying. Excavation activities may result in two impacts - the first, is the case where excavations involve unloading the toe of natural slopes resulting in the potential for movement/failure of those slopes; the second, are impacts associated with the creation of steep temporary cut slopes associated with various construction activities.

However, the natural slopes in the study area are generally of a shallow gradient and stable. In general, the potential for natural slope instability is very low to low. Note that in terms of natural slope stability, landslides are natural events which may occur independently of the Project construction and operational phases.

Mitigation Measures

Sufficient geological-geotechnical evaluation will be undertaken such that the structures can be designed for their suitability to the terrain. This will include consideration of soil erosion and landslide.

Any drainage systems provided for the Project must be sufficient to ensure effective surface water drainage, maintaining the stability of the slopes and not causing erosion.

Conduct regular inspection and maintenance of any drainage system provided by the Project.

Impact Summary

The table below summarizes the impact assessment.

Impact: Potential slope instability					
Criteria	Pre-mitigation assessment		Key Mitigation Measures	Post-mitigation assessment	
Nature	Negative		Sufficent geological-geotechnical evaluation will be undertaken such that the structures can be designed for their suitability to the terrain. This will include consideration of soil errosion and landslide. Any drainage systems provided for the Project must be sufficient to ensure effective surface water drainage, maintaining the stability of the slopes and not causing erosion. Conduct regular inspection and maintenance of any drainage system provided by the Project.	Negative	
Type	Direct			Direct	
Extent	Local	1		Local	1
Intensity	Medium	2		Low	1
Duration	Medium-term	2		Short-term	1
Consequence	Low	5		Very low	3
Probability	Possible			Improbable	
Significance	Very Low			Insignificant	
Comparison to Original EIS: No change.					

Impact: Adverse effects on geological heritage or mineral resources

Impact Assessment

No sites of importance relating to geological heritage or geomorphology have been identified within the ROW. Impacts on geology and geomorphology are expected to be very limited, as no significant earthmoving activities is currently expected to be necessary during construction of the proposed powerline. However, geology and topography will affect the transmission line in terms of engineering, construction costs, and accessibility. It is assumed that a detailed geotechnical assessment or survey will be required. Also, it will be important to confirm the geological and soil conditions during the detailed design for the towers, particularly on steeper terrain close to rivers and streams.

Regarding the mineral resources, Mozambique has a wide range of geological resources which are at various stages of identification and development. While some deposits have been identified and being extracted, others have only recently been discovered and have yet to be developed. Others have yet to be discovered.

In general, powerline routes should seek to avoid sterilising known mineral or aggregate reserves which are currently being exploited (like Boane deposit or bentonite quarries), or could potentially be, at some point in the future. Impacts to mineral resources could be significant if the mineral resources of economic value to the region and the residents of the district/province are lost or made inaccessible for future use.

As mentioned in the baseline chapter, the transmission line crosses one concession area for Bentonite Prospection and Research and three Mining Concessions (for bentonite and rhyolite extraction). The concessionary companies should be consulted.

Mitigation Measures

Consult with the mining concession companies which the ROW crosses to determine any concerns that they have and identify any additional mitigation measures required.

Impact Summary

The table below summarizes the impact assessment.

Impact: Adverse effects on geological heritage or mineral resources					
Criteria	Pre-mitigation assessment		Key Mitigation Measures	Post-mitigation assessment	
Nature	Negative		Consult with the mining concession companies which the ROW crosses to determine any concerns that they have and identify any additional mitigation measures required	Negative	
Type	Direct			Direct	
Extent	Local	1		Local	1
Intensity	High	3		Low	1
Duration	Long-term	3		Short-term	1
Consequence	High	7		Very low	3
Probability	Probable			Improbable	
Significance	High			Insignificant	
Comparison to Original EIS: No change.					

Impact: Changes in erosion, transport and sedimentation processes

Impact Assessment

The implementation of overhead transmission lines can cause changes in erosion, transport, and sedimentation processes in several ways.

Table 96: Causes of changes in erosion, transport, and sedimentation processes

Aspect	Description
Clearing of vegetation	To construct energy transmission lines, vegetation such as trees and bushes must be cleared. Vegetation plays a crucial role in reducing soil erosion and controlling sedimentation. When it is cleared, the soil is exposed to the elements, increasing the potential for erosion.
Soil compaction	The construction process of energy transmission lines can result in soil compaction. Compacted soils have a lower infiltration rate, which can lead to increased surface runoff and erosion. Additionally, compacted soils may not support vegetation as effectively, further exacerbating erosion and sedimentation issues.
Alteration of drainage patterns	Changes to natural drainage patterns can lead to increased runoff and erosion, especially in areas prone to flash flooding.
Increased runoff	Energy transmission lines often require the construction of access roads and other infrastructure. This can increase the amount of impervious surfaces in the area, leading to increased runoff during precipitation events. Increased runoff can result in erosion and sedimentation issues downstream.
Sedimentation in water bodies	The installation of energy transmission lines may require the crossing of water bodies such as rivers or streams. During construction, sediment may be disturbed and carried downstream, leading to increased sedimentation in the water body. This can harm aquatic habitats and reduce water quality.

Overall, the implementation of energy transmission lines can cause changes in erosion, transport, and sedimentation processes. These changes can negatively impact the environment and surrounding communities.

Mitigation Measures

Implementation of an Erosion and Sedimentation Management Program – See EMP.

Unused soil remaining after backfilling of tower foundation sites shall be disposed near the tower foot, levelled and vegetated.

All towers will be located at least 30 m from the nearest water source to avoid polluting the waters and to reduce the flow of sediments.

Impact Summary

The table below summarizes the impact assessment.

Impact: Changes in erosion, transport and sedimentation processes					
Criteria	Pre-mitigation assessment		Key Mitigation Measures	Post-mitigation assessment	
Nature	Negative		Implementation of an Erosion and Sedimentation Management Program – See EMP. Unused soil remaining after backfilling of tower foundation sites shall be disposed near the tower foot, levelled and vegetated.	Negative	
Type	Direct			Direct	
Extent	Regional	2		Local	1
Intensity	Low	1		Low	1
Duration	Medium-term	2		Short-term	1
Consequence	Low	5		Very low	3

Impact: Changes in erosion, transport and sedimentation processes			
Criteria	Pre-mitigation assessment	Key Mitigation Measures	Post-mitigation assessment
Probability	Probable	All towers will be located at least 30 m from the nearest water source to avoid polluting the waters and to reduce the flow of sediments.	Improbable
Significance	Low		Insignificant
Comparison to Original EIS: No change.			

7.6. Soils

7.6.1. Construction phase

Impact-generating activities

The disturbance of soil and land resources during development or other land use activities has the potential for major impacts on the quality of our environment. Soil erosion, stream sedimentation, mass movement, soil pollution and altered hydrological regimes are just some of the associated environmental problems. Fortunately, there has been an increased awareness of the potential impacts on soil and land resources and a greater commitment to overcome them in recent years. There is, however, still much room for improvement. This section outlines the major environmental impacts and mitigation measures relating to soil.

Electric power transmission lines could have significant impacts on soil resources and land use, namely through the following activities:

- Vegetation clearance: Trees and other vegetation may need to be cleared to create space for the transmission line (RoW). This activity can impact the soil's ability to retain moisture, leading to increased erosion;
- Land modelling / Soil stabilization: The transmission line's foundation may need to be stabilized with concrete or other materials to prevent erosion and ensure stability. This activity can alter the soil's physical and chemical properties, potentially affecting its ability to support vegetation.
- Waste generation and handling of hazardous substances: inadequate management or handling of wastes and hazardous substances could lead to accidental spills or leaks, with potential contamination of soils.
- Movement and operation of vehicles, machinery, and equipment: Access roads may need to be constructed to facilitate the transportation of materials and equipment, and excavation required to install the foundations for the towers are the main activities likely cause significant soil disturbance, including soil compaction, loss of topsoil, and changes to soil structure. This can have a significant impact on the soil's ability to support vegetation, leading to changes in land use. Foundations will be dug up to variable depths depending on the tower type and soil characteristics.

The potential effects of these impacts and their significance within the study area are described below.

Impact: Impacts on irrigation lands and on soils with suitability for irrigation

Impact Assessment

The potential impacts are related to the construction activities and the defined location for the placement of the towers (the impact extends to the operation phase). However, at the present stage of the Project, the site of the towers has yet to be defined, so their consideration in irrigated areas or soils suitable for irrigation cannot be assessed in detail. Nevertheless, there is expected to be some destruction of farmland. The Project should repair much of the damage that can occur during construction and provide compensation for damage that cannot be easily fixed.

Overall, the construction of the powerline can have significant impacts on irrigation lands and soils with suitability for irrigation. Proper planning and mitigation measures can help minimize these impacts, but careful consideration should be given to the potential impacts before the definition of the sites for the towers and access roads. Some of the potential impacts include:

- Soil compaction and erosion: The construction of transmission lines involves heavy equipment, which can cause soil compaction and erosion, reducing the soil's ability to absorb and retain water. This can impact the productivity of irrigated lands and affect the suitability of soil for irrigation.
- Soil contamination: During the construction process, hazardous materials and chemicals may be released into the soil, contaminating the irrigation lands and soils with suitability for irrigation. This can harm crops and affect soil fertility, leading to decreased yields.
- Alteration of soil structure: The installation of transmission towers and associated infrastructure can alter the soil structure, affecting water infiltration and drainage, and reducing soil fertility.
- Loss of productive land: The construction of transmission lines may require the permanent occupation of land, resulting in the loss of productive irrigated land. This can impact local agricultural production, food security, and economic development.
- Interference with irrigation infrastructure: The installation of transmission lines may require the relocation or modification of existing irrigation infrastructure, such as canals or pipelines, resulting in additional costs and potential impacts on water availability and irrigation efficiency.

The following figure presents the cartography of the significant infrastructure irrigated areas dependent on water from the Limpopo Dam. The powerline ROW does not intercept these irrigated lands.

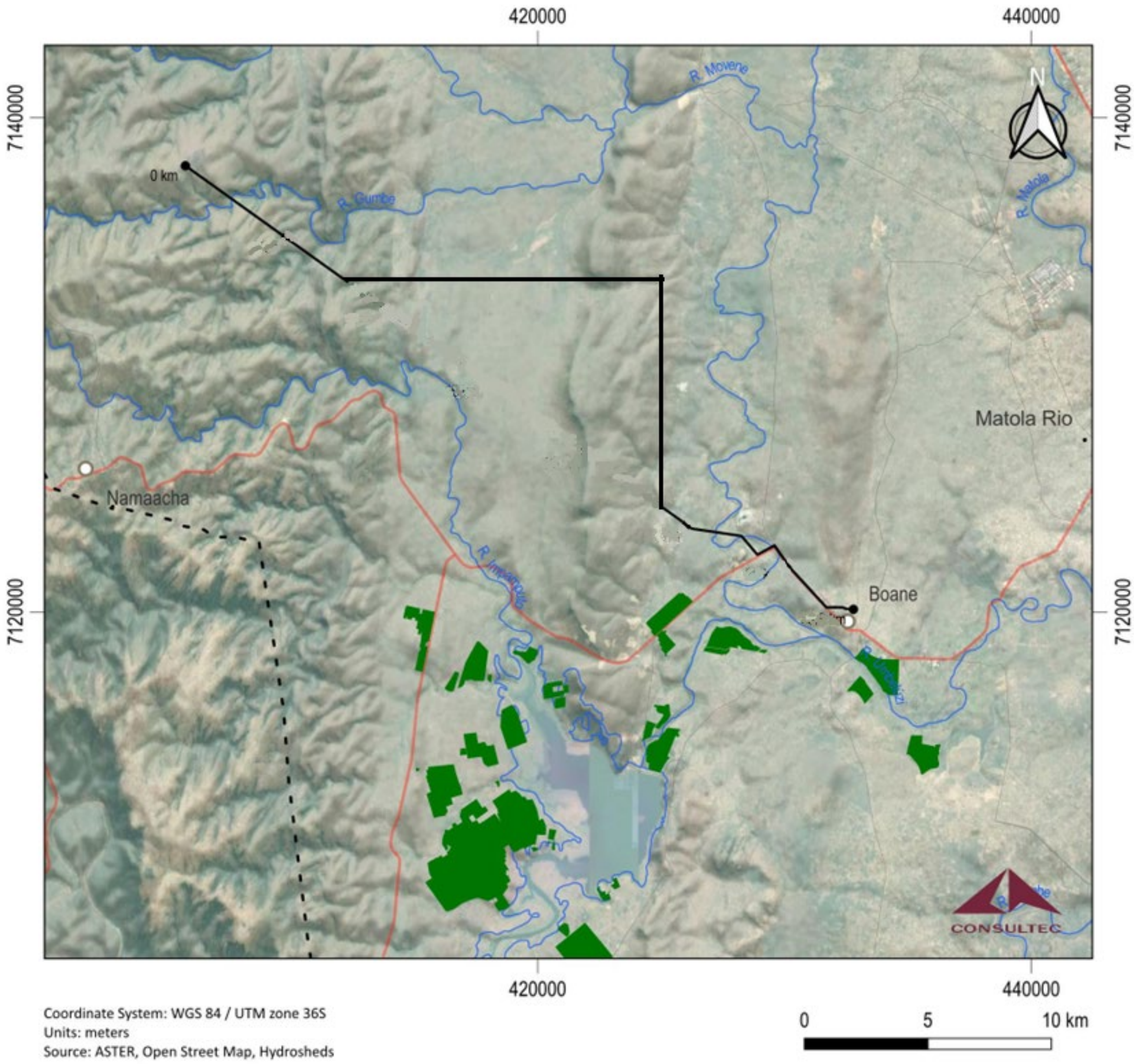


Figure 143: Irrigated and infrastructure areas

Selecting a site for the towers of high-voltage power lines requires a comprehensive assessment of technical, environmental, social, and economic factors to ensure that the site is suitable for the purpose and will provide reliable and safe power transmission. Choosing a site to implement the towers of high-voltage power lines involves several criteria, including:

Table 97: Criteria for choosing the location of the high-voltage line towers

Aspect	Description
Topography and terrain	The site's topography and terrain must be suitable for constructing the high-voltage power line towers. The land must be stable and level to ensure that the towers can be erected securely.
Accessibility	The site must be easily accessible to enable construction equipment and materials to be transported to the site. The access roads must be adequate to support the heavy equipment that will be required for construction and maintenance.
Availability of resources	The site must have access to the resources required for construction, such as concrete, steel, and electricity. Additionally, the site must have adequate water supply to support construction and operation.
Safety considerations	The site must be evaluated for safety concerns, including risks associated with natural disasters, such as hurricanes, tornadoes, and earthquakes. The towers must be designed to withstand high winds and other severe weather conditions.

Land use	The site's land use must be evaluated, including the potential for conflicts with existing infrastructure, such as roads, railroads, and buildings. Additionally, the site's proximity to residential areas must be evaluated to avoid negative impacts on local communities. The irrigated and infrastructure lands must be avoided.

The extent of the impact is local. The impact duration is long term. The intensity can be considered as moderate, which results in a medium consequence. However, the occurrence of this impact is possible, but not probable. The impact is thus rated as of low significance.

Mitigation Measures

Prioritize the use of existing tracks to access work sites. Restrict transportation to the identified access by clearly marking out the limit of the RoW and access roads.

Limit the clearing of vegetation to strictly required areas.

Conducting regular meetings or workshops with farmers to discuss their upcoming field activities and understand their specific needs regarding powerline construction. This will allow for proactive planning and coordination between the powerline project team and farmers, minimizing disruptions.

Impact Summary

The impact summary is provided in the table below. The application of the proposed mitigation measures limits the intensity of the impact to low and keeps he duration globally of short-term. Furthermore, it becomes improbable, thus post-mitigation assessment is insignificant.

Impact: Impacts on irrigation lands and on soils with suitability for irrigation					
Criteria	Pre-mitigation assessment		Key Mitigation Measures	Post-mitigation assessment	
Nature	Negative		Prioritize the use of existing tracks to access work sites. Restrict transportation to the identified access by clearly marking out the limit of the RoW and access roads. Limit the clearing of vegetation to strictly required areas. Conducting regular meetings or workshops with farmers to discuss their upcoming field activities and understand their specific needs regarding powerline construction. This will allow for proactive planning and coordination between the powerline project team and farmers, minimizing disruptions.	Negative	
Type	Direct			Direct	
Extent	Local	1		Local	1
Intensity	Medium	2		Low	1
Duration	Long term	3		Short-term	1
Consequence	Medium	6		Very Low	3
Probability	Possible			Improbable	
Significance	Low			Insignificant	
Comparison to Original EIS: No change.					

Impact: Increased soil erosion and compaction

Impact Assessment

Soil erosion and the consequent sediment transport are caused by the action of water, wind or gravity on exposed soil. The process involves the detachment of particles from the soil surface due to the force of raindrop impact, flowing water or wind and its subsequent transportation away from the site. These impacts are more likely to occur at the beginning of the route, where the soils have an erosion risk of category 6, with slope being the major contributing factor to erosion hazard. The impacts resulting from soil erosion manifest themselves in various ways.

Impacts at the site of erosion

The most serious impacts are generally the loss of valuable soil, particularly topsoil, which provides the medium for plant growth. This soil loss results in less potential for agriculture, site rehabilitation, re-establishment of native ecosystems. Note that soil erosion can also occur on adjacent lands away from the RoW as a result of increased water runoff. Some of the common characteristics of an area from which soil has been eroded include:

- Loss of topsoil: Erosion can strip away the top layer of fertile soil, leaving behind a thin layer of less productive soil.
- Exposed rocks and subsoil: As the topsoil is removed, rocks and subsoil may become exposed, creating a rocky and barren landscape. This effect may be magnified in the area where lithic rhyolitic soils occur.
- Changes in the landscape: Erosion can alter the landscape, creating gullies, ravines, and other erosion features.
- Reduced plant growth: Without topsoil, plants may struggle to grow and thrive, leading to a reduction in plant cover and biodiversity.
- Increased runoff: With less soil to absorb water, rainfall and runoff may increase, leading to flooding and further erosion.
- Nutrient depletion: As the topsoil is lost, nutrients may be depleted, leading to reduced soil fertility.

Impacts in the transporting waters and air

A serious impact is the reduction in water quality arising from high turbidity; sediment has been described as the world's greatest pollutant of surface waters. Also, depending of the soil quality, contamination of the waters can occur when the eroded soil contains high nutrient levels or hazardous chemicals. These problems result in degradation of the natural aquatic ecosystem and decline in quality of water for human use.

In the case of wind erosion, fine dust can be carried over great distances through the air, resulting in lowered air quality.

Impacts at the site of sediment deposition

The build-up of sediment in sites of deposition is often associated with serious problems. Waterways such as river channels, lakes, estuaries and wetlands may become filled with sediment leading to:

- a smothering of natural aquatic and riparian habitat, eg, sea grass beds or riverbank vegetation.
- increased streambank erosion and channel width, resulting in potential loss of riparian habitat or agricultural land.
- increased flooding due to decreased carrying capacity of waterways; and/or
- damage and a loss in utility assets such as water storage facilities and stormwater channels.

As mentioned in the baseline chapter, the soils present along the ROW are fundamentally (around 90%) clayed and sandy clay loam soils, varying depth with variable presence of silt and clay. Generally, the finer the non-clay fraction, the more erodible the soil, e.g., sand particles are less erodible than silt particles; high clay contents usually mean greater soil cohesion and less erodibility.

Soil mixing, rutting, and compaction are interrelated impacts commonly associated with transmission construction and can greatly affect future crop yields and vegetation regeneration. Soils may be mixed during the excavation of pole foundations or during the undergrounding of electrical lines (the excavation depth for transmission structure foundations can vary greatly).

Excavated parent material or subsoils should not be mixed with topsoil and spread on the surface of the RoW. Significant rutting can occur when soil becomes saturated or in areas of sensitive, which may impact agricultural lands. The degree to which soil is compacted by heavy construction equipment again depends on the type of soil and its saturation level. Ineffective erosion controls may wash valuable topsoil downhill and impact wetlands and waterways. Agricultural soils that have been improperly protected or mitigated may suffer decreased yields for several years after the construction of the transmission line is completed.

Resulting impacts are very low even in the pre-mitigation scenario.

Mitigation Measures

Site clearing and topsoil handling - the clearing and disturbance to existing vegetation should be kept to a minimum. In addition to the immediate benefits in erosion and sediment control, it also provides a source of seed for future regeneration. For parts of the site undergoing greatest disturbance, the stripping and appropriate stockpiling of topsoil should be undertaken; this ensures its preservation for later use. It generally involves separate storage of organic and inorganic soil layers, preferably in low flat mounds. Stockpiles must be adequately protected from wind and water erosion by using of a cover crop or other protection measures where the storage period is significant (normally over 14 days).

To minimize soil compaction during construction in low-lying areas, saturated soils, and/or suitable irrigation soils, low-impact machinery with wide tracks can be used. When construction of the line is complete, the soil in the RoW in fields that were accessed by heavy construction traffic should be checked for compaction with a soil penetrometer and compared to penetrometer readings on soils outside of the RoW, especially in irrigated areas. If compaction within the RoW is detected, appropriate equipment should be used to restore the soil tilth. A soil with good tilth has large pore spaces for adequate air infiltration and water movement. Application of the mitigation measures outlined below such as the decompaction of soils following construction as well as the postponing of construction activities during times when soils are saturated will help reduce associated adverse effects.

Impact Summary

The table below summarizes the impact assessment.

Impact: Increased soil erosion and compaction					
Criteria	Pre-mitigation assessment		Key Mitigation Measures	Post-mitigation assessment	
Nature	Negative		Implementation of an Erosion and Sedimentation Management Program – See EMP.	Negative	
Type	Direct			Direct	
Extent	Local	1	Prioritize the use of existing tracks to access work sites. Restrict transportation to the identified access by clearly marking out the limit of the RoW and access roads;	Local	1
Intensity	Medium	2		Low	1
Duration	Medium-term	2		Short-term	1
Consequence	Low	5	Control the movement of heavy vehicles and equipment over the soil, including restricting movement over non-essential areas;	Very low	3
Probability	Possible			Improbable	
Significance	Very Low		Stockpile topsoil into low, broad mounds and replacing as soon as possible to prevent excessive compaction and help with the retention of soil fauna; Protect temporarily stored soils with a waterproof cover and adequate height to ensure stability; Ensure that all cleared and impacted land is rehabilitated and re-vegetated, as appropriate; Soils excavated for pylon foundations should be used for backfilling excavations and not be left exposed to wind or water for long periods; Implementation, if necessary, of appropriate structural erosion and sediment control measures, e.g., water diversion banks, contour banks, sediment traps and sediment dams.	Insignificant	
Comparison to Original EIS: No change.					

Impact: Potential soil contamination

Impact Assessment

Soil contamination may result from unsound waste management practices. Hazardous waste can be easily ignited, corrosive, reactive, or toxic. They can also have other physical, chemical, or biological characteristics that pose a potential risk to human health or the environment, if improperly managed.

The contamination can result in several problems including:

- human health problems such as poisoning by toxic substances when contact is made with the soil, and the spread of disease by bacteria, viruses and other organisms that have developed in wastewater.
- degradation or prevention of re-establishment of native ecosystems.

- pollution of surface and groundwaters either through the leaching of contaminants by permeating waters or through the erosion and transportation of contaminated soil affecting plant and animal life in the area.
- decline or even a complete loss in agricultural potential, making it more difficult for crops to grow, which can affect food security and the economy.
- decrease in public amenity due to unpleasant odors and increased insect numbers.
- Legal and financial implications: property owners may be liable for the cost of cleaning up contaminated soil on their land, which can be a significant financial burden.
- Prevention of soil contamination requires careful control, collection and disposal of all potentially contaminating materials on a development or operational site. Contractors and sub-contractors will be required to develop and implement waste management plans that comply with relevant waste management guidelines to ensure that various types of waste produced during the construction phase (sanitary, non-hazardous and hazardous) are adequately recovered, stored and disposed of.
- Inadequate handling or management of hazardous substances, or bad maintenance of vehicles and machinery, can also lead to spills or leaks of contaminants, with potential soil contamination.

This impact is pre-mitigation assessed as negative, of local extent, medium intensity (in particular if soils of good agricultural quality are affected) and medium-term duration. It is, however, an impact with a low probability of occurrence (possible), as it will only manifest in the event of accidental spills or if inadequate management of wastes and hazardous substances is verified. Thus, the significance is rated as very low. With the application of the mitigation measures it is possible to reduce the impact with regard to its intensity and duration, also reducing its consequence, resulting in a residual impact rated as insignificant.

Mitigation Measures

Maintain vehicles and equipment to ensure no oil or fuel leakages. If a spill occurs, a spill kit must be used to immediately reduce the potential spread of the spill.

Prohibit the discharge of any type of non-treated residual water in the soil and/or water resources (rivers, streams, springs, lagoons, aquifers, etc.).

Develop a Waste Management Plan (WMP) that is fully aligned with IFC Performance Standard 3 (see EMP, Annex 1). The WMP will define how wastes will be reduced, re-used, collected, managed, recycled and disposed of in an appropriate manner and in accordance with good international practice. The WMP will provide the basis for all the waste management arrangements and act as a central point of reference for how wastes will be managed by the Project. Appropriate disposal routes have already been identified for the whole range of wastes that are likely to be generated by the Project. The WMP will include:

- clear objectives and targets with respect to waste management;
- an analysis of types/quantities of waste that will be produced by the drilling operation and support activities;
- an analysis of potential opportunities to reduce, reuse or recycle waste in accordance with the waste hierarchy (reduction, re-use, recycling, disposal) and a description of how this will be achieved at the Project sites;
- a description of roles, responsibilities and resources to ensure that the objectives and targets are achieved;
- procedures governing the handling, treatment and disposal of all wastes;

- verification procedures for appropriate assessment of contractors and third-party facilities used for waste transport, management and disposal; and
- a comprehensive waste inventory will be prepared detailing information about the types and quantities of each type of waste generated by the Project.

Impact Summary

The table below summarizes the impact assessment.

<table>
<tr><td colspan="6">Impact: Potential soil contamination</td></tr>
<tr><td>Criteria</td><td colspan="2">Pre-mitigation assessment</td><td>Key Mitigation Measures</td><td colspan="2">Post-mitigation assessment</td></tr>
<tr><td>Nature</td><td colspan="2">Negative</td><td rowspan="8">Maintain vehicles and equipment to ensure no oil or fuel leakages. If a spill occurs, a spill kit must be used to immediately reduce the potential spread of the spill.

Prohibit the discharge of any type of non-treated residual water in the soil and/or water resources.

Develop a Waste Management Plan that is fully aligned with the requirements set out in IFC Performance Standard 3 (see EMP).</td><td colspan="2">Negative</td></tr>
<tr><td>Type</td><td colspan="2">Direct</td><td colspan="2">Direct</td></tr>
<tr><td>Extent</td><td>Local</td><td>1</td><td>Local</td><td>1</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>2</td><td>Low</td><td>1</td></tr>
<tr><td>Duration</td><td>Medium-term</td><td>2</td><td>Short-term</td><td>1</td></tr>
<tr><td>Consequence</td><td>Low</td><td>5</td><td>Very low</td><td>3</td></tr>
<tr><td>Probability</td><td colspan="2">Possible</td><td colspan="2">Improbable</td></tr>
<tr><td>Significance</td><td colspan="2">Very Low</td><td colspan="2">Insignificant</td></tr>
<tr><td colspan="6">Comparison to Original EIS: No change.</td></tr>
</table>

7.6.2. Operational phase

During the operation phase, no relevant impacts on soils are expected. As during the construction phase, the risk of soil contamination from accidental oil spills from maintenance vehicles and machinery cannot be completely discarded. Oil spills could result from equipment breakdown and lead to soil contamination in proportion with the magnitude of these accidental events. The application of general mitigation measures and of the waste management plan will help reduce this risk significantly.

7.7. Water Resources

Sustainable management and development of water resources is the foundation of a green economy and essential for inclusive growth. Water resources management underpins and interacts with all the pillars of the economy, including environmental protection, food and energy. An activity associated with a development can impact any of the resource ecosystem drivers (flow regime, water quality, geomorphological) or responses (habitat, biota) and this will have a knock-on effect on potentially all the other drivers and or responses.

The preservation of freshwater ecosystems is fundamental to the concept of sustainable development as they provide services that are crucial for human survival. As well as providing clean water for household use, agriculture and industry, they support fisheries, recycle nutrients, remove waste, replenish groundwater, help prevent soil erosion, and protect against floods. This is particularly the case in Mozambique, as they often depend directly on water and other ecosystem services provided by rivers, lakes and wetlands for their livelihoods.

7.7.1. Construction phase

Impact-generating activities

The construction of the powerline can have several impacts on hydrology, both on surface water and underground water systems:

Surface water runoff: During the construction of a transmission line, vegetation and soil are disturbed, which can increase surface water runoff. This can lead to erosion, sedimentation, and changes in the flow and quality of nearby water bodies.

Alteration of streams and rivers: Transmission line construction may require stream or river crossings, which can alter the course, depth, and flow of these water bodies. This can affect the habitats of aquatic organisms and cause changes to the water quality.

Changes in groundwater recharge: Transmission line construction can result in changes to the amount of water that infiltrates the soil and recharges groundwater. This can lead to changes in the groundwater table and potentially affect the availability of groundwater for wells and other uses.

Soil compaction: The construction of transmission line towers and access roads can result in soil compaction, which can reduce soil permeability and increase surface water runoff. This can also affect the infiltration of water into the ground.

Contamination: Transmission line construction activities may involve the use of chemicals and fuels, which can potentially contaminate surface and groundwater systems if they are not properly handled and disposed of.

The following table summarizes the activities that can generate the impacts summarized above.

Table 98: Sources of impact to hydrology

Construction Phase	
Construction of access roads and tower foundations	Clearance of vegetation Soil compaction and erosion Increased runoff (volume and capacity) Alteration of local hydrological regime (e.g., creation of preferential flow paths)
Construction camp/ equipment laydown areas.	Decreased roughness Increased runoff (volume and velocity) Soil compaction and erosion Hydrocarbon contamination
Creating servitudes (RoW)	Clearing of vegetation Decreased roughness. Increased runoff (volume and velocity) Change in vegetation community (i.e. species composition) of catchments
Use of machinery to construct the foundations; for the placement of towers and stringing of the transmission lines	Hydrocarbon leaks/spills entering the systems through surface flow, groundwater/ subsurface pathways Soil compaction and erosion
Waste Management	Potential for material packaging and general wastes (plastic wrapping and bottles) entering the freshwater systems Potential sewage contamination to the systems from portable toilets

Impact: Changes to natural run-off patterns and water bodies

Impact Assessment

Stream corridors are dynamic and complex systems that support aquatic (within the stream), riparian (adjacent to the stream), and terrestrial (land-based) ecosystems. Stream corridor refers to the stream and adjacent lands within a stream valley and active floodplain.

Streams continually change at rates related to their position within a watershed or the erodibility of their bed and banks. Confined canyon streams change little and very slowly, while unconfined alluvial valley streams may change more rapidly. Alluvial refers to streams whose bed and banks are composed of mobile material and are able to modify their channel via erosion and deposition of sediment. In the Movene River valley area and the Umbeluzi River mouth area, these rivers behave as alluvial rivers.

Episodic events like floods or landslides can cause rapid changes such as channel widening, realignment, and even the creation of new flow paths within the floodplain, potentially impacting riverine infrastructure. Disturbance can be beneficial from an ecological perspective. Floods create and maintain complex and diverse aquatic, riverine, and terrestrial habitats, sustaining crucial ecosystems.

Connectivity, defined as the movement of flow, materials, and organisms, is a fundamental concept in contemporary stream research and management. For example, longitudinal connectivity refers to pathways of flow, sediment, organic matter, and organisms through stream corridors. Lateral connectivity is the exchange of this material between the stream channel(s) and adjacent floodplains and riparian areas.

It should be highlighted that during heavy rainfall events the Umbeluzi and Movene River catchments can produce flooding. Flooding is a result of flow exceeding the capacity of the stream channels and overspilling the natural banks. In the case of Umbeluzi River this situation can further occur or be aggravated when the storage capacity of the Pequenos Limpopos dam is exceeded, and it is necessary to proceed to the discharges that increase the average and maximum flow, to which the communities and environment are adapted. In the low-lying coastal areas of the catchment (estuaries area) flooding can be also increased by high-tide conditions, storm-surge conditions or large freshwater flood flows moving down an estuary.

Construction activities can increase surface water runoff in several ways, such as removing vegetation, compacting soil, and altering drainage patterns. This increased runoff can have several impacts on the environment, including:

Soil Erosion: With increased runoff, there is a high possibility of soil erosion, leading to sedimentation in waterways. Soil erosion can also expose the underlying rocks, making the area prone to landslides.

Flooding: High levels of runoff can overwhelm natural drainage systems, leading to flooding in nearby areas. This can result in property damage and pose a risk to human life.

Water Quality Degradation: Increased runoff can pick up pollutants from construction sites, such as sediments, oils, and chemicals. These pollutants can then flow into nearby waterways, causing water quality degradation and harm to aquatic life.

Habitat Destruction: High volumes of runoff can cause significant damage to the ecosystem by eroding the soil and destroying vegetation, which can have adverse effects on the habitat of wildlife.

Increased Costs: Construction activities that lead to increased runoff may require additional resources to manage and mitigate the impacts on the environment. This can lead to increased project costs and timelines.

The Project would not substantially alter the existing drainage pattern of the site area, including through the alteration of a course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in on site or off-site flooding. Also, the Project would not result in additional impermeable surfaces and would not significantly alter the existing topography or drainage characteristics.

The overall water management approach is to design drainage of the site to replicate natural conditions (engineering with nature). Designing landforms that mimic pre-development or natural conditions in the watersheds helps stabilize soil, prevent erosion, and prevent introduction of sediment to the aquatic environment.

Mitigation Measures

Do not block or constrain river flow in the construction of access roads, even if temporary. Ensure that suitable transversal drainage (culverts, viaducts, etc.) are in place.

Only areas already disturbed (outside any watercourse) or within the construction area limits should be used for setup of laydown areas. The following sites must be avoided:

Sites susceptible to seasonal flooding.
Steep terrain which, in periods of high rainfall, may drag sediments downstream and into waterways.
Places that are less than 50 m from surface water and any identified wells and boreholes
Watercourses, including wetlands should be clearly marked. These areas should be avoided by contractors and site personnel.

Riverbeds will not be modified beyond the strictly necessary to complete a particular work. The affected areas will be rehabilitated to the original profile and native vegetation.

Impact Summary

The table below summarizes the impact assessment.

Impact: Potential changes to natural run-off patterns and water bodies					
Criteria	Pre-mitigation assessment		Key Mitigation Measures	Post-mitigation assessment	
Nature	Negative		Do not block or constrain river flow in the construction of access roads, even if temporary. Ensure that suitable transversal drainage (culverts, viaducts, etc.) are in place. Only areas already disturbed (outside any watercourse) or within the construction area limits should be used for setup of laydown areas. The following sites must be avoided: Sites susceptible to seasonal flooding. Steep terrain which, in periods of high rainfall, may drag sediments downstream and into waterways.	Negative	
Type	Direct			Direct	
Extent	Local	1		Local	1
Intensity	Medium	2		Low	1
Duration	Long-term	3		Short-term	1
Consequence	Medium	6		Very low	3
Probability	Possible			Improbable	
Significance	Low			Insignificant	

Impact: Potential changes to natural run-off patterns and water bodies			
Criteria	Pre-mitigation assessment	Key Mitigation Measures	Post-mitigation assessment
		Places that are less than 50 m from surface water and any identified wells and boreholes Watercourses, including wetlands should be clearly marked. These areas should be avoided by contractors and site personnel. Riverbeds will not be modified beyond the strictly necessary to complete a particular work. The affected areas will be rehabilitated to the original profile and native vegetation.	
Comparison to Original EIS: No change.			

Impact: Accidental contamination of surface and/or ground waters

Impact Assessment

Water pollution is any physical, chemical, or biological change in water quality that renders it unfit for its intended purpose or causes damage to living organisms.

The removal of vegetation and excavations in riverbanks, floodplains or wetland areas can increase soil erosion and sediment run-off into the water resources, especially during rainy events. Eventually, this could lead to the deterioration of water quality, through the increase of Suspended Solids and associated Turbidity. High turbidity can affect water colour. High concentration of suspended solids decreases the passage of light through water, limiting photosynthesis of aquatic plants and the production of Dissolved Oxygen. Additionally, water temperature increases, since suspended particles absorb more heat. Thus, Suspended Solids increase can also affect aquatic life. Suspended materials can clog fish gills, reduce fish resistance to disease, lower growth rates, and affect roe and larval development. As the particles settle on riverbeds, especially in calm waters, they can suffocate fish eggs and benthic macro-invertebrates.

Wastewater produced at refuelling, maintenance and equipment washing areas are rich in oil and greases (oils, fuel, and lubricants) and detergents. These organic chemicals can affect human health and damage aquatic life.

Domestic wastewater from camps is rich in organic matter and suspended solids. It can also contain relevant concentrations of nitrogen (nitrates, ammonia) and phosphates. The increase of organic matter in water reduces the concentration of dissolved oxygen, due to its decomposition by aerobic bacteria, and can affect aquatic communities. The presence of nutrients such as nitrites, phosphates, and ammonia, promote excessive growth of algae and aquatic plants, potentially leading to imbalances in aquatic ecosystems and, in extreme cases, to the eutrophication of water bodies. Domestic wastewater contains human faeces and as such is rich in bacteria, and can also contain pathogenic micro-organisms (Virus, Salmonella, Vibrio cholera). Infectious agents are the major concern associated with domestic wastewater pollution.

Moreover, the excavation of pits for the towers' foundations could expose groundwater. This groundwater will be consequently more exposed to contamination by spills or leaks of contaminants. Thus, any contaminated groundwater observed during excavation should be pumped out of the pits.

If not adequately managed, construction activities can lead to the contamination of surface water that, in turn, can have adverse indirect impacts in the aquatic communities and affect the health of the population that uses the water.

Mitigation Measures

The disposal and/or storage of construction materials and construction waste shall be protected from wind and rain and should be located as far away as possible from sensitive areas, including water lines (minimum 50 m).

No soil, vegetation, waste or construction materials will be knowingly discharged into any water courses.

Natural water resources (rivers, lakes, etc.) will not be used for equipment or vehicle washing. This activity will only be conducted in designated authorized washing areas, inside the construction sites.

Refuelling and maintenance of equipment will only be done only in designated areas, adequately delimitated, with impermeable pavement and adequate drainage infrastructure, including a water-oil separation system. The waste generated from these activities must be properly managed to ensure safe disposal (storing and transporting).

Whenever necessary, install portable toilets in the construction sites, with watertight septic tank for storage. Toilet should not be more than 250 meters from the working area.

Any spill of chemicals or hydrocarbons on the soil surface will be cleaned up using control/spill kits. Contaminated soils will be collected and managed and disposed appropriately as hazardous waste.

Impact Summary

The table below summarizes the impact assessment.

Impact: Accidental contamination of surface and/or ground waters					
Criteria	Pre-mitigation assessment		Key Mitigation Measures	Post-mitigation assessment	
Nature	Negative		The disposal and/or storage of construction materials and construction waste shall be protected from wind and rain and should be located as far away as possible from sensitive areas, including water lines (minimum 50 m). No soil, vegetation, waste or construction materials will be discharged into any water courses. Natural water resources (rivers, lakes, etc.) will not be used for equipment or vehicle washing. This activity will only be conducted in designated authorized washing areas. Refuelling and maintenance of equipment will only be done only in designated areas, adequately	Negative	
Type	Direct			Direct	
Extent	Regional	2		Regional	2
Intensity	Medium	2		Low	1
Duration	Short-term	1		Short-term	1
Consequence	Low	5		Very Low	4
Probability	Probable			Probable	
Significance	Low			Very Low	

Impact: Accidental contamination of surface and/or ground waters			
Criteria	Pre-mitigation assessment	Key Mitigation Measures	Post-mitigation assessment
		delimitated, with impermeable pavement and adequate drainage infrastructure, including a water-oil separation system. The waste generated from these activities must be properly managed to ensure safe disposal (storing and transporting). Whenever necessary, install portable toilets in the construction sites, with watertight septic tank for storage. Any spill of chemicals or hydrocarbons on the soil surface will be cleaned up using control/spill kits. Contaminated soils will be collected and managed and disposed appropriately as hazardous waste.	
Comparison to Original EIS: No change.			

Impact: Increase of suspended sediments in water bodies

Impact Assessment

The removal of vegetation and excavations in riverbeds and riverbanks areas can increase soil exposure and erosion and the dragging of sediments into the water resources, especially during rain events. Eventually, this could lead to the deterioration of water quality, through the increase of Suspended Solids and associated Turbidity. This aspect is particularly important at the beginning of the route, between pk 0+000 and 7+500 and at the end between pk 25+000 – 30+000.

Turbidity, or the cloudiness of water, is a measure of the concentration of suspended sediment in water. Suspended sediment is undissolved matter ranging from clay-size particles to fine pebbles (2 to 4mm). Most of this material is made up of soil particles released by erosion of the banks of a watercourse or disturbed upland areas.

Increased water turbidity in rivers can have a range of impacts, including:

- Reduced sunlight penetration: High levels of turbidity can reduce the amount of sunlight that penetrates the water, which can affect the growth of aquatic plants and algae. This, in turn, can affect the food chain, as many organisms rely on these plants and algae for their survival.
- Reduced dissolved oxygen: Suspended particles can also reduce the amount of dissolved oxygen in the water, making it difficult for fish and other aquatic organisms to breathe. This can lead to fish kills and other negative impacts on the aquatic ecosystem.
- Increased water temperature: Turbid water can absorb more solar radiation, leading to an increase in water temperature. This can be harmful to fish and other aquatic organisms that are sensitive to changes in water temperature.
- Altered nutrient cycles: Suspended particles can carry nutrients, such as nitrogen and phosphorus, which can promote the growth of algae and other aquatic plants. This can lead to eutrophication, which can have negative impacts on water quality and aquatic biodiversity.

- Reduced water clarity: High turbidity can reduce water clarity, making it more difficult for aquatic organisms to find food and avoid predators. This can also affect recreational activities, such as swimming and fishing.

Mitigation Measures

Limit the clearing of vegetation to the strictly required areas, i.e. within the ROW; construction site areas and accesses created.

In areas with high erosion risk (i.e. from pk 0+000 to 2+500), ensure that sediment control measures are in place prior to disturbance.

Rehabilitate disturbed areas as soon as practicable after they are vacated, and no longer than 2 months after vacated; Rehabilitation should be phased to ensure that no soil is left bare for long. Revegetate disturbed areas along riverbanks.

Silt-laden water must not be pumped directly into a watercourse. It must be pumped into a settling pond, behind a silt-filtering medium, or onto an adjacent vegetated area sufficient in size to filter any water returning to the watercourse, such that the concentration of suspended solids in the watercourse does not increase more than 25 mg/l above background level.

Restore the transversal and longitudinal profile of the river to its original geometry. In areas with high erosion risk (i.e. from pk 0+000 to 2+500), construct the necessary protection works of riverbanks.

Impact Summary

The table below summarizes the impact assessment.

<table>
<tr><td colspan="6">Impact: Increase of suspended sediments in water bodies</td></tr>
<tr><td>Criteria</td><td colspan="2">Pre-mitigation assessment</td><td>Key Mitigation Measures</td><td colspan="2">Post-mitigation assessment</td></tr>
<tr><td>Nature</td><td colspan="2">Negative</td><td rowspan="8">Limit the clearing of vegetation to the strictly required areas, i.e. within the ROW; construction site areas and accesses created.

In areas with high erosion risk (i.e. from pk 0+000 to 2+500), ensure that sediment control measures are in place prior to disturbance.

Rehabilitate disturbed areas as soon as practicable after they are vacated, and no longer than 2 months after vacated; Rehabilitation should be phased to ensure that no soil is left bare for long. Revegetate disturbed areas along riverbanks.

Silt-laden water must not be pumped directly into a watercourse. It must be pumped into a settling pond, behind a silt-filtering medium, or onto an adjacent vegetated area sufficient in size to filter any water returning to the watercourse, such that the concentration of suspended solids</td><td colspan="2">Negative</td></tr>
<tr><td>Type</td><td colspan="2">Direct</td><td colspan="2">Direct</td></tr>
<tr><td>Extent</td><td>Regional</td><td>2</td><td>Local</td><td>1</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>2</td><td>Low</td><td>1</td></tr>
<tr><td>Duration</td><td>Short-term</td><td>1</td><td>Short-term</td><td>1</td></tr>
<tr><td>Consequence</td><td>Low</td><td>5</td><td>Very Low</td><td>3</td></tr>
<tr><td>Probability</td><td colspan="2">Probable</td><td colspan="2">Probable</td></tr>
<tr><td>Significance</td><td colspan="2">Low</td><td colspan="2">Very Low</td></tr>
</table>

Impact: Increase of suspended sediments in water bodies			
Criteria	Pre-mitigation assessment	Key Mitigation Measures	Post-mitigation assessment
		in the watercourse does not increase more than 25 mg/l above background level. Restore the transversal and longitudinal profile of the river to its original geometry. In areas with high erosion risk (i.e. from pk 0+000 to 2+500), construct the necessary protection works of riverbanks.	
Comparison to Original EIS: No change.			

Impact: Changes in groundwater recharge

Impact Assessment

The construction of a power transmission line can impact groundwater recharge in several ways. During the construction of a transmission line, heavy equipment is used to perform soil clearance, excavations for tower foundations, installation of towers, and stringing of cables. This can result in soil compaction, which reduces the amount of pore space in the soil where water can infiltrate and recharge the groundwater.

Transmission lines are typically constructed in open areas, which may require the removal of vegetation. Vegetation plays an important role in regulating the water cycle by intercepting rainfall and allowing it to slowly infiltrate the soil. Removing vegetation can increase the amount of water that runs off the surface and reduces the amount of water that can recharge the groundwater.

Also, powerlines have to cross streams or other water bodies. Altering the flow of surface water can also impact groundwater recharge by changing the way water is distributed across the landscape.

Excavating foundations for tower installation can disturb the soil and alter its permeability, which can lead to changes in the way water moves through the soil and impacts groundwater recharge.

These actions, often in combination, lead to changes in aquifer recharge, which in turn, groundwater recharge can have several impacts on the environment, human health, and socio-economic activities. Some of the significant effects resulting from altered groundwater recharge include:

Lowered water tables: If groundwater recharge is reduced, the water table may drop, which can lead to a reduction in the amount of available water for human and environmental needs.

Reduced stream flows: Groundwater is often a significant source of baseflow for streams and rivers. If groundwater recharge is reduced, stream flows can also decrease, which can impact aquatic ecosystems and limit the availability of water for agriculture, industry, and human consumption.

Land subsidence: In areas where groundwater is a significant source of subsurface support, reduced groundwater recharge can lead to land subsidence, which can cause infrastructure damage and impact local economies.

Contamination: Groundwater recharge can help dilute and remove contaminants from the subsurface. Reduced groundwater recharge can result in higher concentrations of contaminants in the groundwater, which can pose a risk to human health and the environment.

Reduced water quality: Lowered water tables can cause surface water to become more saline, which can impact water quality and make it unsuitable for certain uses, such as irrigation.

Mitigation Measures

During the construction of the powerline minimize the disturbance to the ground and avoid damaging the aquifer recharge zone (alluvial zones). This may include using low-impact construction techniques, minimizing the amount of excavation, and avoiding the use of heavy equipment in sensitive areas.

If possible, use permeable materials to construct access roads to maintain the natural recharge.

Impact Summary

The table below summarizes the impact assessment.

<table>
<tr><td colspan="6">Impact: Changes in groundwater recharge</td></tr>
<tr><td>Criteria</td><td colspan="2">Pre-mitigation assessment</td><td>Key Mitigation Measures</td><td colspan="2">Post-mitigation assessment</td></tr>
<tr><td>Nature</td><td colspan="2">Negative</td><td rowspan="8">During the construction of the powerline minimize the disturbance to the ground and avoid damaging the aquifer recharge zone (alluvial zones). This may include using low-impact construction techniques, minimizing the amount of excavation, and avoiding the use of heavy equipment in sensitive areas;

If possible, use permeable materials to construct access roads to maintain the natural recharge.</td><td colspan="2">Negative</td></tr>
<tr><td>Type</td><td colspan="2">Direct</td><td colspan="2">Direct</td></tr>
<tr><td>Extent</td><td>Local</td><td>1</td><td>Local</td><td>1</td></tr>
<tr><td>Intensity</td><td>Low</td><td>1</td><td>Low</td><td>1</td></tr>
<tr><td>Duration</td><td>Short-term</td><td>1</td><td>Short-term</td><td>1</td></tr>
<tr><td>Consequence</td><td>Very Low</td><td>3</td><td>Very Low</td><td>3</td></tr>
<tr><td>Probability</td><td colspan="2">Possible</td><td colspan="2">Improbable</td></tr>
<tr><td>Significance</td><td colspan="2">Insignificant</td><td colspan="2">Insignificant</td></tr>
<tr><td colspan="6">Comparison to Original EIS: No change.</td></tr>
</table>

7.7.2. Operational phase

The impacts during the operational phase will largely be related to the maintenance requirements of tower and transmission lines and are likely to be infrequent and largely confined to individual tower positions or sections of line that require periodic repair or maintenance. It is assumed that such activities would center mainly on repairs to the lines and their support or insulation structures on the towers, and the need for replacement of the towers themselves would be highly infrequent, although possible.

7.8. Landscape

7.8.1. Construction phase

Impact-generating activities

For assessing landscape and visual impacts in tropical habitats no formal methodology exists. Therefore, a combination of the World Bank Group EHS Guidelines 2007 and the Landscape Institute Guidelines for Landscape and Visual Impact Assessment, 2002 has been used as the basis for this impact assessment and definitions.

The significance of the impacts on the landscape depends on the quality and the capacity of the landscape to integrate the changes that the infrastructure causes in the spatial organization of the area under study. The highest quality landscape spaces are those that suffer the greatest impacts, while the lower quality landscapes with heterogeneous spatial organization and high human influence have less significant impacts.

In general terms, the construction of the project will involve several activities that will potentially affect the landscape of the area of influence of the project. The activities that are expected to have greater influence on the visual component will be:

- Clearance of trees in the line's RoW;
- Temporary construction camps and presence of associated equipment;
- Presence of infrastructures (towers, power line, buildings);
- Presence of permanent RoW under the overhead lines.

These actions will result in visual impacts for observers who circulate in the surrounding areas. This is a temporary effect that will impact only in the short time span of the construction.

Impact: Temporary degradation of landscape at worksites

Impact Assessment

The more significant impacts on landscape will occur during the construction phase as a result of vegetation clearance in the RoW, presence of temporary construction camps and associated equipment, construction traffic, machinery movement, earthworks, infrastructures assembly and installation. All these activities will generate negative, localized, mostly temporary, impacts limited to the construction phase, which can overall be described as a temporary degradation of the landscape at worksites. This impact is a combined effect of several aspects, including:

- Reduction of Landscape Quality;
- Reduction of Visual Absorption Capacity / Greater Visual Accessibility (due to vegetation clearance);
- Temporary degradation of scenic value in woodland and forested areas;
- Change in tranquillity of the surrounding landscape;
- Visual impact of moving machines;
- Localized light pollution;
- Changing wilderness character and creating dominant visual elements; and
- Spatial disorganization.

The reduction of landscape quality, visual absorption capacity, and spatial disorganization generate relevant impacts that will remain in the operation phase. In places with potential for visualization, identified in the reference situation, the perception of alterations in the landscape resulting from the infrastructure will be higher and the visual impacts may become more significant.

The extent of the impact is local, as the impact will only be felt along the RoW and access roads, and directly adjacent areas. The impact duration is short to medium (2 to 5 years), as it will be felt continuously over a period of time equivalent to the construction phase. The intensity is assessed as moderate. The probability of the occurrence of this impact is definite because the landscape will certainly be disrupted at the work sites and potentially at scenic areas. The impact is thus rated as of low significance.

Mitigation Measures

Vegetation clearing, topsoil removal, and earthmoving activities should be minimized as much as practicable and limited to the strictly needed areas.

All temporary construction sites, such as borrow pits and landing areas, and any other areas disturbed by construction, will be revegetated as soon as practicable following the completion of the construction activities. The use of native species will be prioritized for the rehabilitation works.

Priority will be given to areas that are already highly disturbed for the establishment of construction site camps and/or laydown areas.

Laydown areas and machinery parks should be located as far as possible (minimum distance of 300 m) from any areas of sensitive use (residential areas, schools, and health units).

Limit the movement of machines and vehicles to work areas.

Impact Summary

The impact summary is provided in the table below. The application of the proposed mitigation measures limits the intensity of the impact on the landscape during the construction phases. With the implementation of the mitigation measure this impact is expected to see its residual significance reduced to very low.

Impact: Temporary degradation of landscape at worksites					
Criteria	Pre-mitigation assessment		Key Mitigation Measures	Post-mitigation assessment	
Nature	Negative		Vegetation clearing, topsoil removal, and earthmoving activities should be minimized as much as practicable and limited to the strictly needed areas. All temporary construction sites, such as borrow pits and landing areas, and any other areas disturbed by construction, will be revegetated as soon as practicable following the completion of the construction activities. The use of native species will be prioritized for the rehabilitation works. Priority will be given to areas that are already highly disturbed for the establishment of construction site camps and/or laydown areas.	Negative	
Type	Direct			Direct	
Extent	Local	1		Local	1
Intensity	Medium	2		Low	1
Duration	Short to medium-term	2		Short-term	1
Consequence	Low	5		Very Low	3
Probability	Definite			Definite	
Significance	Low			Very Low	

Impact: Temporary degradation of landscape at worksites			
Criteria	Pre-mitigation assessment	Key Mitigation Measures	Post-mitigation assessment
		Laydown areas and machinery parks should be located as far as possible (minimum distance of 300 m) from any areas of sensitive use (residential areas, schools, and health units). Limit the movement of machines and vehicles to work areas.	
Comparison to Original EIS: No change.			

7.8.2. Operational phase

Impact-generating activities

During the operation phase, the main impacts will be the presence of a permanent RoW under the overhead lines and the presence of infrastructure (towers, power line, buildings), elements that will reduce landscape quality and visual intrusions, giving artificiality and complexity to the rural character of the landscape in the study area.

Throughout the alignment occupied by the infrastructure, the organization of the space will be permanently altered, creating a spatial discontinuity due to the presence of the line and towers, and constant visual intrusion in a landscape of natural and rural characteristics.

The identified impact is assessed in the following section.

Impact: Permanent alteration to the landscape

Impact Assessment

The overall aesthetic effect of a transmission line is likely to be negative to most people, especially where proposed lines would cross natural landscapes. The tall steel structures may seem out of proportion and not compatible with agricultural landscapes, vast plains, or hills. This impact can be described as a permanent alteration to the landscape, resulting from several aspects including:

- Landscaping Quality Reduction;
- Visual Intrusion;
- Change in tranquillity of the surrounding landscape;
- Changing wilderness character and creating dominant visual elements.

Research and experience show that reaction to aesthetic of transmission lines vary. Some residents do not notice them or find them objectionable from an aesthetic perspective. To some, the power transmission lines or other utilities may be viewed as part of the infrastructure necessary to sustain everyday lives and activities and are therefore acceptable. To others, new transmission lines may be viewed in a positive way as they are associated with economic development.

The extent of the impact is local as the impact will be felt along the entire length of the transmission line. The impact duration is long as it will be felt continuously for the lifetime of the transmission line. The intensity of the impact on the landscape during the operation phase is considered moderate. The impact's significance is assessed as medium.

Mitigation Measures

The described landscape alteration results directly from the presence of the project infrastructure, so it is not avoidable. However, it can be minimized through the application of the following mitigation:

- Limit vegetation removal/maintenance activities exclusively to the transmission line corridor;
- During maintenance activities, existing access roads will be used as much as possible to avoid new landscape disturbance;
- Allow tree and shrub species whose height is limited to 4 m to grow within the RoW.

Impact Summary

The impact summary is provided in the table below. The application of the proposed mitigation measures lowers the magnitude of the impact, but the residual significance remains medium.

<table>
<tr><td colspan="6">Impact: Permanent alteration to the landscape</td></tr>
<tr><td>Criteria</td><td colspan="2">Pre-mitigation assessment</td><td>Key Mitigation Measures</td><td colspan="2">Post-mitigation assessment</td></tr>
<tr><td>Nature</td><td colspan="2">Negative</td><td rowspan="8">Limit vegetation removal/maintenance activities exclusively to the transmission line corridor;

During maintenance activities, existing access roads will be used as much as possible to avoid new landscape disturbance;

Allow tree and shrub species whose height is limited to 4 m to grow within the RoW.</td><td colspan="2">Negative</td></tr>
<tr><td>Type</td><td colspan="2">Direct</td><td colspan="2">Direct</td></tr>
<tr><td>Extent</td><td>Local</td><td>1</td><td>Local</td><td>1</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>2</td><td>Low</td><td>1</td></tr>
<tr><td>Duration</td><td>Long-term</td><td>3</td><td>Long-term</td><td>3</td></tr>
<tr><td>Consequence</td><td>Medium</td><td>6</td><td>Low</td><td>5</td></tr>
<tr><td>Probability</td><td colspan="2">Definite</td><td colspan="2">Definite</td></tr>
<tr><td>Significance</td><td colspan="2">Medium</td><td colspan="2">Low</td></tr>
<tr><td colspan="6">Comparison to Original EIS: No change.</td></tr>
</table>

7.9. Biodiversity

7.9.1. Construction phase

Impact-generating activities

During the construction phase, the main actions that could generate potential impacts on biodiversity include the following:

- Construction of access roads.
- Foundations.
- Opening and exploration of borrow pits to provide aggregates and inert materials.
- Establishment of construction camps, including temporary workers' accommodation and temporary storage sites for equipment and materials.

- Establishment of right-of-way (RoW) and vegetation clearance.
- Potential inadequate management of wastes and hazardous materials, leading to soil and water contamination, and subsequent impacts on biodiversity.
- Movement of machinery and equipment and other construction activities – noise emissions and increased human presence.

The identified impacts are assessed in the following section.

Impact: Wetlands and riverine areas degradation

Impact Assessment

The construction activities will generate wastewater and solid wastes and will require the handling and use of oils and other pollutants. Inadequate management of these can lead to water quality degradation on rivers and waterbodies.

Accidental spills can lead to local degradation of water quality, and dispersion of those pollutants downstream, affecting directly both aquatic flora and fauna, as well as indirectly terrestrial fauna that feed and roost close by, like aquatic birds and bats.

The construction of towers in riverbeds or banks must be avoided, to avoid changes on water turbidity and degradation of water quality, causing impacts in fishes and other fauna. Soil movement would also affect invertebrates' habitat, causing injuries and death, especially to sediment invertebrates. As distance between towers (span length) may reach 1000 m to facilitate single span river crossings, it may be possible to avoid affecting river banks and river beds.

Considering the above, this impact is assessed as negative, regional (considering the impact can extend to a significant part of the rivers basin), of Medium magnitude and of medium-term duration (since pollutants, and particularly oil can accumulate or remain in sediments for several years), resulting in a medium significance.

Mitigation Measures

As described in Section 6.2.3.2, the Project already implemented the first step in the mitigation hierarchy to avoid impacts at the watering hole identified in the August 2024 reconnaissance survey by rerouting the proposed line to avoid direct construction in this area.

The described wetlands and riverine areas degradation can be minimized, through the application of the mitigation already proposed above to minimize water quality impacts. Additionally, the following mitigation is proposed:

- Adopt good housekeeping to prevent spillages and contamination.
- Prioritize locating the towers outside riverbanks, wetlands, and floodplains.
- Forbid movement of heavy machinery in wetlands, riverbanks, riverbeds, and waterbodies as far as practically possible. Where it can't be avoided, the project HSE manager must provide case by case guidance to the EPC on how best to avoid damage, record any damage caused and ensure it is rehabilitated completely before construction is completed.
- All vehicles and equipment should be well-maintained per manufacturers' guidance.
- All refuelling and servicing of equipment should take place in demarcated areas, away from rivers, wetlands, and waterbodies. Refuelling and servicing of equipment must take place on an impermeable surface, and a spill kit must be available where the servicing or refuelling takes place.

- Limit the movement of machines and vehicles to work areas. Forbid any disturbance outside site boundaries.
- Implement an Emergency Response Plan, to respond to any accidental spills.
- Implement a Waste Management Plan.

Impact Summary

The impact summary is provided in the following table. The proposed mitigation lowers the impact's magnitude and probability, resulting in a very low residual significance.

Impact: Wetlands and riverine areas degradation					
Criteria	Pre-mitigation assessment		Key Mitigation Measures	Post-mitigation assessment	
Nature	Negative		Adopt good housekeeping to prevent spillages and contamination. Prioritize locating the towers outside riverbanks, wetlands, and floodplains. Forbid movement of heavy machinery in wetlands, riverbanks, riverbeds, and waterbodies as far as practically possible. Where it can't be avoided, the project HSE manager must provide case by case guidance to the EPC on how best to avoid damage, record any damage caused and ensure it is rehabilitated completely before construction is completed. All vehicles and equipment should be well-maintained per manufacturers' guidance. All refuelling and servicing of equipment should take place in demarcated areas, away from rivers, wetlands, and waterbodies. Refuelling and servicing of equipment must take place on an impermeable surface, and a spill kit must be available where the servicing or refuelling takes place. Limit the movement of machines and vehicles to work areas. Forbid any disturbance outside site boundaries.	Negative	
Type	Indirect			Indirect	
Extent	Regional	2		Regional	2
Magnitude	Medium	2		Low	1
Duration	Medium-term	2		Medium-term	2
Consequence	Medium	6		Low	5
Probability	Probable			Improbable	
Significance	Medium			Very Low	
Comparison to Original EIS: No change.					

Impact: Direct loss of vegetation units and habitats

Impact Assessment

The construction of roads and line will require the clearing of vegetation in the RoW. All vegetation clearance will be limited to within the identified PPZ. It is expected that full vegetation clearance will likely occur within ~60-70% of the PPZ to allow for construction and laydown of materials. Most of this will be allowed to regrow back during the operational phase with the access road and the pylon footprints the only areas with 100% vegetation loss, and the 5 m immediately under the line being trimmed to prevent large tree grown (e.g. >4 m in height).

Vegetation clearance constitutes a direct loss of the vegetation units affected, as well as a loss of habitat for the fauna communities that depend on these habitats.

As expected, the percentages of the affected units are very similar to the percentages of these units cover at the study area, which means that these will be affected nearly in the proportion they occur. Referring to the vegetation mapping presented in 6.2.2.1, the estimated areas of habitat potentially subject to some degree of vegetation clearance are:

- Forest – 24.63 ha
- Bushveld – 136.5 ha
- Agromosaic habitat – 82.07 ha

The loss of vegetation units corresponds to a direct loss of habitats for fauna, including foraging, roosting, and breeding/nesting habitat. This impact is especially relevant for threatened species and woodland species.

It is important to note that the described losses of natural habitats are not avoidable by exploring alternative alignments. The natural habitats that will be impacted (e.g., African lineage acacia and undifferentiated woodlands) are widely distributed and abundant throughout the region crossed by the proposed power lines. As part of the BAP for the combined wind farm and transmission line projects, a residual impact assessment was carried out by TBC to estimate the amount of quality hectares of natural habitat that should be offset to achieve no net loss. The BAP sets out the proposed measures to achieve this offset.

Considering the start and end points of the power line (Namaacha Wind Farm to the connection point at the Boane Substation), there are no possible alternative alignments that would avoid losses of undifferentiated woodlands.

Considering the above, this impact is assessed as negative, local, of medium magnitude (considering the total extension of natural areas that will be lost) and of long-term duration (as these areas will be kept cleared until project decommission, after which they will naturally regenerate within 2 to 15 years, depending on the habitat), resulting in a medium significance.

Mitigation Measures

Strictly limit the clearing of vegetation to the required areas, with particular emphasis of this in areas of natural habitat.

Prioritise siting of construction lay-down areas and borrow pits outside of areas of natural habitat (to be detailed in the BAP).

Avoid locating towers and access roads in wetlands and riverbeds and on banks.

Areas to be cleared within the right-of-way will be marked by a surveyor and searched by a suitably trained professional for threatened species, before the vegetation is cleared. Any identified threatened species will be relocated in similar habitats outside the area to be disturbed. If any animal or nesting sites with eggs or chicks/juveniles are identified, they will be removed and relocated, unless the species is identified as threatened, upon which the breeding will be allowed to reach completion. The surveys will be done during the flowering season of the majority of threatened plant species that may be present. Search and rescue reports will be maintained, which will include the names and coordinates of relocated specimens. Vegetation in the remainder of the transmission line servitude will remain untouched, except where required for access, construction, or height clearance it will be cropped no lower than knee height. Rehabilitate temporary work areas as soon as practical (i.e., once work is concluded in each segment), to reduce the duration of the impact.

Whenever possible new and temporary accesses should be created based in existent accesses.

Impact Summary

The implementation of the mitigation proposed above will reduce the impact's magnitude to low and lower its probability from definite to probable. This results in a residual very low significance impact on natural habitats. The impact summary is provided in the table below.

<table>
<tr><th colspan="6">Impact: Direct loss of vegetation units and habitats</th></tr>
<tr><th>Criteria</th><th colspan="2">Pre-mitigation assessment</th><th>Key Mitigation Measures</th><th colspan="2">Post-mitigation assessment</th></tr>
<tr><td>Nature</td><td colspan="2">Negative</td><td rowspan="8">Strictly limit the clearing of vegetation to the required areas, with particular emphasis of this in areas of natural habitat.

Prioritise siting of construction lay-down areas and borrow pits outside of areas of natural habitat.

Avoid locating towers and access roads in wetlands and riverbeds and on banks.

Areas to be cleared within the right-of-way will be marked by a surveyor and searched by a suitably trained professional for threatened species, before the vegetation is cleared. Any identified threatened species will be relocated in similar habitats outside the area to be disturbed. If any animal or nesting sites with eggs or chicks/juveniles are identified, they will be removed and relocated, unless the species is identified as threatened, upon which the breeding will be allowed to reach completion. The surveys will be done during the flowering season of the majority of threatened plant species that may be present. Search and rescue reports will be maintained, which will include the names and coordinates of relocated specimens. Vegetation in the remainder of the transmission line servitude will remain untouched, except where required for access, construction, or height clearance it will be cropped no lower than knee height.

Rehabilitate temporary work areas as soon as practical (ie, once work is concluded in each segment).

Whenever possible new and temporary accesses should be created based in existent accesses.</td><td colspan="2">Negative</td></tr>
<tr><td>Type</td><td colspan="2">Direct</td><td colspan="2">Direct</td></tr>
<tr><td>Extent</td><td>Local</td><td>1</td><td>Local</td><td>1</td></tr>
<tr><td>Magnitude</td><td>Medium</td><td>2</td><td>Low</td><td>1</td></tr>
<tr><td>Duration</td><td>Long-term</td><td>3</td><td>Long-term</td><td>3</td></tr>
<tr><td>Consequence</td><td>Medium</td><td>6</td><td>Very Low</td><td>4</td></tr>
<tr><td>Probability</td><td colspan="2">Definite</td><td colspan="2">Probable</td></tr>
<tr><td>Significance</td><td colspan="2">Medium</td><td colspan="2">Very Low</td></tr>
</table>

Impact: Direct loss of vegetation units and habitats			
Criteria	Pre-mitigation assessment	Key Mitigation Measures	Post-mitigation assessment
Comparison to Original EIS: No change.			

Impact: Degradation of nearby vegetation units

Impact Assessment

Construction activities that implicate soil and machinery movements will contribute for the expansion of ruderal and invasive flora species through the construction areas, thus degrading habitats quality in nearby areas of the study area, especially in the north were vegetation is less disturbed by human activities.

The opening of new access roads can potentially increase natural resources exploration by local people, both of flora (wood and charcoal) and others (quarries). This can lead to vegetation degradation though unmanaged cutting and litter.

High rate of movement of machinery and vehicles associated with vegetation clearance and soil movements will lead to dust emission and dispersion that can affect plants evapotranspiration and photosynthesis rate, generally affecting vegetation health.

Considering the above, this impact is assessed as negative, local, of low magnitude (considering that only vegetation units very close to the construction area would be affected) and of medium-term duration (as most of these habitats will naturally regenerate within 5 to 15 years, depending on the habitat), resulting in a very low significance.

Mitigation Measures

Limit the movement of machines and vehicles to work areas. Forbid disturbance outside site boundaries. Where disturbance outside site boundaries can't be avoided, the HSE Manager needs to record the instance and an environmental incident and ensure that the area is rehabilitated.

Limit non-Project vehicles entrance in the construction area to avoid invasive and ruderal species dispersion and entrance of people that can illegally exploit natural resources.

Strictly limit the clearing of vegetation to the required areas, with particular emphasis of this in areas of natural habitat.

Whenever possible, new and temporary accesses should be created based in existent accesses.

Impact Summary

The impact summary is provided in the table below.

Impact: Degradation of nearby vegetation units			
Criteria	Pre-mitigation assessment	Key Mitigation Measures	Post-mitigation assessment
Nature	Negative	Limit the movement of machines and vehicles to work areas. Forbid disturbance outside site boundaries. Where disturbance outside site	Negative
Type	Indirect		Indirect

Impact: Degradation of nearby vegetation units					
Criteria	Pre-mitigation assessment		Key Mitigation Measures	Post-mitigation assessment	
Extent	Local	1	boundaries can't be avoided, the HSE Manager needs to record the instance and an environmental incident and ensure that the area is rehabilitated. Limit non-Project vehicles entrance in the construction area to avoid invasive and ruderal species dispersion and entrance of people that can illegally exploit natural resources. Strictly limit the clearing of vegetation to the required areas, with particular emphasis of this in areas of natural habitat. Whenever possible, new and temporary accesses should be created based in existent accesses.	Local	1
Magnitude	Low	1		Low	1
Duration	Medium-term	2		Medium-term	2
Consequence	Very Low	4		Very Low	4
Probability	Possible			Improbable	
Significance	Insignificant			Insignificant	
Comparison to Original EIS: No change.					

Impact: Reduction of feeding, breeding and roosting areas

Impact Assessment

Clearance of vegetation will destroy feeding, breeding and roosting areas for fauna species, especially for birds and mammals. Since most of the area affected is woodland, species that depend on trees will be especially affected, such as tree frogs, reptiles, rodents, and bats that use the inside of trees as roosts, but also several tree nesting birds species (most of the small birds, nocturnal birds, and raptors, among others), and even bigger mammals that roost in trees, like monkeys and leopard (although the presence of this last species is unlikely in the study area).

Feeding areas will be lost by vegetation clearance along much of the route, although since the vegetation clearance strip is narrow, animals should be able to feed in similar nearby areas.

Considering the above, this impact is assessed as negative, local, of medium magnitude (considering the extension amount of feeding, roosting and breeding areas that will be lost) and of long-term duration (as these areas will be kept cleared until project decommission, after which they will naturally regenerate within 2 to 15 years, depending on the habitat, regenerating into new feeding, roosting and breeding areas, that may however provide lower quality habitats), resulting in a high significance.

Mitigation Measures

The described reduction of feeding, breeding and roosting areas results directly from the construction of the project infrastructure, so it is not avoidable. The following mitigation is proposed:

- Vegetation clearing, topsoil removal, and earthmoving activities should be minimized as much as practical and limited to the strictly needed areas.

- Avoid locating towers and access roads in wetlands and river beds and on banks (i.e. within 50 m).
- Areas to be cleared within the right-of-way will be marked by a surveyor and searched by a suitably trained professional for threatened species, before the vegetation is cleared. Any identified threatened species will be relocated in similar habitats outside the area to be disturbed. If any animal or nesting sites with eggs or chicks/juveniles are identified, they will be removed and relocated, unless the species is identified as threatened, upon which the breeding will be allowed to reach completion. The surveys will be done during the flowering season of the majority of threatened plant species that may be present. Search and rescue reports will be maintained, which will include the names and coordinates of relocated specimens. Vegetation in the remainder of the transmission line servitude will remain untouched, except where required for access, construction, or height clearance it will be cropped no lower than knee height.
- Whenever possible new and temporary accesses should be created based in existent accesses.
- The Project will conduct training on biodiversity management program.

Impact Summary

The impact summary is provided in the table below. The implementation of the proposed mitigation will reduce the residual significance to low.

<table>
<tr><td colspan="6">Impact: Reduction of feeding, breeding and roosting areas</td></tr>
<tr><td>Criteria</td><td colspan="2">Pre-mitigation assessment</td><td>Key Mitigation Measures</td><td colspan="2">Post-mitigation assessment</td></tr>
<tr><td>Nature</td><td colspan="2">Negative</td><td rowspan="8">Vegetation clearing, topsoil removal, and earthmoving activities should be minimized as much as practical and limited to the strictly needed areas.

Avoid locating towers and access roads in wetlands and river beds and on banks.

Areas to be cleared within the right-of-way will be marked by a surveyor and searched by a suitably trained professional for threatened species, before the vegetation is cleared. Any identified threatened species will be relocated in similar habitats outside the area to be disturbed. If any animal or nesting sites with eggs or chicks/juveniles are identified, they will be removed and relocated, unless the species is identified as threatened, upon which the breeding will be allowed to reach completion. The surveys will be done during the flowering season of the majority of threatened plant species that may be present. Search and rescue reports will be maintained, which will include the names and coordinates of relocated specimens. Vegetation in the remainder of the transmission line servitude will remain untouched, except where required for</td><td colspan="2">Negative</td></tr>
<tr><td>Type</td><td colspan="2">Direct</td><td colspan="2">Direct</td></tr>
<tr><td>Extent</td><td>Local</td><td>1</td><td>Local</td><td>1</td></tr>
<tr><td>Magnitude</td><td>Medium</td><td>2</td><td>Low</td><td>1</td></tr>
<tr><td>Duration</td><td>Long-term</td><td>3</td><td>Long-term</td><td>3</td></tr>
<tr><td>Consequence</td><td>Medium</td><td>6</td><td>Low</td><td>5</td></tr>
<tr><td>Probability</td><td colspan="2">Definite</td><td colspan="2">Probable</td></tr>
<tr><td>Significance</td><td colspan="2">Medium</td><td colspan="2">Low</td></tr>
</table>

Impact: Reduction of feeding, breeding and roosting areas			
Criteria	Pre-mitigation assessment	Key Mitigation Measures	Post-mitigation assessment
		access, construction, or height clearance it will be cropped no lower than knee height. Whenever possible new and temporary accesses should be created based in existent accesses. The Project will conduct training on biodiversity management program.	
Comparison to Original EIS: No change.			

Impact: Increased fauna mortality and decreased species diversity

Impact Assessment

Vegetation clearance will lead to death of some animals, potential decreasing species diversity in the study area. Organisms that are sessile during the day and roost in trees, such as bats, tree frogs and reptiles, will most likely be affected, since these animals typically don't leave roosting sites during the day. As such, these will likely not escape and therefore die during vegetation removal activities. Birds that nest in trees (including eggs and chicks), especially nocturnal ones, can also die during these activities.

It is recognised that with the rerouting of the transmission line, there is a section of the transmission line with natural habitat (12.34 km in total) where primary baseline data is limited. To help offset this risk, the Project will perform pre-construction clearance surveys to identify any sensitive fauna within the right-of-way prior to vegetation clearance.

An increase in machinery and vehicles movements will also lead to a high risk of run over. Animals that move slower, like reptiles and amphibians, are typically the most affected by this impact, because they have difficulties in moving away rapidly and are also difficult to detect by drivers.

Considering the above, this impact is assessed as negative, local, of medium magnitude (considering that most of the area is woodland and therefore a large number of trees and animals can be affected) and of medium-term duration (as for several species successful reproductive cycles take several years), resulting in a medium significance.

Mitigation Measures

The described direct loss of species and decreased species diversity results directly from the construction of the project infrastructure, so it is not avoidable. However, the application of the following mitigation measures is very important to avoid impacts in threatened species, enabling a relevant decrease in the impact significance.

The fauna surveys undertaken to date have not identified any specific hotspots along the proposed transmission line route for bird collisions or electrocution (nest sites of birds of prey, riparian zones, elevated ridges or cliffs, etc). As such, the following additional recommended measures are planned:

- A desktop assessment of the route should be undertaken by a suitably qualified avifauna expert to determine where these hotspots are likely to be (pre-construction).
- Any such areas should be the focus of intensive pre-construction surveys and nest searches, which should also be undertaken by experienced avifauna specialists at appropriate times of the year (e.g. winter breeding period for raptors).

The following mitigation is then proposed:

- Vegetation clearing, topsoil removal, and earthmoving activities should be minimized as much as practical and limited to the strictly needed areas.
- Limit machinery and vehicles speed limit to 30km/h to reduce risk of animal run over.
- Place signs along access roads informing speed limits and possible animal presence.
- During induction sessions inform workers about the importance of biodiversity and commitment of the project to it, in order to avoid running over animals on purpose.
- In instances where animals and birds have not vacated a specific construction area and the construction can't be postponed, the project will use an air horn to frighten animals from the area in order to avoid injury or fatalities during vegetation clearance.
- Areas to be cleared within the right-of-way will be marked by a surveyor and searched by a suitably trained professional for threatened species, before the vegetation is cleared. (See the additional requirements regarding pre-construction surveys in any identified avifauna ‘hot spots’.) Any identified threatened species will be relocated in similar habitats outside the area to be disturbed. If any animal or nesting sites with eggs or chicks/juveniles are identified, they will be removed and relocated, unless the species is identified as threatened, upon which the breeding will be allowed to reach completion. The surveys will be done during the flowering season of the majority of threatened plant species that may be present. Search and rescue reports will be maintained, which will include the names and coordinates of relocated specimens. Vegetation in the remainder of the transmission line servitude will remain untouched, except where required for access, construction, or height clearance it will be cropped no lower than knee height.
- Avoid locating towers and access roads in wetlands, river beds, and on river banks.
- Whenever possible, new and temporary accesses should be created based in existent accesses.

Impact Summary

The impact summary is provided in the table below.

Impact: Increased fauna mortality and decreased species diversity					
Criteria	Pre-mitigation assessment		Key Mitigation Measures	Post-mitigation assessment	
Nature	Negative		Vegetation clearing, topsoil removal, and earthmoving activities should be minimized as much as practical and limited to the strictly needed areas. Limit machinery and vehicles speed limit to 30km/h to reduce risk of animal run over. Place signs along access roads informing speed limits and possible animal presence.	Negative	
Type	Direct			Direct	
Extent	Local	1		Local	1
Magnitude	Medium	2		Low	1
Duration	Medium-term	2		Medium-term	2
Consequence	Low	5		Very Low	4

Impact: Increased fauna mortality and decreased species diversity			
Criteria	Pre-mitigation assessment	Key Mitigation Measures	Post-mitigation assessment
Probability	Probable	During induction sessions inform workers about the importance of biodiversity and commitment of the project to it, in order to avoid running over animals on purpose. In instances where animals and birds have not vacated a specific construction area and the construction can't be postponed, the project will use an air horn to frighten animals from the area in order to avoid injury or fatalities during vegetation clearance. Areas to be cleared within the right-of-way will be marked by a surveyor and searched by a suitably trained professional for threatened species, before the vegetation is cleared. Any identified threatened species will be relocated in similar habitats outside the area to be disturbed. If any animal or nesting sites with eggs or chicks/juveniles are identified, they will be removed and relocated, unless the species is identified as threatened, upon which the breeding will be allowed to reach completion. The surveys will be done during the flowering season of the majority of threatened plant species that may be present. Search and rescue reports will be maintained, which will include the names and coordinates of relocated specimens. Vegetation in the remainder of the transmission line servitude will remain untouched, except where required for access, construction, or height clearance it will be cropped no lower than knee height. Avoid locating towers and access roads in wetlands, river beds, and on river banks. Whenever possible, new and temporary accesses should be created based in existent accesses. Additional Recommended Measures: - A desktop assessment of the route should be undertaken by a suitably qualified avifauna expert to determine where these hotspots are likely to be (pre-construction). - Any such areas should be the focus of intensive pre-construction surveys and nest searches, which should also be undertaken by experienced avifauna specialists at appropriate times of the year (e.g. winter breeding period for raptors).	Probable
Significance	Low		Very Low
Comparison to Original EIS: No change to predicted impact significance, but additional recommended measures added to improve the confidence of predicted residual impact.			

Impact: Possible introduction or spread of invasive species in the Project area

Impact Assessment

Construction activities such as new access road opening, soil movements, and movement of machinery will contribute to the expansion of ruderal and invasive flora species along the lines corridors, especially in the north, were vegetation is less disturbed by human activities. This impact is even more likely since reconnaissance of the transmission line route has identified a high prevalence of multiple alien invasive species in the area (especially near farming areas).

Since access roads come from more urban areas, potentially with a higher number of invasive species, it is possible that the number of invasive species in the study area will increase, increasing also the risk of their expansion to non-affected areas.

Considering the above, this impact is assessed as negative, regional, of low magnitude and of medium-term duration, resulting in a low significance.

Mitigation Measures

Forbid vegetation disturbance outside the set boundaries for each construction site.

Limit vegetation clearance to the construction footprint. Avoid clearing any further vegetation in the project boundary as far as possible.

Restrict people and vehicle movements outside project accesses, especially in natural habitat areas.

Whenever possible, new and temporary accesses should be created based in existent accesses.

Impact Summary

The impact summary is provided in the table below.

<table>
<tr><td colspan="6">Impact: Possible introduction or spread of invasive species in the Project area</td></tr>
<tr><td>Criteria</td><td colspan="2">Pre-mitigation assessment</td><td>Key Mitigation Measures</td><td colspan="2">Post-mitigation assessment</td></tr>
<tr><td>Nature</td><td colspan="2">Negative</td><td rowspan="7">Forbid vegetation disturbance outside the set boundaries for each construction site.

Limit vegetation clearance to the construction footprint. Avoid clearing any further vegetation in the project boundary as far as possible.

Restrict people and vehicle movements outside project accesses, especially in natural habitat.

Whenever possible, new and temporary accesses should be created based in existent accesses.</td><td colspan="2">Negative</td></tr>
<tr><td>Type</td><td colspan="2">Indirect</td><td colspan="2">Indirect</td></tr>
<tr><td>Extent</td><td>Local</td><td>1</td><td>Local</td><td>1</td></tr>
<tr><td>Magnitude</td><td>Low</td><td>1</td><td>Low</td><td>1</td></tr>
<tr><td>Duration</td><td>Medium-term</td><td>2</td><td>Medium-term</td><td>2</td></tr>
<tr><td>Consequence</td><td>Very Low</td><td>4</td><td>Very Low</td><td>4</td></tr>
<tr><td>Probability</td><td colspan="2">Probable</td><td colspan="2">Improbable</td></tr>
<tr><td>Significance</td><td colspan="2">Very Low</td><td></td><td colspan="2">Insignificant</td></tr>
<tr><td colspan="6">Comparison to Original EIS: No change.</td></tr>
</table>

Impact: Exclusion of fauna species due to increase of disturbance

Impact Assessment

All construction activities will result in increasing noise, light, movement, and disturbance in general. This will result in disturbance of fauna species and consequent exclusion of fauna around the study area.

This impact is especially relevant to more sensitive species, like shy forest bird species in undisturbed, or less disturbed, woodland areas, and during breeding period. This can also lead to abandonment of nests, breeding, roosting and/or congregation sites. This is particularly relevant for water birds, that present a high number of congregatory and migratory species in the study area and are very sensitive to human presence, especially in more undisturbed wetland areas.

A particular species of note identified in the Project area was the African elephant. The Project's footprint is near a seasonal watercourse that is used by elephants. The initial alternative evaluated crossed through this area, but the proposed route was moved further south to avoid direct impact to the watering hole and to reduce the potential impact to elephants.

Considering the above, this impact is assessed as negative, local, of medium magnitude (considering the area extension and the species potentially present) and of short-term duration (as disturbance will finish after construction and at least several fauna species may then return to the previously abandoned areas), resulting in a very low significance.

Mitigation Measures

The application of the following mitigation measures will help avoid impacts in threatened species, enabling a relevant decrease in the impact significance. The following mitigation is proposed:

- Strictly limit the clearing of vegetation to the required construction footprint, particularly in areas of natural habitats.
- Whenever possible new and temporary accesses should be created based in existent accesses.
- Areas to be cleared within the right-of-way will be marked by a surveyor and searched by a suitably trained professional for threatened species, before the vegetation is cleared. Any identified threatened species will be relocated in similar habitats outside the area to be disturbed. If any animal or nesting sites with eggs or chicks/juveniles are identified, they will be removed and relocated, unless the species is identified as threatened, upon which the breeding will be allowed to reach completion. The surveys will be done during the flowering season of the majority of threatened plant species that may be present. Search and rescue reports will be maintained, which will include the names and coordinates of relocated specimens. Vegetation in the remainder of the transmission line servitude will remain untouched, except where required for access, construction, or height clearance it will be cropped no lower than knee height.
- Restrict construction works to the daytime hours, limiting illumination in the construction areas as much as practical.
- All garbage should be secured in sealed containers overnight to avoid attracting nocturnal carnivores and other opportunistic species to site.

- Avoid vegetation clearance activities in natural habitats and near large water masses between October and March, as much as practical, to minimize impacts on migratory birds.
- Start construction from south to north (between April to September) to avoid disturbing the larger natural areas during the period when more birds are breeding.

Whilst the re-routing of the line to avoid the watering hole should minimise potential impacts to elephants, it is also recommended the EPC Contractor include measures in their Management Plans related to elephants, including:

- Further engagement with district government and/ or elephant specialists working in the area (prior to any construction) in order to determine frequency of elephant movement in the area of the watering hole (e.g. how many days a month would they be encountered) and the seasonality of the movements (what months of the year they are present). Also consult with Mandevo community leaders to determine if (and if so when) the watering hole dries up each year. Using these data, schedule construction near the watering hole when elephants are not be expected to present in the area.
- Ensure that clearing of vegetation and construction of pylons takes place when elephants are not expected to be within the construction area (based on tracking information from NGOs).
- Training of staff on the Endangered status of these animals and restrictions on harm to these animals, e.g. no shooting.
- Stop work measures if elephants approach an active construction area.

Impact Summary

The impact summary is provided in the table below.

<table>
<tr><th colspan="6">Impact: Exclusion of fauna species due to increase of disturbance</th></tr>
<tr><th>Criteria</th><th colspan="2">Pre-mitigation assessment</th><th>Key Mitigation Measures</th><th colspan="2">Post-mitigation assessment</th></tr>
<tr><td>Nature</td><td colspan="2">Negative</td><td rowspan="8">Strictly limit the clearing of vegetation to the required construction footprint, particularly in areas of natural habitats.

Whenever possible new and temporary accesses should be created based in existent accesses.

Areas to be cleared within the right-of-way will be marked by a surveyor and searched by a suitably trained professional for threatened species, before the vegetation is cleared. Any identified threatened species will be relocated in similar habitats outside the area to be disturbed. If any animal or nesting sites with eggs or chicks/juveniles are identified, they will be removed and relocated, unless the species is identified as threatened, upon which the breeding will be allowed to reach completion. The surveys will be done during the flowering season of the majority of threatened plant species that may be present.</td><td colspan="2">Negative</td></tr>
<tr><td>Type</td><td colspan="2">Direct</td><td colspan="2">Direct</td></tr>
<tr><td>Extent</td><td>Local</td><td>1</td><td>Local</td><td>1</td></tr>
<tr><td>Magnitude</td><td>Medium</td><td>2</td><td>Low</td><td>1</td></tr>
<tr><td>Duration</td><td>Short-term</td><td>1</td><td>Short-term</td><td>1</td></tr>
<tr><td>Consequence</td><td>Very Low</td><td>4</td><td>Very Low</td><td>3</td></tr>
<tr><td>Probability</td><td colspan="2">Definite</td><td colspan="2">Probable</td></tr>
<tr><td>Significance</td><td colspan="2">Very Low</td><td colspan="2">Insignificant</td></tr>
</table>

Impact: Exclusion of fauna species due to increase of disturbance			
Criteria	Pre-mitigation assessment	Key Mitigation Measures	Post-mitigation assessment
		Search and rescue reports will be maintained, which will include the names and coordinates of relocated specimens. Vegetation in the remainder of the transmission line servitude will remain untouched, except where required for access, construction, or height clearance it will be cropped no lower than knee height.. Restrict construction works to the daytime hours, limiting illumination in the construction areas as much as practical. All garbage should be secured in sealed containers overnight to avoid attracting nocturnal carnivores and other opportunistic species to site. Avoid vegetation clearance activities in natural habitats and near large water masses between October and March, as much as practical, to minimize impacts on migratory birds. Start construction from south to north (between April to September) to avoid disturbing the larger natural areas during the period when more birds are breeding. Recommended Additional Measures: - Further engagement with district government and/ or elephant specialists working in the area (prior to any construction) in order to determine frequency of elephant movement in the area of the watering hole (e.g. how many days a month would they be encountered) and the seasonality of the movements (what months of the year they are present). Also consult with Mandevo community leaders to determine if (and if so when) the watering hole dries up each year. Using these data, schedule construction near the watering hole when elephants are not be expected to present in the area. - Ensure that clearing of vegetation and construction of pylons takes place outside of the time of the year that elephants are least likely to be present (based on information received from local residents); this will be relevant to the operational phase as well in terms of maintenance of vegetation growth along the T-line corridor.	

Impact: Exclusion of fauna species due to increase of disturbance			
Criteria	Pre-mitigation assessment	Key Mitigation Measures	Post-mitigation assessment
		- Training of staff on the Endangered status of these animals and restrictions on harm to these animals, e.g. no shooting. - Stop work measures if elephants approach an active construction area.	
Comparison to Original EIS: No change in significance. Elephants were identified within the Project area previously, but upon further review, it is considered prudent to include the recommended additional mitigation measures listed above.			

7.9.2. Operational phase

Impact-generating activities

Transmission line operation, i.e. the presence of the transmission and associated permanent RoW, will result in habitat fragmentation. The conductor cables and towers will also introduce a risk of collisions and electrocution, leading to increased bird mortality.

Transmission line maintenance activities and presence of access roads – the presence of access roads and the project maintenance activities could facilitate the spread of invasive flora species and could increase human exploitation of previously inaccessible areas, resulting in further degradation of the habitats along the RoW.

The identified impacts are assessed in the following section.

Impact: Indirect degradation of vegetation units and habitats along the RoW

Impact Assessment

Maintenance operations include vegetation control in the RoW, which will limit the recovery of vegetation recovery within this corridor. Frequent maintenance operations will also contribute to expansion of ruderal and invasive flora species.

Access roads to the corridor and towers can also increase natural resources exploration by local people, both of flora (wood and charcoal) and others (quarries). This can lead to vegetation degradation though unmanaged vegetation clearance of new areas.

Considering the above, this impact is assessed as negative, local, of low magnitude (although the length of the area is considerable, the impact will only be relevant for vegetations units with low representativity – essentially Acacia woodland) and of long-term duration (as vegetation will only be able to fully regenerate after project decommission), resulting in a very low significance.

Mitigation Measures

Forbid vegetation control outside the designated maintenance boundary.

Limit non-Project vehicle entrance and circulation along the RoW, as much as possible, through the placement of signage.

Incorporate in the normal maintenance procedures of the RoW the monitoring of creation of new settlements or cutting or burning of woodland areas in adjacent areas along the RoW and report these occurrences to the local authorities.

Impact Summary

The impact summary is provided in the table below.

Impact: Indirect degradation of vegetation units and habitats along the RoW					
Criteria	Pre-mitigation assessment		Key Mitigation Measures	Post-mitigation assessment	
Nature	Negative		Forbid vegetation control outside the designated maintenance boundary. Limit non-Project vehicle entrance and circulation along the RoW, as much as possible, through the placement of signage. Incorporate in the normal maintenance procedures of the RoW the monitoring of creation of new settlements or cutting or burning of woodland areas in adjacent areas along the RoW and report these occurrences to the local authorities.	Negative	
Type	Indirect			Indirect	
Extent	Local	1		Local	1
Magnitude	Low	1		Low	1
Duration	Long-term	3		Long-term	3
Consequence	Very Low	4		Very Low	4
Probability	Possible			Improbable	
Significance	Very Low			Insignificant	
Comparison to Original EIS: No change.					

Impact: Increased mortality of bird and bat species due to collisions and electrocution with high voltage power line

Impact Assessment

Bird collision occurs in all kinds of suspension lines (power, communications, railways, etc.) because birds do not see the cables. The risk of collision is higher with reduced visibility (like at night and with fog) or with small diameter cables.

In high voltage lines there are two types of cables: conduction cables and ground cables. Ground cables cause most of bird mortality since they are located higher than conduction cables and have smaller diameter. The risk of collision is also related with the number of horizontal plans in which cables are stretched, being higher as the number of horizontal plans increase. Mortality risk is also higher in vertical track frames than in horizontal track frames.

Several factors may increase a bird risk of collision with lines concerning species-specific factors, including sensory perception (like avian vision), morphological features (that include manoeuvre capacity based on wing loading and wing aspect ratio), flight behaviour (gregarious species showing higher susceptibility), phenology and circadian habits, age, sex, and health (Bernardino et al., 2018). In general, congregatory, nocturnal, migratory, juveniles, and both slow (like vultures) and very fast (like swallows, swifts and martins) fliers, diving birds, poor fliers (such as Otididae) and water birds have higher risk of collision with lines (Bevanger, 1998).

Collisions may occur mostly when birds cross power lines in their local, daily movements, as migrants are referred as generally flying well above the height of power lines (Newton, 2010), although there may be exceptions. nocturnal migrants, like rails, thrushes, starlings, and other passerines seem to be more susceptible (Drewitt & Langston, 2008). Also, birds that spend a large part of their day flying between breeding/nesting or roosting sites and foraging areas (or between foraging areas, such as several waterbird species), which often fly during crepuscular periods with low light levels, can have a higher collision risk, especially if the areas are relatively close together and birds tend to fly between them at lower altitudes (Bevanger, 1994. Drewitt and Langston, 2008). Concerning raptors, although infrequently reported as collision victims, power lines intersecting the home range of some eagle species can be problematic (Rollan et al., 2010. Watts et al., 2015). The exact location is important though. power line spans placed close to the nest may never be crossed by individuals, whereas spans more distant may pose a higher collision risk if located directly along flight paths between the nest and foraging areas (Rollan et al., 2010).

Despite their nocturnal habits, owls and nighthawks seem to collide with power lines in relatively small numbers, especially compared to other anthropogenic sources of mortality (e.g., Alonso et al., 1994. Schaub et al., 2010).

This impact is considered relevant for several bird threatened species (Ferrer, 2012). The groups of birds that are considered among the more susceptible to collision risk include: waterbirds (in particular large ducks, geese and swans, pelicans, flamingos, large herons, and waders), grebes, gamebirds and rails, and cranes and bustards. Smaller species may be also susceptible, like pigeons, various passerines and solitary, high-speed predators such as falcons (Jenkins et al. 2010. Bernardino et al., 2018).

Vultures are a particularly important group in the study area, since three Critically endangered vultures are potential for the area. however, their presence in the study area is unlikely, with at most infrequent and occasional occurrences. and as such, impacts are improbable.

There are few records of bat mortality due to collision with power lines, since echolocating bats can easily avoid them, but not non-echolocating fruit bats (Pteropodidae family), for which the risk exists, being even higher for migratory species, such as the African straw-coloured fruit-bat (Eidolon helvum) (Kipeto Energy Limited, 2013).

A bird's death though electrocution occurs when the bird touches two conducting elements, allowing energy current to circulate in the bird's body. Electrocution occurs close to the towers and not in the suspended lines (once there the distance between cables is too large) (ICNF, 2019). As such, electrocution happens mainly when birds rest in towers, and when they try to hunt another bird that is sitting in a tower. This risk is higher in tension towers, since the pole and the conductor are closer. electrocution risk is also high in substations due to the presence of transformer towers (ICNF, 2019). Electrocution occurrence is restricted to power lines carrying tensions of 130 kV and below and to transformer and substations (Bevanger, 1994), as the highest is the tension, the larger are the distances of isolation and hence lower the electrocution risk. As such, if the distance between cables is larger than wingspan, the risk should be residual (Kipeto Energy Limited, 2013). Considering the tension of the transmission lines of the present project (66 kV), electrocution is considered a negligible impact.

Considering the above, this impact (particularly due to collision) is assessed as negative, local, of potential high magnitude (considering the length of the corridor, the number of species present and the susceptibility of endangered species) and of long-term duration (as the impact will occur during all operation phase), resulting in a medium significance.

Mitigation Measures

The described increased mortality of bird and bat species due to collisions with high voltage power line results directly from the operation of the project infrastructure, so it is not avoidable. The inherent design of the towers has been selected to minimise collision risk. Additionally, the application of the following mitigation measures will also reduce the impact significance:

Signalling devices must be installed in the whole extension of earth cables. Signals must be placed with 20 m spacing, alternating in each earth cable, resulting in an apparent 10 to 10 m distancing between signals considering both earth cables. Use this signalling scheme with rotative fireflies or tapes as signal devices in areas where the line cross or goes closer to riparian vegetation and any large, undisturbed woodland areas along the route (i.e., those in the northern part of the route). In other woodland areas use double spirals as signal devices with the same distancing. Note that signalling lines are the most effective ways to minimize mortality though collision, although these measures still do not completely avoid the impact.

Implement design measures aligned with those set out in the IUCN's "Wildlife and power lines: Guidelines for preventing and mitigating wildlife mortality associated with electricity distribution networks", i.e.:

- Install elements that increase the gap between the conductors on the crossarm;
- Cover the conductors and other live elements (surge arresters, fuses, disconnectors) with insulating materials, to ensure minimum safety distances; and
- Install elements that discourage or prevent birds from perching on dangerous parts (anti-perching devices).

Impact Summary

The impact summary is provided in the table below.

<table>
<tr><th colspan="6">Impact: Increased mortality of bird and bat species due to collisions and electrocution</th></tr>
<tr><th>Criteria</th><th colspan="2">Pre-mitigation assessment</th><th>Key Mitigation Measures</th><th colspan="2">Post-mitigation assessment</th></tr>
<tr><td>Nature</td><td colspan="2">Negative</td><td rowspan="8">Signalling devices must be installed in the whole extension of earth cables. Signals must be placed with 20 m spacing, alternating in each earth cable, resulting in an apparent 10 to 10 m distancing between signals considering both earth cables. Use this signalling scheme with rotative fireflies or tapes as signal devices in areas where the line cross or goes closer to riparian vegetation and any large, undisturbed woodland areas along the route (i.e., those in the northern part of the route). In other woodland areas use double spirals as signal devices with the same distancing.

Install elements that increase the gap between the conductors on the crossarm.</td><td colspan="2">Negative</td></tr>
<tr><td>Type</td><td colspan="2">Direct</td><td colspan="2">Direct</td></tr>
<tr><td>Extent</td><td>Local</td><td>1</td><td>Local</td><td>1</td></tr>
<tr><td>Magnitude</td><td>Medium</td><td>2</td><td>Medium</td><td>2</td></tr>
<tr><td>Duration</td><td>Long-term</td><td>3</td><td>Long-term</td><td>3</td></tr>
<tr><td>Consequence</td><td>Medium</td><td>6</td><td>Medium</td><td>6</td></tr>
<tr><td>Probability</td><td colspan="2">Probable</td><td colspan="2">Improbable</td></tr>
<tr><td>Significance</td><td colspan="2">Medium</td><td colspan="2">Low</td></tr>
</table>

Impact: Increased mortality of bird and bat species due to collisions and electrocution			
Criteria	Pre-mitigation assessment	Key Mitigation Measures	Post-mitigation assessment
		Cover the conductors and other live elements (surge arresters, fuses, disconnectors) with insulating materials, to ensure minimum safety distances. Install elements that discourage or prevent birds from perching on dangerous parts (anti-perching devices).	
Comparison to Original EIS: No change.			

Impact: Habitat fragmentation due to the presence of the RoW

Impact Assessment

The establishment and maintenance of the RoW will imply the creation of a linear long corridor with modified vegetation, which will likely be composed of secondary shrub (as the growth of larger trees will be controlled through maintenance activities). Where this corridor crosses large areas of unfragmented habitats, such as in the northern part of the alignment, which crosses large extents of woodland habitats, the RoW could induce an effect of habitat fragmentation, i.e., animals, in particular the more sensitive species, might avoid crossing this corridor, thereby sub-dividing animal populations. This effect can lead to a reduction of biodiversity, if the fragmentation is so severe that animal populations are rendered unviable. This effect, however, is not expected to be critical in the study area, as large extents of continuous non-fragmented woodlands, able to support local fauna populations, are relatively abundant in the northern region of the study area.

Considering the above, this impact is assessed as negative, regional, of medium magnitude (considering the length of the corridor) and of medium-term duration (as with time vegetation may recover – but the complete recover is only possible after project decommissioning - and some animals species may get used to the line and to crossing the area in the absence of natural vegetation), resulting in a medium significance.

Mitigation Measures

The described habitat fragmentation in the study area and surroundings results indirectly from the construction of the project infrastructure, so it is not avoidable. The following mitigation is proposed:

- Limit vegetation clearance to within the designated maintenance boundary.
- Ensure tree and shrub species, whose height is limited to 4 m, are allowed to re-establish in the RoW, by providing a list of such species to vegetation clearing/ control contractors and ensuring they are trained on the identification of such species.

Impact Summary

The impact summary is provided in the table below.

Impact: Habitat fragmentation due to the presence of the RoW					
Criteria	Pre-mitigation assessment		Key Mitigation Measures	Post-mitigation assessment	
Nature	Negative		Limit vegetation clearance to within the designated maintenance boundary. Ensure tree and shrub species, whose height is limited to 4 m, are allowed to re-establish in the RoW, by providing a list of such species to vegetation clearing/ control contractors and ensuring they are trained on the identification of such species.	Negative	
Type	Direct			Direct	
Extent	Regional	2		Regional	2
Magnitude	Medium	2		Medium	2
Duration	Medium-term	2		Medium-term	2
Consequence	Medium	6		Medium	6
Probability	Probable			Improbable	
Significance	Medium			Low	
Comparison to Original EIS: No change.					

7.10. Socioeconomic Environment

Following the establishment of the socioeconomic baseline, this chapter presents the assessment of the potential socioeconomic impacts resulting from the construction and operation of the future Namaacha – Boane 66 kV Power Evacuation Line.

7.10.1. Construction phase

Impact-generating activities

The construction phase of the Namaacha – Boane Project will include all construction works necessary for the establishment of the powerline and associated infrastructure, thus encompassing a wide range of construction activities, such as vegetation and soil clearing, earthworks, construction of temporary roads and setting up temporary construction camps and laydown areas, and the operation of construction machinery as well as the movement of heavy vehicles, among other activities. Borrow pits to provide aggregates and inert materials may be required, as well as spoil areas for disposal of excavated soils that may be unsuitable for reuse, but these would typically be licensed sites operated by third-party suppliers, so their core impacts would have been safeguarded within their own licensing processes.

The clearing of the construction area and the line's protection zone and the setup of the temporary construction support areas and road access will result in permanent changes to land use rights, and in some sort of involuntary resettlement [17] of Project Affected Peoples (PAPs) [18] along the route.

The construction activities will also require the mobilization of workforce. This will result in direct positive impacts, due to the creation of employment opportunities, but could also result in indirect negative impacts, associated with the potential influx of migrants from other districts, provinces or even countries.

The construction phase will thus include a wide range of activities with several potential social and economic impacts, of which the expectedly more relevant ones are the following:

- Land clearing – the required clearance of the Project's PPZ will lead to loss of houses and or other built structures, farmland and cultural heritage, hence causing physical and/or economic displacement, either temporary or permanent.
- In this regard, land parcels subject to temporary resettlement refers to land within the protection zone that will be cleared of vegetation and usage prohibited during construction but where usage – albeit restricted – will be permitted during the Project's operational phase. Such PAPs will, therefore, be subject to the temporary loss of their machambas and land plots during construction and subsequently, once the machambas/land plots have been returned, they will be subject to conditional usage (no tall trees or structures).
- Workforce mobilization – the hiring of temporary construction workers will result in some employment opportunities, with potential positive impacts associated with training, experience and/or short to medium-term income generation amongst the local population. The total required labour force is estimated to be no less than 200 workers for the power line itself (ascending to around 330, when combined with the wind farm construction, to be deployed in parallel). It is a Project objective to maximize the number of national workers, with a smaller number of expatriate workers to provide specialised knowledge and/or supervision. It should be noted that whilst the construction phase of the Project may be considered to be a relatively large endeavour, it is not expected that the construction will result in a massive influx of prospective workers to the surrounding areas, as most workers will probably come from Boane and Namaacha districts and eventually other neighbouring areas (such as Matola), where the construction and industry sectors are very well represented. This means that skilled workers are likely available, thus the contractors expect to recruit locally and, if needed, utilize local accommodations for the staff rather than having an independent accommodation unit. A bus transportation service shall also be provided. Also, local individuals are aware of the social conventions of the existing communities, and they are unlikely to generate social conflicts. As such, the Project is not expected to have the potentially significant associated impacts on social infrastructure or local communities, which are common for large scale projects in more remote locations.

---

[17] Involuntary resettlement is herein referred to as displacement and/or impacts of land use rights changes – as a result of the Project related land acquisition, for which affected individuals or households do not have the right to refuse such land acquisition or rights changes and which may result in physical displacement (relocation, loss of residential land or loss of shelter), economic displacement (loss of land, assets or access to assets, leading to loss of income sources or other means of livelihoods), or both.

[18] individuals, households and communities directly affected by the Projects land acquisition processes.

- Operation of vehicles and machinery and constructions activities in general – the construction activities, such as clearing, excavations, erection of poles/towers, cable installation, as well as setting and operation of construction camps, along with associated road traffic and machinery operation, will generate noise, dust and other air emissions, as well as possibly some disturbance to traffic, along with temporary access restrictions. These combined effects are mainly a nuisance factor for the surrounding communities but can also result in possible health and safety issues.

The relevant potential social impacts generated by these Project activities are discussed and assessed in the following sections, divided into:

- Economic impacts, i.e., impacts that affect the daily life practices or the economic livelihood of families and communities.
- Cultural heritage impacts, i.e., impacts affecting cultural heritage sites, resources and values. and
- Community health and safety impacts, i.e., impacts affecting community health (such as from noise or environmental quality degradation) or safety (such as increased safety and security risks).

Impact: Involuntary resettlement as a result of the establishment of the transmission line's Protection Zone (physical and economic)

Impact Assessment

The project's land requirements will result in involuntary displacement of PAPs, either physical (permanent) or economic displacement (temporary or permanent).

The construction of the Namaacha - Boane Project will require the clearing of any built structure that currently exists in the Project's PPZ. The proposed alignment for the transmission line was designed with the general philosophy of avoiding crossing villages as much as possible, to minimize the number of structures affected by the Project's footprint. The rerouting of the line from the alignment included in the original EIS Report minimizes households experiencing resettlement.

In the original alignment, 4 households were expected to experience physical resettlement and there were a large number 30-40 households with machambas located on military land that the Project was being restricted from compensating by the military due to fears of setting a national precedent.

A RAP scoping exercise was caried out in September 2024 to estimate assets and PAPs along the revised transmission line route. Figure 135 shows the location of the expected PAPs along the route. Table 96 provides a comparison between the expected impacts of the original and revised routes.

Table 99: Summary of resettlement impacts

Aspect	Value
Number of Project Affected Parties	252 + those associated with the 9 commercial farms
Number of PAPs to be physically displaced	0 (Zero)

Number of PAPs to be economically displaced	252 (134 F: 118 M), + those associated with the 9 commercial farms
Number of affected households	45 + those associated with the 9 commercial farms
Number of households losing their primary residence	0
Number of auxiliary buildings to be demolished	2 (2 outdoor bathrooms)
Number of households losing their crops and/or source of revenue	26
Total area of farmland lost (ha)	~183 ha
Estimate of agricultural revenue loss[1]	Total – USD 595,691 Annual crops - USD 581,040 Tree crops - USD 14,651
Number of tree crops lost[1]	Cultivated fruit trees = 39 Beneficial indigenous trees = 193 Trees of economic importance = 20 Total = 252
Number of commercial kiosks to be demolished	0
Number of semi-mobile street sellers affected	0
Number of community level service infrastructure disrupted or dismantled	0
Notes: **[1]Excluding commercial farms. Assess was not granted during RAP scoping exercise to these properties, so this data will not be available until the detailed census is completed.**	

Source: Acer Africa (2024).

A detailed Resettlement Action Plan (RAP) was prepared to fully characterise the predicted resettlement impacts for the PAPs affected by the original alignment. A revised RAP is being prepared (October 2024) to set out expected changes to the RAP based on this alignment change, as informed by the RAP scoping study that was carried out. A detailed asset enumeration is planned for the newly affected PAPs in October 2024 to fully characterise the impacts for these additional PAPs as well. Once the enumeration is completed, the RAP will be further revised with the results.

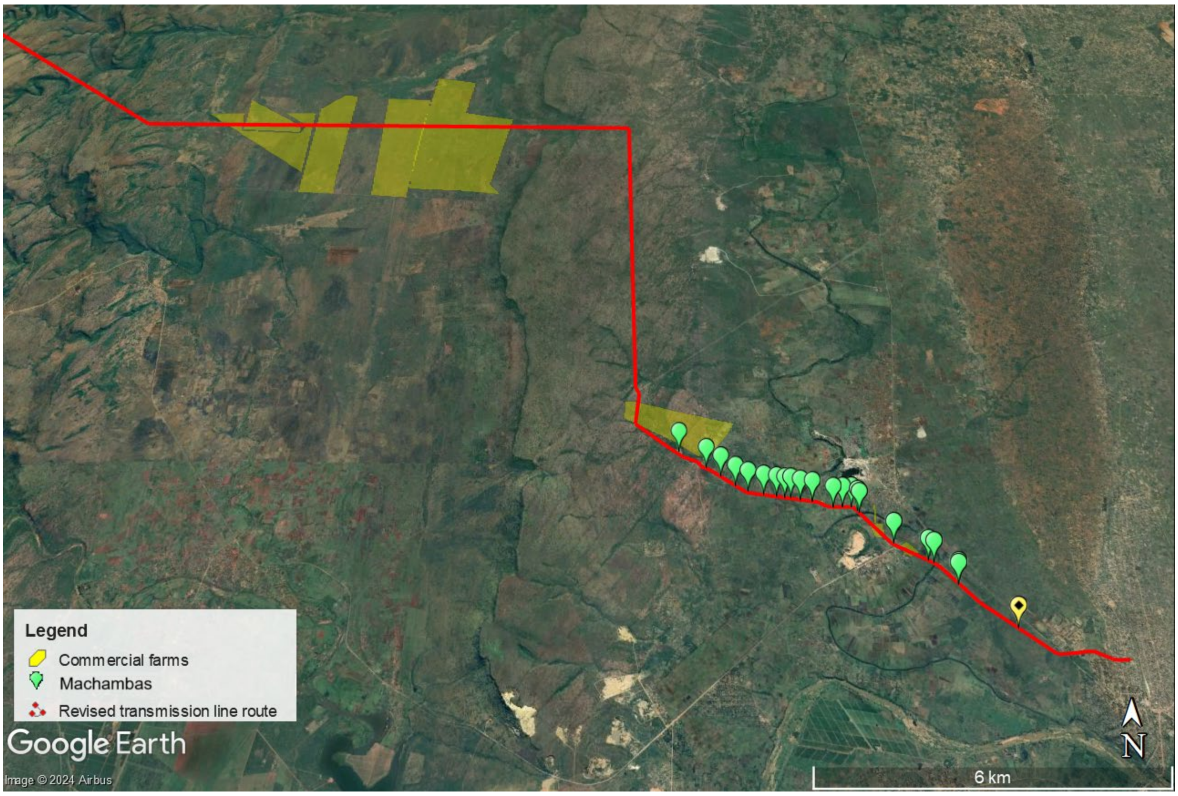


Figure 144: Location of Project Affected Households for Resettlement

Structures and trees of economic value (that can grow over the safe distance from the transmission line) located within the protection zone will be permanently lost. The land parcels (machambas and vacant land) will be subject to either permanent resettlement, temporary resettlement, or temporary resettlement with the permanent loss of land parcel meterage (depending on relative size and Project footprint overlap). Land parcels subject to temporary resettlement refers to land within the protection zone where land will be cleared of vegetation and usage prohibited during construction and where usage – albeit restricted – will be permitted during the Project operation phase. Such PAPs will, therefore, be subject to the temporary loss of their machambas and land plots during Project construction and subsequently, once the machambas/land plots have been returned, they will be subject to conditional usage only. Land plots subject to permanent loss refers to land parcels and typically vacant land, where a meaningful section is within the protection zone and can no longer be utilised by owner as intended, or where the protection zone runs through the land parcel, effectively creating an incontiguous land parcel.

If not well-managed, resettlement impacts have the potential to lead to destitution, impoverishment, loss of income, food insecurity and significant deterioration in living standards amongst the affected households, recovery from which is considered to be long term or in some cases, even generational. In addition, impacts may disturb or generate additional pressure (compounding effects) on the social and family networks of the affected households, thereby widening the scale of the impacts. Vulnerable individuals, households and/or groups are also considered likely to face additional barriers/challenges and/or burdens resulting from the resettlement impacts, as well as in relation to recovery strategies.

This impact is assessed as negative, of local extent (the impacts only occur within the Project's footprint), but of medium intensity (as the social dynamics of the affected families are highly disturbed) and long-term in duration. This results in an overall medium significance impact prior to mitigation.

Mitigation Measures

Given the potential significance of the assessed impact, mitigation will be required to reduce the residual impact to acceptable significance levels. The general principle of mitigation is that all losses are fully compensated for, in such a way as to ensure that the current livelihoods and quality of life of the affected families are at least maintained, and if possible improved. Following the mitigation hierarchy, avoidance of impacts should be pursued wherever possible. The Project design has already been tailored to avoid new impacts through the use of the existing EDM servitudes, a change that was made specifically to avoid resettlement impacts. This design change should have resulted in greatly reducing the predicted impacts; however, because the EDM servitudes for the existing line has not been maintained, this does not fully avoid all resettlement impacts in the Boane area. As such, one of the mitigations that was identified in the original EIS Report was:

"During the detailed engineering design of the project, the route of the transmission line should be further evaluated for optimization in order to potentially reduce the number of households requiring resettlement. "

This realignment is therefore an application of this previously identified mitigation measure.

The Project will develop and implement a comprehensive Resettlement Action Plan (hereinafter referred to as the "RAP") based on the resettlement policy framework (RPF) and that is fully aligned with the Mozambican legislative framework (including Decree 31/2012 and directives No. 155/2014 and 156/2014) and the IFC's Performance Standards (including PS 1 and 5) and AfDB's OSS2. The Project already has a nationally-approved RAP that was also disclosed by the lenders; however, this was for the previously assessed route. The Project is currently undertaking a detailed census for the revised route and following this process, a revision to the RAP will be issued. It is expected that the entitlements matrix will be largely consistent with the original RAP that was already approved and disclosed.

Some key resettlement principles and approaches that will be applicable to the Project's RAP process include:

- That resettlement will take place prior to the commencement of Project activities.
- That resettlement will be guided by the relevant local legislation and the PS 5, with the overall objective of improving PAP living standards, or at the very least, ensuring no negative change in living standards from pre-resettlement levels occurs, in accordance with the GAP analysis detailed in the RPF.
- That all PAPs shall be fully compensated for all losses, and impacts on livelihoods, at full replacement value, including both tangible and intangible losses, in accordance with the eligibility and compensation methodology as defined in the RPF.
- That a full PAP census, which includes both qualitative and quantitative socioeconomic data and the identification of all lost assets, will be carried out, and shall, in accordance with Mozambican legislation, serve as the cut-off date. The census shall include all the required information to serve as the PAP baseline from which livelihoods and living standards are monitored.

- That, as part of the implementation of the Project-wide Grievance Redress Mechanism (GRM - as elaborated in the EMP and the RPF, specific additional requirements as per directives No. 155/2014 and 156/2014, including the establishment of the MSCT (Monitoring and Supervision Technical Committee for Resettlement), shall be integrated into the GRM for the duration of the resettlement process.
- That participation and engagement, based of the Projects Stakeholder Engagement Framework, shall be tailored to include specific resettlement related public participation requirements as detailed in the RPF, for the duration of the RAP elaboration and implementation process.
- That a detailed methodology for a participatory Livelihoods Restoration Plan (LRP) be elaborated, based on the approach to livelihoods, as detailed in the RPF. The methodology shall include a specific focus on vulnerable PAPs and utilize the full PAP census survey as a basis for the monitoring of PAP livelihoods.
- That a detailed monitoring and evaluation methodology, inclusive of both RAP implementation outputs and LRP outcome indicators be elaborated in accordance with the RPF.

Impact Summary

The impact assessment summary is provided in the following table. The implementation of the RAP and the LRP will, i) potentially reduce the Project impacts and, ii) ensure that all affected/impacted PAPs are provided with the appropriate compensation for all losses as well as livelihoods restoration measures, in accordance with the national legislation and the PS 5. This implementation will reduce the impact's duration, thus resulting in an overall medium impact significance.

<table>
<tr><td colspan="6">Impact: Involuntary resettlement as a result of the establishment of the transmission line's Protection Zone (economic)</td></tr>
<tr><td>Criteria</td><td colspan="2">Pre-mitigation assessment</td><td>Mitigation Measures</td><td colspan="2">Post-mitigation assessment</td></tr>
<tr><td>Nature</td><td colspan="2">Negative</td><td rowspan="7">During the detailed design of the Project, further optimization of the route of the Namaacha – Boane transmission line should be considered in order to reduce the economic resettlement on agricultural areas.

The Project will develop and implement a comprehensive Resettlement Action Plan (hereinafter referred to as the "RAP") based on the resettlement policy framework (RPF) and that is fully aligned with the Mozambican legislative framework (including Decree 31/2012 and directives No. 155/2014 and 156/2014) and the IFC's Performance Standards (including PS 1 and 5) and AfDB's OSS2. This will include livelihood restoration/economic resettlement. A RAP has been prepared that is fully aligned with IFC's PS 5 and that also includes all the specific requirements for a PSES under the Mozambican system. This document is being updated for the revised route.</td><td colspan="2">Negative</td></tr>
<tr><td>Type</td><td colspan="2">Direct</td><td colspan="2">Direct</td></tr>
<tr><td>Extent</td><td>Local</td><td>1</td><td>Local</td><td>1</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>2</td><td>Medium</td><td>2</td></tr>
<tr><td>Duration</td><td>Long-term</td><td>3</td><td>Medium-term</td><td>2</td></tr>
<tr><td>Consequence</td><td>Medium</td><td>6</td><td>Low</td><td>5</td></tr>
<tr><td>Probability</td><td colspan="2">Definite</td><td colspan="2">Definite</td></tr>
<tr><td>Significance</td><td colspan="2">Medium</td><td></td><td colspan="2">Low</td></tr>
<tr><td colspan="6">Comparison to Original EIS: Whilst the overall number of PAPs has reduced, given the inherent consequences associated with resettlement, the overall significance rating has remained the same. Note that in the</td></tr>
</table>

Impact: Involuntary resettlement as a result of the establishment of the transmission line's Protection Zone (economic)			
Criteria	Pre-mitigation assessment	Mitigation Measures	Post-mitigation assessment
previous EIS Report an impact was also assessed for physical resettlement (Significance of High pre-mitigation and Medium post-mitigation); however, as the new route has no expected physical resettlement, this impact no longer exists.			

Impact: Creation of employment opportunities

Impact Assessment

The construction phase will generate direct employment opportunities, the majority being unskilled or semi-qualified labour. Estimates provided by the Proponent indicate that an approximate total of 200 workers at the peak of construction, including specialized and non-specialized workers, will likely be involved in the construction works. Considering the wind farm construction, to be deployed in parallel, this number can rise to around 330, highlighting a cumulative impact between the two associated projects.

To note that the Proponent will not hire these workers directly, but instead will retain construction contractors, which will mobilize the adequate workforce. Most of these workers will be national. A small number of foreign workers may be required to provide specialized knowledge. Most of this workforce will likely be recruited locally, i.e., at district and provincial level, with a smaller percentage of specialized workers can be mobilized from other provinces or from abroad.

The significant investment will also generate indirect jobs not only in the construction sector (supplies, services, etc.) but in related sectors as well, such as security, cleaning, machine and vehicle's sale and maintenance, catering, amongst many possible others. Multiplier effect can reach 1,5 to 2 times the number of direct jobs.

At present, employment opportunities for the communities in the Project area are scarce. Thus, the jobs created by the Project, both directly and indirectly, will lead to an increase in family income of the workers hired locally, and the improvement of the wellbeing of their families. Note, however, that these are temporary jobs (the construction phase is expected to last 18 months). This is a positive impact, of local extent (Boane and Namaacha, and eventual neighbouring areas), and low intensity (given the relatively small number of expected direct jobs, plus some fraction of indirect jobs) and short-term duration (restricted to the 18 months expected for the construction phase), resulting in a very low significance.

Enhancement Measures

The adoption of the following enhancement measures is recommended that the Project:

- Develop a transparent, fair, non-discriminatory and ethical local recruitment plan. The recruitment plan shall be consistent with local labour legislation and international standards including the UNGPs and ILO standards (1 through to 17) and declarations.
- Ensure that, during the process of contracting workers, priority should be given to the local population and consideration on gender parity apply, provided applicants have the necessary skills for the relevant employment opportunity.

- Ensure that employment opportunities are adequately advertised, so as not to limit application opportunities.
- Carry out the process of contracting staff in a transparent manner, following pre-established and accepted criteria.
- Implement Globeleq's corporate GBVH procedure, which shall be applicable to all staff as well as third party contractors.

Impact Summary

The impact summary is provided in the following table. The enhancement measures will not be able to increase the residual significance rating and the overall impact will remain as Very Low (positive).

<table>
<tr><td colspan="6">Impact: Creation of employment opportunities</td></tr>
<tr><td>Criteria</td><td colspan="2">Pre-mitigation assessment</td><td>Enhancement Measures</td><td colspan="2">Post-mitigation assessment</td></tr>
<tr><td>Nature</td><td colspan="2">Positive</td><td rowspan="8">Develop a transparent, fair, non-discriminatory and ethical local recruitment plan. The recruitment plan shall be consistent with local labour legislation and international standards including the UNGPs and ILO standards (1 through to 17) and declarations.

Ensure that, during the process of contracting workers, priority should be given to the local population and consideration on gender parity apply, provided applicants have the necessary skills for the relevant employment opportunity.

Ensure that employment opportunities are adequately advertised, so as not to limit application opportunities.

Carry out the process of contracting staff in a transparent manner, following pre-established and accepted criteria.

Implement Globeleq's corporate GBVH procedure, which shall be applicable to all staff as well as third party contractors.</td><td colspan="2">Positive</td></tr>
<tr><td>Type</td><td colspan="2">Direct/Indirect</td><td colspan="2">Direct/Indirect</td></tr>
<tr><td>Extent</td><td>Local</td><td>1</td><td>Local</td><td>1</td></tr>
<tr><td>Intensity</td><td>Low</td><td>1</td><td>Low</td><td>1</td></tr>
<tr><td>Duration</td><td>Short-term</td><td>1</td><td>Short-term</td><td>1</td></tr>
<tr><td>Consequence</td><td>Very Low</td><td>3</td><td>Very Low</td><td>3</td></tr>
<tr><td>Probability</td><td colspan="2">Definite</td><td colspan="2">Definite</td></tr>
<tr><td>Significance</td><td colspan="2">Very Low</td><td colspan="2">Very Low</td></tr>
<tr><td colspan="6">Comparison to Original EIS: No change.</td></tr>
</table>

Impact: Transfer of skills to local communities due to mobilization of construction workforce

Impact Assessment

Unskilled local people that will be employed by the Project will benefit not only from increased yields but also the development of training, including technical / professional issues and general issues (e.g., awareness about health and safety). This will result in a transfer of know-how and skills to the local communities and will naturally improve the chances of the trained personnel in obtaining employment in the future, with associated benefits for their families and dependents, resulting in an indirect long-term benefit.

This is a positive impact, which is assessed as indirect, of long-term duration (as the acquired skills will benefit these workers beyond the limit of this specific job), of local extent and of medium intensity (given the overall lack of worker specialization and know-how in the Project region), resulting in a medium significance.

Enhancement Measures

Even though a significant positive impact is already expected, some enhancement measures can be developed to increase the effectiveness of the skill transfer process, namely:

- The construction contractor should develop and implement a Training and Skill Transfer Program, with the following main goals:
- Provide technical training programs for unskilled workers, with the objective of improving their job performance and giving them the skills to compete for other positions.
- Provide environmental and social awareness training to all workers, including matters related to the code of conduct, non-discrimination and sexual harassment, abuse and exploitation.
- The construction contractor will provide environmental and social awareness training to all workers.
- The construction contractor will provide health and safety training to all workers.

Impact Summary

The impact assessment summary is provided in the following table. The enhancement measures defined above increase the impact probability, although this does not change the rating of the residual significance, which remains Medium (positive).

<table>
<tr><td colspan="6">Impact: Transfer of skills to local communities due to mobilization of construction workforce</td></tr>
<tr><td>Criteria</td><td colspan="2">Pre-mitigation assessment</td><td>Enhancement Measures</td><td colspan="2">Post-mitigation assessment</td></tr>
<tr><td>Nature</td><td colspan="2">Positive</td><td rowspan="8">The construction contractor should develop and implement a Training and Skill Transfer Program, with the following main goals:

Provide technical training programs for unskilled workers, with the objective of improving their job performance and giving them the skills to compete for other positions.

Provide environmental and social awareness training to all workers, including matters related to the code of conduct, non-discrimination and sexual harassment, abuse and exploitation.

The construction contractor will provide environmental and social awareness training to all workers.

The construction contractor will provide health and safety training to all workers.</td><td colspan="2">Positive</td></tr>
<tr><td>Type</td><td colspan="2">Indirect</td><td colspan="2">Indirect</td></tr>
<tr><td>Extent</td><td>Local</td><td>1</td><td>Local</td><td>1</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>2</td><td>Medium</td><td>2</td></tr>
<tr><td>Duration</td><td>Long-term</td><td>3</td><td>Long-term</td><td>3</td></tr>
<tr><td>Consequence</td><td>Medium</td><td>6</td><td>Medium</td><td>6</td></tr>
<tr><td>Probability</td><td colspan="2">Probable</td><td colspan="2">Definite</td></tr>
<tr><td>Significance</td><td colspan="2">Medium</td><td colspan="2">Medium</td></tr>
<tr><td colspan="6">Comparison to Original EIS: No change.</td></tr>
</table>

Impact: Local and regional economic stimulation due to construction expenditure

Impact Assessment

Although most of the materials needed (steel structures, cables, electrical gear, etc.) will likely be manufactured abroad and transported to Maputo by ship, from where they will later be taken by truck to the construction area, it is expected that a considerable part of the necessary materials (cement, gravel, sand, fuel, general supplies, etc.) and services (security, cleaning, maintenance, catering, etc), for the construction phase are purchased on the domestic market, thus having an indirect positive effect on the tertiary/services sector. The increased income of the hired workforce for the construction supplies' companies can lead to an increase of levels of consumption, enhancing the economic stimulus.

This by its turn will lead to an increase in demand for consumer products, goods and services. Greater demand will develop the local markets, especially in the food sector, which will benefit the local, district and provincial economies, stimulating the creation of businesses and jobs. Informal commercial activities will also likely arise, benefiting some residents with increased family income.

This is an indirect positive impact, which is considered of a regional extent, since the products and services needed for the construction phase can be purchased from companies not only from Boane ana Namaacha Districts but also from Maputo Province (or even from other areas of the country), of low intensity and short-term duration, probably resulting in a very low significance prior to mitigation.

Enhancement Measures

Even though a positive impact is already expected, some enhancement measures can be implemented to increase the local and regional economy stimulation during the construction phase:

The procurement of goods and services by the EPC Contractor will give priority to sourcing from the local and provincial markets, whenever possible. The EPC Contractor should:

Identify the goods and services required by the Project that can be supplied locally (e.g., meals and cleaning) and encourage and support local companies in the production and supplying of these goods and services.

Before the start of the activities of the Project the EPC Contractor should identify and disclose the types of services they will require, to enable local entrepreneurs the possibility of training, improvement of skills and services to offer.

Impact Summary

The impact assessment summary is provided in the following table. The enhancement measures likely can raise the impact's intensity and the residual significance becomes Low (positive).

Impact: Local and regional economic stimulation due to construction expenditure			
Criteria	Pre-mitigation assessment	Enhancement Measures	Post-mitigation assessment
Nature	Positive	The procurement of goods and services by the construction contractor will give priority to	Positive
Type	Indirect		Indirect

Impact: Local and regional economic stimulation due to construction expenditure					
Criteria	Pre-mitigation assessment		Enhancement Measures	Post-mitigation assessment	
Extent	Regional	2	sourcing from the local and provincial markets, whenever possible.	Regional	2
Intensity	Low	1		Medium	2
Duration	Short-term	1		Short-term	1
Consequence	Very Low	4		Low	5
Probability	Probable			Probable	
Significance	Very Low			Low	
Comparison to Original EIS: No change.					

Impact: Loss of cultural heritage sites

Impact Assessment

The clearing of the Namaacha - Boane Project RoW may lead to the loss of cultural heritage. As part of the census developed for the preparation of the EIA, a cultural heritage survey was carried out, aiming to identify all archaeological or other cultural heritage sites, such as sacred sites, cemeteries, religious temples, or any other site or asset of cultural heritage relevance. This was then supplemented with the RAP Scoping conducted by Acer Africa in September 2024 for the route change. Based on data collected, it is expected that the Project will directly affect 1 grave and 1 private spiritual house in Boane. There is also a sacred tree and a parade yard in the Boane military area where impacts have been avoided by routing.

In the pre-mitigation scenario, construction of the Project would lead to the loss of these cultural heritage sites. This impact is assessed as negative, of local extent (the impact would only occur within the Project implantation area), but of medium intensity (given the low total number of impacts, however with high cultural and social value of these sacred and religious sites) and of long-term duration (given that in the unmitigated scenario, this loss is permanent). This results in a pre-mitigation medium significance.

Mitigation Measures

Given the medium significance of the impact, mitigation will be required in order to reduce the residual impact significance. To this end, the loss of these sites should be prevented by relocating them or compensating where appropriate.

Affected graves will be exhumed and moved to a new location. The new location will be agreed with the community and this activity will be monitored by the local authorities. The Proponent will bear all costs of exhuming and relocating the graves, including professional services, as agreed with the community. Each community will organize a ceremony for the removal and transfer of graves, in accordance with religious beliefs and/or local customs. These rituals are conducted by a spiritual leader and/or community leader.

Although no other archaeological sites have been identified within the RoW, the existence of underground archaeological elements cannot be ruled out. The implementation of a Chance Finds

Procedure will allow the safeguarding of any archaeological site or element that may be found during construction:

Implement a Chance Finds Procedure for cultural heritage, during construction activities that involve vegetation clearance and earthworks (as detailed in the EMP, Vol. III of this EIA).

Impact Summary

The summary of the impact assessment is presented in the following table. Implementation of the proposed mitigation will allow the relocation or compensation of all affected sites and assets, and still allow for the safeguarding of any chance finds, decreasing the intensity and duration of the residual impact, thus resulting in a residual impact of Low significance.

Impact: Loss of cultural heritage sites					
Criteria	Pre-mitigation assessment		Mitigation Measures	Post-mitigation assessment	
Nature	Negative		Religious temples will be relocated or compensated according to the RAP process. The affected cemeteries will be relocated to a location to be agreed with the local communities, following all the necessary ceremonies and traditional practices. Implement a Chance Finds Procedure for cultural heritage, during construction activities that involve vegetation clearance and earthworks (as detailed in the EMP, Vol. III of this EIA).	Negative	
Type	Direct			Direct	
Extent	Local	1		Local	1
Intensity	Medium	2		Medium	2
Duration	Long-term	3		Medium-term	2
Consequence	Medium	6		Low	5
Probability	Definite			Definite	
Significance	Medium			Low	
Comparison to Original EIS: Whilst there is a reduction in overall impacts to identified sensitive cultural heritage (i.e. from 8 graves to 1 grave), the overall significance of this impact remains unchanged. The reason for this is the risk of chance finds along the route, which remains the same.					

Impact: Increase in road traffic and potential damage to existing roads and other public infrastructures

Impact Assessment

The construction works will lead to an increase in the number of heavy vehicles circulating on local roads, thus potentially affecting the living standards of residents in the surrounding areas, as well as increasing safety risks and inflicting possible damages to public roads and other infrastructures. Noteworthy that traffic in the main road accessing Boane from Maputo/Matola (N2) can currently be considered intense in some sections, such as the urban areas of Matola and Boane town center. In addition, the route of the OHL crosses N2 two times exiting Boane town, which may lead to temporary traffic restrictions during construction.

The construction of the power line will require a considerable transport logistics to supply construction materials (concrete, steel poles, electrical cables and gear) and equipment and workers to and from site. Approximately 400 containers for equipment/supplies and plant, approximately 3 busses for worker transportation, are expected, along the major transportation route from Maputo Port to the site (N2).

The increase of traffic due to the expected construction activities may increase road congestion, where additional vehicle movements could congest the flow of traffic causing delays and inconvenience to local road users, especially within the main roads located in the project area and connections to Matola and Maputo, from where most supplies are expected to come from, namely the N2, exacerbating the existing congestion at peak times. Increasing traffic flows on busy roads may also increase the risk of accidents affecting local people.

Traffic flows will also be disrupted if unusually wide or heavy loads are moved by vehicles travelling at slow speed especially within the main roads.

Movement of heavy vehicles may also cause some damage on the roads, especially on local dirt roads inland in the Namaacha district that are not suitable to support heavy traffic. Road enhancement will have to be implemented.

The impact of the increase in traffic is expected to be temporary (short-term duration), although potential damage to roads, if not immediately corrected, could have effects of medium-term duration. Given the current traffic conditions on the main routes (normally intense traffic till Boane), the impact is rated as medium intensity, especially during the periods in which the main road will likely have to be closed or severely restricted, i.e., during the N2 crossings outside Boane town lines, and/or when exceptionally heavy/long/wide equipment must be transported to site. In any case the non-mitigated scenario, the impact is assessed to be of low significance.

Mitigation Measures

The EPC Contractor will develop, and submit for the Proponent's approval, a Traffic and Transport Management Plan. The EPC Contractor will then implement this plan throughout the construction phase.

This Traffic and Transportation Management Plan will include the following measures:

Restrict the circulation of heavy vehicles to primary or specifically constructed/ enhanced local roads and avoid the use of roads not designed for supporting heavy loads.

Set and enforce speed limits for construction heavy vehicles. This speed limit should not exceed 30 km/h in critical segments, such as when near residential areas.

Plan material deliveries to work fronts so as to avoid traffic peak hours as much as possible.

Install temporary official traffic signs on local roads around the work fronts before and during the execution of the works together with local transit authorities.

Ensure that where temporary road closures do take place an alternative access is ensured.

Ensure that timeous information on potential road closures is provided to all relevant stakeholders, in accordance with the stakeholder engagement plan (SEP, as defined in Vol. III of this EIA).

Any damage to roads resulting from the Project construction should be restored as soon as the construction area is vacated.

A training program, with documentation, to verify that all drivers are aware of the requirements of the Traffic and Transport Management Plan.

Impact Summary

The impact assessment summary is presented in the following table. The implementation of the proposed mitigation will likely reduce the interference of heavy vehicles with local traffic, decreasing the intensity of the residual impact, thus resulting in a residual impact of very low significance.

<table>
<tr><td colspan="6">Impact: Increase in road traffic and potential damage to existing roads and other public infrastructures</td></tr>
<tr><td>Criteria</td><td colspan="2">Pre-mitigation assessment</td><td>Key Mitigation Measures</td><td colspan="2">Post-mitigation assessment</td></tr>
<tr><td>Nature</td><td colspan="2">Negative</td><td rowspan="8">The EPC Contractor will develop, and submit to the Proponent's for approval, a Traffic and Transport Management Plan. The EPC Contractor will then implement this plan throughout the construction phase.</td><td colspan="2">Negative</td></tr>
<tr><td>Type</td><td colspan="2">Direct/Indirect</td><td colspan="2">Direct/Indirect</td></tr>
<tr><td>Extent</td><td>Local</td><td>1</td><td>Local</td><td>1</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>2</td><td>Low</td><td>1</td></tr>
<tr><td>Duration</td><td>Short to medium-term</td><td>2</td><td>Short-term</td><td>1</td></tr>
<tr><td>Consequence</td><td>Low</td><td>5</td><td>Very Low</td><td>3</td></tr>
<tr><td>Probability</td><td colspan="2">Probable</td><td colspan="2">Probable</td></tr>
<tr><td>Significance</td><td colspan="2">Low</td><td colspan="2">Very Low</td></tr>
<tr><td colspan="6">Comparison to Original EIS: No change.</td></tr>
</table>

Impact: Potential public safety impacts as a result of Project construction and increased traffic volumes

Impact Assessment

Potential public safety risks as a result of Project construction and increased traffic volumes are primarily associated with the occurrence of accidents (from heavy machinery use and increased traffic volumes) and petty violence and GBV/SEA (from the concentration of labour at construction sites).

In terms of the increased traffic volumes, these risks are of concern particularly around the residential areas adjacent to the main routes that will be used by heavy vehicles and particularly if such vehicles are operative during the night-time period. Many of these roads have poor or no formal lighting, nor sufficient traffic lights or pedestrian crossings which will increase the associated safety risk.

Construction related risks associated with the concentration of labour, although considered very low, given the number of labourers, harbours risks, particularly in nearby residential areas, where there may be the opportunity for petty crime/violence and GBV/SEA committed by the Project labourers.

This increase in community hazard risk is considered of high intensity (as any death or serious injury caused by construction traffic would cause serious disruption of social functions and impact the Project and the Proponent's reputation), although of short-term duration (the increased risk will be limited to the construction phase, hence 18 months at maximum) and local extent. The significance is thus evaluated as low.

Mitigation Measures

Despite the low significance, all relevant mitigation will be implemented to mitigate the traffic-related safety risks associated with the construction phase. The same mitigation measures described to reduce traffic impacts will also lower the associated safety risks. To this effect, the EPC Contractor will develop and submit for Proponent's approval a Traffic Management Plan, detailing the management procedures and mitigation measures to minimize traffic related impacts. Among other issues, setting and enforcing speed limits for construction vehicles is essential, especially within and adjacent to residential areas, as well as placing traffic control staff on Project access routes that are near communities, to enforce the speed limits and help pedestrians and non-Project traffic to use the accesses safely. Where appropriate, the EPC Contractor shall deploy temporary mobile traffic lights and road lightings in critical areas or road sections to prevent accidents.

Prior to the construction phase, detailed and appropriate information related to traffic norms, speed limits and speed control procedures must be provided to operators and drivers, upon which services/employment must be made conditional. Additionally, where possible, install and maintain official traffic signs on new accesses that may be created to support the project construction, before and after the execution of the work, in conjunction with local transit authorities.

Further to the measures listed for the preceding traffic impact, the following additional measures will also be implemented:

- If an existing road or pedestrian access is cut due to Project construction activities, alternative routes will be provided, to restore pedestrian and road accessibility.
- The Project will implement Globeleq's corporate GBVH procedure for all labourers (including those subcontracted) and ensure all relevant labour policies are in place.
    - The GRM shall be fully communicated and implemented along the impacted areas to ensure stakeholders are aware of and able to seek recourse from the Project.

Impact Summary

The impact summary is provided in the following table. The mitigation measures will be capable of decreasing the probability of occurrence of accidents, lowering the residual significance to very low.

Impact: Potential public safety impacts as a result of Project construction and increased traffic volumes					
Criteria	Pre-mitigation assessment		Mitigation Measures	Post-mitigation assessment	
Nature	Negative		The EPC Contractor will develop and submit a Traffic and Transport Management Plan to the Proponent for approval. The EPC Contractor will then implement this plan throughout the construction phase.	Negative	
Type	Direct/Indirect			Direct/Indirect	
Extent	Local	1		Local	1
Intensity	High	3		High	3

Impact: Potential public safety impacts as a result of Project construction and increased traffic volumes					
Criteria	Pre-mitigation assessment		Mitigation Measures	Post-mitigation assessment	
Duration	Short-term	1	If an existing road or pedestrian access is cut due to Project construction activities, alternative routes will be provided to restore pedestrian and road accessibility. The Project will implement Globeleq's corporate GBVH procedure for all labourers (including those subcontracted) and ensure all relevant labour policies are in place. The GRM shall be fully communicated and implemented along the impacted areas to ensure stakeholders are aware of and able to seek recourse from the Project.	Short-term	1
Consequence	Low	5		Low	5
Probability	Probable			Possible	
Significance	Low			Very Low	
Comparison to Original EIS: No change.					

Impact: Risk of social conflicts elicited by the Project security personnel

Impact Assessment

One of the potential impacts associated with major developments is the potential risk of conflicts arising from the interactions of local communities with security workers, hired to safeguard construction personnel and property.

However, for the Namaacha – Boane Project this risk is generally low. Given the linear nature of the project (which will make it hard to establish large, concentrated construction camps in a single location) and the relatively low intensity and man-power requirements of the construction works, security arrangements will likely be contracted to local security companies. No use of police or military personnel, or even para-military security is planned or likely.

Local security companies are staffed almost exclusively with national personnel, which helps minimize the risk of social conflicts with local communities. So, while it is likely that security personnel will be deployed in the construction camps, these will be unarmed, national workers, whose main functions will be guarding the camps against thefts and similar issues. The risk of conflicts with local communities will be very low.

As such, this risk is assessed as negative, direct, of short-term duration (limited to construction phase), of local extent (limited to the construction yards and laydown areas, if different) and of medium intensity (as even if low risk, it may result in physical violence and potential human rights abuses), however its probability is considered possible, rendering the non-mitigated scenario, the impact is thus assessed to be of very low significance.

Mitigation Measures

Despite the very low significance rating, best practices are still applicable in what regards the risks associated with security personnel. As such, the following mitigation will be implemented:

- The EPC Contractor will develop a Security Management Plan, detailing the security arrangements to be deployed during construction. This plan will be compliant with IFC's PS 4, and with the UNGPs and ILO standards, regarding human rights and labour and, and will be submitted for the Proponent's approval, prior to start of construction. This plan will include mandatory training for all security personnel, in what regards human rights, proportionate force use and adherence to the Contractor's code of conduct.
- The Project will implement Globeleq's corporate GBVH procedure for all labourers (including those subcontracted) and ensure all relevant labour policies are in place.

Impact Summary

The impact summary is provided in the following table. It is expected that the impact will become improbable, and the intensity will decrease to low, with the application of the mitigation. The residual significance remains as very low.

Impact: Risk of social conflicts elicited by the Project security personnel					
Criteria	Pre-mitigation assessment		Mitigation Measures	Post-mitigation assessment	
Nature	Negative		The EPC Contractor will develop a Security Management Plan, detailing the security arrangements to be deployed during construction. This plan will be compliant with IFC's PS 4, and with the UNGPs and ILO standards, regarding human rights and labor and, and will be submitted for the Proponent's approval, prior to start of construction. This plan will include mandatory training for all security personnel, in what regards human rights, proportionate force use and adherence to the Contractor's code of conduct. The Project will implement Globeleq's corporate GBVH procedure for all labourers (including those subcontracted) and ensure all relevant labour policies are in place.	Negative	
Type	Direct			Direct	
Extent	Local	1		Local	1
Intensity	Medium	2		Low	1
Duration	Short-term	1		Short-term	1
Consequence	Very Low	4		Very Low	3
Probability	Possible			Improbable	
Significance	Very Low			Very Low	
Comparison to Original EIS: No change.					

Impact: Potential impacts on workers' health and safety during the construction phase

Impact Assessment

As previously stated, the Project's construction phase will likely require the mobilization of roughly 200 workers. Impacts on worker's health and safety could manifest as a result of inadequate implementation of existing labour standards by the EPC Contractor or from work related injury or health effects. Work accidents could occur during several of the planned construction activities, such as site preparation, excavations, vegetation clearance, waste and hazardous materials management, transportation and circulation or worksite restoration.

The main common causes of accidents in construction are:

- Working at height.
- Working in an unsecured excavation.
- Working on slippery surfaces.
- Accidentally falling objects.
- Moving heavy loads.
- Wrong working positions, often in confined spaces.
- Working on or near water (drowning).
- Encounters with dangerous fauna (i.e. venomous snakes).
- Working near live electrical wires and equipment (electrocution).

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

Child labour is also a risk during construction work that should be avoided at all costs. Child labour is described as having workers below 18 years of age. Therefore, child labour shall be strictly prohibited, and any case thereof should be reported to the Proponent by the individuals responsible for surveillance. The ultimate responsibility for preventing child labour lies with the EPC Contractor.

This potential impact on workers' health and safety is assessed as negative, direct, of short-term duration, of local extent (only the workers at the construction sites are potentially impacted) but of high intensity (as work accidents could result in serious injuries or even fatalities), resulting in a Low significance prior to mitigation.

Mitigation Measures

To mitigate the impact described above, it must be ensured that the labour and working conditions are of an acceptable standard. Specifically, the following mitigation will be implemented.

The EPC Contractor will develop and implement an Emergency Response Plan (as per the guidance given in the EMP – see Vol. III of this EIA).

The EPC Contractor will develop and implement a Health and Safety Management Plan to protect every worker involved in construction activities, even temporary workers. This plan will comply with national legislation, international best practices (OHSAS 18001:2007, NEBOSH or similar) and address all aspects of labour standards relevant to the project as specified by World Bank/IFC General EHS Guidelines and WBG/IFC Industry Sector Guideline for Electric Power Transmission. Sub-contractors will be contractually bound to comply with labour and health and safety legislation. Specific provisions must be included for:

- Supply drinking water and maintain its quality and ensure sanitation at the construction sites.
- Declaration of accidents through an accident reporting mechanism
- Handling domestic and specialized waste, as well as dangerous goods
- Procedures in case of injuries and accidents
- Secure equipment and demarcate any excavation work areas
- Sign and fence construction areas, where necessary

- Implement a long-term training program throughout the construction phase to ensure adequate training and qualification of all staff employed for the project. Specific training must be provided for working at heights and working around live power lines.
- Provide and ensure the use of appropriate personal protective equipment (PPE).
- Establish and develop a grievance mechanism for all workers.

Impact Summary

The impact summary is provided in the following table. The proposed mitigation lowers the intensity and probability of the impact/risk, resulting in a very low residual significance.

Impact: Potential impacts on workers' health and safety during the construction phase					
Criteria	Pre-mitigation assessment		Mitigation Measures	Post-mitigation assessment	
Nature	Negative		The EPC Contractor will develop and implement an Emergency Response Plan. The EPC Contractor will develop and implement a Health and Safety Management Plan to protect every worker involved in construction activities, even temporary workers. This plan will comply with national legislation, international best practices (OHSAS 18001:2007, NEBOSH or similar) and WBG General EHS Guidelines and WBG Industry Sector Guideline for Electric Power Transmission. Establish and develop a grievance mechanism for all workers.	Negative	
Type	Direct			Direct	
Extent	Local	1		Local	1
Intensity	High	3		Medium	2
Duration	Short-term	1		Short-term	1
Consequence	Low	5		Very Low	4
Probability	Probable			Possible	
Significance	Low			Very Low	
Comparison to Original EIS: No change.					

Impact: Potential impacts on people dependent on ecosystem services not otherwise assessed

Impact Assessment

As presented in Section 6.2.3.5, there are a number of ecosystems services present in the Project's area of influence. Some of these have been assessed elsewhere in Section 7, e.g. cultural ecosystem services and agricultural provisioning ecosystem services, and supporting and regulating ecosystem services have been scoped out due to the relative small land take compared to the wider ecosystems; however, the remaining provisioning ecosystem services require further evaluation.

Of the remaining provisioning ecosystem services identified in Section 6.2.3.5, two were flagged as high importance for the area: hunting and wood (i.e. charcoal) collection. The primary impact-generating activity that will affect these ecosystem services is vegetation clearance.

The construction of roads and line will require the clearing of vegetation in the RoW. All vegetation clearance will be limited to within the identified PPZ. It is expected that full vegetation clearance will likely occur within ~60-70% of the PPZ to allow for construction and laydown of materials. Most of this will be allowed to regrow back during the operational phase with the access road and the pylon footprints the only areas with 100% vegetation loss, and the 5 m immediately under the line being trimmed to prevent large tree grown (e.g. >4 m in height).

As expected, the percentages of the affected units are very similar to the percentages of these units cover at the study area, which means that these will be affected nearly in the proportion they occur. Referring to the vegetation mapping presented in Section 6.2.2.1, the estimated areas of habitat potentially subject to some degree of vegetation clearance are:

- Forest – 24.63 ha
- Bushveld – 136.5 ha

Given the relative abundance of similar bushveld habitats in the area, it is really only the vegetation clearance of forest areas that would be significant from an ecosystem services perspective.

It is important to note that the described losses of natural habitats are not avoidable by exploring alternative alignments. Considering the start and end points of the power line (Namaacha Wind Farm to the connection point at the Boane Substation), there are no possible alternative alignments that would avoid losses of undifferentiated woodlands.

Considering the above, this impact is assessed as negative, local, of small magnitude and of long-term duration (as these areas will be kept cleared until project decommission, after which they will naturally regenerate within 2 to 15 years, depending on the habitat), resulting in a Low significance.

Mitigation Measures

Whilst the pre-mitigation impact was assessed to have a Low significance, and therefore mitigation measures are not strictly needed to further reduce the impact, there are several recommended measures that could be implemented to further reduce the impact. The are as follows:

- Strictly limit the clearing of vegetation to the required areas, with particular emphasis of this in forested areas.
- After the Project clears any woody material, this should be left in a public location (to be agreed with local leadership) for the local communities to use.

Impact Summary

The impact summary is provided in the table below.

<table>
<tr><td colspan="6">Impact: Direct loss of vegetation units and habitats</td></tr>
<tr><td>Criteria</td><td colspan="2">Pre-mitigation assessment</td><td>Key Mitigation Measures</td><td colspan="2">Post-mitigation assessment</td></tr>
<tr><td>Nature</td><td colspan="2">Negative</td><td rowspan="5">Mitigation measures are not strictly needed to further reduce the impact, but there are several recommended measures that should be considered where practical:
• Strictly limit the clearing of vegetation to the required areas, with particular emphasis of this in forested areas.</td><td colspan="2">Negative</td></tr>
<tr><td>Type</td><td colspan="2">Direct</td><td colspan="2">Direct</td></tr>
<tr><td>Extent</td><td>Local</td><td>1</td><td>Local</td><td>1</td></tr>
<tr><td>Magnitude</td><td>Low</td><td>1</td><td>Low</td><td>1</td></tr>
<tr><td>Duration</td><td>Long-term</td><td>3</td><td>Long-term</td><td>3</td></tr>
</table>

Impact: Direct loss of vegetation units and habitats					
Criteria	Pre-mitigation assessment		Key Mitigation Measures	Post-mitigation assessment	
Consequence	Very Low	6	• After the Project clears any woody material, this should be left in a public location (to be agreed with local leadership) for the local communities to use.	Very Low	4
Probability	Definite			Definite	
Significance	Low			Very Low	
Comparison to Original EIS: This impact was not assessed in the original EIS Report (although the baseline data was presented). It has been added for completeness during this revision of the EIS Report.					

7.10.2. Operational phase

Impact-generating activities

The operational phase will have few activities with the potential to impact the socioeconomic environment. The main positive impact will be the increase in power supply in Maputo Province, which will help to stimulate development.

Once built, the transmission line will be handed over to EDM, that will be responsible for the maintenance and operation. The main works associated with transmission line operation are the maintenance of the OHL protection zone, tower and line inspections and line maintenance works. Control of vegetation regrowth is necessary to avoid disruption to the OHL and towers.

Impact: Creation of employment opportunities

Impact Assessment

The number of direct employment opportunities created by the Project during the operational phase will be very low. The operation of the overhead line will mostly be performed by EDM's existing personnel. Further to this, local teams may be employed to perform maintenance clearance of the protection zone and the substation will run with the existing workers.

While positive, this impact will be of local extent and low intensity, although of long-term duration. The resulting rating, considering the direct application of the adopted standardized impact assessment methodology, is low. However, given the very low number of jobs created, this impact is regarded as of very low significance.

Enhancement Measures

The adoption of the following enhancement measures is recommended that the Project:

- Develop a transparent, fair, non-discriminatory and ethical local recruitment plan. The recruitment plan shall be consistent with local labour legislation and international standards including the UNGPs and ILO standards (1 through to 17) and declarations.
- Ensure that employment opportunities are adequately advertised, so as not to limit application opportunities.
- Carry out the process of contracting staff in a transparent manner, following pre-established and accepted criteria.

Impact Summary

The impact summary is provided in the following table. The enhancement measures do not increase the significance rating, mostly given the very low number of jobs created.

Impact: Creation of employment opportunities					
Criteria	Pre-mitigation assessment		Enhancement Measures	Post-mitigation assessment	
Nature	Positive		Develop a transparent, fair, non-discriminatory and ethical local recruitment plan. The recruitment plan shall be consistent with local labour legislation and international standards including the UNGPs and ILO standards (1 through to 17) and declarations. Ensure that employment opportunities are adequately advertised, so as not to limit application opportunities. Carry out the process of contracting staff in a transparent manner, following pre-established and accepted criteria.	Positive	
Type	Direct			Direct	
Extent	Local	1		Local	1
Intensity	Low	1		Low	1
Duration	Long-term	3		Long-term	3
Consequence	Low	5		Low	5
Probability	Definite			Definite	
Significance	Very Low			Very Low	
Comparison to Original EIS: No change.					

Impact: Regional economic stimulation, due to increase in power availability

Impact Assessment

The Namaacha - Boane 66 kV powerline will evacuate the renewable energy generated at CEN in Namaacha to Boane substation, improving the evacuation of power generated within the southern region and subsequent future distribution. By injecting electricity generated from a renewable source into the grid, the project will indirectly contribute, cumulatively with the wind farm, to lower the current external dependence on fossil fuels to produce energy, which is a national priority in economic terms and also regarding climate change mitigation.

This increased power availability, facilitated by the Project, will have a positive impact on the economy and quality of life of Maputo province. On current conditions, the power supply in some areas is weak or even non-existent. The Namaacha - Boane Project will allow for the increase of power supply in Maputo Province and will allow a better distribution of power in areas which are currently not electrified, through the existing or new substations, from which distribution schemes can be developed at a later date.

This, along with the required maintenance activities, can also create business opportunities, mainly related with electrification and the acquisition of construction materials.

All these vectors of economic stimulation will in turn result in the creation of jobs.

This is thus a positive indirect economic impact, of long-term duration, of regional extent and of medium intensity, resulting in a high significance.

Enhancement Measures

No enhancement measures are required for this positive impact.

Impact Summary

The impact assessment summary is provided in the following table.

Impact: Regional economic stimulation, due to increase in power availability					
Criteria	Pre-mitigation assessment		Enhancement Measures	Post-mitigation assessment	
Nature	Positive		No enhancement measures are required for this positive impact.	Negative	
Type	Indirect			Indirect	
Extent	Regional	2		Regional	2
Intensity	Medium	2		Medium	2
Duration	Long-term	3		Long-term	3
Consequence	High	7		High	7
Probability	Probable			Probable	
Significance	High			High	
Comparison to Original EIS: No change.					

Impact: Risks to community health and safety due to encroachment into the Protection Zone

Impact Assessment

As previously discussed, during the operational phase a 70 m wide safety protection zone along the power line will have to be maintained and enforced, in order to minimize risks to the transmission infrastructure but also to protect neighbouring communities in the event of an accident (e.g., the fall of a tower or the rupture of a power cable).

One common phenomenon, however, is the progressive encroachment in the protection zone. If uncontrolled, people will tend to start encroaching into the apparently unoccupied area, including building houses and other structures which poses a risk to both the power line and the infrastructures, in case of malfunction or accident.

This risk is assessed as a negative impact, indirect, of long-term duration, of local extent (applicable only to any house that encroaches into the protection zone), of high intensity (as any incident could result in serious injuries or even fatalities), but of low probability (possible) resulting in a medium significance prior to mitigation.

Mitigation Measures

This risk can be effectively mitigated by enforcing the restrictions to building houses in the protection zone. The encroachment into the restricted areas that may constitute a risk to the OHL is already one of the aspects that will be monitored during the planned technical inspections to the power line. As such, no further mitigation is required. The restrictions to new construction in the protection zone will be strictly enforced, in order to also safeguard community health and safety and also the line's integrity and safety.

Impact Summary

The impact summary is provided in the following table. With periodic inspection of the protection zone and control of encroachment, the intensity drops to low, resulting in a very low residual significance.

Impact: Risks to community health and safety due to encroachment into the Protection Zone					
Criteria	Pre-mitigation assessment		Mitigation Measures	Post-mitigation assessment	
Nature	Negative		Monitor encroachment of infrastructure into the protection zone and strictly enforce the restrictions.	Negative	
Type	Indirect			Indirect	
Extent	Local	1		Local	1
Intensity	High	3		Low	1
Duration	Long-term	3		Long-term	3
Consequence	High	7		Low	5
Probability	Possible			Improbable	
Significance	Medium			Very Low	
Comparison to Original EIS: No change.					

Impact: Potential impacts on workers' health and safety

Impact Assessment

During the operational phase, risks to workers' health and safety will mostly be associated with maintenance works in the transmission line, with the normal operations of the substations, transportation and circulation of workers and waste and hazardous materials management, hence it will not differ from the same risks already assessed for the construction phase.

EDM workers could be exposed to these accidents at the worksite. However, EDM already operates many similar infrastructures (both substations and transmission lines) across Mozambique, and as such already has suitable health and safety procedures and practices in place to address these health and safety risks. The application of the same existing procedures to the Project should help prevent or reduce the probability of accidents from occurring.

In the non-mitigated scenario, the potential impact on workers' health and safety during operations is assessed as negative, direct, of long-term duration, of local extent but of high intensity (as work accidents could result in serious injuries or even fatalities), resulting in a high significance.

Mitigation Measures

As stated above, EDM already has suitable health and safety procedures and practices in place to address the health and safety risks of the operation of substations and transmission lines, as they already operate similar infrastructure. These procedures and practices will be applied to the Project. No additional mitigation is required.

Impact Summary

The impact summary is provided in the following table. The mitigation lowers the intensity and probability of impact occurrence, resulting in a low residual significance.

Impact: Potential impacts on workers' health and safety					
Criteria	Pre-mitigation assessment		Mitigation Measures	Post-mitigation assessment	
Nature	Negative		Implement EDM's existing health and safety policies and procedures for the operation of substations and transmission lines.	Negative	
Type	Direct			Direct	
Extent	Local	1		Local	1
Intensity	High	3		Medium	2
Duration	Long-term	3		Long-term	3
Consequence	High	7		Medium	6
Probability	Probable			Possible	
Significance	High			Low	
Comparison to Original EIS: No change.					

7.11. Decommissioning Phase

As described in Section 4.5, the design lifetime of the infrastructure is 35 years, although this may be prolonged via maintenance and/or upgrades. The Project's decommissioning phase is thus likely to occur in a relatively distant timeframe, and as such the degree of confidence regarding the activities to be developed at that stage is relatively low. In general, however, the decommissioning phase will likely include the following activities:

- Removal of foundations and towers;
- Removal of wastes and decontamination of sites;
- Disposal of wastes and hazardous materials, in adequate waste disposal facilities; and
- Devolution and reuse of RoW, in line with the proposed end use.

Given the distant timeframe of these activities, a Decommissioning Plan should be developed by EDM prior to decommissioning, which should include all specialist studies required to guide the decommissioning activities and minimize their environmental and social impacts. Decommissioning will be done according to the relevant environmental policies and technical procedures relevant at the time of decommissioning.

The decommissioning of the infrastructure will involve some construction-like activities, mainly dismantling equipment, some demolitions (likely restricted to the tower's foundations), and cleaning/rehabilitating the project affected areas, which can typically cause some localized negative impacts similar to the ones expected for the construction phase, but normally with less extent, intensity and duration, resulting in a lower significance (which is already generally low in construction, as assessed previously).

The most obvious examples of impacts from decommissioning are dust and noise from construction equipment and truck traffic, which can originate nuisances to the sensitive receptor that may exist around the sites or road accesses at the time, but typically short-termed and of low significance. Apart from the short period of air and noise emissions, no other relevant emissions are expected that can cause significant impacts on soils, water resources and or biodiversity. Water and wastewater management plan will be prepared as part of the plan for decommissioning activities.

7.12. Impact Assessment Summary

This section presents a summary of all impacts assessed for the Project, including pre and post-mitigation assessments. It further presents the proposed key mitigation in order to facilitate a global perception of the Project's impacts. The impact assessment summary is presented in tabulated form, separated by environmental component and per project phase in the following tables.

Table 100: Summary of Project impacts – Construction Phase

#	Impact Description – Construction Phase	Significance Rating		Nature of Impact
		Pre-mitigation	Post-mitigation	
Climate and Climate Change				
	GHG emissions during the construction phase	Very Low	Very Low	(-)
Air Quality				
	Increase of dust emissions near sensitive receptors	Very Low	Very Low	(-)
	Increase in atmospheric concentrations of exhaust gases from vehicle and equipment operation	Very Low	Very Low	(-)
Noise				
	Increase of noise levels near sensitive receptors during construction	Low	Very Low	(-)
Geology				
	Potential slope instability	Very Low	Insignificant	(-)
	Adverse effects on geological heritage or mineral resources	High	Insignificant	(-)
	Changes in erosion, transport and sedimentation processes	Low	Insignificant	(-)
Soils				
	Impacts on irrigation lands and on soils with suitability for irrigation	Low	Insignificant	(-)
	Increased soil erosion and compaction	Very Low	Insignificant	(-)
	Potential soil contamination	Very Low	Insignificant	(-)
Water Resources				
	Changes to natural run-off patterns and water bodies	Low	Insignificant	(-)
	Accidental contamination of surface and/or ground waters	Low	Very Low	(-)
	Increase of suspended sediments in water bodies	Low	Very Low	(-)
	Changes in groundwater recharge	Insignificant	Insignificant	(-)
Landscape				
	Temporary degradation of landscape at worksites	Low	Very Low	(-)
Biodiversity				
	Wetlands and riverine areas degradation	Medium	Very Low	(-)
	Direct loss of vegetation units and habitats	Medium	Very Low	(-)
	Degradation of nearby vegetation units	Insignificant	Insignificant	(-)
	Reduction of feeding, breeding and roosting areas	Medium	Low	(-)

#	Impact Description – Construction Phase	Significance Rating		Nature of Impact
		Pre-mitigation	Post-mitigation	
	Increased fauna mortality and decreased species diversity	Low	Very Low	(-)
	Possible introduction or spread of invasive species in the Project area	Very Low	Insignificant	(-)
	Exclusion of fauna species due to increase of disturbance	Very Low	Insignificant	(-)
Socio-economic environment				
	Involuntary economic resettlement as a result of the establishment of the transmission line's Protection Zone	Medium	Low	(-)
	Creation of employment opportunities	Very Low	Very Low	(+)
	Transfer of skills to local communities due to mobilization of construction workforce	Medium	Medium	(+)
	Local and regional economic stimulation due to construction expenditure	Very Low	Low	(+)
	Loss of cultural heritage sites	Medium	Low	(-)
	Increase in road traffic and potential damage to existing roads and other public infrastructures	Low	Very Low	(-)
	Potential public safety impacts as a result of Project construction and increased traffic volumes	Low	Very Low	(-)
	Risk of social conflicts elicited by the Project security personnel	Very Low	Very Low	(-)
	Potential impacts on workers' health and safety during the construction phase	Low	Very Low	(-)

Table 101: Summary of Project impacts – Operational Phase

#	Impact Description – Operational Phase	Significance Rating		Nature of Impact
		Pre-mitigation	Post-mitigation	
Noise				
	Wind-induced noise	Low	Very Low	(-)
Landscape				
	Permanent alteration to the landscape	Medium	Low	(-)
Biodiversity				
	Indirect degradation of vegetation units and habitats along the RoW	Very Low	Insignificant	(-)
	Increased mortality of bird and bat species due to collisions and electrocution	Medium	Low	(-)
	Habitat fragmentation due to the presence of the RoW	Medium	Low	(-)
Socio-economic environment				
	Creation of employment opportunities	Very Low	Very Low	(+)
	Regional economic stimulation, due to increase in power availability	High	High	(+)
	Risks to community health and safety due to encroachment into the Protection Zone	Medium	Low	(-)
	Potential impacts on workers' health and safety	High	Low	(-)

7.13. Cumulative Impacts

7.13.1. Potential Cumulative Effects on Valued Environmental and Social Components

Cumulative impacts are those that result from the successive, incremental, and/or combined effects of an action, project, or activity in combination with other existing, planned, and/or reasonably anticipated future ones.

According to IFC (2013), a cumulative impact assessment (CIA) is the process of:

- Analysing the potential impacts and risks of proposed developments in the context of the potential effects of other human activities and natural environmental and social external drivers on chosen Valued Environmental and Social Components (VECs) over time; and
- Proposing concrete measures to avoid, reduce, or mitigate such cumulative impacts and risks to the extent possible.

Because it is unrealistic to think that every environmental and social component can be subjected to a cumulative impact assessment, it is good practice to focus on VECs. VECs are sensitive or valued receptors of impact. In other words, they are environmental and social aspects that are considered to be important in assessing the risks and may include physical features, biodiversity (e.g., habitats or wildlife populations), ecosystem services, natural processes (e.g., water and nutrient cycles, microclimate), social conditions (e.g., health, economics), or cultural aspects (e.g., traditional spiritual ceremonies).

The key analytical task is to discern how the potential impacts of a proposed development may combine cumulatively with the potential impacts of existing or future project within the project area of influence. To a certain extent, cumulative impacts with other human activities and other natural stressors such as droughts or extreme climatic events may need to be addressed. Other human activities of greatest importance in a cumulative impact assessment are those that (a) will occur in the future, or, if already existing, have ongoing influences on the environment in the future, and (b) are expected to interact with the same VECs in the future as does the development under assessment.

The selection of the VECs to consider in this assessment was based on *(i)* their biophysical and/or socioeconomic importance in the areas crossed by the proposed Project, *(ii)* the degree of impact on the VEC resulting from the proposed Project and *(iii)* the findings of the EIA public consultation activities. As the goal is to assess cumulative impacts, in principle only VECs which are significantly affected by the proposed Project should be considered. This means that, in principle, only VEC's for which the Project is expected to generate relevant negative or positive residual impacts should be included in the assessment (i.e., environmental and social aspects with residual impacts of medium or higher significance).

However, considering the transmission line project's inherent interconnectedness with the CEN wind power plant, exceptions to this were impacts associated with habitat loss and fragmentation and avifauna, which were all assessed to be of low residual significance but were included in the analysis, given the concerns regarding potential cumulative impacts. In the same way, impacts on employment were also included, as obvious cumulative impacts will arise.

A total of 3 VECs have been selected for the current assessment: They are listed below, along with the indicative aspects that will be considered for the evaluation of cumulative aspects (the indicative aspects reflect the way in which the Project impacts the VEC):

- <u>Flora and vegetation</u>. Indicative aspect: loss of habitats and habitat fragmentation;
- <u>Avifauna</u>. Indicative aspect: decrease of populations (increased mortality);
- <u>Local communities and socio-economic impacts.</u> Indicative aspects: employment opportunities; resettlement impacts; Economic and social development due to increased electricity supply.

The cumulative impact assessment also requires that a realistic area and time period be established within which present and future projects are identified, i.e., the definition of spatial and time boundaries, as per IFC (2013). These were defined as follows:

- Spatial boundary - the Project's Area of Indirect Influence (AII), i.e. the territory of the Districts crossed by the OHL route was selected (please see Section 4.1.3). This is the widest area where Project impacts will be felt, and thus that cumulative impacts with other projects can be generally expected;
- Time boundary - a period of 5 years was selected, as the predictions of new projects and developments beyond that timeframe is very uncertain. However, cumulative impact assessment (CIA) will consider the project's expected lifespan, at least 35 years.

As far as relevant planned new developments for the area of interest (Districts crossed by the Project):

- The CEN wind power plant (CEN WPP), a 120 MW wind farm within a site of approximately 855 ha near Namaacha town The generated electricity from this power plant will be evacuated by the 66kv transmission line. The wind farm followed its own EIA process and has already secured its environmental license from the MTA.

No other major developments that might generate relevant interactions with the proposed Project are known to be planned for these districts [19]. However, it is likely that the 66 kV Namaacha – Boane transmission line will contribute to the development of the distribution electric grid, and as such the following generic development was considered:

- Continuous development of the secondary electric grid, enabled by the new transmission lines.

In terms of existing vectors of human development, which may have cumulative impacts with the Project, these include:

- The continuous expansion of the major urban centres in these districts, both from natural growth and from migration from rural areas; and
- The increasing clearance of woodlands, due to the expansion of slash and burn agricultural practices and the exploitation of natural resources, namely firewood collection and charcoal production. This occurs in all concerned districts.

The potential effects of these planned projects and development vectors on the selected VECs are listed in the table below.

Table 102: Potential effects of planned development and vectors of development on VECs

Planned projects and vectors of development	Potential Effects on VECs		
	Flora and vegetation	**Local communities and socio-economic impacts**	**Avifauna**
The CEN wind power plant	o Local loss of habitats and habitat fragmentation	o Local resettlement impacts o Employment opportunities o Increased electricity supply; Economic and social development	o Loss of habitats o Increased avifauna mortality
Development of secondary electric grid	o Localized loss of vegetation	o Typically, no relevant resettlement impacts, as the RoW for the secondary grid is much smaller and typically low voltage power lines routes follow existing roads	o May have some localized impacts on avifauna mortality, but much lower than that caused by high-voltage power lines

[19] Note that the STE Project Phase I – 400 kV OHL Vilanculos - Maputo is likely to be implemented in the near future, but despite terminating in the eastern edge of Boane District (Maputo substation, at Beluluane) does not seem capable of having relevant interactions with the Namaacha – Boane 66 kV line.

		○ Increased access to electricity; Economic and social development	
Expansion of major urban centers	○ Increased loss of natural habitats	○ Not applicable	○ Loss of habitat, but no direct impact on avifauna mortality
Clearance of woodlands due to farming and natural resources exploitation	○ Increased loss of woodland habitats	○ Not applicable	○ Loss of habitat, but no direct impact on avifauna mortality

7.13.2. Assessment of Cumulative Impacts on VECs

Evaluation of cumulative effects takes into consideration the potential impacts that could be generated by the Project and adds those generated by the identified planned developments and vectors of human development.

7.13.2.1. Flora and Vegetation

Impacts on flora and vegetation resulting from the Namaacha – Boane 66 kV Project include:

- Direct loss of vegetation units and habitats (mostly undifferentiated woodlands, after agricultural land) during the construction phase, due to the clearance of the RoW. This negative impact was assessed to be of *medium* significance, prior to mitigation, with a residual very *low* significance impact remaining after mitigation;
- Indirect degradation of natural habitats (mostly undifferentiated woodland habitats) along the RoW during the operational phase, in particular due to the expanse of agriculture and natural resources exploitation along the RoW, given the increased ease of access to presently inaccessible areas. This negative impact was assessed to be of *very low* significance, prior to mitigation, with a residual insignificant impact remaining after mitigation;
- Habitat fragmentation, caused by the establishment and maintenance of the RoW, translating into a linear long corridor with modified vegetation, which will likely be composed of secondary shrub (as the growth of larger trees will be controlled through maintenance activities. This negative impact was assessed to be of *medium* significance, prior to mitigation, with a residual *low* significance impact remaining after mitigation.

The identified projects and vectors will affect this VEC as follows:

- The CEN wind power plant will result in similar impacts regarding loss of vegetation (mostly degraded acacia woodland) but globally of lower magnitude, generally insignificant after mitigation. No fragmentation impacts are expected.
- The development of the secondary grid may result in localized loss of vegetation, but no relevant impact at habitat level is expected, as typically the secondary grid develops along existing roads;
- The expansion of urban areas, and of agriculture and natural resources exploitation, will result in a progressive loss of natural habitats, in particular woodland habitats, in the areas surrounding urban centres. Depending on the way these areas expand, they could also cause fragmentation of habitats. This aspect, however, is impossible to assess without the knowledge on how exactly human presence will expand in this territory.

The direct loss of habitats caused by the Project will have a cumulative effect with the losses of habitat caused by the listed development and vectors of human development. However, the cumulative effect is not anticipated to be significant.

7.13.2.2. Avifauna

Potentially relevant impacts on avifauna are the increased mortality of birds (particularly birds with large wing spans) and bats, due to collisions and electrocution with the overhead line and towers. This impact is one of the major impacts of high-voltage power lines and is typical of this project typology. The conducted assessment concluded that the pre-mitigation negative impact could be of medium significance, but the proposed mitigation measures would be able to reduce it to low.

In a similar way, bird and bat mortality (due to collisions) and disturbance are also one of the main negative impacts associated with wind farms. These impacts for CEN wind power plant have been assessed as having low to moderate significance negative impacts prior to mitigation but resulting in low to insignificant residual impacts considering the proposed measures.

In face of the above, it is not expected that the cumulative effect between the two projects will be able to significantly increase the individually anticipated impacts, thus keeping the residual cumulative impact of low significance.

No other considered planned project or vector of development has a similar direct impact on bird mortality. The secondary electric grid may result in a small increase of bird mortality, but localized and of a much lower intensity than the WPP and the 66 kV OHL, due to the different characteristics of the line infrastructure. All the vector of development will likely result in loss of habitats over time, which could result in an indirect cumulative impact on bird and bat populations, but this effect is expected to of minor relevance.

7.13.2.3. Local communities and socio-economic impacts

The most important impact of the Project on local communities are the one deriving from resettlement - the loss of dwellings and other built infrastructure, as well as agricultural plots and businesses - due to the clearance of the RoW. This negative impact was assessed to be of *high* significance, prior to mitigation, with a residual *medium* significance impact remaining after mitigation.

The CEN wind power plant project is expected to also require resettlement of receptors being affected by the shadow effect, noise, or both. Initial studies indicated around 30 cases, still to be confirmed in the RAP phase. There may also be PAPs that require resettlement for both the transmission line and the wind farm itself.

While these numbers will sum up, particularly in the Namaacha District, they are considered to still translate into a residual medium significance impact, admitting the correct implementation of the correspondent RAPs, as proposed in the EIA/RPF.

Concerning employment opportunities:

- The 66 kV OHL will have a construction workforce estimated to reach a peak of 200 people (spread over an 18-month period), backed by indirect jobs, that may reach 1,5 to 2 times the number of direct jobs. Nevertheless, the positive direct and indirect impact on employment was assessed as of very low significance even post enhancement.

- Considering the wind farm's construction, to be deployed in parallel, this number can rise to around 330, highlighting a cumulative impact between the two projects. The wind power plant's EIS considers the positive impact on employment as of high significance after enhancement.

As for economic and social development, both developments go in the same direction, combining synergies to boost the regional energy sector, by providing clean energy and reducing dependence on fossil fuels for power generation, which is a national priority in economic terms and also regarding climate change mitigation. A wide range of cascading indirect impacts will be stimulated by increased power availability, such as general economic development, that by its turn will create jobs/income, demand for a wide range of products and services, tax revenue, social development, etc. This will confirm an expected high significance cumulative positive impact.

8. Public Participation Process

8.1. Introduction

Public participation Process (PPP) is one of the key components of an EIA process. It involves relevant stakeholders, including those interested in or affected by the proposed project, in terms of opportunities, risks, and issues of concern. Public participation thereby assists the Project team to take into accounts relevant local conditions instead of imposing project designs that potentially pose risks and impacts to environment and social receptors. Fulfilling the basic requirements of public participation is a legal requirement, and failure to address this aspect can create significant risks to project development.

The PPP undertaken in this EIA process was developed according to Mozambican EIA Regulations and in line with international best practices. The relevant documents that guided the PPP were the following:

- General Guidelines for Public Participation Process in the EIA process, Ministerial Diploma No 130/2006: this diploma provides the guidelines to be followed in any PPP undertaken as part of an EIA process, as regulated by Decree 54/2015;
- Equator Principle (EP4 revision) 5 (Stakeholder Engagement), which states that public consultation with project affected communities shall be well structured and undertaken in a culturally adequate manner;
- IFC's Performance Standard 1 (Assessment and Management of Social and Environmental Risks and Impacts); and
- AfDB's Operational Safeguard 1 (Environmental and Social Assessment).

The main objectives of the consultation process are to inform affected communities of the proposed activities and their potential impacts, allowing them an opportunity to present their views, concerns, and expectations regarding the project. This process is critical for the development and promotion of trust between the Project and the affected communities. The table below summarises the wider objectives of the PPP.

Table 103: Summary of PPP Objectives

OBJECTIVE	DETAIL

Identify influential and affected people	Involving as many stakeholders as possible can facilitate good communication and capture a wider range of issues and concerns. Interaction with stakeholders should aim to represent the perspectives of all stakeholders, including relevant civil society groups.
Disseminate accurate information about the project	Ensure that information is available to the stakeholders in their local languages, particularly those directly affected by the proposed project, to allow them to make appropriate comments and enable them to plan for their future, thereby reducing levels of uncertainty and anxiety. The information should allow parties to develop an understanding of the potential impacts, risks, and benefits of the Project.
Collect relevant information for technical and environmental studies	Identifying issues through people familiar with the local environment and social context, and including them in the scope of the assessment, ensures expert focus on relevant issues. It is also important to ensure the best appropriate Project design and management.
Promotion of constructive interaction between all parties	Developing a relationship of trust between the developer and I&APs contributes to proactive interactions and avoids, where possible, unnecessary conflicts based on rumours and lack of information. Identifying structures and processes for resolving conflicts and complaints, rather than stonewalling disputes, can provide a better understanding of *stakeholder* concerns and expectations, thereby increasing the opportunities to enhance the benefit of the Project for them.
Record and respond to the public's concerns, questions, and suggestions	Documentation of stakeholder issues allows for follow-up and justification of Project decisions and provides the opportunity for participants to track the inclusion of their input into the planning and design process. This documentation reduces the potential concern of stakeholders that their consultation is merely a token gesture by developers to comply with legal requirements.
Manage stakeholders' expectations	Maintaining realistic expectations (e.g., about employment opportunities, provision of local infrastructure, social development, disruption to daily life and applicable compensation), limits disillusionment and frustration of directly affected parties at later stages of Project implementation. Frustration and unrealized expectations are conflict instigating factors and require mitigation and management, which can be avoided through proper PPP.
Comply with national and international public consultation requirements	Ensuring compliance with regulatory standards can avoid potential project delays resulting from purely procedural issues.

In accordance with national legislation and in line with international best practice and standards, the Project requires public participation and stakeholder engagement during the various stages of the Project's lifespan and in relation to specific Project activities. Given the nature of the Project, participation and engagement with stakeholders has been carried out in accordance with national legislation and the licensing procedure. This has been supplemented by regular community engagement carried out in accordance with the Project's Stakeholder Engagement Plan (SEP).

8.2. PPP for the National EIA Process

In accordance with Ministerial Diploma No. 130/2006, the PPP for the original EIA process includes consultation in two phases: early in the EIA process (Scoping/EPDA Phase) and again during the EIA/EIS phase. This is also in accordance with Equator Principle 4, which states that disclosure should occur early in the assessment process and on an ongoing basis during the preparation of EIA.

The overall PPP as per national legislation includes:

- Mapping and identification of stakeholders.
- Definition of engagement principles and methodology.
- The disclosure and availability of documentation for a 30-day period (15 days prior to and after public meetings).
- Public meetings and other stakeholder engagement activities, including community level stakeholder engagement.
- Inclusion of issues raised in the public meetings on the reports drafted as part of the EIA process; and
- Documenting stakeholder concerns, issues, and feedback/input.

Table 104: Public meetings held as part of the national PPP

Location	Venue	Date	No. of participants
EPDA (Scoping) Phase			
Namaacha	Centro de Formação de Professores	13/12/2022	49
Boane	Boane District Administration Meeting Venue	14/12/2022	37
EIA/EIS Phase			
Namaacha	Centro de Formação de Professores	18/10/2023	40
Boane	Boane District Administration Meeting Venue	19/10/2023	38

8.2.1. PPP during EPDA Phase

The PPP for the EPDA phase was undertaken in December 2022. The main activities of the PPP for the EPDA phase were as follows:

- Compilation of stakeholder database
- Disclosure of the Draft EPDA report
- Media advertisement for the public meetings
- Telephone follow-up calls to confirm the reception of invitations
- Public meetings
- Written comments reception period
- Compilation of the PPP Report and its integration in the EPDA Final Report

The Draft EIS Report, following the EPDA phase, was compiled to support the PPP activities of the EIS phase.

The main questions, suggestions and comments raised during the EPDA public participation are summarised in the table below.

Table 105: Feedback from EPDA Public Consultation

Component	Main questions (Q), concerns, comments (C) and suggestions (S) raised	Project reply/comments
Technical aspects	1. Opportunities to build a substation in Namaacha (C) 2. Concerns about the concrete poles that are being placed along the road, whether they belong to the project or not (Q) 3. Evaluation of the possibility of energy support to the Kingdom of Eswatini, considering that in times of water shortages these have increased the river flows to Mozambique (S) 4. Liaise with CFM regarding their future projects that may interfere with the line (S)	1. The cost-benefit of having a substation in Namaacha will be evaluated by EDM. 2. EDM has a project called Neighbourhood Energy Expansion and the mentioned poles that are being installed are part of that project. 3. The generated energy will be sold to EDM who is responsible for distribution. The project is viable not only for domestic consumption, but also to export. 4. Institutions/activities where the transmission line can cause possible impacts will be approached in due time, including CFM, as was the procedure followed in the wind farm project.
Environ-mental aspects	5. Analyse the risk of contributing to global warming due to the trees felling (S)	5. This is a renewable energy project and has little impact on CO2 emissions. This project has no relevant impact on global warming, but (the wind farm and line) helps in reducing the carbon dioxide emissions (in the case from electricity production sector) that drives global warming.
Socio-economic aspects	6. The consideration of a Security Plan for potential threats (during construction works and during operation (S) 7. The potential use of the right-of-way for illegal activities and the role of the Mozambique Police (C) 8. Expectations regarding employment; Hiring of local workforce and involvement of local leaderships in the recruitment; preparation of local youth to assist on the project construction (C) 9. Questions and recommendations regarding the resettlement process; Conducting a fair and transparent process (involving communities and leaders) (Q/S) 10. Benefits of the project for the districts (Q) 11. Allocation of energy at a lower price to affected communities (S) 12. Corporate Social Responsibility: Support for the communities where the project will cross: Construction of health units and schools; energy allocation (a direct connection from the wind farm to the communities) (S)	6. A security company will be hired for this purpose. 7. Regarding the safety of the poles and exclusion zones, we´ll study and design the best mitigation measures to be applied. However, the operation and management of the lines will be undertaken by EDM which has already a plan being implemented in other operations. This also involves the integration of Mozambican Police and the existence of safety components in the equipment, such as fences and others. 8. The goal is to hire local young people and to involve the local leaderships in the recruitment process. The project expects to employ around 400 people in the construction phase of the transmission line. The maintenance and operation of the transmission line will be done by EDM. 9. Will be incorporated in the next phases of resettlement 10. EDM already has an expansion and distribution plan for energy, which may account for distribution to Namaacha and other areas that currently doesn't have this resource. 11. The cost of energy is not defined by the producer, but by ministerial decree and is standard for the whole country, therefore the cost of energy is set at the level of EDM, by the Ministers Council and Ministry of Mineral Resources and Energy. 12. The proponent will have some social responsibility activities and actions. Under these activities, the proponent can create local development fund considering some benefits such as the construction of a football field, schools, etc. A community development plan will be prepared in coordination with districts, local leaders and communities. The allocation of energy may also be considered, through EDM projects and the communities located close to the transmission line are considered.

The raised questions, suggestions and comments were considered in the EIA preparation, especially in Section 7 (impact assessment and mitigation measures).

8.2.2. PPP during EIS Phase

8.2.2.1. Disclosure of the Draft EIS for Comments

The Draft EIS, along with a Non-technical Summary (NTS), was made available to stakeholders to allow public analysis and comments. These documents were available at the following venues:

- National Directorate for the Environment (DINAB - MTA) in Maputo.
- Maputo Provincial Environment Services.
- Namaacha District Administration;
- Boane District Administration; and
- Consultec's office in Maputo.

Additionally, the EIS Draft Report was available on Consultec's website (www.consultec.co.mz) throughout the consultation period. The website was be mentioned in the public announcement. The Draft EIS was available for comment 15 days prior to the public meetings. The documents were available for an additional 15 days after the public meetings to allow for any written comments.

Advertisements were placed in Mozambique's main newspaper (*Jornal Notícias*) in the two weeks preceding to the public meetings to notify the public of the draft EIS and planned meeting. In addition, individual invitation letters and facsimile were sent to all stakeholders on the stakeholder database developed during the EPDA process. During the week prior to the consultation meetings, telephone calls were made as a follow up.

8.2.2.2. Public Meetings

The meetings took place on October 18th and October 19th, 2023, 15 days after the disclosure of the Draft EIS Report. The consultation meetings were conducted face-to-face using an audio-visual presentation covering the Project and the main findings of the EIS Draft Report. A Non-Technical Summary (NTS) was distributed to all meeting participants to allow a better understanding of the project.

The presentation was followed by an open question and answer period, during which the attendees were encouraged to express their views and to raise questions and concerns regarding the project and the EIA process.

At the end of the meetings, attendees were informed that further comments and suggestions could be sent by either e-mail, fax or postal address till the next 15 days after the meetings (2nd of November 2023).

The feedback received as a result of this consultation process is summarised in the table below.

Table 106: Feedback from EIS Public Consultation

Main questions (Q), concerns, comments (C) and suggestions (S) raised	Project reply/comments
1. Questions and concerns related to removal of trees and mitigation suggestions, such the Project to support community forests (Q/C/S)	1. For safety reasons of the infrastructure and the communities, the right-of-way must be free of vegetation, namely trees and taller shrubs. The resulted impacts were assessed in the ESIA and overall deemed as of low significance. This area cannot be replanted, but several mitigation measures were proposed (see EMP), such as limiting soil clearing as much as practicable and sticking the strictly required areas for safety reasons, minimizing the opening of new access roads by using the existing tracks whenever possible. After construction, trees and shrubs species, whose height is limited to around 4 m, should be allowed to re-establish in the right-of-way. Temporary working areas (i.e., outside the row) should be rehabilitated/revegetated as soon as practical. Trees of economic value were surveyed and will be compensated. The suggestion for the Project to support community forests was duly noted and may perhaps be integrated in the CEN's social responsibility plan / community development plan that is currently being developed, in coordination with the District Government and Namaacha Municipality. Additionally, the sustainable use of the felled trees by the communities is possible but must be coordinated with the local authorities. A new measure was included in the Environmental Management Plan to ensure this.
1. Concerns related to the conditions that will be created in the resettlement sites, such as the availability of water, to avoid conflicts within the resettled population (C/S) 2. Safety concerns and restrictions on local access routes (Q/C)	1. The selection of a host area will be done in the next step of the Resettlement Process (RAP) and will have a number of decision factors into consideration. Regarding the host areas, it should be mentioned that this is not an activity developed only by the consultant. The selection of a host area is defined jointly by a committee consisting of the Government structures through SDAE and SDPI, the proponent, the communities to be resettled and the local structures, as well as the consultant. The decision of the host area is not only made by the companies of the Project, but together, so that there is a common understanding and satisfaction of the people to be resettled. This is what the resettlement law requires. 2. The potential restrictions on the project area may be related to the construction phase, to ensure safety. They are only safety restrictions and not a ban on passage or use of access roads. If for any reason some access road to land must be restricted, an equivalent alternative will be provided. As mentioned in the EIA (See EMP) the Contractor must develop a Traffic and Transportation Management Plan, detailing the management procedures and mitigation measures to minimize traffic related hazard risks to communities. In the operation phase, the maintenance and inspection activities of the line will be carried out by EDM, with the support of PRM, in patrolling and ensuring safety on access roads.

8.3. Supplemental Consultation for the Transmission Line Route Change

From 30 September – 2 October 2024 the Project carried out a series of Focus Group Discussions (FGDs) with each of the communities affected by the proposed changes to the transmission line route (eight communities in total). These meetings were held in the local community circles and conducted in both Portuguese and Changana to facilitate ease in participation for community members. In each community separate FGDs were held with local leadership and community representatives, new Projected Affected People (PAPs), formerly affected PAPs for physical resettlement, and formerly affected PAPs for economic resettlement. Note that local leadership was invited to join each of the PAP FGDs to support.

The objectives of these meetings were to:

1) notify the communities of the proposed changes;
2) gain their feedback on the change of route;
3) strengthen community awareness of the Project's grievance mechanism; and
4) provide clarity on the next steps in the Project's timeline (e.g. the detailed census/ asset verification of resettlement impacts along the transmission line route and the planned process for local hiring).

An overview of the meetings is provided in the table below.

Table 107: Public meetings held as part of the national PPP

Location	Date	Focus Groups	No. of Participants / Gender Split (F: M)
Namaacha District			
Gumbe	30 September 2024	Local leaders/ community representatives	4 (1F: 3M)
		Previous PAPs (Physical)	5 (1F: 4M)
		Previous PAPs (Economic)	8 (3F: 5M)
Mandevo	30 September 2024	Local leaders/ community representatives	14 (8F: 6M)
Kulula	30 September 2024	Local leaders/ community representatives	14 (14M)
Milwakene	30 September 2024	Local leaders/ community representatives	20 (15F: 7M)
Baca Baca 2	1 October 2024	Local leaders/ community representatives	7 (1F: 6M)
		New PAPs (Economic)	14 (3F: 11M)
		Previous PAPs (Physical and Economic)	8 (2F: 6M)
Baca Baca 1	1 October 2024	Local leaders/ community representatives	3 (3M)
		New PAPs (Economic)	11 (3F: 8M)
Boane District			
Mabanja	1 October 2024	Local leaders/ community representatives	7 (3F: 4M)

		All PAPs (New and Previous)	41 (27F: 14M)
Barrio 1	2 October 2024	Local leaders/ community representatives	10 (3F: 7M)
		All PAPs (New and Previous)	62 (45F: 17M)
		New PAPs (Economic)	11 (3F: 8M)

Whilst the new PAPs were invited to the FGDs, some were not able to attend the meetings (involvement in the upcoming elections cited as the main reason). To ensure that all affected peoples are aware of the Project and the expected impacts to them, the Project is scheduling follow-on with one-on-one meetings with PAPs who where unable to attend the FGDs.

The main questions, suggestions and comments raised during the T-line rerouting consultations are presented in the table below.

Table 108: Feedback from EIS Public Consultation

Main questions (Q), concerns, comments (C) and suggestions (S) raised	Project reply/comments
Employment opportunities are limited in the communities the transmission line passes through. Several communities wanted further details on the employment process during construction (i.e. Gumbe, Mandevo, Kulula, Baca Baca 1). (C)	The Project representatives described the types of jobs that will be available during the construction phase and noted that people from affected communities would be given priority for all unskilled jobs. It was described that the CLO would be compiling a list of people from the affected communities interested in these positions prior to the construction phase. The CLO's contact details were given to all.
Many of the communities do not have access to power. This was flagged as a major concern for two communities (i.e. Milwakene, Kulula) (S)	The Project reiterated previous information that this line is a transmission line and is of too high a voltage to provide direct power for the communities it passes through. EDM representatives noted the feedback from the specific communities raising concern and said that it would be considered as part of a wider regional strategy for electrification.
Gumbe representatives asked if the Project would be improving the local roads. (S)	The Project stated that no firm plans for road improvements are envisioned at this stage. This will be considered this as part of the future Socio-economic Development (SED) programme.
The community of Barrio 1, who had a lot of previous affected PAPs on military land that the Project was struggling to get agreement with the military to compensate, was pleased to hear that the PAPs within the military area would no longer be affected and expressed support for the project. (C)	No response necessary.
Two of the households along the original route (in Baca Baca 2) formerly subject to physical resettlement expressed concern that they would no longer be subject physical resettlement and stated that they think the project should still provide new houses for them. They staked concerns about safety and death by proximity to the line. (C)	The Project reiterated that the transmission lines would be set back from any houses by at least 25 m per the safety Project Protection Zone required under Mozambiquan legislation. The Project committed to further engagement will be conducted with these households to help them visualize the distance from the new route and what other compensations they are eligible for during the revised census/ asset verification commencing at the end of October.

Baca Baca 1 and Barrio 1 asked very specific questions about how the compensation would work for machambas (e.g. which crops get counted, how would permanent footprint loss be handled, how would access ensured, would renters be compensated). (Q)	The project confirmed that the detailed census/ asset verification would itemise the assets that would be subject to compensation for each PAP and that the PAP will sign off on a PAP consent form to agree the assets before construction and any compensation takes place.
Project representatives asked many of the communities about the presence of elephants in their communities to better understand the health and safety risks. It was confirmed that elephants are present across the Project area in varying frequency and can pose a risk to local agriculture and human safety. Communities notify one another when elephants are in the area and the district and province government have a specialist that can be called in to help manage the elephants if necessary. (Q)	This feedback confirmed that the additional recommended mitigation measures that the Project planned to implement with regards to elephant/ human interactions will be appropriate.
Four of the communities specifically mentioned that they had good visibility of the project because there has been so much engagement throughout the process. Two communities did mention that in the future the Project should schedule meetings with more advanced warning. (C)	The Project confirmed that it will endeavour to give as much advanced notice as possible for future meetings.

This feedback was noted and used to inform this ESIA, the RAP Addendum that is being draft concurrently and the overall stakeholder engagement programme. The comments about provision of energy and road improvements will be considered as part of the Project's future Socio-economic Development (SED) programme.

9. Conclusions and Recommendations

EDM (the Proponent) propose the construction of a new 38.9 km long 66 kV Transmission Line connecting the Namaacha Wind Power Plant (CEN) to Boane Substation, in Maputo Province. This report presents the revisions to the previously approved EIS Report to incorporate a proposed route modification that results in improved environmental and social impacts.

The construction and operation of the transmission line will generate a wide range of different impacts on the receiving environment. In the construction phase, these are mostly related to the changes to land use in the construction site, the clearance of the RoW and the construction activities themselves, which require the mobilization of the workforce and the operation of heavy machinery and equipment along the (linear) construction area. In the operation phase, most of the transmission line impacts are associated with the presence of the overhead line itself, as well as with the RoW maintenance activities. Regarding the substation, only minor upgrades are needed within EDM's existing Boane site, thus the related impacts are insignificant.

The results of the impact assessment exercise conducted in the EIS are summarized in a tabulated form in Section 7.12. Assuming the implementation of the mitigation requirements, almost all of the Project's negative impacts (35 out of 36 identified negative impacts in both phases) were rated as of insignificant, very low or low significance in the post-mitigation scenario.

No high significance negative residual impacts were identified and only one negative impact was rated as of medium significance in the mitigated scenario, thus being the most relevant one: Involuntary resettlement as a result of the establishment of the transmission line's Protection Zone.

Despite the proposed alignment for the transmission line has been designed with the general strategy of not crossing settlements, as much as possible, it will nevertheless require the physical and economic relocation of some affected people. The general principle of mitigation is that all losses are to be fully compensated for, in such a way to ensure that the current quality of life of the affected families is at least maintained, and if possible improved. This will be achieved through the development and implementation of a Resettlement Action Plan, to keep the final impact significance at a social and economic acceptable level.

A broad set of other mitigation measures were recommended to avoid or minimize other less significant impacts, of which some of the more relevant include the implementation the adoption of control measures in the design of line and towers, to minimize bird collisions.

The mitigation of the indirect impact of the possible encroaching into the RoW during the operational phase will require coordinated effort by several government agencies, to avoid the establishment of settlements in the RoW and to control human activities with the potential to impact own and the powerline's safety, as well as impacts on biodiversity, such as hunting, deforesting, harvesting, etc.

In what regards positive impacts, a highly significant primary impact was identified in the socioeconomic environment, along with others of lesser importance, and which can be summarized as follows:

- By injecting electricity generated from a renewable source into the grid, the project will indirectly contribute, cumulatively with the wind farm, to lower the current external dependence on fossil fuels to produce energy, which is a national priority in economic terms and also regarding climate change mitigation.
- This increased power availability, facilitated by the Project, will have a positive impact on the economy and quality of life of Maputo province. On current conditions, the power supply in some areas is weak or even non-existent. The Namaacha - Boane Project will allow for the increase of power supply in Maputo Province and will allow a better distribution of power in areas which are currently not electrified, through the existing or new substations, from which distribution schemes can be developed at a later date.
- For the same reasons, the development of the Project could also create business opportunities. All these vectors of economic stimulation will in turn result in the creation of jobs and economic and social development, in general. This impact, which is indeed the main goal of the Project, was assessed as a high significance residual positive impact.

Considering the above, the Project will result in both positive and negative impacts on the receiving environment, which was to be expected. However, it should be noted that no high significance residual negative impacts were identified and that the positive impacts seem to outweigh the negative ones, resulting in a favourable balance, and as such the Project is considered to be environmentally feasible, if all mitigation and enhancement measures outlined in the EIS are implemented by the Proponent.

The Project's EMP summarizes and provides structure for managing the prevention and mitigation measures during construction and operational phases and monitoring its effectiveness. It is recommended that the EMP is strictly adopted and further developed, by the Project Proponent, into an Environmental and Social Management System (ESMS), to ensure that the Project is conducted and managed sustainably. The Project Proponent shall ensure that its contractors contractually abide by the EMP and relevant environmental and social action plans (ESAP), by making it as part of the contractors' contractual obligations, whenever applicable and pertinent.

10.References

Acer Africa (2024). Draft Revised Resettlement Action Plan for the 66 kV Power Evacuation Line from Namaacha Wind Power Project to Boane Substation , October 2024.

Burrows, J.E., Burrows, S.M., Lotter, M.C, & Schmidt, E. (2018). Trees and Shrubs of Mozambique. Publishing Print Matter (Pty) Ltd, Noordhoek, Cape Town.

Aurecon (2017). BOSA Transmission Interconnection Project. Visual Impact Assessment – Impact Assessment phase input. Eskom Holdings (Pty) Ltd. 46 pp.

BirdLife International (2019). Country profile: Mozambique. Available from http://www.birdlife.org/datazone/countrymozambique. Checked: 2019-04-09

Chonguiça, E. and Brett, R. (2003) «Assessing the need for a regional approach to Environmental Impact Assessment in Southern Africa», IUCN - The World Conservation Union, 6, p. 239.

Cigré (2009), "Ruído de linhas eléctricas de muito alta tensão: um estudo experimental e previsional".

CITES (2017). Appendices I, II, III and IV of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, as amended by the Conference of the Parties in 1979 and 1983. Effective: April 2017.

CMS (2015). Appendices I and II of the Convention on the Conservation of Migratory Species of Wild Animals (CMS), as amended by the Conference of the Parties in 1985, 1988, 1991, 1994, 1997, 1999, 2002, 2005, 2008, 2011 and 2014. Effective: 8 February 2015.

Columbia University (2016). NASA's Earth Observing System Data and Information System, Global Annual PM2.5 Grids from MODIS, MISR and SeaWiFS Aerosol Optical Depth (AOD) with GWR, v1 (1998–2016).

Consultec (2013). Noise Specialist Study for the environmental Impact assessment of the Habitation project EIA in Vilanculos, Mozambique. SASOL, SA. 2013.

Consultec (2021). Environmental Impact Assessment of the Chibuto – Dzimbene Transmission Power Line

Consultec (2022). Noise, Specialist study for the import of LNG, using the technology FSRU and expansion of the transmission line project. MGC, 2016.

Consultec (2023). Environmental Impact Assessment for the 66kV Power Evacuation line from Namaacha Wind Power Project to Boane Substation, Environmental Impact Study, Vol 1-4, Final Report, November 2023.

Consultec (2024). Environmental Impact Assessment for the 66kV Power Evacuation line from Namaacha Wind Power Project to Boane Substation, Environmental and Social Impact Assessment Addendum, September 2024.

Coombs (2024). Habitat mapping of vegetation along an overhead powerline route and wind energy facility between Namaacha and Boane in Maputo province, Mozambique. Dr. Gareth Coombs, March – April 2024.

Copernicus Atmosphere Monitoring Service (2022). https://ads.atmosphere.copernicus.eu/cdsapp#!/dataset/cams-global-reanalysis-eac4

Crutzen, P.J. and M.O. Andreae (1990). Biomass burning in the tropics: impact on atmospheric chemistry and biogeochemical cycles. Science, 250, 1669-1678.

Cumbane et. Schwela, D. (2007). The World Bank "Review of urban air quality in Sub-Saharan Africa. Clean Air Initiative in Sub-Saharan African cities, Washington DC.

Cumbane, J. & Ribeiro, N. (2004). "Impacts of air pollution in Mozambique".

Cumbane, J. (2004). Air pollution management in Southern African cities. Air pollution issues in Mozambique. *In*: Feresu, S. et al. (org.). *Proceedings of the Regional Workshop on "Better Air Quality in the Cities of Africa 2004"*. Johannesburg: Stockholm Environment Institute. p. 98-103

Davis-Reddy, CL and Vincent, K (2017). Climate Risk and Vulnerability: A Handbook for Southern Africa (2nd Edition), Council for Scientific and Industrial Research, Pretoria, South Africa.

Dones, R., *et al.* (2007). Life Cycle Inventories of Energy Systems: Results for Current Systems in Switzerland and Other UTCE Countries. Final report EcoInvent data v2.0, No. 5. Dübendorf: EcoInvent Swiss Centre for Life Cycle Inventories. www.ecoinvent.ch.

EPRI (2004). AC Transmission Line Reference Book-200kV and Above.

European Council - EC, (2000). European Landscape Convention. http://conventions.coe.int/treaty/en/treaties/Html/176.htm

FAO (2016). AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO).

Geosolve & Certiprojecto (2009). EN1 Nacional Road upgrade between Vila Franca Xira/Carregado, Portugal - Environmental Impact Assessment Report. Estradas de Portugal, E.P., Portugal.

Hadley Center (2018). Met Office Handley Center and Climatic research Unit. https://www.metoffice.gov.uk/hadobs/monitoring/index.html

IFC (2007a). *Environmental, Health, and Safety General Guidelines*. International Finance Corporation, World Bank Group, April 30, 2007.

IFC (2007b). *Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution*. International Finance Corporation, World Bank Group, April 30, 2007.

IFC (2012). Performance Standard 6. Biodiversity Conservation and Sustainable Management of Living Natural Resources. January 1.

IFC Carbon Emissions Estimator Tool (IFC 2014).

INGC (2009). Synthesis report. INGC Climate Change Report: Study on the impact of climate change on disaster risk in Mozambique. [Brito van Logchem B and R (ed.)]. INGC, Mozambique. http://www.ingc.gov.mz/

INIA/DTA (1995). Legenda da Carta Nacional de Solos, Escala 1:1 000 000. Com. 73, Sér. Terra e Água, Maputo.

INIA/UEM (1995). Manual de Descrição do Solo e Codificação para o Banco de Dados (SDB). Comunicação n° 74. Maputo.

Iowa State University. https://mesonet.agron.iastate.edu/ . (accessed on June 2022)

IPCC (2006). 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Prepared by the National Greenhouse Gas Inventories Programme, Eggleston H.S., Buendia L., Miwa K., Ngara T. and Tanabe K. (eds). Published: IGES, Japan.

IUCN (2022). IUCN *Red List of Threatened Species*. Version 2022.2. (www.iucnredlist.org).

Jones, R.F. (2007). Aeroacoustics of Aeolian Tones and Effects of Periodic Holes. 16th Australasian Fluid Mechanics Conference, Crown Plaza, Gold Coast, Australia, 2-7 December 2007.

Journal of Geophysical Research (2004) Vol. 109," Southern African Regional Science Initiative"

Landscape Institute (2002). Guidelines for Landscape and Visual Impact Assessment. Second Editions. The Landscape Institute with the Institute of Environmental. London and New York. 165 pp.

Madrigal, M. & Spalding-Fecher, R. (2010). *Impacts of Transmission and Distribution Projects on Greenhouse Gas Emissions. Review of Methodologies and a Proposed Approach in the Context of World Bank Lending Operations*. Energy and Mining Sector Board Discussion Paper, Paper nº 21, November 2010. World Bank.

MICOA (2007). Programa de Acção Nacional para a Adaptação Às Mudanças Climáticas (NAPA).

MICOA, Estratégia Nacional de Mudanças Climáticas (2013-2025).

Muchangos, Aniceto (1999). Moçambique Paisagens e Regiões Naturais. Edição do Autor.

NASA Prediction of Wordwide Energy Resources. Surface meteorology and Solar Energy (SSE). Prediction of Worldwide Energy Resource (POWER) Project. (Merra-2/GEOS 5.12.4) Accessed on November 2020. https://power.larc.nasa.gov/

Neuray, G. (1982). Des paysages pour qui? Pourquoi? Comment. Presses agronomiques Gembloux, pp 239-250.

NOAA's (2017). National Hurricane Center. https://www.nhc.noaa.gov/

NP 1730-1 (1996) "Acústica. Descrição e medição do ruído Ambiente. Parte 1: Grandezas fundamentais e procedimentos."

NP 1730-2 (1996) "Acústica. Descrição e medição do ruído Ambiente. Parte 2: Recolha de dados relevantes para o uso do solo."

NP 1730-3 (1996) "Acústica. Descrição e medição do ruído Ambiente. Parte 3: Aplicação aos limites do ruído.

Our World in Data Portal: Ourworldindata.org (consulted in May 2023).

Peel, M. C. Finlayson, B. L. and McMahon, T. A. (2007). Updated world map of the Köppen-Geiger climate classification. *Hydrol. Earth Syst. Sci*., 11, 1633–1644. 2007.

Peralta, José Costa Alberto et al, 2009 in "Ruído de Linhas Eléctricas de Muito Alta Tensão: Um Estudo Experimental e previsional – XIII ERIAC - Décimo Tercer Encuentro Regional Ibero americano de Cigré.

Pinto, A.M. (2008). *Análise e Mitigação do Ruído Acústico nas Linhas de Muito Alta Tensão da Rede Nacional de Transporte*. Tese de mestrado integrado. Engenharia Electrotécnica e de Computadores (Major Energia). Faculdade de Engenharia. Universidade do Porto.

Programa Nacional de Irrigação (2015). Fase 2 – PNI. Relatório Final. INIR 2015

PROMAP (2012)," Power Line Survey Project Report Ncondezi".

Seinfeld, J. H. and Pandis, S. N. (1998). Atmospheric Chemistry and Physics from air pollution to climate change. New York. John Wiley and Sons, Incorporated.

Skinner, J.D. and Chimimba, C.T. (2005). *The Mammals of the Southern African Subregion*. Cambridge University Press, Cambridge

Smithers, R. H. N. & Tello, J. L. P. (1976). *Check List and Atlas of the Mammals of Moçambique*. Museum Memoir 8:1-184.

Sowler, S., Stoffberg, S., MacEwan, K., Aronson, J., Ramalho, R., Potgieter, K., Lötter, C. (2017). *South African Good Practice Guidelines for Surveying Bats at Wind Energy Facility Developments - Pre-construction*: Edition 4.1. South African Bat Assessment Association.

Stuart, C. Stuart, T. (2001). *Field Guide to Mammals of Southern Africa* 3rd edition, Struik Publishers, Cape Town

The Biodiversity Consultancy (TBC) (2024). *Biodiversity Action Plan*, Revised October 2024.

UNDP (2016). UNDP Climate Change Country profiles. C. McSweeney et al. http://geog.ox.ac.uk/research/climate/projects/undp-cp/UNDPCCCP_documentation.pdf

Union of the Electricity Industry (2003). "Acoustical Noise in Electricity Networks".

Union of the Electricity Industry (2003). "Acoustical Noise in Electricity Networks".

WDPA (2017). World Database of Protected Areas. WCPA – UNEP, ProtectPlanet 2014-2017. (www.protectedplanet.net).

WFP (2017). Historical Frequency of Cyclones. https://geonode.wfp.org/layers/geonode:moz_nhr_cyclonehazard_geonode_20170623/metadata_detail

White, F. (1983). The vegetation of Africa, a descriptive memoir to accompany the UNESCO/AETFAT/UNSO Vegetation Map of Africa (3 Plates, Northwestern Africa, Northeastern Africa, and Southern Africa, 1:5,000,000). UNESCO, Paris.

WHO (1999). "Guidelines for Community Noise". Genebra, Abril de 1999.

World Bank (1998). "Prevention and reduction pollution Handbook, General Environmental Guidelines". July 1998.

World Health Organization. (2021). WHO global air quality guidelines: particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. World Health Organization. https://apps.who.int/iris/handle/10665/345329.

World Resources Institute (2021).https://www.climatewatchdata.org/ghg.

Annex 1: Environmental Management Plan

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE 66 kV POWER EVACUATION LINE FROM NAMAACHA WIND POWER PROJECT TO BOANE SUBSTATION

ENVIRONMENTAL IMPACT STUDY

FINAL REPORT

ENVIRONMENTAL MANAGEMENT PLAN

NOVEMBER 2024

Prepared for:

EDM – Electricidade de Moçambique, E.P.

Prepared by:

Consultec – Consultores Associados, Lda.

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE 66 KV POWER EVACUATION LINE FROM NAMAACHA WIND POWER PROJECT TO BOANE SUBSTATION

ENVIRONMENTAL IMPACT STUDY

FINAL REPORT

ENVIRONMENTAL MANAGEMENT PLAN

EDM – Electricidade de Moçambique, E.P.

Av. Eduardo Mondlane Nr.1390, 5º andar,

Maputo, Moçambique

Olga Utchavo | olga.utchavo@edm.co.mz

Consultec – Consultores Associados, Lda.

Rua Tenente General Oswaldo Tazama, n.º 169

Maputo, Moçambique

Phone: +258 21 491 555

Email: consultec@consultec.co.mz

November 2024

VOLUME INDEX

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

AEJA	Youth and Adult Literacy and Education (*Alfabetização e Educação de Adultos e Jovens*)
AHP	Analytical Hierarchy Process
AIDS	Acquired Immunodeficiency Syndrome
ANAC	National Administration of Conservation Areas
ANE	National Road Administration (*Administração Nacional de Estradas*)
AP	Administrative Post
AQUA	The National Agency for the Control of Environmental Quality
ARA	Regional Water Authorities
ARENE	Energy Regulatory Agency
ART	Anti-retroviral
CEN	Central Eléctrica da Namaacha
DINAB	National Directorate for Environment
DNA	National Water Directorate
DNE	National Directorate of Energy
DPTADER	Provincial Directorate of Land and, Environment and Rural Development
DUAT	Land use rights
EDM	Electricidade de Moçambique, E.P.
EIA	Environmental Impact Assessment
EIS	Environmental Impact Study
EMP	Environmental Management Plan
EN	National Road
EP	Primary School
EPC	Complete Primary School
EPDA	Environmental Pre-feasibility and Scope Definition Study
ES	Ecosystem Services
ESG	General Secondary School
EIA	Environmental Impact Assessment
FIPAG	Investment Fund for Water Supply (*Fundo de Investimento e Património do Abastecimento de Água)*
FUNAE	Mozambique Energy Fund (Fundo de Energia)
GDB	Boane District Government
GDN	Namaacha District Government
GDP	Gross Domestic Product
GoM	Government of Mozambique's
HH	Household
HIV	Human Immunodeficiency Syndrome
HU	Health Unit

HV	High Voltage
IAN	Namaacha Agricultural Institute (*Instituto Agrário de Boane*)
IBA	Important Bird and Biodiversity Areas
IF	Infrastructure
IFC	International Finance Corporation
IFP	Teachers Training Institute (*Instituto de Formação de Professores*)
INE	National Institute of Statistic (*Instituto Nacional de Estatística*)
ISETT	Higher Institute of Education and Technology
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Areas (KBAs)
km/h	Kilometres per hour
kV	Kilovolt
m	Metre
MAE	Ministry of State Administration (*Ministério da Administração Estatal*)
MCDM	Multicriteria Decision-Making
MIMAIP	Ministry of the Sea, Inland Waters and Fisheries (Ministério do Mar, Águas Interiores e Pescas)
MIREME	Ministry of Natural Resources and Energy
MISAU	Ministry of Health (*Ministério da Saúde*)
MTA	Ministry of Land and Environment
OHL	Over Head Line
PA	Administrative Post
PAV	Vaccination Expanded Programme (*Programa Alargado de Vacinação*)
PESOD	District Economic and Social Plan and Budget (*Plano Económico e Social e Orçamento Distrital*)
PESOE	Economic and Social Plan and State Budget
PPP	Public Participation Process
PS	(IFC Environmental and Social) Performance Standards
PSAA	Small Water Supply Systems (*Pequenos Sistemas de Abastecimento de Água*)
PSESR	Physical and Socioeconomic Survey Report
PT	Transformer Stations (*Posto de Transformação*)
RGPH	General Census of Population and Housing (*Recenseamento Geral da População e Habitação)*
SADC	Southern African Development Community
SAPP	Southern African Power Pool
SDAE	Economic Activities District Service (*Serviço Distrital de Actividades Económicas*)
SDEJT	Education, Youth and Technology District Service (*Serviço Distrital de Educação, Juventude e Tecnologia)*
SDPI	Planning and Infrastructure District Service (*Serviço Distrital de Planeamento e Infraestruturas*)
SDSMAS	Health, Women and Social Affairs District Service (*Serviço Distrital de Saúde, Mulher e Acção Social*)
SES	Simplified Environmental Study

SMI	Mother and Child Health (*Saúde Materno-Infantil*)
SNS	National Health System (*Sistema Nacional de Saúde*)
SPA	Provincial Environmental Services
ToR	Terms of Reference
WHO	World Health Organization
WPP	(Namaacha) Wind Power Project

1 Introduction

1.1 General Considerations

EDM (the Proponent), with the support of Globeleq and Source Energia[1], propose the construction of a transmission line, for the evacuation of energy generated by Central Eléctrica da Namaacha Project (CEN[1]), through two 66 kV overhead lines that connect the wind farm to Boane Substation.

To obtain the Environmental License required in terms of the Environmental Law (Law No. 20/1997, of 1 October) for the development described above (hereafter the “Project”), the Proponent must conduct an Environmental Impact Assessment (EIA) Process. Further to national law, the EIA is also a requirement of the Project’s funding agencies, to ensure that environmental and social risks and impacts of the project are adequately assessed and mitigated and to inform the decision-making process. Consultec - Consultores Associados, Lda, was appointed by the Proponent to carry out the EIA process on their behalf.

The EIA Process is initiated through the submission of a Screening Report to the Ministry of Land and Environment (MTA), to allow Project categorisation. The Screening Report was submitted to MTA on May 2022. Following MTA’s pre-assessment, the Project was classified as Category A on 16 June 2022 (letter ref. 601/SPA/DA/407/220/2022), thus requiring a full EIA Process.

This Environmental Management Plan (EMP) was compiled as part of the Environmental Impact Study (EIS)[2] and synthesizes all environmental management, mitigation and monitoring measures coming out of the impact assessment provided in **Volume II** of the EIS Report.

1.2 Purpose and Objectives of the EMP

Environmental management of a proposed activity is a crucial tool to ensure any project’s environmental performance. This EMP aims to establish the guidelines for best practice environmental management of the Project, through a clear definition of the environmental actions and management procedures to be implemented in each phase of project development, as defined in the EIS.

The objectives of the EMP are to:

- Recommend changes to the Project design, to be developed in the detailed engineering phase, so as to avoid or minimize negative impacts;

[1] Central Eléctrica da Namaacha (CEN) Project, whose shareholders are Globeleq, Source Energia and EDM, consists of the construction of a 120 MW wind farm within a site of approximately 855 ha near Namaacha tow and had its own EIA process. The CEN has secured its environmental license from MTA.

[2] In the Mozambican context, the EIA process has three phases: screening, scoping and impact assessment. The Environmental Impact Study (EIS) is the report that presents the findings of the third phase of the EIA process, including baseline assessment, impact assessment and mitigation and the EMP. In the international context, this is usually referred to as the EIA report. As such, the terms EIS report and EIA report are interchangeable and should be read as synonyms.

- Facilitate the implementation of relevant environmental mitigation actions. These should be practical, easy to implement and suited to the nature and scale of the proposed Project;
- Highlight the environmental management and implementation requirements throughout the life cycle of the Project, and the responsibilities of each of the key role players;
- Identify management programs for achieving the required environmental management during all project phases, reflecting the recommendations of the EIS;
- Encourage and achieve the highest environmental performance and response from all employees and contractors;
- Ensure that management efforts are proactive and focused to prevent impacts from occurring; and
- Supplement the proactive approach with reactive measures to minimize the severity or significance of any impacts that cannot be prevented at source.

By formally documenting environmental management measures and commitments, the EMP serves a vital role in ensuring that potential negative impacts are minimized, and positive impacts enhanced. The EMP, therefore, is a tool that guides the management and monitoring of impacts.

In the event that impacts are found to be higher than initially predicted, additional mitigation measures will need to be implemented to control, reduce or prevent an impact from occurring. As such, this EMP will need to be continuously updated and amended as necessary, throughout the project life cycle, to ensure that any negative impacts from the Project are prevented or reduced and positive ones are enhanced.

As noted above, the EMP documents the environmental (and social) management measures and commitments resulting from the EIS. It is important to note, however, that at the time of development of the EIS and associated EMP the detailed engineering design was not available. As such, some of the mitigation measures and commitments resulting from the EIS and included in the EMP will need to be further defined to be more site-specific, once the detailed design information as available.

Given the above, the Proponent will need to:

- Update and finalize the EMP where applicable, on completion of the review of the Project conceptual design and submit any modifications to the EMP for approval by MTA. The updated EMP, based on the reviewed conceptual design, will inform the environmental requirements and environmental specifications in the bidding documents for all EPC contracts;
- Once the EPC Contractors have completed the detailed engineering design and the detailed design has been reviewed, any modifications to the EMP arising from the detailed design review will be submitted to MTA for approval, and where applicable the EPC Contractors' EMP (C-EMP) shall be amended;
- Further develop the EMP into a Project Environmental and Social Management System (ESMS), compliant with PS1, so as to ensure that the Project is conducted and managed in a sustainable manner;

- Ensure that its contractors abide by the EMP, making it a part of the contractors' contractual obligations. To the effect, the Proponent will require its Contractor to develop a Construction EMP (C-EMP), in compliance with all requirements listed in this EMP and including all management plans required in this EMP. This C-EMP will be developed and submitted for the Proponent's approval prior to the start of field construction activities. The C-EMP shall include a detailed implementation budget.

It should also be noted that the EMP does not address the Project's economic and physical resettlement impacts. Mitigation of those impacts will be addressed through a Resettlement Action Plan (hereinafter referred to as the RAP), as stated in the EIS. As per the national resettlement regulations, the RAP will be developed following the approval of the EIA, based on the resettlement policy guidelines provided in the Physical and Socioeconomic Survey Report (Volume IV of the EIS).

1.3 EMP Structure

The structure of this EMP is presented in **Table 1.1**.

Table 1.1 – Structure of the Environmental Management Plan

Chapter	Content
Chapter 1	**Introduction** Provides a background to the proposed project and describes the objectives of the EMP.
Chapter 2	**Legal and Regulatory Framework** Outlines the legal framework within which the EIA will be undertaken and identifies other environmental legislation, standards, and guidelines applicable to the project.
Chapter 3	**Project Description** Discusses the background and desirability of the project and provides a description of the project.
Chapter 4	**Implementation of the EMP** Indicates the management structure for implementation of the EMP and lists the roles and responsibilities of key role players throughout the project life cycle.
Chapter 5	**Environmental Management** Provides the main recommendations resulting from the EIA for the detailed engineering phase and lists the mitigation and management measures to be implemented during the construction and operation phases, in order to avoid or minimize impacts.
Chapter 6	**Environmental Management Plans** Provides guidelines for specific environmental management programs and plans that will need to be developed and implemented by the Project Proponent or its Contractors.
Chapter 7	**Environmental Monitoring and Reporting** Outlines the monitoring and reporting processes associated with this EMP.

2 Legal and Regulatory Framework

2.1 Institutional Framework

2.1.1 Environmental Authorities

The **Ministry of Land and Environment** (MTA), established by Presidential Decree No. 1/2020, of 17 January, is the central authority that plans, coordinates, controls and ensures the execution of policies related to the management of land, forests and wildlife, environment, conservation areas and climate change. Presidential Decree No. 4/2020, of 7 February, defines MTA's role and scope of intervention. At the provincial level, MTA is represented by the **Provincial Environmental Services (SPA)**.

EIA applications are managed by MTA through the **National Directorate for Environment (DINAB)** at the national level, and through SPA at the provincial level.

The management and monitoring of environmental quality, such as pollution control, water, soils and air quality, noise emissions and waste management, are also a part of MTA's attributions. The **National Agency for the Control of Environmental Quality** (AQUA) was created by Decree 80/2010, of 31 December, amended by Decree 2/2016, of 10 February, and is responsible, among other attributions, to develop and implement strategies for the integrated control of water, air, and soil pollution.

2.1.2 Energy Sector

The **Ministry of Mineral Resources and Energy** (MIREME) was created by Presidential Decree No. 1/2015, of 16 January. The Ministry's attributions are defined by Resolution No. 14/2015, of 8 July, and include, among others, promoting improved knowledge of national energy resources and their development and usage and the development of energy production to satisfy national needs and to seize the opportunities of the regional market.

The **Energy Regulatory Agency** (ARENE) was created by Law No. 11/2017, of 8 September, replacing the former National Electricity Council. ARENE possesses supervision, regulation, inspection, and sanctioning powers over the energy sector.

The **National Directorate of Energy** (DNE), created by Resolution No. 14/2015, of 8 July, is the department of MIREME responsible for the conception, promotion, assessment, execution, and monitoring of the electricity sector policies.

Electricidade de Moçambique, E.P. (EDM) was created in 1977 by Decree-Law No. 38/77, of 27 August, as the state-owned national electricity utility. It became a public enterprise in 1995, expected to operate on commercial terms (Decree No. 28/95, of 17 July). EDM is under the tutelage of MIREME and is tasked with the establishment and operation of the public service of production, transmission, distribution, and commercialisation of electricity in Mozambique, and as such manages the national electrical grid (Decree No. 43/2005 of 29 November).

2.2 Legislative Framework

The Constitution of the Republic of Mozambique defines the right of all citizens to a balanced environment and the duty to protect it (Article 90º). Additionally, the State is required to ensure: *(i)* the promotion of initiatives to ensure ecological balance and environmental preservation, and *(ii)* the implementation of policies to prevent and control pollution and integrate environmental concerns in all sectorial policies to guarantee the citizen the right to live in a balanced environment supported by sustainable development (Article 117º).

The proposed Project must comply with the legal requirements for environmental licensing, taking into consideration not only the specific EIA regulations but also all the applicable environmental regulation (physical, ecological, social, and economic) that may be relevant to the Project throughout its life cycle (construction, operation, and decommissioning).

The environmental instruments and regulations relevant to the proposed Project's EIA Process, as well as the relevant legal framework in place for the Energy Sector, are discussed in Table 2-1 below.

Table 2-1 – Key environmental and social legislation

Legislation	Description	Relevance
ENVIRONMENTAL IMPACT ASSESSMENT		
Resolution 5/95 - National Environmental Policy	Establishes the basis for all environmental legislation. According to clause 2.1, its main goal is to ensure sustainable development, to maintain an acceptable balance between socioeconomic development and environmental protection. To reach this goal, the Policy requires the integration of environmental considerations in the socioeconomic planning, the management of the country's natural resources and the protection of ecosystems and of the essential ecological processes.	The Project should strive to meet the policy's goals, integrating environmental considerations in its design, thus minimizing impacts on natural resources and ecosystems. The environmental and social assessment developed in this EIA will generate inputs to the project's design.
Law 20/97 - Environmental Law	Defines the legal basis for the sound use and management of the environment towards the sustainable development of the country. The Environmental Law applies to all public and private activities that may directly or indirectly affect the environment.	The Project should strive to meet the sustainable development principle defined by the Environmental Law, throughout its life cycle. This EIA is part of that effort.
Decree 54/2015 - Regulation for the EIA Process	Establishes the EIA Process as one of the fundamental instruments for environmental management, aiming at mitigating the negative impacts that public or private projects may cause to the natural and socio-economic environment, through the undertaking of environmental studies prior to commencement of the projects. Defines the EIA Process, the required environmental studies, PPP, studies review process, project environmental feasibility decision process and environmental license issuance. Applies to all public or private activities with direct or indirect influence in environmental components.	The Project needs to be submitted to a formal EIA Process, in accordance with this regulation. An environmental license needs to be obtained from MTA, and the issuance of the environmental license precedes any other license or permit required for the Project. The EPDA is the second step in the Project's EIA Process, as described in Chapter 3.
Ministerial Decree 129/2006 - General Guidelines for Environmental Impact Studies	Provides details on environmental licensing procedures, as well as the format, structure, and contents of the environmental impact assessment report. The objective is to standardise procedures followed by various role-players in the EIA process.	The EIS report must conform to the guidelines outlined in this Ministerial Decree. During the compilation of the EIS, the requirements of this legislation will be considered.

Legislation	Description	Relevance
Ministerial Decree 130/2006 - guides the PPP of the EIA Process	Defines the basic principles, methodologies, and procedures for the EIA consultation process. Considers public participation as an iterative process that initiates at the design stage and continues throughout the lifetime of the project.	The PPP for the EIA Process (including for this EPDA) is being developed in compliance with the guidelines provided in this Ministerial Decree.
Decree 25/2011 - Regulation on the Environmental Audit Process	Defines an environmental audit as a documented and objective instrument for management and systematic assessment of the management system and relevant documentation implemented to ensure protection of the environment. Its objective is to assess compliance of work and operational processes with the environmental management plan, including the environmental legal requirements in force, as approved for a project.	Throughout the Project's lifecycle, the Proponent should conduct independent environmental audits at least once a year. In addition, public environmental audits may be requested under this decree.
Decree 11/2006 - Regulation for Environmental Inspections	Regulates the supervision, control, and verification of compliance with environmental protection rules at a national level.	During the construction or operational phases of the Project, MTA may undertake inspections to ascertain compliance with environmental legislation and the Environmental Management Plan (EMP). The Proponent must allow for and facilitate such inspections.
ATMOSPHERIC EMISSIONS AND AIR QUALITY		
Law 20/97 - Environmental Law	Article 9 forbids the discharge of any toxic substances to the atmosphere if exceeding the legal standards. The emission standards are defined by Decree No. 18/2004 (see below).	The Project must comply with the air quality emissions limits, as defined in this regulation. Given the nature of the project, this will mostly be applicable to the emissions of vehicles and machinery.
Decree 18/2004 (as amended by Decree 67/2010) - Regulation for Environmental Standards and Effluent Emissions	Establishes parameters for the maintenance of air quality (Article 7º); patterns of emission of gaseous pollutants for various industries (Article 8º); and standards for emission of gaseous pollutants from mobile sources (Article 9º) - including light and heavy vehicles.	
Decree 24/2008 of July 1st - Approves the Regulation on the Management of Substances that Deplete the Ozone Layer	It establishes the general bases of the environmental protection regime, the discharge into the atmosphere of any toxic or polluting toxic or polluting substances, the production and deposit in the soil, and assigns to the Government the responsibility to ensure that measures are taken for the protection of the ozone layer.	
Resolution No.78/2009, of December 22nd (on the banning of import, export, production, commercialization, and transit of Ozone-Depleting Substances	It aims to strengthen the legal framework for the implementation of the Vienna Convention on the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer. As part of the adoption of measures to protect the Ozone Layer, this Resolution bans the import, export, production, marketing and transit of substances that deplete the ozone layer. The banned substances are Chlorofluorocarbons (CFC's), Halogenated hydrocarbon (Halon-1211, Halon-1301 and Halon-2402) and Carbon Tetrachloride (CCL4).	The banned substances must not be used in any of the project phases

Legislation	Description	Relevance
WATER RESOURCES AND WATER QUALITY		
Law 16/91 - Water Law	This law is based on the principles of public water use, basin scale management, and user-pays and polluter-pays. Intends to safeguard the ecological balance and environment. Water uses require either a water concession (permanent or long-term water uses) or a water license (short term water uses). Licenses are given for a period of 5 renewable years, while concessions are valid for a period of 50 renewable years. Article 54 of this Law stipulates that any activity with the potential of contaminating or degrading public waters, in particular the discharge of effluents, is subject to a special authorisation to be issued by the Regional Water Administration and payment of a fee.	The project needs to include measures to prevent the pollution of any water resources in the construction and operation phases. If the Project requires the discharge of effluents into water bodies, a discharge license must be obtained.
Decree 18/2004 – Regulations for Environmental Quality Standards and Effluent Emissions	Determines that when industrial effluent is discharged into the environment, the final effluent discharged must comply with discharge standards established in Annex III of the decree. The discharge of domestic effluent must comply with the discharge standards in Annex IV.	The Project must comply with the effluent emission limits established by this regulation. This may be applicable to any construction camps used in support of the Project's construction.
POLLUTION AND WASTE MANAGEMENT		
Law 20/97 – Environmental Law	Limits the production and / or disposal into the soil or subsoil and the disposal into water or the atmosphere of any toxic or polluting substances, as well as the practice of activities that accelerate erosion, desertification, deforestation, or any other form of environmental degradation to those limits established by the law (Article 9).	The Project needs to include measures to prevent pollution during and after implementation. Any project must conform to the requirements outlined in this regulation. The EMP will include such measures.
Decree 94/2014 - Regulation for Urban Solid Waste Management	Establishes the legal framework for urban solid waste management. The key objective is to establish rules for the generation, collection, and disposal of urban solid wastes, so as to minimise their impacts on public health and the environment. Urban solid wastes are to be classified in accordance with the Mozambican Norm NM339 – Solid Wastes – Classification. Waste management is a responsibility of Municipal Councils and District Governments, as applicable.	The project should implement suitable waste management practices throughout its life cycle, in compliance with the requirements outlined in this regulation. To the effect, a Waste Management Plan will be included in the EMP.
Decree 83/2014 - Regulation for Hazardous Waste Management	Establishes the legal framework for hazardous waste management. The key objective is to establish rules for the generation, collection, and disposal of hazardous wastes, so as to minimise their impacts on public health and the environment. Annex IX of this decree provides waste classifications. MTA is the competent entity to manage hazardous wastes, namely by licensing waste management units. Only entities which are licensed by MTA can collect and transport hazardous wastes, beyond the limit of the facilities where they were generated.	
Decree No. 8/2003 of February 18th - Regulation on Biomedical Waste Management	Aims to establish the rules for the management of biomedical waste in order to safeguard the health and safety of health care facility workers, ancillary workers and the general public and to minimize the impacts of such waste on the environment.	

Legislation	Description	Relevance
BIODIVERSITY		
Law 20/97 – Environmental Law	Articles 12 and 13 state that the planning, implementation, and operation of projects should guarantee the protection of biological resources, particularly of plant or animal species threatened with extinction or that, by their genetic value, ecological, cultural, or scientific, require special attention and this issue is to extend their habitats, especially those built within areas of environmental protection.	The Project must consider protected biodiversity. The presence of potentially relevant biodiversity values in the Project area will be assessed in the EIA. The EMP will include adequate mitigation to minimize the Project's impacts on biodiversity.
Law 10/99 - Forests and Wildlife Law	Establishes the principles and basic rules on protection, conservation and sustainable use of forest and wildlife resources.	The Project must consider the protection of forest and wildlife. The Proponent must notify MTA if a species listed in this regulation is affected or disturbed.
Decree 12/2002 – Regulation on the Forests and Wildlife Law	Applies to protection, conservation, use, exploration and production activities of fauna and flora resources. Includes the commerce, transport, storage and primary artisanal or industrial transformation of these resources. Annex I include a list of classification of wood-producing species, including precious wood and woods of 1st, 2nd, 3rd, and 4th grades. Annex II includes a list of protected fauna species, for which hunting is prohibited.	
Decree No. 25/2008 – Regulation for the Control of Invasive Alien Species	Article 8 of this decree prohibits activities involving invasive alien species without prior authorization and states that 'after hearing the Interinstitutional Group for the Control of Exotic Species Invasive, the National Environmental Authority (MTA) may prohibit any activity which, by its nature, may involve the spread of invasive alien species'. Activities include the following: - Import of any type of invasive exotic species, whether by sea, land or air; - Possess any type of invasive exotic species; - Develop, breed or otherwise propagate any type of invasive alien species; and - Transport, move or relocate any type of invasive alien species	The Project must ensure the control of the propagation of invasive alien species. Article 11 of the decree suggests that adequate methods must be implemented to control and eradicate invasive alien species. The Project should include mitigation measures for potential impacts related to invasive alien species, which must be binding and ensure compliance with the requirements of the Regulation by the proponent.
Law 16/2014 (as amended by Law 5/2017) – Protection, Conservation and Sustainable Use of Biodiversity Law and its Regulation	This Law regulates the creation and management of all conservation areas in Mozambique, revoking the Forestry and Wildlife Law competences in this matter. Article 16 states that all activities that could result in changes to vegetation cover, or that could disturb flora, fauna, and ecological processes up to the point of compromising their maintenance, are interdicted within national parks, except if required for scientific reasons or management needs. Article 26 states that activities can be approved within conservation areas, if planned in the area's management plan, which among other things defines the construction of the infrastructure required for the area's management or that aimed to improve the quality of life of the local populations.	No protection or conservation areas are interfered by the Project.
Decree No. 89/2017 of December 29th - Regulation of Protection, Conservation and Sustainable Use of Biological Diversity;	The present Regulation applies to the set of values and natural resources existing in the national territory and in the waters under national jurisdiction, covering all public or private entities that may directly or indirectly influence the national system of the country's conservation areas, under the terms of the Law No. 16/2014 (Amended by Law 5/2017), law for the Protection, Conservation and Sustainable Use of Biological Diversity.	

Legislation	Description	Relevance
Decree 51/2021 of July 19th - Regulation for the Protection, Conservation and Sustainable Use of Avifauna	This decree regulates the protection, conservation and sustainable use of avifauna, including its natural, continental, marine, lake and river habitats. Art 5 defines as avifauna protection zones the "Key Areas for Biodiversity", and "Important Areas for Birds" and art. 4 prohibits the exercise of any activity or construction of infrastructure capable of disturbing the avifauna or its habitat in the protection areas, as well as any economic or social infrastructure, to be built in sensitive areas for birds, must respect the international standards of good practice, ensuring the placement of signalling devices that prevent collision of birds or any other damage that affects the avifauna. Appendices A and D define the protected species whose exploitation is not permitted; Appendix B defines the species of avifauna in Mozambique included in CITES.	The Project must consider the protected avifauna as well as their habitats. The presence of relevant potential avifauna values in the Project area, namely "Key Areas for Biodiversity", and "Important Areas for Birds", should be assessed in the EIA.
Ministerial Diploma No. 55/2022 of May 19th – Adoption of the Biodiversity Counterbalances Directive	Establishes the principles, methodologies, requirements and procedures for the correct implementation of Biodiversity Counterbalances, integrated into environmental impact assessment processes.	The Project must consider Biodiversity Counterbalances if significant residual impacts over key biodiversity areas, critical habitats or threaten species or ecosystems are identified. Biodiversity Action Plan should be part of the EMP.
LAND OWNERSHIP AND RESETTLEMENT		
Resolution 10/95 – Land National Policy	Establishes that the State must provide the land for each family to build or possess their own habitation, and is responsible for land use and physical planning, although plans can be made by the private sector.	The Project must conform to the principles of this policy, as per the regulations defined in the implementing legislation, which is discussed below.
Law 19/1997 – Land Law	Defines land use rights (DUAT), including details on customary rights and procedures for acquisition and use of land titles by communities and individuals. This law recognises and protects the rights acquired through inheritance and occupation (customary rights and duties of good faith), except for legally defined reserves or areas where land has been legally transferred to another person or institution.	The Land Law and its regulation define total and partial protection zones. In these zones, land use is restricted. According to this regulation, the corridor of 50 m to each side of a new transmission line is considered to be a partial protection zone (the line's RoW). The approval of power transmission line projects by the Council of Ministers or by the relevant competent authorities automatically implies the creation of the respective partial protection zones.
Decree 66/98 – Regulation for Land Law	Defines total protection areas, set aside for nature conservation and State defence, as well as partial protection areas, where land use titles may not be granted, and where activities cannot be implemented without a license. Partial protection areas, which include, amongst others, the 50 m strip of land along lakes and rivers, 100 m strip of land along the seafront and estuaries, 50 m along aerial, surface or underground pipelines/cables for electricity, telecommunications, oil, gas and water, 30 m along primary roads and 15 m along secondary and tertiary roads.	
Decree 31/2012 – Regulation for the Resettlement Process Resulting from Economic Activities	Defines rules and basic principles for resettlement processes from the implementation of public or private economic activities. Article 15 states that the Resettlement Plan is part of the EIA Process and that its approval precedes the issuance of the environmental license. There are three steps in the Resettlement Plan (article 19): a) Physical and socioeconomic data collection; b) Resettlement Plan; and c) Resettlement Action and Implementation Plan.	If physical displacement results from the Project, this regulation is applicable, and a resettlement action plan will be required. Any potential economic displacement (such as the loss of farming plots or other assets) will also need to be assessed in the EIA and, if present, duly compensated for, in abidance with the Land Law. Note that for electricity projects, expropriation procedures may apply (please see Decree 21/97 below).

Legislation	Description	Relevance
Technical Directives No. 155/2014 and 156/2014	TD 155/2014 approves the internal regulation for the Monitoring and Supervision Technical Committee for Resettlement. TD 156/2014 approves the technical requirements for the preparation of RAPs. Section 3 describes in detail the requirements for the 3 steps of the RAP: a) Physical and Socioeconomic Survey Report; b) Resettlement Plan; and c) Resettlement Action and Implementation Pan. It also defines the requirements of the RAP's Public Consultation and Participation Process.	The Resettlement Plan to be prepared has to follow the technical requirements stated on Technical Directive 156/2014, regarding the process steps and specifications. The Physical and Socioeconomic Survey Report is developed along with the EIA.
Law 12/2022, Electricity Law	Approves the new Electricity Law, revoking previous Law n.º 21/97. Article 43, concerning land use and expropriation, states that: 1) The land to carry out energy production, transportation and distribution activities is governed by the Land Law and related applicable legislation; 4) The construction or deployment of electrical facilities, including overhead, surface, underground and subsea power lines, for the transport and distribution of electricity, as well as for the connection of production installations to transport or distribution grids, requires the creation of an administrative servitude, to be defined in accordance with the tension levels and technical and safety standards, up to 50 metres of confining land from the line's axis; 5) The terms and conditions of the confining strip of land indicated in paragraph 4 of this Article is in accordance with tension levels and other technical and safety standards, and is assessed in function of the rural or urban environment; 6) (…) a safety zone for the electrical facilities, corresponding to the adjacent strip. is established, within the servitude area; 8) The acquisition of the right of land use, as well as the creation of the servitude for the purpose of carrying out energy supply activities is subject, where applicable, to the resettlement rules and the payment of compensations, in accordance with the applicable legislation.	According to this law, a servitude of up to 50 m from the 66 kV line's axis needs to be established in accordance with the tension levels and technical and safety standards. Within this area, a safety zone shall be established. The technical and safety standards to define the specific width of these areas are yet to be published.
Decree 23/2008 – Regulation for Land Planning	Aims to establish regulatory territorial planning measures and procedures to ensure the rational and sustainable use of natural resources, regional potentials, infrastructure, and urban centres, and to promote national cohesion and safety of the people. Articles 68 to 71 deal with expropriation procedures for private property for national public interest reasons. Article 70 states that expropriation should be preceded by fair compensation.	If expropriation of land or land rights is required for Project implementation, the requirements of this regulation should be complied with. Expropriation requires the issuance of a declaration of public interest for the Project, as defined in the Electric Energy Law.
Ministerial Decree 181/2010 – Guidelines for the Expropriation Process Resulting from Land Planning	Establishes procedures for expropriation processes resulting from land planning, including procedures for the issuance of a declaration of public interest, compensations for expropriation (including calculation methods) and the expropriation process itself.	If expropriation of land and land rights within the Project area is required, the procedures established in these guidelines should be followed.

Legislation	Description	Relevance
CULTURAL HERITAGE		
Law 10/88 - Cultural Heritage Law	Aims to legally protect material and non-material assets of the Mozambican cultural heritage. Under this law, cultural heritage is defined as a "group of material and non-material assets created or integrated by the Mozambican people through history, with relevance to the definition of the Mozambican cultural identity". Material cultural assets include monuments, groups of buildings with historic, artistic, or scientific importance, places or locations (with archaeological, historic, aesthetic, ethnologic or anthropologic interest) and natural elements (physical and biological formations with particular interest from an aesthetic or scientific point of view).	The potential presence of cultural heritage on the Project area will be assessed in the EIS. Archaeological objects may also be found during the construction phase of the Project. In such cases, the Proponent must immediately communicate the finding to the relevant cultural heritage agency.
WORK AND SAFETY		
Law 23/2007 - Labour Law	Defines general principles and establishes the legal framework applicable to individual and collective employment relationships in respect of work rendered to an employer for remuneration.	The project must, throughout its entire life cycle, abide by Mozambique's labour law.
Law 19/2014 - Law of Protection of People, Workers and Job Applicants Living with HIV/AIDS	This law establishes the general principles that aim to ensure that all employees and job applicants are not discriminated against in the workplace or when applying for jobs, for being suspected of having or having HIV / AIDS. It is prohibited testing of HIV / AIDS to workers, job seekers, or candidates to training or promotion, at the request of employers, without the employee's or job seeker consent.	Testing job applicants for HIV / AIDS is prohibited. Testing of workers without the employee's consent is also prohibited. The proponent must train and reorient all HIV positive workers who are able to fulfil their duties at work, with activities compatible with their capabilities.
Decree 45/2009 - Regulation on the General Labour Inspectorate	This Regulation lays down the rules on inspections, under the control of the legality of work. Paragraph 2 of Article 4 provides for the employer's responsibility for the prevention of occupational health and safety risks for the employee.	The Proponent shall comply with the requirements. In the case of an inspection, the proponent must help to provide all necessary information to the inspectors.
Decree 62/2013 - legal regime for accidents at work and occupational diseases	Establishes the legal regime for accidents at work and occupational diseases and aims to bring the legal in line with the current labour law, introduce new formulas for calculating pensions and indemnities, as well as the possibility of revising pensions as a result of the aggravation or corrosion of the elements that served as the basis for its calculation.	The Proponent shall comply with the requirements.
ELECTRIC ENERGY		
Law 12/2022, Electricity Law	Same as above.	Same as above.
Decree 42/2005 – Regulation establishing rules for the national electric grid	Article 3 reinforces that the construction and operation of power transmission infrastructure requires the issuance of a concession, as required by Law No. 21/97.	EDM has been designated as the managing entity of the national power transmission grid, as per Decree No. 43/2005. As such, EDM will be the operator of the proposed transmission line.
Decree 57/2011 – Safety Regulation for High Voltage Power Lines	This Decree establishes several standards and guidelines for the design of power lines, to ensure their safety. Article 28 (clause 3) states that in order to ensure a safe operation of high voltage power lines, trees close to the power line may need to be cut, within a protection zone with a maximum width of: *(i)* 30 m, for lines under 66 kV, and *(ii)* 50 m, for lines equal or over 66 kV.	According to this decree, trees and other obstacles that may result in a risk to the infrastructure will need to be removed. Note that the protection zone named in this decree is a safety zone, and is not equivalent to the line's partial protection zone (the Project's RoW), as defined in the Land Law.

2.3 Relevant International Conventions

Relevant international conventions for the Project under assessment are provided in **Table 2-2**.

Table 2-2 – Relevant international conventions

Convention	Description
BIODIVERSITY	
African Convention on the Conservation of Nature and Natural Resources (AU 1968) as well as its Revised Version (AU 2017)	Under this Convention, the Contracting States commit to take action to ensure the conservation, use and development of soil, water, flora, and fauna resources in accordance with scientific principles and with due regard to the best interests of the people. Pursuant to Resolution 18/81, of 30 December 1981, the Republic of Mozambique acceded to this convention.
United Nations Convention on Biological Diversity (UN 1992)	The main goals of this convention are the conservation of biodiversity, the sustainable use of biodiversity, and the fair and equitable sharing of the benefits arising from the use of genetic resources. Its overall objective is to encourage actions which will lead to a sustainable future. Mozambique ratified this convention in 1994, through Resolution 2/94.
Convention on Wetlands of International Importance, Especially as Waterfowl Habitat – Ramsar Convention (UNESCO 1971)	Pertains to the sustainable use and conservation of wetlands. Ratified by Mozambique in 2003.
Convention on the International Trade of Endangered Species of Wild Fauna and Flora (CITES 1973)	Aims to ensure that international trade in specimens of wild animals and plants does not threaten the species survival. It accords varying degrees of protection to more than 33,000 species of animals and plants. Convention ratified by Mozambique through Resolution 20/81.
Convention on the Conservation of Migratory Species of Wild Animals (CMC 1979)	Aims to foster protection measures for migratory species of wild animals throughout their natural range, through a conservation strategy of wildlife and habitats on a global scale. Ratified by Mozambique in 2008.
SADC's Protocol on Wildlife Conservation and Law Enforcement (SADC 1999)	Aims to ensure the conservation and sustainable use of wildlife resources. Ratified by Mozambique in 2002.
NON-HAZARDOUS AND HAZARDOUS WASTE	
Basel Convention on the control of Trans-boundary Movements of Hazardous Wastes and their Disposal (UNEP 1989)	This convention regulates the import, export, and trans-boundary movement of hazardous waste. The Basel Convention was superseded by the Bamako Convention (see below). The Republic of Mozambique ratified the Basel Convention on the control of Trans-boundary Movements of Hazardous Wastes and their Disposal by way of Resolution 18/96 of 26 November.
Convention on the Ban of the Import into Africa and the Control of Transboundary Movements and Management of Hazardous Wastes within Africa (AU 1991)	During the negotiation of the Basel Convention, the African states represented by the Organisation for African Unity adopted the Bamako Convention believing that the Basel Convention was not strict enough. The Bamako Convention totally prohibits the import of hazardous waste into Africa. The Convention came into force on April 22, 1998. The Republic of Mozambique ratified the Bamako Convention by way of Resolution 19/96 of 26 November.

Convention	Description
AIR QUALITY / CLIMATE CHANGE	
The United Nations Framework Convention on Climate Change (UNFCCC 1992) and the Kyoto Protocol (UNFCCC 1997)	UNFCCC is an international environmental treaty produced with the objective of achieving stabilisation of greenhouse gas concentrations in the atmosphere at a low enough level to prevent dangerous anthropogenic interference with the climate system. The Kyoto Protocol to the UNFCCC was adopted in December 1997, whereby the signing parties agreed to legally binding reductions in greenhouse gas emissions of an average of 6 to 8% below 1990 levels between the years 2008-2012, defined as the first emissions budget period. The UNFCCC was ratified by way of Resolution 1/94, of 24 August and the Kyoto Protocol acceded to by the Republic of Mozambique by way of Resolution 10/2004, of 28 July.
Vienna Convention for the Protection of the Ozone Layer (UNEP 1985)	Under this Convention, the parties committed to take appropriate measures to protect human health and the environment against adverse effects resulting or likely to result from human activities which modify or are likely to modify the ozone layer. Pursuant to Resolution 8/93, of 8 December, the Republic of Mozambique acceded to the Vienna Convention for the Protection of the Ozone Layer and to its 1990 and 1992 Amendments.
The Montreal Protocol on Substances that deplete the Ozone Layer (UNEP 1987), London Amendment (UNEP 1990), Copenhagen Amendment (UNEP 1992), Montreal Amendment (UNEP 1997)	Designed to control the production of ozone depleting substances to reduce their abundance in the atmosphere, and thereby protect the earth's fragile ozone Layer. Forbids the use of chlorofluorocarbons. Mozambique ratified this convention through Resolution 9/2009.
POLLUTION PREVENTION	
Stockholm Convention on Persistent Organic Pollutants (UNEP 2001).	Action and control at world level of chemicals that persist in the environment, bio-accumulate in the food chain, and pose a risk to human health and the environment. These substances are listed in Annex I. Mozambique ratified this convention in 2005.
CULTURAL HERITAGE	
UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage (UNESCO 1972)	Designed to help identify and protect both cultural (monuments, groups of buildings and sites) and natural heritage (natural features, geological and physiographical formations, and natural sites). Mozambique ratified the convention in 1982.
UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (UNESCO 2003)	Aims to safeguard to ensure respect for the intangible cultural heritage of communities, groups, and individuals. Ratified by Mozambique in 2007.
UNESCO Convention on the Protection and Promotion of the Diversity of Cultural Expressions (UNESCO 2005)	Aims to protect and promote the diversity of cultural expressions, promote dialogue between cultures and promote respect for cultural diversity. Ratified by Mozambique in 2007.

Convention	Description
HUMAN RIGHTS	
International Labour Organisation Conventions	Forced Labour Convention, ratified in June 2003: Convention concerning Forced or Compulsory Labour (ILO 1930) Freedom of Association and Protection of the Right to Organise Convention, Dec 1996: Convention concerning Freedom of Association and Protection of the Right to Organise (ILO 1948) Right to Organise and Collective Bargaining Convention, Dec 1996: Convention concerning the Application of the Principles of the Right to Organise and to Bargain Collectively (ILO 1996) Equal Remuneration Convention, Jun 1977: Convention concerning the equal remuneration for men and women workers for work of equal value refers to rates of remuneration established without discrimination based on sex (ILO 1977) Abolition of Forced Labour Convention, Jun 1977: Convention concerning the Abolition of Forced Labour (ILO 1977a) Discrimination (Employment and Occupation) Convention, June 1977: Convention concerning Discrimination in Respect of Employment and Occupation (ILO 1977b) Minimum age specified: 15 years Jun 2003: Convention concerning Minimum Age for Admission to Employment (ILO 2003) Worst Forms of Child Labour Convention, June 1999: Convention concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour (ILO 2003a)
International Covenant on Civil and Political Rights (UN 1966)	Recognises equal and inalienable rights to all human beings in terms civil and political freedom. Ratified in 1993.
International Covenant for the Elimination of Racial Discrimination (UN 1969).	The signing parties undertake to pursue by all appropriate means and without delay a policy of eliminating racial discrimination in all its forms and promoting understanding among all races. Ratified in 1983.
Convention on the Elimination of Discrimination against Women (UN 1979)	States have the obligation to ensure the equal rights of men and women to enjoy all economic, social, cultural, civil, and political rights. Ratified in 1997; 2008.
Convention Against Torture (UN 1985)	State parties prohibit themselves under any circumstances from committing acts of torture and other cruel, inhuman, or degrading treatments or punishments. Ratified in1999.
Convention on the Rights of the Child (UN 1989)	Guarantees protection of children's rights. Signed in 1990 and ratified in 1999.
International Convention on the Rights of Migrant workers (UN 1990)	Its primary objective is to protect migrant workers and their families, a particularly vulnerable population, from exploitation and the violation of their human rights. Signed in 2012; ratified in 2013.
International Convention on the Rights of Persons with Disabilities (UN 2007)	States have the obligation to protect the rights and dignity of persons with disabilities; signed in 2007.
African Union related protocols	Several protocols and charters promoting and protecting human rights and basic freedoms, children rights and others on the African continent.

2.4 International Best Practice Guidelines and Policies

This EIA is being developed in compliance with national regulations and in line with international best practice, notably the environmental and social policy and performance requirements as defined by the World Bank / International Finance Corporation (IFC). The most important of these international standards and guidelines applicable to the Project are described below.

2.4.1 IFC Performance Standards

The IFC Performance Standards (PS) on Environmental and Social Sustainability, which were published in January 2012 (IFC, 2012), are among the most comprehensive standards available to international finance institutions working within the private sector. The principles provide a framework for an accepted international approach to the management of social and environmental issues.

The seven IFC PS applicable to the proposed Project are:

- **PS 1: Assessment and Management of Social and Environmental Risks and Impacts** underscores the importance of managing environmental and social performance throughout the life of a project. PS 1 requires the client to conduct a process of environmental and social assessment and to establish and maintain an Environmental and Social Management System (ESMS), appropriate to the nature and scale of the project and commensurate with the level of its environmental and social risks and impacts;
- **PS 2: Labour and Working Conditions** recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers;
- **PS 3: Resource Efficiency and Pollution Prevention** recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels;
- **PS 4: Community Health, Safety and Security**, recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts;
- **PS 5: Land Acquisition and Involuntary Resettlement**, recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land;
- **PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources**, recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development;
- **PS 8: Cultural Heritage** recognizes the importance of cultural heritage for current and future generations.

It should be noted that PS 7 (Indigenous People) is not applicable to the Project, as the concept of Indigenous People, as defined in this PS, is not applicable to Mozambique. Under this PS, Indigenous Peoples are groups who, by virtue of their economic, social, and legal status and/or their institutions, custom, culture and/or language may be characterized as distinct from mainstream society, and that maintain a collective attachment to distinct habitats or ancestral territories. Although Mozambican society is composed of several different ethnicities, they are all integrated into one mainstream society and do not have differentiated claims over the territory.

PS 1 establishes the importance of *(i)* integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects; *(ii)* effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and *(iii)* the client's management of environmental and social performance throughout the life of the project.

IFC PS's 2, 3, 4, 5, 6 and 8 present requirements to avoid, reduce, mitigate, or compensate for impacts on people and the environment, and to improve conditions where appropriate. Where social or environmental impacts are anticipated, the client is required to manage them through its ESMS consistent with PS 1.

2.4.2 IFC Environmental Health and Safety Guidelines

IFC's Environmental Health and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice, as defined in IFC's PS 3 on Resource Efficiency and Pollution Prevention.

The EHS Guidelines contain the performance levels and measures that are normally acceptable to IFC and are generally considered to be achievable in new facilities at reasonable costs by existing technology. For IFC-financed projects, application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets with an appropriate timetable for achieving them. The environmental assessment process may recommend alternative (higher or lower) levels or measures, which, if acceptable to IFC, become project- or site-specific requirements.

Relevant Industry Sector IFC guidelines applicable to the proposed Project include:

- EHS General Guidelines (IFC, 2007a);
- EHS Guidelines for Electric Power Transmission and Distribution (IFC, 2007b).

2.4.3 Southern African Power Pool Guidelines

The Southern African Power Pool (SAPP) is a regional body that was formed in 1995 through a Southern African Development Community (SADC) treaty to optimize the use of available energy resources in the region and support one another during emergencies. SAPP is comprised of twelve SADC member countries represented by their respective Electric Power Utilities, including Mozambique, represented by EDM.

SAPP's Environmental Sub-Committee has developed a number of environmental management guidelines, aiming to ensure that energy sector activities are developed sustainably. The following SAPP guidelines were taken into consideration:

- EIA Guidelines for Transmission Infrastructure for the SAPP Region (September 2010) - provides a recommended framework and guide to a systematic approach to performance of EIA for power transmission infrastructure projects in the SAPP region;
- SAPP Occupational Health, Safety and Environmental Guideline (November 2007).

2.4.4 AfDB Integrated Safeguard System

AfDB's Integrated Safeguard System consists of an Integrated Safeguards Policy Statement, Operational Safeguards (OSs), a revised set of Environmental and Social Assessment Procedures (ESAPs) and Integrated Environmental and Social Impacts Assessment (IESIA) Guidance Notes. The set of 5 OSs is globally aligned with IFC PSs as well as the ESAPs. The OSs include:

- OS1: Environmental and social assessment
- OS2: Involuntary resettlement: land acquisition, population displacement and compensation
- OS3: Biodiversity, renewable resources and ecosystem services
- OS4: Pollution prevention and control, hazardous materials and resource efficiency; and
- OS5: Labour conditions, health and safety

OS1 sets out the AfDB's overarching requirements for borrowers or clients to identify, assess, and manage the potential environmental and social risks and impacts of a project, including climate change issues. OSs 2-5 support the implementation of OS1 and set out specific requirements relating to different environmental and social issues, including gender and vulnerability issues, that are triggered if the assessment process reveals that the project may present certain risks.

3 Project Description

3.1 Project Overview

The proposed Project is located in Maputo Province and in the Districts of Boane and Namaacha.

The main Project components are the following:

- Two 66 kV overhead lines approximately 38.9 km long, connecting the CEN to Boane substation;
- 66 kV electrical extensions at Boane substation.

The CEN will export power via two 66 kV lines that shall run from the CEN site in Namaacha to Boane substation with a length of approximately 38.9 km. The purpose of the two separate overhead lines is to provide n-1 redundancy (i.e., the full export of the wind farm capacity on one of the lines, if the other line fails) on the connection of the WPP to the EDM network in Boane Substation, in accordance with the Mozambican grid code requirements. For the first 32.7 km of the route (starting from the Namaacha wind farm site), two parallel 66 kV lines (20 m minimum separation) will be installed. From this point onward, the transmission line will be installed on monopole towers (double circuit overhead line). In this section, single monopole towers will be used, with two lines installed, to minimize the corridor affecting resettlement. In the last 339 m of the route, the transmission line transitions to a buried underground cable.

The line will be supported by the monopole steel towers (typically 200 m spaced and 20-25m high).

The complete Boane substation 66 kV existing busbar conductor and associated clamps and support structures is to be replaced to allow for an uprated conductor to be used.

The two new 66 kV line bays are to be installed in the existing Boane substation control building and are to match those that are already in place at Boane substation.

In order to accommodate the additional busbar and the two incomer 66kV feeder lines from the Namaacha WPP, as well as the Statcom, the Boane substation yard is to be extended by approximately 25m to the East.

3.2 Main Activities

3.2.1 Construction Phase

The main activities of the construction phase will involve civil construction works, including:

- Preliminary earthworks - preparation of the site work areas will start with preliminary site survey and earthworks activities which include, removing of shrubs and trees, surface slope and grading, drainage line and containment according to the design drawings;
- Setting up of the site and mobilization of equipment and auxiliary structures;
- Transmission line survey, environmental and social clearance surveys;

- Land clearing – the construction areas will be marked and cleared, including the clearing of vegetation and tree roots and the removal of the upper layer of soil;
- Earthworks – including cuts and fills to model the terrain and prepare the foundations;
- Transportation of construction materials and workers to/from site;
- Operation of vehicles and heavy equipment;
- Construction of the transmission power line and Boane substation expansion;
- Installation of the equipment and control systems;
- Pre-commissioning and commissioning activities.

Specifically for overhead lines, the following typical tasks can be listed:

Table 3-1 – Typical tasks associated with overhead line construction.

Task	Description
Site preparation	This may include vegetation clearance, verification of local utilities and underground services, and geotechnical surveys, as necessary.
Site enabling works	Vehicle access to each tower site is required either via direct access road or along the RoW. This may require the construction of one or more temporary access roads.
Civil works	Tower foundations are mechanically excavated and filled with concrete. Piled foundations may be required in some areas where ground conditions are unstable. The dimensions of the excavation will differ depending on local conditions. Concrete will be delivered by ready mixed concrete truck from batching plants.
Steel structure fabrication	Steel structure fabrication may not be carried out in Mozambique. In such case the materials need to be transported via Maputo Port to the tower location along the power line route.
Steel erection	Steelwork sections for the towers will be delivered by road using a four-wheel drive vehicle. Cranes may be necessary to support the assembly of higher sections of the towers.
Conductor stringing	Stringing is undertaken using a winch to pull the conductor along the towers and a "tensioner" at the other end to keep the conductor above the ground.
Testing of equipment	Overhead line components including conductors, insulators, towers, joints, and fittings are designed and tested to prove compliance with structural, mechanical, and electrical requirements.
Reinstatement of tower construction area (during construction decommissioning)	At completion, the area and materials will be disassembled and transported for reuse or recycled. Site along the PPZ will be, cleared and tidied up. Access routes and disturbed land will be reinstated in agreement with the land users and title owners or Mozambique Authority.

Further to the Project's main components, described above, the implementation of the transmission line will require complementary components and activities, which are required to support the Project's construction or to allow its operation and maintenance. These include:

- Construction of access roads, for line construction and maintenance purposes;
- Exploration of borrow pits to provide aggregates and inert materials;
- Establishment and maintenance of the right-of-way (RoW).

3.2.2 Operational Phase

Once built, EDM will be responsible for the maintenance and operation.

The expected average annual evacuated electricity through the transmission line is 350GWh/yr.

The main works associated with transmission line operation are the maintenance of the RoW, tower and line inspections and line maintenance works. Control of vegetation regrowth is necessary to avoid disruption to the overhead line and towers. If tree and plant growth is left unchecked, there are higher risks of power outages from contact with trees, forest and bush fires, corrosion of steel equipment, equipment access blockages, and interference with grounding equipment. Access for technical inspection and repairs will be intermittent and use existing access roads and take place within the existing RoW. One aspect that will be monitored during technical inspections is the encroachment of new infrastructure and settlements into the RoW, which may constitute a risk.

During operations, the substation will be mostly automated. A few EDM workers will monitor the substation operation, as it is already the case for the existing Boane substation. Maintenance works will be intermittent and within the operational site boundary.

3.2.3 Decommissioning Phase

The design lifetime of the infrastructure is 35 years[3], although this may be prolonged via maintenance and/or upgrades. The Project's decommissioning phase is thus likely to occur in a relatively distant timeframe, and as such the degree of confidence regarding the activities to be developed at that stage is relatively low. In general, however, the decommissioning phase will include the following activities:

- Removal of foundations and towers;
- Removal of wastes and decontamination of sites;
- Disposal of wastes and hazardous materials, in adequate waste disposal facilities; and
- Devolution and reuse of RoW, in line with the proposed end use.

Given the distant timeframe of these activities, a Decommissioning Plan should be developed by EDM prior to decommissioning, which should include all specialist studies required to guide the decommissioning activities and minimize their environmental and social impacts.

[3] The useful life could be considered 35 years. The Concession Agreement is a BOOT (Build Own Operate Transfer) arrangement, therefore after the term of the PPA (25 years), the asset transfers to EDM.

4 Implementation of the EMP

4.1 Coordination with Relevant Agencies / Stakeholders

Regular coordination and communication with all relevant agencies supervising environmental and social affairs will be maintained throughout the lifetime of the Project covering permit requirements, environmental and social reports, management of change and in the unlikely event of emergency coordination/notification. Similar coordination will be carried out with EPC Contractors (and subcontractors) who will be responsible to implement the EMP during construction phase.

4.2 Roles and Responsibilities

4.2.1 Key Role Players

The **Proponent** of the Project is EDM. Their implementation partners, Globeleq and Source Energia will be the organizations ultimately responsible for Project implementation during construction, but will do so by hiring one or more construction contractors, that will be responsible for construction of the Project infrastructure. As such, many of the construction environmental and social mitigation and management required under this EMP will be the Contractor's responsibility, under the Proponent's supervision.

Once built, EDM will be responsible for the maintenance and operation.

Mitigation of the Project's induced impacts will require active management in all project phases. Given that these phases will be under the responsibility of different role players, it is crucial to clearly define the responsibilities of the main role players across the project's life cycle, to ensure that the environmental management procedures defined in this EMP are fully implemented.

The environmental and social management of the Project will thus be dependent on the actions of the following key role players:

- **Globeleq and Source Energia**, as the Project implementation partners, leading during construction under EDM supervision, will be responsible for ensuring that the Project is designed and built according to the requirements set out in this EMP. This will include the following main tasks:
    - Ensure that the Project's detailed design (which will be undertaken by each of the EPC Contractor) complies with the requirements set out in the EMP (see Chapter 5.1);
    - Update and finalize the EMP based on the final detailed engineering design and ensure that measures to be undertaken during construction and environmental technical specifications are included in the bidding documents and contractual obligations with the winning bidder for each of the contracted elements of the Project;
    - Ensure that the EPC Contractor(s) are fully aware of, and contractually bound to, the environmental management requirements set out in the EMP for the construction phase of the different Project components (included in Chapters 5.2 and 6), through their inclusion in the tendering process and on the subsequent contracts;

- Require from all Contractors the submission of a Construction Environmental and Social Management Plan (CESMP) and all related management plans and method statements, for the Proponent approval, that are compliant with all requirements included in this EMP;
- Oversee a contractor to lead on the RAP/IRAP process, as set out in the Resettlement Framework Plan;
- Supervise the EPC Contractor's environmental performance, to ensure that all management requirements in this EMP are implemented;
- Develop and implement a project-specific Stakeholder Engagement Plan (SEP), based on the guidelines provided (see Section 6.6), and a Grievance Redress Mechanism (GRM), as per the guidelines provided in Section 6.6.5.

- **EPC Contractor –** the EPC Contractor, to be procured and appointed by the Proponent/implementation partners, will be responsible for developing the detailed engineering design of their respective parts of the Project to a level of detail adequate for construction, in compliance with the requirements provided in the EMP for detail design and the construction phase (see Chapters 5.1 and 5.2). When hiring subcontractors, the EPC Contractor will also ensure that they abide by all requirements of the EMP, through the inclusion of the EMP in the tendering process and contracts of their subcontractors.
- **EDM,** as the Project Proponent and leading institution during operation, will manage the Project during the operational phase in compliance with the environmental management requirements set out in this EMP for operations (included in Chapter 5.3 and 6, where applicable).

The responsibilities of each of these key role players are described in greater detail in the following sections.

4.2.2 Responsibility of the Implementation Partners (Construction)

Globeleq and Source Energia, implementation partners leading during construction, shall interact with EDM and the detailed engineering phase contractor, to verify that the final design is compliant with the recommendations and guidelines set out in Chapter 5.1, 5.2 and 6 (where applicable) of this EMP.

With regards to the construction phase, Globeleq and Source Energia shall appoint an **Environmental and Social Governance Manager (ESGM)**, responsible for monitoring compliance of the EPC Contractor within the implementation of the EMP, including the undertaking of environmental management compliance audits.

The ESGM shall have the following responsibilities:

- Ensure that the EPC Contractor is duly informed of the EMP, and all its environmental and social management requirements, prior to any contract award, by including the necessary environmental and social documents in tenders and expression of interests;

- Make sure that the EPC Contractor takes ownership of the environmental and social requirements defined in this EMP, by requesting the Contractor to submit a CESMP, and any associated plans or procedures, detailing how the EPC Contractor will implement these requirements;
- Review and approve the CESMP and any associated plans or procedures;
- Inform key, on-site staff of their roles and responsibilities in terms of the EMP, through initial environmental awareness training;
- Monitor, review and verify compliance with the EMP by the EPC Contractor, as well as any sub-contractors, if applicable;
- Identify areas of non-compliance and recommend measures to rectify them in consultation with EDM and EPC Contractor, as required;
- Ensure that the EPC Contractor remedies environmental and social problems in a timely manner and to the satisfaction of EDM and authorities (when necessary);
- Request method statements from the EPC Contractor prior to the start of relevant activities and approve these (as appropriate) without causing undue delay to the EPC Contractor;
- Ensure induction material includes Project appropriate environmental and social issues;
- Approve environmental training programs and other awareness initiatives;
- Provide feedback for continual improvement in environmental and social performance;
- Respond to changes in project implementation or unanticipated site activities which are not addressed in the EMP, and which could potentially have environmental impacts, and advise EDM and the EPC Contractor as required;
- Review, approve and archive the EMP Performance Reports.

The ESGM will be supported by the Community Liaison Officer (CLO), appointed by the implementation partners, who will have the following main responsibilities:

- Liaise with communities and report to ESGM any issues that need to be resolved;
- Provide information to local communities about the upcoming construction activities;
- Together with the ESGM, evaluate compliance to the construction phase stakeholder engagement, as per the Stakeholder Engagement Plan to be developed by Globeleq and Source Energia, based on the Communication Plan Framework provided in this EMP;
- Together with the ESGM, ensure that the Grievance Redress Mechanism (GRM) is implemented and disclosed to the communities around the construction corridor. The CLO will be the point of contact for lodging of grievances and suggestions resulting from the Project's construction phase.

4.2.3 Responsibility of the EPC Contractor

The **EPC Contractor** shall be responsible for implementation of all management actions outlined in this EMP for the construction phase (see Chapters 5.1, 5.2 and 6) and shall abide by the ESGM instructions regarding the implementation of the EMP. Note that the Proponents may name either a single EPC Contractor for the transmission line and the wind power plant, or this scope may be split between two contractors. If the later, these responsibilities apply to the EPC Contractor assigned the transmission line, but it is noted that some collaboration will be required between the two contractors where the transmission line connects to the wind farm site.

The EPC Contractor shall name a **Health, Safety and Environmental Manager (C-HSEM**), or equivalent, who shall report to the Proponents' ESGM and ensure that the management actions set out in this EMP are complied with on a day-to-day basis. The C-HSEM shall:

- Develop environmental induction and awareness training for all new site personnel (e.g., posters, toolbox talks, signage);
- Ensure that all activities on site are undertaken in accordance with the EMP;
- Undertake visual inspections of the activities of employees regarding implementation of the requirements outlined in the EMP;
- Immediately notify the ESGM of any non-compliance with the EMP, or any other complaints or issues of environmental and or social concern;
- Develop and submit the C-EMP to the ESGM for approval;
- Develop and submit Method Statements to the ESGM for approval;
- Keep site documentation related to environmental management on site (e.g., permits, EMP, Environmental Method Statements, Environmental License, reports, audits, receipts for waste removal, etc.);
- Keep a regular photographic record of all environmental incidents;
- Monitor and record EMP performance indicators;
- Keep any records as required in the Environmental Management Plans/Programs;
- Compile and submit EMP performance reports to the ESGM.

The C-HSEM will also ensure that all stakeholder engagement activities under the contractor's responsibility are undertaken as per the Communication Plan Framework set out in the EMP and in coordination with the Proponent's CLO.

Additionally, the EPC Contractor has the following general responsibilities:

- Get all necessary licenses and permits to perform the activities;
- Get all the licenses and permits required for wastewater discharge;
- Get all the licenses and permits required for handling, treatment, transport, and disposal of waste at final destination;
- Comply with all requirements included in the EMP;
- Allocate human and financial resources to implement the EMP. Ensure that all the necessary equipment (e.g., waste containers, safety equipment, fire extinguishers) and materials (e.g., spill kits) are available on board;

- Provide environmental training to the workers;
- Carry out their own inspections to ensure compliance with the EMP;
- Be open to periodic audits from the Proponent and provide necessary information to do so.
- Implement a communication channel with local communities according to the Communication Plan Framework, coordination with the Proponent's CLO;
- Ensure that Subcontractors, if any, comply to the EMP;
- Implement all necessary correctives measures. Keep record of the incidents, accidents and community complains;
- Supervise the activities of the subcontractors; and
- Report all relevant incidents and accidents to the Proponent.

4.2.4 Responsibility of the Proponent (Operation)

Once built, the transmission line will be operated by EDM (Proponent/Operator). EDM will be fully responsible for the maintenance and operation, in compliance with the environmental management requirements outlined in this EMP for operations (included in Chapter 5.3 and 6, where applicable).

4.2.5 Organogram

The following organograms show the different role players and the official chain of communications proposed for the implementation of the EMP in the construction and operation phases.

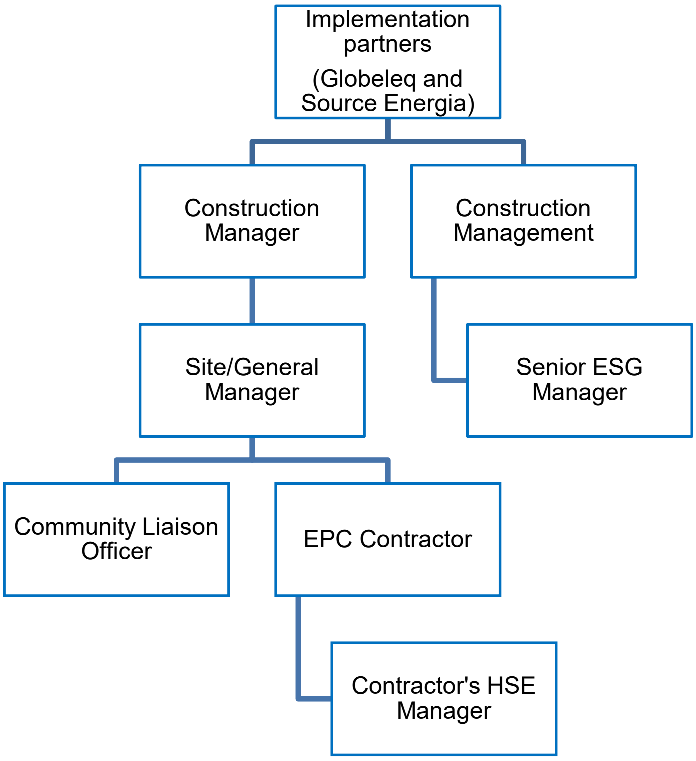


Figure 4.1 – EMP organizational chart for the construction phase

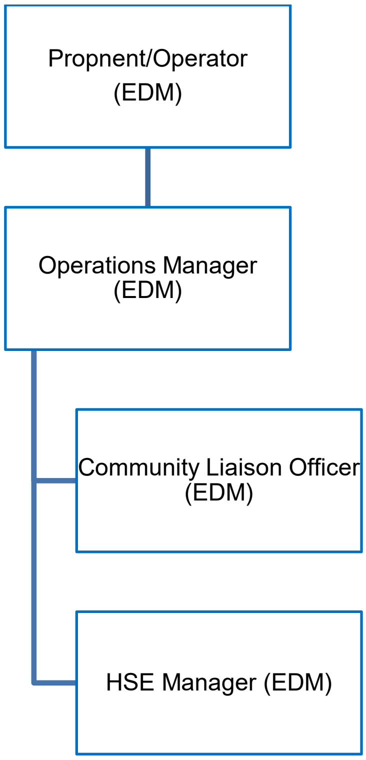


Figure 4.2 – EMP organizational chart for the operation phase

5 Environmental Management

5.1 Mitigation Measures for Detailed Design

Following the Project's impact assessment, the EIS defined a number of measures for the detailed engineering phase, which are summarized in These include guidelines for the detailed design of some Project components, which are proposed to avoid or minimize negative impacts. The integration of these recommendations into the Project final design will be the responsibility of the EPC Contractor, under the supervision and approval of the Proponent. Note that whilst these measures will be implemented during the detailed design phase, they mostly mitigate impacts during operation. All measures listed below will be verified through a one-time demonstration prior to construction, and will be documented via a Performance Report and Audit.

Table 5.1. These include guidelines for the detailed design of some Project components, which are proposed to avoid or minimize negative impacts. The integration of these recommendations into the Project final design will be the responsibility of the EPC Contractor, under the supervision and approval of the Proponent. Note that whilst these measures will be implemented during the detailed design phase, they mostly mitigate impacts during operation. All measures listed below will be verified through a one-time demonstration prior to construction, and will be documented via a Performance Report and Audit.

Table 5.1 – Requirements for the Detailed Engineering Phase

Project Component	Requirements	Avoided or Mitigated Impacts
Transmission line towers / Overhead line	- Sufficient geological-geotechnical evaluation will be undertaken such that the structures can be designed for their suitability to the terrain. This will include consideration of soil erosion and landslide. - Consult with the mining concession companies which the ROW crosses to determine any concerns that they have and identify any additional mitigation measures required.	- Potential slope instability - Adverse effects on geological heritage or mineral resources
	- Any drainage systems provided for the Project must be sufficient to ensure effective surface water drainage, maintaining the stability of the slopes and not causing erosion.	- Impacts on geology and water resources
	- All towers will be located at least 30 m from the nearest water source to avoid polluting the waters and to reduce the flow of sediments. - Prioritize/avoid locating the towers outside riverbanks, wetlands, and floodplains.	- Impacts on water resources - Direct loss of vegetation units and habitats - Impacts on riverine habitats

Project Component	Requirements	Avoided or Mitigated Impacts
Overhead line	- Signalling devices must be installed in the whole extension of earth cables. Signals must be placed with 20 m spacing, alternating in each earth cable, resulting in an apparent 10 to 10 m distancing between signals considering both earth cables. Use this signalling scheme with rotative fireflies or tapes as signal devices in areas where the line cross or goes closer to riparian vegetation and any large, undisturbed woodland areas along the route (i.e., those in the northern part of the route). In other woodland areas use double spirals as signal devices with the same distancing. - Install elements that increase the gap between the conductors on the crossarm. - Cover the conductors and other live elements (surge arresters, fuses, disconnectors) with insulating materials, to ensure minimum safety distances. - Install elements that discourage or prevent birds from perching on dangerous parts (anti-perching devices).	- Increased mortality of bird and bat species due to collisions and electrocution
	- The route of the transmission line should be further evaluated for optimization in order to potentially reduce the number of households requiring resettlement.	- Involuntary resettlement

5.2 Mitigation Measures for the Construction Phase

Table 5.2 lists the general mitigation measures for the construction phase (i.e., not integrated into a specific management program), by type of construction activity. These are mostly good practice environmental management procedures that should be applied to minimize impacts on several environmental aspects. Table 5-2 also provides information regarding the impacts that will be mitigated by the proposed measures, as well as the key actor which is responsible for their implementation. Note, however, that the Proponent is the ultimate responsible for ensuring the implementation of mitigation, even when other actors (such as the contractors) are involved, through supervision and auditing.

Table 5.2 – Mitigation measures for construction phase

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
CLIMATE AND CLIMATE CHANGE					
GHG emissions during the construction phase	Promote proper and regular maintenance of vehicles and other motorized equipment per manufacturers' guidance.	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Monthly
AIR QUALITY					
Increase in dust emissions near sensitive receptors	Vegetation clearing and earthworks should be minimized as much as possible and limited to the strictly needed areas	EPC Contractor	- Performance report - Audits	- % of cleared area - No. of Non-conformities	- Monthly
	All the unpaved surfaces where vehicle movement is to be expected should be kept moist (e.g., through a water sprinkler truck), in particular during dry and windy conditions, to minimize the dust emitted by vehicle entrainment	EPC Contractor	- Performance report - Audits	- No. of Non-conformities - No. of complaints	- Monthly
	Speed limits for construction heavy vehicles should not exceed 30 km/h in critical segments, such as when near residential areas	EPC Contractor	- Performance report - Audits	- No. of Non-conformities - No. of complaints	- Monthly
	Circulation of construction heavy vehicles should be limited to pre-approved construction routes	EPC Contractor	- Performance report - Audits	- No. of Non-conformities - No. of complaints	- Monthly
	Heavy trucks transporting construction materials should not be loaded to full capacity. A free edge of approximately 0.2m should be kept avoiding spills during materials transport	EPC Contractor	- Performance report - Audits	- No. of Non-conformities - No. of complaints	- Monthly
	Stockpiles of granular materials should be regularly sprinkled with water to minimize windborne dust	EPC Contractor	- Performance report - Audits	- No. of Non-conformities - No. of complaints	- Monthly
	Trucks carrying dusty materials should have the load conveniently covered, preventing the emission of particulate matter and fugitive dust	EPC Contractor	- Performance report - Audits	- No. of Non-conformities - No. of complaints	- Monthly

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
Increase in atmospheric concentrations of exhaust gases from vehicle and equipment operation	All internal combustion machinery and equipment should be kept in good maintenance conditions, in order to minimize combustion gases exhaust emissions	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Monthly
	Select traffic construction routes that minimize the crossing of residential areas and optimize fuel consumption as much as feasible possible	EPC Contractor	- Performance report - Audits	- No. of Non-conformities - No. of complaints	- Monthly
	Speed limits for construction heavy vehicles should not exceed 30 km/h when near residential areas	EPC Contractor	- Performance report - Audits	- No. of Non-conformities - No. of complaints	- Monthly
	Internal combustion equipment should be turned off when not in operation. Avoid maintaining equipment in idle when not being used	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Monthly
NOISE					
Increase of noise levels near sensitive receptors during construction	Vegetation clearing and earthworks should be minimized as much as possible and limited to the strictly needed areas	EPC Contractor	- Performance report - Audits	- % of cleared area - No. of Non-conformities	- Monthly
	Speed limits for construction heavy vehicles should not exceed 30 km/h in critical segments, such as when near residential areas	EPC Contractor	- Performance report - Audits	- No. of Non-conformities - No. of complaints	- Monthly
	Construction activities, in particular the noisier ones, should whenever possible be limited to the daytime period (between 07:00 and 22:00) during weekdays, avoiding working during the night-time and on weekends	EPC Contractor	- Performance report - Audits	- No. of Non-conformities - No. of complaints	- Monthly
	Circulation of construction heavy vehicles should be limited to pre-approved construction routes. These will avoid crossing residential areas, schools, hospitals, cultural heritage and religious facilities whenever feasible	EPC Contractor	- Performance report - Audits	- No. of Non-conformities - No. of complaints	- Monthly
	Operate earth moving equipment within specification and capacity (e.g., ensure machines are not overloaded)	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Monthly
	Perform regular maintenance of all equipment as per manufacturer specifications	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Monthly
	The EPC Contractor should avoid, whenever possible, placing fixed equipment (such as cranes or compressors) in proximity to sensitive receptors	EPC Contractor	- Performance report - Audits	- No. of Non-conformities - No. of complaints	- Monthly

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
	Inhabitants of local communities nearby the construction locations should be previously informed by the EPC Contractor regarding the upcoming construction activities, including information on the planned start of activities, their nature and duration. This communication should also include information regarding the project nature and goals as per the Project Stakeholder Engagement Plan	EPC Contractor, CLO	- Performance report - Audits	- N.º of engagements with communities - No. of Non-conformities - No. of complaints	- Monthly
	Grievance redress mechanisms should be implemented during construction phase	EPC Contractor, CLO	- Performance report - Audits	- No. of Non-conformities - No. of implemented measures	- During construction
GEOLOGY					
Potential slope instability	Conduct regular inspection and maintenance of any drainage system provided by the Project	EPC Contractor	- Regular field inspections to visually assess the condition of the drainage systems, such as culverts, ditches, or retention ponds	- Absence or minimal occurrence of surface water-related issues, such as ponding, flooding, or erosion, within the project area	- Daily or weekly inspections during critical construction activities
Changes in erosion, transport and sedimentation processes	Unused soil remaining after backfilling of tower foundation sites shall be disposed near the tower foot, levelled and vegetated	EPC Contractor	- Regular site inspections - Documentation and records	- Compliance with project specification - Adequacy of vegetation growth	- One-off activity during the construction phase

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
SOILS					
Impacts on irrigation lands and on soils with suitability for irrigation	Prioritize the use of existing tracks to access work sites. Restrict transportation to the identified access by clearly marking out the limit of the RoW and access roads	EPC Contractor	- Site inspections	- Violations or incidents: The number of instances where vehicles or personnel deviate from the designated access routes	- Daily basis throughout the construction phase
	Limit the clearing of vegetation to strictly required areas	EPC Contractor	- Visual inspections - Transect surveys	- % of vegetation cleared: This indicator measures the extent of vegetation cleared in relation to the total area of the power transmission line corridor. - Incidents of unauthorized clearing	- Daily basis throughout the construction phase
	Conducting regular meetings or workshops with farmers to discuss their upcoming field activities and understand their specific needs regarding powerline construction. This will allow for proactive planning and coordination between the powerline project team and farmers, minimizing disruptions	EPC Contractor, CLO	- Meeting records - Feedback mechanisms	- Frequency of meetings - Farmer satisfaction through surveys or feedback mechanisms	- Monthly or quarterly schedule for meetings or workshops

<table>
<tr><th rowspan="2">Impact</th><th rowspan="2">Mitigation Actions</th><th rowspan="2">Responsible</th><th colspan="3">Monitoring and Performance Evaluation</th></tr>
<tr><th>Monitoring Methods</th><th>Performance Indicators</th><th>Timing / Frequency</th></tr>
<tr><td rowspan="4">Increased soil erosion and sediment compaction</td><td>Prioritize the use of existing tracks to access work sites. Restrict transportation to the identified access by clearly marking out the limit of the RoW and access roads</td><td>EPC Contractor</td><td>- Site inspections</td><td>- Incidents of unauthorized access
- Condition of markings</td><td>- Throughout the construction phase on a daily basis</td></tr>
<tr><td>Control the movement of heavy vehicles and equipment over the soil, including restricting movement over non-essential areas</td><td>EPC Contractor</td><td>- Regular Inspections
- Security Personnel</td><td>- Violation Incidents
- Corrective Actions
- Communication and Training</td><td>- Daily basis, especially during peak construction periods
- Event-based Assessments: Certain activities, such as the transportation of large equipment or materials, may require additional monitoring during their execution</td></tr>
<tr><td>Soils excavated for pylon foundations should be used for backfilling excavations and not be left exposed to wind or water for long periods</td><td>EPC Contractor</td><td>- Site Inspections
- Documentation and Records: Maintaining accurate records of the excavation activities, including the quantity and location of soil reuse</td><td>- Soil reuse %
- Exposure duration</td><td>- Daily basis during the active construction phase</td></tr>
<tr><td>Stockpile topsoil into low, broad mounds and replacing as soon as possible to prevent excessive compaction and help with the retention of soil fauna</td><td>EPC Contractor</td><td>- Site Inspections
- Maintaining records and documentation of the stockpiling and replacement activities, including</td><td>- Soil compaction (using a penetrometer to measure soil resistance)</td><td>- As Needed/Ad Hoc: The measure can be implemented whenever topsoil is being stockpiled during the construction phase.</td></tr>
</table>

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
			dates, quantities, and locations		
	Protect temporarily stored soils with a waterproof cover and adequate height to ensure stability	EPC Contractor	- Site inspections - Documentation: Maintaining records or logs to document the status of the soil storage areas	- Stability of covers - Incidents of soil erosion or sediment runoff Incidents of soil erosion or sediment runoff	- Throughout the construction phase on a daily basis
	Ensure that all cleared and impacted land is rehabilitated and re-vegetated, as appropriate	EPC Contractor	- Site Inspections - Vegetation Surveys	- Vegetation coverage - Plant Species Diversity - Soil Erosion	- During Construction: as frequently as needed to ensure timely restoration after each stage of construction
Potential soil contamination	Maintain vehicles and equipment to ensure no oil or fuel leakages. If a spill occurs, a spill kit must be used to immediately reduce the potential spread of the spill.	EPC Contractor	- Maintenance records - Spill kit inventory	- Compliance with maintenance schedules - Absence of spill incidents - Spill response time	- Daily throughout the construction phase
	Prohibit the discharge of any type of non-treated residual water in the soil and/or water resources	EPC Contractor	- Regular site inspections	- Absence of pollution incidents: Tracking the occurrence of pollution incidents or violations related to the discharge of non-treated residual water	- Throughout the construction phase on a daily basis

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
WATER RESOURCES					
Changes to natural run-off patterns and water bodies	Do not block or constrain river flow in the construction of access roads, even if temporary. Ensure that suitable transversal drainage (culverts, viaducts, etc.) are in place	EPC Contractor	- Site inspections of transversal drainage structures.	- Compliance with design specifications - Monitoring the functionality of transversal drainage structures	- Daily or weekly monitoring during the rainy season
	Only areas already disturbed (outside any watercourse) or within the construction area limits should be used for setup of laydown areas. The following sites must be avoided: a. Sites susceptible to seasonal flooding. b. Steep terrain which, in periods of high rainfall, may drag sediments downstream and into waterways. c. Places that are less than 50 m from surface water and any identified wells and boreholes	EPC Contractor	- Regular inspections by environmental experts or designated personnel - Records or logbooks that document the selection process for laydown areas, including site assessments and the justification for chosen locations	- Absence of environmental impacts - Compliance with regulatory requirements	- Early stages of the project to identify suitable locations and avoid prohibited sites - This assessment can be considered a one-off activity
	Watercourses, including wetlands should be clearly marked. These areas should be avoided by contractors and site personnel	EPC Contractor	- Site inspections - Records (e.g., within CESMP) document the marking of watercourses and wetlands, as well as any instances of non-compliance or corrective actions taken	- Absence of encroachments or disturbances - Corrective actions taken: Documenting any instances of non-compliance and tracking the implementation of corrective actions to address identified issues	- Watercourses and wetlands should be marked before the start of construction activities. This marking process can be considered a one-off activity

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
	Riverbeds will not be modified beyond the strictly necessary to complete a particular work. The affected areas will be rehabilitated to the original profile and native vegetation	EPC Contractor	- Before-and-after documentation: Conducting surveys and collecting photographic evidence before and after construction activities to compare the condition of the riverbeds.	- Degree of modification: Assessing the extent of riverbed modification compared to the original profile - Rehabilitation success: monitoring vegetation growth, erosion control, and the overall ecological function of the rehabilitated areas	- Throughout the construction phase whenever riverbeds are encountered or affected
Accidental contamination of surface and/or ground waters	The disposal and/or storage of construction materials and construction waste shall be protected from wind and rain and should be located as far away as possible from sensitive areas, including water lines (minimum 50 m)	EPC Contractor	- Site inspections - Documentation review: related to storage and disposal practices, such as records of material inventory, waste management plans, and disposal receipts	- Compliance with storage guidelines - Verifying the distance: through on-site measurements and spatial analysis	- Daily or weekly inspections during active construction phases, while monthly or quarterly during less intense periods
	No soil, vegetation, waste or construction materials will be discharged into any water courses	EPC Contractor	- Documentation review: Reviewing documentation related to waste management plans, spill response procedures, and incident reports	- Compliance with discharge guidelines	- Daily or weekly during active construction phases, while monthly or quarterly during less intense periods

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
	Natural water resources (rivers, lakes, etc.) will not be used for equipment or vehicle washing. This activity will only be conducted in designated authorized washing areas	EPC Contractor	- Site inspections	- Compliance with designated washing areas - Reviewing incident reports	- Daily or weekly inspections during active construction phases, while monthly or quarterly during less intense periods
	Refuelling and maintenance of equipment will only be done only in designated areas, adequately delimitated, with impermeable pavement and adequate drainage infrastructure, including a water-oil separation system. The waste generated from these activities must be properly managed to ensure safe disposal (storing and transporting)	EPC Contractor	- Site inspections - Waste management tracking	- Waste management compliance - Incident reports	- Daily or weekly during active construction phases, while monthly or quarterly during less intense periods
	Whenever necessary, install portable toilets in the construction sites, with watertight septic tank for storage	EPC Contractor	- Site inspections - Feedback and complaints mechanism	- Inspection findings and documentation review - Worker's satisfaction	- Installed at the construction site before the start of the construction activities or as soon as the need arises
	Any spill of chemicals or hydrocarbons on the soil surface will be cleaned up using control/spill kits. Contaminated soils will be collected and managed and disposed appropriately as hazardous waste	EPC Contractor	- Spill response protocols - Inspection and observation	- Spill response time. - Post-spill inspections and testing of soil samples - Assesses compliance with regulations and standards for the disposal of hazardous materials	- Throughout the construction activities

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
Increase of suspended sediments in water bodies	Vegetation clearing and earthworks should be minimized as much as possible and limited to the strictly needed areas	EPC Contractor	- Performance report - Audits	- % of cleared area - No. of Non-conformities	- Monthly
	In areas with high erosion risk (from pk 0+000 to 2+500), ensure that sediment control measures are in place prior to disturbance	EPC Contractor	- Site inspections to verify the presence and effectiveness of sediment control measures	- Presence of sediment control measures - Visual inspections	- Before any ground disturbance takes place in the specified areas with high erosion risk
	Rehabilitate disturbed areas as soon as practicable after they are vacated; Revegetate disturbed areas along riverbanks	EPC Contractor	- Site inspections - Vegetation surveys. - Reviewing project documentation, including rehabilitation plans, progress reports, and monitoring records	- % Area rehabilitated. - Evaluating the density and health of vegetation - Compliance with timing requirements	- Throughout the construction phase and beyond
	Silt-laden water must not be pumped directly into a watercourse. It must be pumped into a settling pond, behind a silt-filtering medium, or onto an adjacent vegetated area sufficient in size to filter any water returning to the watercourse, such that the concentration of suspended solids in the watercourse does not increase more than 25 mg/l above background level	EPC Contractor	- Visual inspections	- Suspended solids concentration	- Throughout the construction phase whenever there is a potential for silt-laden water discharge
	Restore the transversal and longitudinal profile of the river to its original geometry. In areas with high erosion risk (from pk 0+000 to 2+500), construct the necessary protection works of riverbanks	EPC Contractor	- Field surveys	- River profile restoration: Assessing the extent to which the transversal and longitudinal profile of the river has been restored to its original geometry.	- Biannual or annual basis, or as determined by the project timeline

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
Changes in groundwater recharge	During the construction of the powerline minimize the disturbance to the ground and avoid damaging the aquifer recharge zone (alluvial zones). This may include using low-impact construction techniques, minimizing the amount of excavation, and avoiding the use of heavy equipment in sensitive areas	EPC Contractor	- Regular field visits by environmental experts	- Area of disturbance	- Monthly or biannually
	If possible, use permeable materials to construct access roads to maintain the natural recharge	EPC Contractor	- Field inspections	- Monitoring groundwater levels in the vicinity of the access roads	- During the initial construction phase
LANDSCAPE					
Temporary degradation of landscape at worksites	Vegetation clearing, topsoil removal, and earthmoving activities should be minimized as much as practicable and limited to the strictly needed areas	EPC Contractor	- Performance report - Audits	- % of cleared area - No. of Non-conformities	- Quarterly
	All temporary construction sites, such as borrow pits and landing areas, and any other areas disturbed by construction, will be revegetated as soon as practicable following the completion of the construction activities. The use of native species will be prioritized for the rehabilitation works;	EPC Contractor	- Performance report - Audits	- % of rehabilitated area - No. of Non-conformities	- Quarterly
	Priority will be given to areas that are already highly disturbed for the establishment of construction site camps and/or laydown areas	EPC Contractor	- Performance report - Audits	- % of cleared area - No. of Non-conformities	- Quarterly
	Laydown areas and machinery parks should be located as far as possible (minimum distance of 300 m) from any areas of sensitive use (residential areas, schools, and health units)	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Quarterly
	Limit the movement of machines and vehicles to work areas	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Quarterly

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
BIODIVERSITY					
Wetlands and riverine areas degradation	Adopt good housekeeping to prevent spillages and contamination	EPC Contractor	- Performance report - Audits	- No. of incidents - No. of Non-conformities	- Quarterly
	Forbid movement of heavy machinery in wetlands, riverbanks, riverbeds, and waterbodies as far as practically possible. Where it can't be avoided, the project HSE manager must provide case by case guidance to the EPC on how best to avoid damage, record any damage caused and ensure it is rehabilitated completely before construction is completed	EPC Contractor	- Performance report - Audits	- No. of complaints - No. of Non-conformities	- Quarterly
	All vehicles and equipment should be well-maintained per manufacturers' guidance	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Quarterly
	All refuelling and servicing of equipment should take place in demarcated areas, away from rivers, wetlands, and waterbodies. Refuelling and servicing of equipment must take place on an impermeable surface, and a spill kit must be available where the servicing or refuelling takes place	EPC Contractor	- Performance report - Audits	- No. of incidents - No. of Non-conformities	- Quarterly
	Limit the movement of machines and vehicles to work areas. Forbid disturbance outside site boundaries	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Quarterly
Direct loss of vegetation units and habitats	Strictly limit the clearing of vegetation to the required areas, with particular emphasis of this in areas of natural habitat	EPC Contractor	- Performance report - Audits	- % of cleared area - No. of Non-conformities	- Quarterly
	Prioritise siting of construction lay-down areas and borrow pits outside of areas of natural habitat	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Quarterly
	Areas to be cleared within the right-of-way will be marked by a surveyor and searched by a suitably trained professional for threatened species, before the vegetation is cleared. Any identified threatened species will be relocated in similar habitats outside the area to be disturbed. If any animal or nesting sites with eggs or chicks/juveniles are identified, they will be removed and relocated, unless the species is identified as threatened, upon which the breeding will be allowed to reach completion. The surveys will be done during the flowering season of the majority of threatened plant species that may be present. Search and rescue reports will be maintained, which will include the names and coordinates of relocated specimens. Vegetation in the remainder of the	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Ongoing visual observation throughout construction - Immediate notification to EO if nesting site identified

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
	transmission line servitude will remain untouched, except where required for access, construction, or height clearance it will be cropped no lower than knee height				
	The sustainable use of the felled trees by the communities must be coordinated with the local authorities.	EPC Contractor/ Local authorities	- Registries - Performance report	- Volume (kg) of wood handed to communities vs. Volume of wood (kg) obtained from felled trees	- Quarterly
	Rehabilitate temporary work areas as soon as practical (ie, once work is concluded in each segment)	EPC Contractor	- Performance report - Audits	- % of rehabilitated area - No. of Non-conformities	- Quarterly
	Whenever possible new and temporary accesses should be created based in existent accesses	EPC Contractor	- Performance report - Audits	- Nº. of new accesses - No. of Non-conformities	- Quarterly
Degradation of nearby vegetation units	Limit the movement of machines and vehicles to work areas. Forbid disturbance outside site boundaries. Where disturbance outside site boundaries can't be avoided, the HSE Manager needs to record the instance and an environmental incident and ensure that the area is rehabilitated.	EPC Contractor	- Performance report - Audits	- No. of complaints - No. of Non-conformities	- Quarterly
	Limit non-Project vehicles entrance in the construction area to avoid invasive and ruderal species dispersion and entrance of people that can exploit illegally natural resources.	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Quarterly
	Strictly limit the clearing of vegetation to the required areas, with particular emphasis of this in areas of natural habitat	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Quarterly
	Whenever possible new and temporary accesses should be created based in existent accesses	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Quarterly
	Vegetation clearing, topsoil removal, and earthmoving activities should be minimized as much as practical and limited to the strictly needed areas	EPC Contractor	- Performance report - Audits	- % of cleared area - No. of Non-conformities	- Quarterly

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
Reduction of feeding, breeding and roosting areas	Areas to be cleared within the right-of-way will be marked by a surveyor and searched by a suitably trained professional for threatened species, before the vegetation is cleared. Any identified threatened species will be relocated in similar habitats outside the area to be disturbed. If any animal or nesting sites with eggs or chicks/juveniles are identified, they will be removed and relocated, unless the species is identified as threatened, upon which the breeding will be allowed to reach completion. The surveys will be done during the flowering season of the majority of threatened plant species that may be present. Search and rescue reports will be maintained, which will include the names and coordinates of relocated specimens. Vegetation in the remainder of the transmission line servitude will remain untouched, except where required for access, construction, or height clearance it will be cropped no lower than knee height	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Ongoing visual observation throughout construction - Immediate notification to EO if nesting site identified
	Whenever possible new and temporary accesses should be created based in existent accesses	EPC Contractor	- Performance report - Audits	- Nº. of new accesses - No. of Non-conformities	- Quarterly
	The Project will conduct training on biodiversity management program	EPC Contractor	- Performance report - Audits	- No. of awareness actions - No. of Non-conformities	- Quarterly
Increased fauna mortality and decreased species diversity	A desktop assessment of the route should be undertaken by a suitably qualified avifauna expert to determine where these hotspots are likely to be (pre-construction).	Proponent (w/ appointed expert)	N/A	Completion of assessment report/ memo.	- One off
	Vegetation clearing, topsoil removal, and earthmoving activities should be minimized as much as practical and limited to the strictly needed areas	EPC Contractor	- Performance report - Audits	- % of cleared area - No. of Non-conformities	- Quarterly
	Avoid locating towers and access roads in wetlands, river beds, and on river banks.	EPC Contractor	- Performance report - Audits	- % of cleared area - No. of Non-conformities	- Quarterly
	Limit machinery and vehicles speed limit to 30km/h to reduce risk of animal run over	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Quarterly

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
	Place signs along access roads informing speed limits and possible animal presence	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Quarterly
	During induction sessions inform workers about the importance of biodiversity and commitment of the project to it, in order to avoid run over animal on purpose	Contractor	- Performance report - Audits	- No. of awareness actions - No. of Non-conformities	- Quarterly
	Areas to be cleared within the right-of-way will be marked by a surveyor and searched by a suitably trained professional for threatened species, before the vegetation is cleared. (See the additional requirements regarding pre-construction surveys in any identified avifauna 'hot spots'.) Any identified threatened species will be relocated in similar habitats outside the area to be disturbed. If any animal or nesting sites with eggs or chicks/juveniles are identified, they will be removed and relocated, unless the species is identified as threatened, upon which the breeding will be allowed to reach completion. The surveys will be done during the flowering season of the majority of threatened plant species that may be present. Search and rescue reports will be maintained, which will include the names and coordinates of relocated specimens. Vegetation in the remainder of the transmission line servitude will remain untouched, except where required for access, construction, or height clearance it will be cropped no lower than knee height.	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Ongoing visual observation throughout construction - Immediate notification to EO if nesting site identified
	In instances where animals and birds have not vacated a specific construction area and the construction can't be postponed, the project will use an air horn to frighten animals from the area in order to avoid injury or fatalities during vegetation clearance	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Throughout construction, verified monthly
	Whenever possible new and temporary accesses should be created based in existent accesses	EPC Contractor	- Performance report - Audits	- Nº. of new accesses - No. of Non-conformities	- Quarterly
Possible introduction or spread of invasive species in the Project area	Forbid vegetation disturbance outside the set boundaries for each construction site	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Quarterly
	Limit vegetation clearance to the construction footprint. Avoid clearing any further vegetation in the project boundary as far as possible.	EPC Contractor	- Performance report - Audits	- % of cleared area - No. of Non-conformities	- Quarterly
	Restrict people and vehicle movements outside project accesses, especially in natural habitat areas	EPC Contractor	- Performance report	- No. of Non-conformities	- Quarterly

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
			- Audits		
	Whenever possible new and temporary accesses should be created based in existent accesses	EPC Contractor	- Performance report - Audits	- Nº. of new accesses - No. of Non-conformities	- Quarterly
Exclusion of fauna species due to increase of disturbance	Strictly limit the clearing of vegetation to the required construction footprint, particularly in areas of natural habitats	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Quarterly
	Whenever possible new and temporary accesses should be created based in existent accesses	EPC Contractor	- Performance report - Audits	- Nº. of new accesses - No. of Non-conformities	Quarterly
	Areas to be cleared within the right-of-way will be marked by a surveyor and searched by a suitably trained professional for threatened species, before the vegetation is cleared. Any identified threatened species will be relocated in similar habitats outside the area to be disturbed. If any animal or nesting sites with eggs or chicks/juveniles are identified, they will be removed and relocated, unless the species is identified as threatened, upon which the breeding will be allowed to reach completion. The surveys will be done during the flowering season of the majority of threatened plant species that may be present. Search and rescue reports will be maintained, which will include the names and coordinates of relocated specimens. Vegetation in the remainder of the transmission line servitude will remain untouched, except where required for access, construction, or height clearance it will be cropped no lower than knee height	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Ongoing visual observation throughout construction - Immediate notification to EO if nesting site identified
	Restrict construction works to the daytime hours, limiting illumination in the construction areas as much as practical	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Quarterly
	All garbage should be secured in sealed containers overnight to avoid attracting nocturnal carnivores and other opportunistic species to site	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Quarterly
	Avoid vegetation clearance activities in natural habitats and near large water masses between October and March, as much as practical, to minimize impacts on migratory birds	EPC Contractor	- Performance report - Audits	- % of cleared area - No. of Non-conformities	- Quarterly
	Start construction from south to north (between April to September) to avoid disturbing the larger natural areas during the period when more birds are breeding	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Quarterly

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
	Further engagement with district government and/ or elephant specialists working in the area (prior to any construction) in order to determine frequency of elephant movement in the area of the watering hole (e.g. how many days a month would they be encountered) and the seasonality of the movements (what months of the year they are present). Also consult with Mandevo community leaders to determine if (and if so when) the watering hole dries up each year. Using these data, schedule construction near the watering hole when elephants are not be expected to present in the area.	Proponent	N/A	Map of elephant activity for project area	-Before construction
	Ensure that clearing of vegetation and construction of pylons takes place when elephants are not expected to be within the construction area (based on tracking information from NGOs).	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Ongoing visual observation throughout construction
	Training of staff on the Endangered status of these animals and restrictions on harm to these animals, e.g. no shooting.	EPC Contractor	- Performance report - Audits	- Training records	- At start of mobilisation
	Stop work measures if elephants approach an active construction area.	EPC Contractor	- Performance report - Audits	- No. of Non-conformities	- Ongoing visual observation throughout construction - Immediate notification to EO/ Construction Manager if elephants sited

<table>
<tr><th rowspan="2">Impact</th><th rowspan="2">Mitigation Actions</th><th rowspan="2">Responsible</th><th colspan="3">Monitoring and Performance Evaluation</th></tr>
<tr><th>Monitoring Methods</th><th>Performance Indicators</th><th>Timing / Frequency</th></tr>
<tr><td colspan="6">SOCIOECONOMIC ENVIRONMENT</td></tr>
<tr><td>- Involuntary resettlement as a result of the establishment of the transmission lines' Partial Protection Zone
- Disturbance of cultivation areas due to the construction of the transmission line and establishment of the Protection Zone</td><td>The Project will develop and implement a comprehensive Resettlement Action Plan (RAP) based on the resettlement policy framework (RPF) and that is fully aligned with the Mozambican legislative framework (including Decree 31/2012 and directives No. 155/2014 and 156/2014) and the IFC's Performance Standards (including PS 1 and 5).</td><td>Proponent</td><td>- Audits
- GRM</td><td>- No. of complaints
- No. of implemented RAP measures</td><td>- Before construction</td></tr>
<tr><td rowspan="5">Creation of employment opportunities during the construction phase</td><td>Develop a transparent, fair, non-discriminatory and ethical local recruitment plan. The recruitment plan shall be consistent with local labour legislation and international standards including the UNGPs and ILO standards (1 through to 17) and declarations.</td><td>EPC Contractor</td><td>- Performance report
- Audits</td><td>- No. of Non-conformities
- No. of implemented measures</td><td>- Before and during construction</td></tr>
<tr><td>Ensure that, during the process of contracting workers, priority should be given to the local population and consideration on gender parity apply, provided applicants have the necessary skills for the relevant employment opportunity.</td><td>EPC Contractor</td><td>- Performance report
- Audits</td><td>- No. of women employed
- No. of local employees</td><td>- Before and during Construction</td></tr>
<tr><td>Ensure that employment opportunities are adequately advertised, so as not to limit application opportunities.</td><td>EPC Contractor</td><td>- Performance report
- Audits</td><td>- No. of Non-conformities
- No. of implemented measures</td><td>- Before and during construction</td></tr>
<tr><td>Carry out the process of contracting staff in a transparent manner, following pre-established and accepted criteria.</td><td>EPC Contractor</td><td>- Performance report
- Audits</td><td>- No. of Non-conformities
- No. of implemented measures</td><td>- Before and during construction</td></tr>
<tr><td>Implement Globeleq's corporate GBVH procedure, which shall be applicable to all staff as well as third party contractors</td><td>EPC Contractor</td><td>- Performance report
- Audits</td><td>- No. of Non-conformities
- No. of implemented measures</td><td>- Before and during construction</td></tr>
</table>

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
Transfer of skills to local communities due to mobilization of construction workforce	The construction contractor should develop and implement a Training and Skill Transfer Program, with the following main goals: - Provide technical training programs for unskilled workers, with the objective of improving their job performance and giving them the skills to compete for other positions. - Provide environmental and social awareness training to all workers, including matters related to the code of conduct, non-discrimination and sexual harassment, abuse and exploitation.	EPC Contractor	- Performance report - Audits	- No. of awareness actions	- Monthly
	The construction contractor will provide environmental and social awareness training to all workers	EPC Contractor	- Performance report - Audits	- No. of awareness actions	- Monthly
	The construction contractor will provide health and safety training to all workers	EPC Contractor	- Performance report - Audits	- No. of awareness actions	- Monthly
Stimulation of the local and regional economy due to construction expenditure	The procurement of goods and services by the construction contractor will give priority to sourcing from the local and provincial markets, whenever possible	EPC Contractor	- Performance report - Audits	- No. of local and regional companies contracted - Volume of local and regional goods purchased	- Before and during construction
Potential disturbance of cultural heritage resources	Religious temples will be relocated or compensated according to the RAP process	Proponent	- Audits - GRM	- No. of complaints - No. of implemented RAP measures	- Before construction
	The affected cemeteries will be relocated to a location to be agreed with the local communities, following all the necessary ceremonies and traditional practices	Proponent	- Audits - GRM	- No. of complaints - No. of implemented RAP measures	- Before construction
	Implement a Chance Finds Procedure for cultural heritage, during construction activities that involve vegetation clearance and earthworks	EPC Contractor	- Performance report - Audits	- No. of Non-conformities - No. of implemented measures	- During construction

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
Increase in road traffic and potential damage to existing roads and other public infrastructures	The EPC Contractor will develop and submit a Traffic and Transport Management Plan to the Proponent for approval. The EPC Contractor will then implement this plan throughout the construction phase.	EPC Contractor	- One-time verification - Performance report - Audits	- No. of Non-conformities	Before construction (plan approval) -Quarterly (plan implementation)
Potential public safety impacts as a result of Project construction and increased traffic volumes	The EPC Contractor will develop and submit a Traffic and Transport Management Plan to the Proponent for approval. The EPC Contractor will then implement this plan throughout the construction phase.	EPC Contractor	- One-time verification - Performance report - Audits	- No. of Non-conformities	- Before construction (plan approval) -Quarterly (plan implementation)
	If an existing road or pedestrian access is cut due to Project construction activities, alternative routes will be provided to restore pedestrian and road accessibility.	EPC Contractor	- Performance report - Audits	- No. of Non-conformities - No. of complaints	- Monthly
	The Project will implement Globeleq's corporate GBVH procedure for all labourers (including those subcontracted) and ensure all relevant labour policies are in place.	EPC Contractor	- Performance report - Audits	- No. of Non-conformities - No. of implemented measures	- Before and during construction
	The GRM shall be fully communicated and implemented along the impacted areas to ensure stakeholders are aware of and able to seek recourse from the Project.	EPC Contractor	- Performance report - Audits	- No. of Non-conformities - No. of implemented measures	- Before and during construction
Risk of social conflicts elicited by the Project security personnel	The EPC Contractor will develop a Security Management Plan, detailing the security arrangements to be deployed during construction. This plan will be compliant with IFC's PS 4, and with the UNGPs and ILO standards, regarding human rights and labor and, and will be submitted for the Proponent's approval, prior to start of construction. This plan will include mandatory training for all security personnel, in what regards human rights, proportionate force use and adherence to the Contractor's code of conduct	EPC Contractor	- Performance report - Audits	- No. of implemented measures - No. of Non-conformities	- Quarterly
	The Project will implement Globeleq's corporate GBVH procedure for all labourers (including those subcontracted) and ensure all relevant labour policies are in place.	EPC Contractor	- Performance report - Audits	- No. of Non-conformities - No. of implemented measures	- Before and during construction

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
Potential impacts on workers' health and safety during the construction phase	The EPC Contractor will develop and implement an Emergency Response Plan	EPC Contractor	- Performance report - Audits	- No. of implemented measures - No. of Non-conformities	- Quarterly
	The EPC Contractor will develop and implement a Health and Safety Management Plan to protect every worker involved in construction activities, even temporary workers. This plan will comply with national legislation, international best practices (OHSAS 18001:2007, NEBOSH or similar) and World Bank/IFC General EHS Guidelines and Industry Sector Guideline for Electric Power Transmission	EPC Contractor	- Performance report - Audits	- No. of implemented measures - No. of Non-conformities	- Quarterly
	Establish and develop a grievance mechanism for all workers.	EPC Contractor	- Performance report - Audits	- No. of implemented measures - No. of Non-conformities	- Quarterly

5.3 Mitigation Measures for the Operational Phase

Table 5.3 lists the general mitigation measures for the operational phase (i.e., not integrated into a specific management program), by Project component.

Table 5.3 also provides information regarding the impacts that will be mitigated by the proposed measures, as well as the key actor which is responsible for their implementation.

Note, however, that the Proponent (Operator), EDM, is the ultimate responsible for ensuring the implementation of mitigation, even when other actors (such as governmental agencies) are involved, through supervision and auditing or engagement with relevant authorities.

Table 5.3 – Mitigation measures for operational phase

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
NOISE					
Wind-induced noise	Regular maintenance of the transmission line such as cleaning and replacing damaged components will reduce the probability of wind-generated noise	EDM	- Inspections - Audits	- No. of Non-conformities	- Monthly
LANDSCAPE					
Permanent alteration to the landscape	Limit vegetation removal/maintenance activities exclusively to the transmission line corridor	EDM	- Inspections - Audits	- % of clearance - No. of Non-conformities	- Quarterly
	During maintenance activities, existing access roads will be used as much as possible to avoid new landscape disturbance	EDM	- Inspections - Audits	- No. of Non-conformities	- Quarterly
	Allow tree and shrub species whose height is limited to 4 m to grow within the RoW	EDM	- Inspections - Audits	- No. of Non-conformities	- Quarterly
BIODIVERSITY					
Indirect degradation of vegetation units and habitats along the RoW	Forbid vegetation control outside the designated maintenance boundary	EDM	- Inspections - Audits	- % of clearance - No. of Non-conformities	- Quarterly
	The sustainable use of the felled trees by the communities must be coordinated with the local authorities.	EDM	- Registries - Audits	- Volume (kg) of wood handed to communities vs. Volume of wood (kg) obtained from felled trees	- Annually
	Limit non-Project vehicle entrance and circulation along the RoW, as much as possible, through the placement of signage	EDM	- Inspections - Audits	- No. of Non-conformities	- Quarterly
	Incorporate in the normal maintenance procedures of the RoW the monitoring of creation of new settlements or cutting or burning of woodland areas in adjacent areas along the RoW and report these occurrences to the local authorities	EDM	- Inspections - Audits	- No. of Non-conformities	- Quarterly

Impact	Mitigation Actions	Responsible	Monitoring and Performance Evaluation		
			Monitoring Methods	Performance Indicators	Timing / Frequency
Habitat fragmentation due to the presence of the RoW	Limit vegetation clearance to within the designated maintenance boundary	EDM	- Inspections - Audits	- % of clearance - No. of Non-conformities	- Quarterly
	Ensure tree and shrub species, whose height is limited to 4 m, are allowed to re-establish in the RoW, by providing a list of such species to vegetation clearing/ control contractors and ensuring they are trained on the identification of such species	EDM	- Inspections - Audits	- % of clearance - No. of Non-conformities	- Quarterly
SOCIOECONOMIC RISK ASSESSMENT AND IMPACTS					
Creation of employment opportunities	Develop a transparent, fair, non-discriminatory and ethical local recruitment plan. The recruitment plan shall be consistent with local labour legislation and international standards including the UNGPs and ILO standards (1 through to 17) and declarations	EDM	- Performance report - Audits	- No. of Non-conformities - % of local workers - No. of grievances	- Before operation start - Annually
	Ensure that employment opportunities are adequately advertised, so as not to limit application opportunities.	EDM	- Performance report - Audits	- No. of Non-conformities - No. of grievances	- Before operation start - Annually
	Carry out the process of contracting staff in a transparent manner, following pre-established and accepted criteria.	EDM	- Performance report - Audits	- No. of Non-conformities - No. of grievances	- Before operation start - Annually
Risks to community health and safety due to encroachment into the Protection Zone	Monitor encroachment of infrastructure into the protection zone and strictly enforce the restrictions	EDM	- Performance report - Audits	- No. of Non-conformities - No. of cases of encroachment	- Annually
Potential impacts on workers' health and safety	Implement EDM's existing health and safety policies and procedures for the operation of substations and transmission lines	EDM	- Performance report - Audits	- No. of Non-conformities - No. of H&S incidents	- Annually

6 Environmental Management Plans and Programs

Based on the affected environment and communities, and the impact assessment carried out, the following programs will be implemented in order to address potential impacts during all project phases (construction and operation):

- Air Quality Management Program;
- Noise Management Program;
- Erosion and Sedimentation Management Program;
- Waste Management Program;
- Biodiversity Management Program;
- Stakeholder Engagement Program;
- Community Health and Safety Management Program;
- Cultural Heritage Chance Find Procedure; and
- Emergency Response Program

The following sections provide guidelines for the development and implementation of these programs, as part of the ESMS to be developed and implemented by the Proponent or the Contractor, as applicable.

Further to the programs listed above, and described in the following sections, the Contractor will also be required to develop and implement a number of management plans for the construction phase, as per the requirements presented in Chapter 5.2 (mitigation measures for construction). These include:

- Security Management Plan;
- Waste Management Plan;
- Soil and Erosion Management Plan;
- Traffic and Transportation Management Plan;
- Local Recruitment and Working Conditions Plan (including Worker Grievance Mechanism);
- Local Procurement Plan;
- Worker's Health and Safety Management Plan;
- Emergency Response Plan;
- Rehabilitation and Revegetation Plan;
- Environmental and Social Code of Conduct;
- Oil Spill Contingency Plan; and
- Method Statements, including, but not limited to: erosion control, water crossing, work in heights, and others that may be required by the ESGM.

These specific management plans will be drafted by the Contractor, based on the requirements presented in this EMP, and submitted to the Proponent (ESGM/CLO) for approval with prior to the start of activities.

6.1 Air Quality Management Program

6.1.1 Justification and Objectives

The construction phase of the Power Evacuation Line from Namaacha to Boane may result in localized and temporary changes to ambient air quality due to construction activities, in residential areas close to construction sites. This Air Quality Management Program aims to control the atmospheric emissions of the construction phase, to avoid nuisance effects on both cultivated fields and the settlements located near the construction fronts. It should be noted that no relevant impacts on air quality were identified for the operational phase, and as such no management actions are proposed for that phase.

6.1.2 Legal Framework

Air quality standards aim to safeguard public health and the protection of ecosystems. Mozambican air quality standards are established through Decree No. 18/2004, of 2 June (Regulation on Environmental Quality Standards and Effluent Emissions), as amended by Decree No. 67/2010, of 31 December. The relevant air quality standards, including IFC General EHS (that point to World Health Organization) are listed on Table 6.1.

Table 6.1 – Relevant ambient air quality standards

Pollutant	Averaging Period	Mozambique ($\mu g/m^3$)	IFC/WHO⁺($\mu g/m^3$)
TSP	24 hours	150	--
	1 year	60	--
PM_{10}	24 hours	--	45
	1 year	--	15
SO_2	10 minutes	500	--
	1 hour	800	--
	24 hours	100	40
	1 year	40	--
CO	30 minutes	60 000	--
	15 minutes	100 000	--
	1 hour	30 000	--
	8 hours	10 000	--
	24 hours	--	4 000
NO_2	1 hour	190	--
	24 hours	--	25
	1 year	10	10

Pollutant	Averaging Period	Mozambique (µg/m³)	IFC/WHO⁺(µg/m³)
O_3	1 hour	160	--
	8 hours	120	--
	24 hours	50	--
	1 year	70	--

* Decree No. 18/2004 as amended by Decree No. 67/2010.

+ World Health Organization (WHO, 2021)

6.1.3 Proposed Actions and Implementation Schedule

Table 6.2 lists the control and mitigation measures to be applied during the planning and construction phases, to minimize emissions of particulate matter and other atmospheric pollutants. It should also be noted that the implementation of the other general mitigation measures proposed for the construction phase will help mitigate some air quality impacts.

Table 6.2 – Environmental control actions, description, and implementation schedule

Control and Mitigation Actions	Description	Implementation Schedule	Responsibility for Implementation	Supervision
Control emissions of dusts and pollutant gases	- The circulation routes of construction vehicles should be adequately planned in order to minimize, as much as possible, crossing through, or passing nearby, residential areas	Planning phase	Contractor	ESGM
	- Speed limits should be set for construction heavy vehicles. This speed limit should not exceed 30 km/h in critical segments, such as when near residential areas	During construction	Contractor	ESGM
Control emissions of dusts and pollutant gases	- All internal combustion machinery and equipment should be kept in good maintenance conditions to minimize combustion gases exhaust emissions. This should include preventive maintenance of machines, equipment and vehicles and operator training, as well as internal monitoring program of proper maintenance of vehicles	During construction	Contractor	ESGM
	- Heavy trucks transporting granular construction materials should not be loaded to full capacity. A free edge of approximately 0.2m should be kept, to avoid spills during materials transport			
	- Vegetation clearing and earthworks should be minimized as much as possible and limited to the strictly needed areas			
	- Trucks carrying dusty materials should have the load adequately covered			
	- Stockpiles of granular materials should be protected with a waterproof cover, or alternatively regularly sprinkled with water			

Control and Mitigation Actions	Description	Implementation Schedule	Responsibility for Implementation	Supervision
	- All the unpaved surfaces where vehicle movement is to be expected should be kept moist (e.g., through a water sprinkler truck), in particular during dry and windy conditions, to minimize the dust emitted by vehicle entrainment	Daily (in the dry season), during construction	Contractor	ESGM
	- The construction machinery parking area (in construction camps) should be regularly sprinkled with water, in particular in dry and windy conditions		Contractor	ESGM

6.1.4 Monitoring Actions and Follow-up

Air quality monitoring actions should be developed during the construction phase nearby relevant sensitive receptors. The following paragraphs define the criteria for the selection of the monitoring points and the air quality monitoring procedures. Two types of monitoring actions are required: periodic air quality monitoring, to verify the effectiveness of the control and mitigation in place, and monitoring in response to local complaints or grievances.

Monitoring Locations

Monitoring should be undertaken in the human settlements along the proposed alignment where heavy construction activities take place at less than 200 m from residential dwellings, as they might be affected by the emissions generated by those activities.

Monitoring Parameters

At the locations described above, air quality monitoring should be undertaken for the following parameters:

- Total Suspended Particle Matter concentrations;
- Visual identification of dust plumes resulting from the movement of construction machinery and equipment.

TSP concentrations should comply with the guideline established in Decree No. 18/2004 (as amended by Decree 67/2010). TSP will be used as an indicative proxy for PM10.

Monitoring Frequency

Visual monitoring should be undertaken whenever heavy construction activities are taking place at less than 200 m from residential dwellings. At the minimum, quarterly campaigns of quantitative TSP values will be undertaken.

Sampling Methods

The reference methods to be applied in the monitoring campaigns should preferably be the following:

- USEPA 40 CFR part 50, Appendix J – “Sampling of Ambient Air for Total Suspended Particulate Matter”. or equivalent method.

Alternative methods, equivalent to the listed above, may be used, if they are internationally recognized by recognized by relevant institutions, such as the International Organization for Standardization (ISO), national environmental protection agencies, etc.

Result Interpretation

The air quality monitoring results should be compared against applicable air quality guidelines, as listed on Table 6.1, to identify any non-compliance with such guidelines.

The following table summarizes the follow-up and monitoring actions and the implementation schedule.

Table 6.3 – Follow-up and monitoring actions, description, and implementation schedule

Follow-up or Monitoring Action	Description	Implementation schedule
Periodic air quality monitoring	- Air quality monitoring actions should be developed during the construction phase nearby relevant sensitive receptors. Monitoring should take place at residential areas closer than 200 m to an active construction front.	Visual monitoring: Whenever work fronts are active near residential areas Quantitative TSP monitoring: At least quarterly
Air quality monitoring in response to complaints	- If complaints from the local population regarding air quality are registered, air quality monitoring should be undertaken near the affected sensitive receptors, to verify the ambient air quality levels and define additional mitigation, if required	When necessary

6.1.5 Corrective Actions

If exceedances of the air quality guidelines are recorded (see previous section for the proposed monitoring actions), or if complaints from the local communities are lodged, the causes of such exceedances should be identified and corrected. Exceedances may result from:

- Non-compliance to the set speed limits by the vehicle conductors;
- Presence of unidentified (new) sensitive receptors;
- Lack of adequate maintenance of machinery and equipment;
- Inadequate implementation of the proposed control and mitigation actions.

In the event of non-conformities, additional mitigation should be implemented, as required, to eliminate or minimize the negative effects. These additional mitigation measures should be defined case by case, depending on the assessment of the specific issues. The following are examples of possible additional mitigation and control actions that may be adopted:

- Intensify and monitor the maintenance of machinery and equipment, to avoid bad working conditions that may cause an increase of dust and tailpipe emissions;
- Provide additional training to workers, regarding the environmental management requirements set out in this management program.

After the implementation of the corrective actions, a monitoring campaign should be undertaken for the areas where the non-compliances were recorded, to verify the resolution of the issue (see following section for the monitoring.

The table below presents the main proposed corrective actions.

Table 6.4 – Environmental corrective actions, description, and implementation schedule

Corrective Actions	Description	Implementation Schedule
Act on exceedances of air quality standards	- If exceedances of the air quality guidelines are recorded the causes of such exceedances should be identified and corrected, through the implementation of adequate mitigation and control measures, to be identified based on the nature of the specific conditions that led to the recorded exceedances. Following correction, monitoring should be undertaken to verify resolution	Whenever necessary
Act on local complaints and grievance claims	- If complaints from the local population regarding air quality are registered, act on them in consultation with local authorities. This may require the adoption of additional mitigation and control measures, as appropriate. Following correction, monitoring should be undertaken to verify resolution	Whenever necessary

6.1.6 Performance and Reporting

6.1.6.1 Performance Indicators

The following performance indicators should be monitored for the Air Quality Management Program:

- Number of TSP exceedances during periodic monitoring;
- Number of community complaints regarding air quality and subsequent verification monitoring;
- Number and type of air quality mitigation measures undertaken in response to complaints.

The performance indicators results should be determined and compiled in quarterly reports, as indicated in the following section.

6.1.6.2 Reports

Table 6.5 summarizes the documental records that should be kept, to control the execution of this environmental management program. These documents should be prepared, archived, and maintained by the ESGM, to document the results of program implementation. Records of relevant events should be made following the occurrence, and monthly progress reports and quarterly Performance Reports should be prepared, reporting on the recorded events and performance indicators.

Table 6.5 – Record Documents for the Air Quality Management Program

Document Title	Document Type	Frequency of Record or Report
Record of periodic air quality monitoring	Record	Whenever necessary
Record of air quality associated community complaints	Record	Whenever necessary

Document Title	Document Type	Frequency of Record or Report
Record of air quality monitoring in response to complaints and mitigation responses	Record	Whenever necessary
Progress Report	Report	Monthly
Performance Report	Report	Quarterly

6.2 Noise Management Program

6.2.1 Justification and Objectives

The construction phase of the Project may result in localized and temporary changes to the noise environment, in particular near the human settlements close to construction sites along the power evacuation route. This Management Plan defines measures to control noise emissions from the construction phase, and for the operation phase as well, in order to avoid the nuisance effects over the identified settlements near the OHL.

6.2.2 Legal Framework

The World Health Organization (WHO) and the World Bank (WB) noise guidelines are widely accepted guidelines and have been adopted as project standards. WHO's recommended noise guidelines were determined considering noise's potentially negative effects on health and specific environments. Under WHO's noise policy residential areas, schools and hospitals are sensitive receptors / land uses. The table below lists WHO's ambient noise guidelines for such sensitive receptors.

Table 6.6 – WHO Ambient Noise Levels Guidelines

Land use / Specific Environment	Guideline (L_{Aeq} in dB (A))	Reference Period	Effect on Health
Outdoor of residential areas (day-time)	55 dB(A)	16 hours (06h00 – 22h00)	Serious annoyance
Outdoor of residential areas (night-time)	45 dB(A)	8 hours (22h00 – 06h00)	Sleep disturbance

Source: Berglund *et al*. (1999).

In 1998, WB developed a pollution management program, so as to ensure that WB financed projects in developing countries were environmentally sustainable (WBG, 1999), the scope of which included noise. The results were then incorporated into WB and International Finance Corporation (IFC) guidelines, which state that noise impacts from a particular project should not exceed the levels presented in Table 6.7 or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site.

Table 6.7 – WB/IFC Noise Level Guidelines

Receptor	One Hour LAeq (dB(A))	
	Daytime (07:00 - 22:00)	Night-time (22:00 – 07:00)
Residential; institutional; educational	55	45
Industrial, commercial	70	70

Source: IFC (2007).

As can be seen from the table above, the WHO noise guideline for outdoors of residential areas are the same as IFC's guidelines for residential, institutional, or educational receptors, for both the daytime and night-time periods.

6.2.3 Proposed Actions and Implementation Schedule

Table 6.8 lists the control and mitigation measures to be applied during the planning and construction phases, to minimize noise emissions.

Table 6.8 – Environmental control actions, description, and implementation schedule

Control and Mitigation Actions	Description	Implementation Schedule
Key noise control measures during construction phase	- Circulation of construction heavy vehicles (such as trucks used in the transportation of materials) should be limited to pre-approved construction routes. These will be defined in order to avoid crossing residential areas, whenever possible. - Construction heavy vehicles, such as trucks used in the transportation of materials, must limit the circulation velocity. This speed limit should not exceed 30 km/h in critical segments, such as when near residential areas. - Construction activities, in particular the noisier ones, should be limited to the daytime period (between 07:00 and 22:00) and to working weekdays, avoiding working during the night-time and on weekends. - Vegetation clearing and earthworks should be minimized as much as possible and limited to the strictly needed areas. - The contractor should avoid, whenever possible, placing fixed equipment (such as cranes or compressors) in proximity to noise sensitive receptors. - The location and organization of the construction camps should be carefully defined, considering the induced road traffic and activities to be undertaken. - Perform noise monitoring campaigns during the construction phase near the identified settlements.	During construction phase
	- Inhabitants of local communities nearby the construction fronts should be previously informed by the contractor regarding the upcoming construction activities. This communication should also include information regarding the project nature and goals. as per the guidelines provided in the Communication Plan Framework.	Before starting construction work in the proximity of a given community
	- Inform the local communities on any upcoming noise monitoring campaign, to avoid misunderstandings.	Before noise monitoring actions
Key noise control measures during operation phase	- Regular maintenance of the transmission line such as cleaning and replacing damaged components will reduce the probability of wind-generated noise.	During operation

6.2.4 Monitoring Actions and Follow-up

Noise monitoring actions should be developed during the construction phase nearby relevant sensitive receptors. The following paragraphs define the criteria for the selection of the monitoring points and the noise monitoring procedures.

Two types of monitoring actions are required: periodic noise monitoring, to verify the effectiveness of the control and mitigation in place, and monitoring in response to local complaints or grievances.

Monitoring Locations

Monitoring should be undertaken in the human settlements along the proposed alignment where heavy construction activities take place at less than 200 m from residential dwellings, as they might be affected by construction noise.

Monitoring Parameters

At the locations described above, noise monitoring should be undertaken for the following parameters:

- At all the monitoring points the continuous A-weighted equivalent sound pressure level (L_{Aeq}) will be recorded. The statistical noise level indicators L95, L90, L50, L10, Lmax, and Lmin will also be determined. 1/3 Octave Band Spectrum will also be recorded at each site. Measurements are to be performed during the daytime reference period, and also during the night-time period, if construction activities occur after 22h00.

Monitoring Frequency

Monitoring should be undertaken whenever heavy construction activities are taking place at less than 200 m from residential dwellings. At the minimum, quarterly campaigns will be undertaken.

Sampling Methods

The reference methods to be applied in the monitoring campaigns should preferably be the following:

- ISO EN 1996-1: 2017 – Acoustics – Description, measurement, and assessment of environmental noise – Part 1: Basic Quantities and assessment procedures;
- ISO EN 1996-2: 2018 - Acoustics – Description, measurement, and assessment of environmental noise - Part 2: Determination of environmental noise levels.

Note that the sampling setup should include:

- mount on a tripod 1.5 m above the ground;
- evaluation of free-field conditions, at least 3.5m away from hard reflecting surfaces;
- use of a windshield to avoid wind noise on the microphone;
- calibration of the noise meter at start of survey.

Monitoring should be planned to avoid large contribution from other noise sources. This means avoid:

- wind speeds above 5 m/s;
- rain or adverse weather conditions such as thunder; and

- monitoring near other localised noise sources (e.g. running vehicle engines, roads, barking dogs, music).

All samples should be for a minimum of 15 minutes.

Result Interpretation

Noise monitoring results should be compared against the adopted project guidelines, as listed on Table 6.9 to identify any non-compliance with such guidelines. The following table summarizes the follow-up and monitoring actions and the implementation schedule.

Table 6.9 – Follow-up and monitoring actions, description, and implementation schedule

Follow-up or Monitoring Action	Description	Implementation schedule
Periodic noise monitoring	- Monitoring actions should be developed during the construction phase nearby the previously identified sensitive receptors. Monitoring should take place at residential areas closer than 200 m to an active construction front	At least quarterly
Noise monitoring in response to complaints	- If complaints from the local population regarding noise emissions are registered, noise monitoring should be undertaken near the affected sensitive receptors, to verify the noise levels and define additional mitigation, if required	When necessary

6.2.5 Corrective Actions

If exceedances of the noise project standards are recorded, or if complaints from the local communities are lodged, the causes of such exceedances should be identified and corrected. Exceedances may result from:

- Non-compliance to the set vehicle speed limits;
- Presence of unidentified (new) sensitive receptors;
- Lack of adequate maintenance of machinery and equipment;
- Inadequate implementation of the proposed control and mitigation actions.

In the event of non-conformities, additional mitigation should be implemented, as required, to eliminate or minimize the negative effects. These additional mitigation measures should be defined case by case, depending on the assessment of the specific issues. The following are examples of possible additional mitigation and control actions that may be adopted:

- Intensify and monitor the maintenance of machinery and equipment, to avoid bad working conditions that may cause increased noise emissions;
- Install noise barriers between the noise source and the affected receptors;
- Provide additional training to workers, regarding the environmental management requirements set out in this management program.

After the implementation of the corrective actions, a monitoring campaign should be undertaken for the areas where the non-compliances were recorded, to verify the resolution of the issue (see following section for the monitoring.

Table 6.10 presents the main proposed corrective actions.

Table 6.10 – Environmental corrective actions, description, and implementation schedule

Corrective Actions	Description	Implementation Schedule
Act on exceedances of Noise project standards	- If exceedances of the noise project standards are recorded, the causes of such exceedances should be identified and corrected, through the implementation of adequate mitigation and control measures, to be identified based on the nature of the specific conditions that led to the recorded exceedances. Following correction, monitoring should be undertaken to verify resolution	Whenever necessary
Act on local complaints and grievance claims	- If complaints from the local population regarding noise emissions are registered, act on them in consultation with local authorities. This may require the adoption of additional mitigation and control measures, as appropriate. Following correction, monitoring should be undertaken to verify resolution	Whenever necessary

6.2.6 Performance and Reporting

6.2.6.1 Performance Indicators

The following performance indicators should be monitored for the Noise Management Program:

- Number of exceedances during periodic monitoring;
- Number of community complaints regarding noise and subsequent verification monitoring;
- Number and type of noise mitigation measures undertaken in response to complaints.

The performance indicators results should be determined and compiled in quarterly reports, as indicated in the following section.

6.2.6.2 Reports

Table 6.11 summarizes the documental records that should be kept, to control the execution of this environmental management program. These documents should be prepared, archived, and maintained by the ESGM, to document the results of the program implementation. Records of relevant events should be made following the occurrence, and monthly progress reports and a quarterly Performance Report should be prepared, reporting on the recorded events and performance indicators.

Table 6.11 – Record Documents for the Noise Management Program

Document Title	Document Type	Frequency of Record or Report
Record of periodic noise monitoring	Record	Whenever necessary
Record of noise associated community complaints	Record	Whenever necessary
Record of noise monitoring in response to complaints and mitigation responses	Record	Whenever necessary
Progress Report	Report	Monthly
Performance Report	Report	Quarterly

6.3 Erosion and Sedimentation Management Program

6.3.1 Objectives

Managing erosion and sedimentation is essential to ensuring compliance with regulations in significant construction endeavours. It can disrupt soil integrity, alter landforms, and disrupt natural drainage patterns. If not effectively addressed at every stage of a project, these disturbances can lead to soil erosion and subsequent contamination of water bodies, thereby posing adverse effects on the surrounding ecosystems.

The purpose of this program is to mitigate the occurrence of activities that have the potential to induce erosion and its consequential impacts on the environment and local communities arising from project-related operations.

6.3.2 Scope and Responsibilities

The onus of executing this Program lies with the Contractors engaged in the construction phase of the Project. They must utilize the guidelines in this Program to formulate a tailored Erosion and Sedimentation Management Program that aligns with their respective activities. The Client assumes the responsibility of conducting audits to assess the adherence of Contractors to the prescribed measures.

6.3.3 Critical areas

The delineated critical zones comprise specific geographic areas containing sensitive receptors, such as populated regions, remote dwellings distanced from inhabited areas, individual residences, and necessary facilities like educational institutions and medical centres. Furthermore, critical areas are identified as recreational spaces within the designated corridor and property boundaries adjacent to forested regions. Moreover, the segment from point pk 0+000 to point pk 2+500 at the initial part of the route is designated as a high-risk erosion zone owing to its topographical characteristics.

6.3.4 Actions and Implementation Schedule

Considering the nature of the Project, it is anticipated that no substantial erosion impacts will occur. Nevertheless, the table below outlines the requisite control and mitigation measures to be implemented during both the planning and construction phases. These measures aim to minimize the likelihood and consequences of erosion events.

Table 6-12 – Actions, description implementation schedule, and responsibility for Implementation

Actions	Description	Implementation Schedule	Responsibility for Implementation
Minimize soil movement (or proceed only where necessary)	- Land clearing and vegetation should be kept to a minimum to reduce soil exposure. Existing vegetation should be conserved whenever possible. - In non-covered areas (areas that have suffered the intervention of project activities), additional vegetation should be planted to stabilize the exposed soil surfaces. - Vegetation should be rehabilitated as an area competes in construction to reduce management of cleared areas - Exposed soils should be inspected regularly to assess the effectiveness of erosion control measures. - The construction site and material storage area should, whenever possible, be located on a with low slope (no more than 2:1), low wind intensity and with close access, in order to avoid/minimize earth movement and opening accesses. - All works involving earthmoving in the vicinity of water lines or small lines or small reservoirs should be carried out in such a way as to avoid water erosion and sediment transport, taking special care during periods of heavy rainfall. - Before the rainy season, erosion mitigation measures should be implemented in areas of exposed soil, namely through water drainage with temporary structures (such as sandbags) and the establishment of retention basins. - Limit soil/material stockpiles and prevent their location within 50 meters (m) of watercourses or stormwater drains.	During the construction phase	Contractor
Minimize the effects of erosion resulting from the provisional soil takeover, including wind and rain erosion	- Land clearing and vegetation should be kept to a minimum to reduce soil exposure. Existing vegetation should be conserved where possible. - In non-covered areas additional vegetation shall be planted to stabilize exposed soil surfaces. - Avoid soil handling or equipment movement during periods of intense rainfall (saturated soil conditions) and/or windy (consistently greater than 30km/h) conditions. - Drainage barriers and controls should be installed before earth moving commences. - Prevent erosion of temporary stockpiles awaiting transfer to soil deposition areas - Mitigation of sediment tracking to areas outside the Project Area.	During the Construction phase	Contractor
Minimize the effects of erosion caused by traffic on the Site	- Temporary access roads and haul roads should be dampened with water to reduce dust and help stabilize the soil. - Land clearing for road opening should be minimal to maximize retention of vegetation cover. - Site vehicle movement should be confined to access routes defined in accordance with the Traffic and Transportation Management Plan. - Construction of new access roads should be minimized, using existing pathways where possible.	During the Construction phase	Contractor

Actions	Description	Implementation Schedule	Responsibility for Implementation

Minimize the effects of erosion in sensitive areas	- Activities should as far as possible be avoided in sensitive areas and if possible, should be developed in areas/zones of total or partial protection, since these are areas of public domain (areas destined for the satisfaction of public interest), avoiding issues of resettlement and direct affectation of communities for the effects of the project.
	- If necessary instal:
	  - Silt Fences - Toe of slope stockpiles or berms containing exposed soils. Downgradient of exposed soil on slopes where rainfall could entrain and transport sediment.
	  - Erosion Control Blanket – Slopes can be stabilized with erosion control blanket to minimize erosion. Also used in channels which will be exposed to water flow before vegetation establishment.
	  - Riprap - Steep slopes can be immediately stabilized with riprap to minimize erosion and ensure long-term stability.
	  - Turbidity Curtain - Used within ponds, lakes, or streams to isolate work area from other water.
		During the Construction phase	Contractor

Worker's training	- Appropriate training for all operation staff including construction contractors, and delegation of responsibilities to appropriate qualified environmental technicians.
	- The environmental technician's responsibility will be to evaluate and report on the effectiveness of the prescribed erosion and sediment control measures and strategies.
	- Relevant employees and contractors will receive training in soil management from the environmental team prior to the start of work. The training will cover:
	  - What types of soils are important for reclamation.
	  - How they are salvaged, stockpiled and inventoried;
	  - How to minimize stockpile erosion, protect stockpiles from contamination and machinery, and prevent the spread of invasive plants;
	  - Soil stockpile locations;
	  - How to report observations of erosion at soil stockpiles
	- On-site Program will be reviewed prior to initiation of Project activities, and a scheduling Program for on-site inspections, sampling, monitoring and reporting will be prepared.
	- Contingency responses for specific site condition triggers will be provided.
		During the Construction phase	Contractor

6.3.5 Follow-up Actions

The following table summarizes the follow-up verification actions and their implementation schedule.

Table 6-13 Erosion and sedimentation management program - follow-up and monitoring actions, description and implementation schedule

Follow-up or Monitoring Action	Description and implementation schedule
Surface Preparation and Construction Activities	- Inspections and monitoring will be conducted during activities and immediately after control measures have been installed - Surface preparation and initial construction activities will require regularly scheduled visual inspections and reporting by qualified technicians. Specifically, check dams and sediment traps, if needed, will require weekly and monthly inspections and maintenance to ensure adequate performance. This includes cleaning check dams and sediment traps when 50% capacity is reached, regular inspection at outlets for evidence or erosion and immediate repairs to any damage - Inspection and cleaning all of erosion and sediment control measures in anticipation of storm events will be conducted.
Operation Activities	- The Erosion and Sedimentation Management Program measurements will require regular monitoring and inspection to ensure adequate performance. Inspections will include description of pre-site activity conditions, implementation of erosion and sediment control measures, monitoring of control measures and records of visual observations. Based on this site monitoring information, recommendations for maintenance and/or improvements to the erosion and sediment control structures will be provided in detailed reports - Scheduled weekly inspections will be conducted during surface preparation, construction, operation, and closure phases. General maintenance procedures include assessing for damaged erosion and sediment control structures, removing accumulated sediment, and maintaining prescribed vegetation erosion control measures - Critical monitoring sites will be developed immediately upstream and immediately downstream of disturbed areas in order to compare sediment inputs against background levels

6.3.6 Contingency Programs

Contingency programs for the Project will be active and adaptive, with ongoing inspection, maintenance and re-evaluation for all control measures and surrounding site conditions.

Routine and specific event monitoring will be conducted to identity control measures that may not be functioning adequately. The following steps will be taken:

Contingency supplies of sediment and erosion control materials shall be maintained on site and workers shall be sufficiently trained in their appropriate installation and maintenance. The contractor will keep an inventory of erosion and sediment control material accessible at work sites. The inventory will consist of but not limited to:

- Silt fence rolls with wooden stakes;
- Rolled erosion control products with staples;
- Floating turbidity curtain;
- Silt curtain;
- Stockpiles of boulder and clean sand; and
- Sand bags

- Confirm control measure/feature installed correctly;
- Assess if appropriate size or length/depth of control method with site circumstances;
- Determine if alternate control method required; and,
- Assess if increased maintenance/inspections required.

In anticipation of a major storm, all erosion and sediment control measures will be inspected and maintained/repaired in advance of the event.

6.3.7 Performance and Reporting

Reports will be prepared to document site conditions and provide Project activity summaries including: progress reports and environmental management efforts, scheduling Programs, on-site and external communications; and upcoming activities. Appropriate data collection and information management systems will be utilized. Detailed site notes, photographs and accurate location of inspection sites will be recorded.

Progressive Erosion and Sediment Control reports will be completed on a weekly/monthly basis, and when site specific events occur (e.g., severe storm events). Progressive Reports will outline the following:

- Program reviews;
- On-site inspections;
- Communications/training strategy for all contractors' staff to ensure knowledge of Erosion and Sedimentation Management Program;
- Construction scheduling and activities;
- Ongoing environmental management efforts, with specific corrective issues and resolutions;
- Incident reports; and,
- Contingency reports.

6.4 Waste Management Program

6.4.1 Objectives

The objective of the Waste Management Program is to ensure adequate management of hazardous and non-hazardous waste. Waste management comprises the collection, conditioning, transportation and deposition at an appropriate final destination.

Adequate waste management is fundamental to prevent the contamination of soils and water resources (surface and groundwater). It is also important so as to prevent jeopardizing the public health of the local communities and workers, and prevent the proliferation of pests.

The present program takes into consideration the Mozambican legislation referring to waste management, as well as international best practices on the issue, namely the recommendations of the IFC PS and IFC EHS General Guidelines.

It is expected that the EPC Contractor will prepare a project-specific Waste Management Plan that aligns with the principles set out in this Waste Management Program.

6.4.2 Scope and Responsibilities

The Waste Management Plan will be applicable to all construction activities. The operational phase is not expected to generate relevant amounts of waste, but a suitable Waste Management Plan will also be required at this stage.

The responsibility for implementing the proposed waste management actions and procedures during construction will be the selected EPC Contractor. During operations, this responsibility will sit with the Operator (EDM).

6.4.3 Availability of Waste Disposal Facilities

When planning its waste management activities, the EPC Contractor will take into consideration the availability, or lack thereof, of adequate waste disposal facilities in Mozambique, namely:

- In what regards urban solid wastes (non-hazardous), no adequate waste disposal facilities exist in Mozambique. Waste management is the responsibility of municipalities, or district authorities where no municipalities exist. No public landfills exist in the Project region, or in Mozambique as a whole. Municipalities use open air dump sites, without adequate environmental controls or monitoring;
- As for hazardous waste, there is one licensed facility in Boane District, Maputo Province – the Mavoco Industrial Landfill. This facility is an adequate final destination for the small volumes of hazardous waste likely produced by the Project.

6.4.4 Waste Management Actions

Table 6.14 below summarizes the proposed waste management actions.

Table 6.14 – Waste management actions

Waste management actions	Description	Implementation Schedule	Responsibility for Implementation	Supervision
Prepare waste inventory	- Prepare inventory of any hazardous and non-hazardous waste; - Classify the waste according to Decree No. 94/2014 and Decree No. 83/2014; - Define sources, volumes and indicate appropriate final destination for each type of waste, taking into consideration the specifications of the region in question in what concerns the availability of waste treatment and disposal facilities.	Planning phase	EPC Contractor	ESGM

Waste management actions	Description	Implementation Schedule	Responsibility for Implementation	Supervision
Reduce waste production	- Working sites must be kept clean, neat and tidy at all times; - Avoid leaving garbage unattended, in order to avoid attracting pests and nocturnal carnivores; - Implement daily cleaning routines to minimize waste; - Promote the recycling and recovery of waste in coordination with municipal authorities or private entities; - Use materials which can be reused easily; - List and estimate the volume of waste that can be reused, recycled or re-process (example, wood scraps, soils, none used materials); - Ensure that the quantities of construction materials on site are as accurate as possible, to avoid surpluses that could result in construction waste.	During construction	EPC Contractor	ESGM
Non-hazardous waste segregation	- Provide containers of appropriate size (according to the expected quantity of waste) for the placement of waste in different working areas. The segregation will be carried out as close as possible to the place of production. These shall ensure adequate hygiene and sealing conditions; - Strictly prohibit littering with plastic or other wastes by all project personnel; - Provide different containers for each type of waste that can be reused, recycled or re-processed. Containers will be clearly identified according to their categorization and classification, allowing to clearly identifying its contents; - Waste segregation must be carried out accordingly, ensuring that waste does not exceed the top of containers; - Maintain containers clean and always closed; - All produced waste will be sorted according to its type. Waste segregation will be initially done by workers; - Produced waste will be removed daily and temporary stored in Temporary Store Facilities until transported to final destination.	During construction	EPC Contractor	ESGM

Waste management actions	Description	Implementation Schedule	Responsibility for Implementation	Supervision
Temporary storage facilities for non-hazardous waste	- Non-hazardous waste must be temporarily stored, prior to final destination, at only one designated area. This area must be duly delimited and signed ("Waste Storage Area"). The area must be roofed, properly ventilated and have impermeable surface floor. Waste temporary storage areas need to be secured, so that they do not create health and safety hazards to people; - Inert waste may be stored in the open without the need for a waterproofing floor in a designated and delimited area; - Location of the Waste Temporary Store Facilities must be at least (50 m) away from water courses and ground depressions; - Maintain a good organization of space and cleaning of waste storage areas; - Waste materials that can be reused by the community, such as removed soil and stones, cut wood and other building materials could be made available for pick up in an orderly fashion and with proper safety arrangements.	During construction	EPC Contractor	ESGM
Non-hazardous waste final destination	- The transport of waste must be carried out in an appropriate vehicle, capable of containing the waste, and in good operating condition. These vehicles must be easily washable; - Transfer operations of waste containers must be carried out safely: without compromising its segregation, not damaging containers, without causing leaks or spills and originating dust; - The final destination and transport of waste are the responsibility of the producing entity; - The final destination and transport of waste must be agreed and authorized by the municipal/district authorities. The necessary licenses must be obtained; - Prohibit the burial or dump of any type waste in soil, water resources (lakes, rivers, etc.) or sea; - Prohibit the burn of waste (including vegetation); - Non-hazardous waste will be removed on a weekly basis; - The Proponent and the Contractor will agree on and document the final disposal site for the waste ensuring that it meets national and IFC requirements, and will keep records of the delivery of the waste at such facilities.	During construction	EPC Contractor	ESGM

Waste management actions	Description	Implementation Schedule	Responsibility for Implementation	Supervision
Hazardous waste segregation	- Provide containers for segregation of hazardous waste. These must be hermetically sealed (ensuring that waste does not exceed the top of containers) and have an appropriate size. Containers will be made of appropriate material so that they are not damaged by their content and that damaging or dangerous substances are formed. They shall ensure adequate hygiene and sealing; - Provide different containers for each type of hazardous waste to be produced. The containers will be clearly identified and include the symbols defined in Decree no. 83/2014; - Hazardous waste will not be mixed with other types of waste; - Containers will be placed on wooden pallets or plastic pails; - Maintain containers clean and always closed; - All produced waste will be sorted according to type (defined in the list of characteristics of Annex III of Decree no. 83/2014) and placed in the corresponding container.	During construction	EPC Contractor	ESGM
Temporary Storage Facilities for Hazardous waste	- Hazardous waste will not be stored at the work fronts, and must be transported daily to Temporary Storage Facilities built by the Contractor for this purpose or hired through a certified service provider; - Hazardous waste must be temporarily stored, prior to final destination, at only one designated area. This area must be duly delimited and signed ("Hazardous Waste Storage Area") and with restricted access. The area must be roofed, properly ventilated and have impermeable surface floor; - Location of the Waste Temporary Store Facilities must be at least (50 m) away from water courses and ground depressions; - No smoking will be allowed in the vicinity of hazardous waste storage area. Place appropriate symbolic signage (No smoking, No naked light and danger); - Provide extinguishers near the waste storage areas; - Maintain a good organization of space and cleaning of waste storage areas.	During construction	EPC Contractor	ESGM

Waste management actions	Description	Implementation Schedule	Responsibility for Implementation	Supervision
Transport of Hazardous Waste	- The transport of hazardous waste, within the facilities of the producing entity up to the storage location, will be made resorting to appropriate equipment or vehicles capable of containing the waste and in good operating conditions. These vehicles must be easily washable. The transport vehicle will be dully identified with signs for the transportation of hazard material; - Hazardous waste must be transported (internal transportation) in containers. The transport must have steel clamps for securing the containers and guarantee safe transport; - Any holder of hazardous waste that does not personally carry out the elimination operations, shall give this work to a private collecting service that will carry out the operations, provided it is duly licensed by MTA to carry out these activities; - The transportation of hazardous waste transport outside the facilities of the producing entity can only be made by an entity licensed by MTA and will comply with the basic rules and procedures defined in Decree No. 83/2014; - When the hazardous waste is collected, a manifest, in four copies, will be completed, indicating the quantities, quality and destination of the collected waste (according to Decree No. 83/2014, appendix VI); one copy is kept by the waste generating entity, another copy is kept by the waste transporting entity, the third copy is kept by the entity receiving the product and the fourth copy is sent to MTA; - The crossing of borders with hazardous waste shall comply with the provisions of the Basel Convention and with the instructions of MTA; - Provide the workers responsible for the handling of hazardous waste with adequate PPE (work wear, gloves, boots and masks).	During construction	EPC Contractor	ESGM
Hazardous Waste Final Destination	- The final disposal of hazardous waste will be made at an infrastructure licensed by MTA for storage, treatment and/or final disposal of hazardous waste. The nearest such infrastructure is the Mavoco Industrial Landfill, located in Boane District, Maputo Province; - Whenever possible, batteries and tires will be returned to the supplier.	During construction	EPC Contractor	ESGM

Waste management actions	Description	Implementation Schedule	Responsibility for Implementation	Supervision
Workers training	- Workers must be briefed on the need to reduce the production of waste as much as possible. The use of disposable products (such as plates or plastic or paper cups, products with excessive packaging) will be limited as much as possible, and the use of reusable products will be promoted; - Workers must be trained on the classification, correct sorting and handling of waste; - Workers responsible for hazardous waste handling must be trained on the classification, correct sorting, handling and transport of hazardous waste. Workers must be briefed on the use of individual protection equipment.	During construction	EPC Contractor	ESGM

6.4.5 Follow-up Actions

Table 6.15 summarizes the follow-up and/or systematic and/or periodic verification actions proposed for waste management.

Table 6.15 – Waste management follow-up and/or systematic and/or periodic verification actions

Follow-up and/or verification action	Description
Inspection of the waste storage areas	- Perform daily visual inspections of the hazardous and non-hazardous waste storage areas, to verify if the existing containers are adequate to the volume of waste produced, the correct waste sorting and conditioning is being carried out, that there are no spills and contamination and that the waste has been properly removed; - Verify the integrity of the containers and other environmental control systems/equipment.
Inspection of working areas	- Perform daily visual inspections of work areas to verify the organization and cleanliness of the site.
Verification of final disposal sites	- Undertake biannual due diligence visits to the final disposal sites (when managed by a third party service provider) to confirm that final elimination is compliant with applicable national standards and IFC EHS guidelines.

6.4.6 Corrective Actions

Table 6.16 summarizes the corrective actions and their implementation schedule.

Table 6.16 – Waste Management Plan - corrective actions, description and implementation schedule

Corrective Actions	Description	Implementation Schedule
Spill mitigation actions	- Removal of substances accumulated in the spill containment trays or basins; - Repair or change the damaged container that leaks.	When applicable
Response to complaints	- In response to workers or community complaints about odours or pests proliferation, increase the frequency of waste collection.	When applicable
Corrective action for improper waste storage	- Provide or increase the quantities of proper containers in the storage areas where the increase of wastes being produced are evident; - Increase the frequency of waste collection.	When applicable

Corrective Actions	Description	Implementation Schedule
Corrective action for littering and illegal dumping	- Increase awareness about waste management.	When applicable

6.4.7 Performance and Reporting

6.4.7.1 Performance indicators

The following table lists the performance indicators to be monitored for the Waste Management Plan.

Table 6.17 – Performance indicators for Waste Management Plan

Indicator	Target	Trend
Weekly volume of waste produced, by type (hazardous and non-hazardous)	Volumes will be recorded. No target is applicable (as volumes will depend on activity).	Volume of waste per workday decreases quarterly (showing efforts to reduce waste production)
Weekly volume of waste transported to final deposition	Equal to weekly volume of waste produced.	n.a.
Number of improper waste management procedures detected	< 5 per quarter	Number of events decreases quarterly
Number of adopted corrective actions in response to detection of improper waste management procedures	Equal to number of improper waste management procedures detected	n.a.

Note: n.a. – not applicable.

The performance indicators results will be determined weekly and compiled in quarterly reports, as indicated in the following section.

6.4.7.2 Reports

The following table summarizes the documental records that will be kept to control the execution of the waste management plan. These documents will be prepared, archived and maintained by the C-HSEM, in order to document the results of the plan's implementation. Records of relevant events and performance indicators shall be kept as appropriate and a quarterly Performance Report will be prepared and submitted to the ESGM, reporting on the recorded events and performance indicators.

Table 6.18 – Record documents for the Waste Management Plan

Document Title	Document Type	Frequency of Record or Report
Weekly volume of waste produced, by type	Record	Weekly
Weekly volume of waste by category transported to final deposition	Record	Weekly
Weekly volume of waste recycled or reused	Record	Monthly

Document Title	Document Type	Frequency of Record or Report
Record improper waste management procedures detected and remediation actions undertaken	Record	Weekly
Performance Report	Report	Quarterly

6.5 Biodiversity Management Program

6.5.1 Justification and Objectives

The construction and operation of the Project will result in some biodiversity impacts, on vegetation and habitat, and on wildlife, particularly birds. Monitoring and management actions for these biodiversity components are required, to continuously evaluate the Project's impacts and the efficacy of the proposed mitigation. The BMP will establish baseline values for the managed/monitored activities, implementation schedule, and responsibility for carrying out the monitoring and corrective actions, supervision responsibilities, budget estimates, and source of funding.

6.5.2 Monitoring and Management Actions and Implementation Schedule

Table 6.19 lists:

- The scope of the BMP, which includes: (a) invasive species; (b) deforestation rate and wildlife poaching activities, the biodiversity monitoring and management actions; and (c) birds and bats fatality monitoring;
- Brief description of the actions to the implemented;
- Implementation schedule;
- Responsibilities for implementation of management and monitoring program; and
- Supervising agency(ies)

For each activity in **Table 6.19**, the BMP will identify:

- Baseline values (including direct and indirect/induced impacts);
- Monitoring indicators (including direct impact of the transmission infrastructure constructed, as well as indirect/induced impacts of the right of way, access roads, and other ancillary infrastructure);
- List of potential corrective actions and their triggers;
- Estimated costs / indicative budget; and
- Source of funding.

Details on the monitoring methodology are provided in the following sections.

Table 6.19 – Biodiversity monitoring and management actions, description and implementation schedule

Monitoring and Management Actions	Description	Implementation Schedule	Responsibility for Implementation	Supervision
Invasive flora species monitoring and management	- Monitor the presence and expansion of invasive flora species along the RoW, access road, and borrow pit areas. - In case of detection of invasive species they will be removed.	Annually during construction (15 months duration) and annually during the first five years of operation	EPC Contractor (construction) EDM (operation) to be carried out by Independent Invasive flora species Monitoring and Management Consultant financed by EDM	ESGM
Deforestation rate and the extent of wildlife poaching monitoring and management – including corrective actions of impacts on natural and critical natural habitat, on both flora and fauna	- Establish the baseline for present deforestation rates and wildlife poaching activities prior to the start of clearing the Right-of-Way; - Monitor the direct and indirect / induced impacts on natural and critical natural habitat, on both flora and fauna, 5 km on both sides of the RoW: deforestation and poaching monitoring and development of corrective actions; - Register the presence of people in and near the RoW and the actions taken by local authorities to prevent illegal logging and poaching activities. These impacts should be assessed through ground monitoring, as well as the use of aerial photographs and Google Earth; - In case problems are detected that cause significant negative impacts on natural and critical natural habitat, on flora and fauna, mitigation measures will be developed and implemented, including reforestation or targeted protection and anti-poaching activities, financed by EDM.	Annually during construction (15 months duration) and during the first five years of operation. Annually during the next 5 years of operation.	EPC Contractor (construction) EDM (operation) to be carried out by Independent Biodiversity Monitoring and Management Consultant financed by EDM	ESGM
Birds and bats fatality monitoring	- Monitor bird and fruit bat fatalities due to power line collisions and (if any) electrocutions.	Operation (during the first five years of operation; the sampling frequency depends on the specific activity)	EDM (operation) to be carried out by Independent Birds and Bat Monitoring and Management Consultant financed by EDM	ESGM

Code of Conduct. In addition to all other issues included in the Code of Conduct, the BMP should specify or cross-reference all the biodiversity-related environmental rules that all contractors and project workers will be expected to follow, along with the required induction training prior to beginning work and the penalties for non-compliance.

Implementation Arrangements. For each planned activity, the BMP will indicate the (i) expected implementation schedule (during construction and operation); (ii) institutional responsibilities for implementation (Proponent, EDM, ESGM, Contractor, and/or collaborating governmental entity or NGO); and (iii) indicative budget and expected source of funds for each key BMP activity during construction and operation (funding could be from some combination of IDA or other project funds, EDM's internal resources, partner organizations, etc.).

6.5.3 Monitoring Methodology

Invasive species

The invasive flora species monitoring plan will start with the construction phase and at that time patches or individuals of invasive flora species will be identified and referenced via GPS. The identified patches/individuals will be removed as possible and their potential regrowth will be monitored biannually during construction and annually during operation phases (at least during the first 5 years), or until no patches are detected.

If new locations of flora invasive species are detected along the corridor, access roads or borrow pit areas during maintenance, those will be monitored, and removed or controlled as well.

The expansion of the monitored invasive species will be evaluated and if needed new measures to control them will be proposed.

Birds and bats mortality

Biodiversity monitoring and adaptive management shall cover bird and fruit bat collisions with transmission lines and also any bird electrocutions (although these should be avoided through appropriate tower design selection). Bird and fruit bat fatality monitoring should follow scientific protocols (small echo-locating bat species tend not to collide with wires, but large fruit bats do).

Birds and bat fatalities due to collision and possibly electrocution will be monitored during the operation phase (at least during the first 5 years and then re-evaluated as to the need to continue the program). This monitoring will be carried out by a qualified Consultant team to be contracted by EDM and led by an experienced specialist.

Wetlands, areas around rivers and water bodies, and selected woodland areas will be inspected for bird and bat mortality. Inspection will be done under the line cable and towers on foot by trained observers. This task will be done regularly, according to a schedule to be specified by the monitoring team, covering all seasons of the year as accessibility conditions permit. Any birds or bats found dead will be removed and collected for further identification and mortality cause determination (as needed), with the specific locality referenced with GPS.

The Consultant team shall define and follow a scientifically valid monitoring protocol that will define specific search dates, localities, and procedures. Analysis of data and findings will take into account and, as needed correct for, factors such as limited searcher efficiency (not all bird carcasses that may be present will be found) and the removal by scavengers or decomposition of some carcasses.

6.5.4 Corrective Actions

The following table presents the main corrective actions.

Table 6.20 – Corrective actions, description and implementation schedule

Corrective Actions	Description	Implementation Schedule
Act on expansion of invasive flora species	- If new patches of invasive species are detected, or if an expansion of the known patches is observed, threatening to invade natural or critical habitats, actions to control and remove these patches will be implemented after being properly evaluated.	Whenever necessary
Act on high levels of impacts on natural and critical natural habitat, flora and fauna	- If the monitoring of impacts on natural and critical natural habitats and on flora and fauna indicate that they are becoming high (double the deforestation and poaching rates prior to opening up the corridor and construction of the access roads) control measures will need to be taken to mitigate these impacts, such as reforestation or targeted protection and anti-poaching measures.	Whenever necessary
Act on high levels of bird and bat mortality	- If the monitoring of birds and bats fatalities detect problem areas (with any fatalities of vultures or other threatened species, or relatively high mortality of more common species, the monitoring Consultant shall propose to EDM additional measures (such as increased or adjusted BFD use) to further reduce collisions and/or electrocutions.	Whenever necessary

6.5.5 Performance and Reporting

Performance indicators

The following table lists the performance indicators to be monitored:

Table 6.21 – Performance indicators for Biodiversity Management Program

Indicator	Target	Trend
Number and extent of invasive flora species patches	Zero increase from pre-project conditions.	Both number of patches and area occupied by invasive species decrease between successive monitoring periods.
Deforestation of natural and critical natural habitat areas and wildlife poaching activities	Deforestation and impacts on natural and critical natural habitat and wildlife poaching activities should not significantly exceed (by double or more) the pre-project levels.	Deforestation impacts on natural and critical natural habitat and wildlife poaching stabilized after the application of additional mitigation measures.
Bird and fruit bat collision (or electrocution) fatalities	For threatened species such as raptors, the target for fatalities should be zero. For more common species, the target should be minimally low (to be specified by the Consultant for particular species groups).	Fatality rate decreases in monitored segments, after application of additional corrective measures.

The performance indicators results will be determined and compiled in quarterly reports, as indicated in the following section.

Reports

The following table summarizes the documental records that will be kept, to control the execution of this monitoring and management program.

Table 6.22 – Record documents for the Biodiversity Management Program

Document Title	Document Type	Frequency of Report
Invasive species monitoring report	Report	Semi-annually (twice per year) during construction phase; annually (once per year) during operation phase
Baseline Report. Monitoring Report and Management Report of impacts on natural and critical natural habitat, on both flora and fauna (deforestation rates and wildlife poaching activities)	Report	Semi-annually
Bird and bat mortality monitoring report	Report	Quarterly

6.6 Stakeholder Engagement Program

6.6.1 Objectives

The construction of the Project could induce nuisances and impacts to surrounding communities, due to influx of workers, noise and dust emissions, increased traffic, disturbance of daily patterns of life, etc. These factors can be effectively controlled through the required mitigation measures and the establishment of effective communication channels between the Contractor / Proponent / EDM and the local populations, to ensure that they are aware of the work to be undertaken, to consult them on how to manage relevant Project – community interactions and to timely flag and address any source of community discontent.

The aim of stakeholder engagement is to ensure that the local communities are well informed of the planned and ongoing activities, including mitigation measures, and to prevent any social conflicts that may disturb the social dynamics of the local populations and hinder or prevent the execution of the planned work.

This Stakeholder Engagement Program applies to both the construction and operation phases but is more intense during the construction phase. The Proponent will develop a full project-specific **Stakeholder Engagement Plan (SEP)** that aligns with IFC Performance Standard 1 for construction. This SEP will form the template for the SEP that EDM later prepares for operations. The SEP for the construction of the transmission line will try to mirror the SEP for the wind power plant where possible for consistence, and will include a similar Grievance Redress Mechanism. Note that the SEP will include a mapping of affected and interested stakeholders, in addition to setting out how these groups will be engaged.

6.6.2 Scope and Responsibilities

The Stakeholder Engagement Program is applicable to all construction activities and will also include the relevant information for the operational phase, including which activities will be allowed or restricted by the Proponent's / EDM in the Project's right-of-way. Proponent / EDM will extend the communication with local communities to the operational phase, through the Stakeholder Engagement Plan referred above.

Both Proponent / EDM and the EPC Contractor will have responsibilities in terms of communication. The SEP(s) will be developed by Proponent / EDM, and most of the communication efforts will be developed by the Proponent / EDM, depending on the project phase. The EPC Contractor will also have dedicated staff responsible for daily communication with local communities throughout the construction phase, although these activities will be coordinated with the Proponent / EDM.

6.6.3 Actions and Implementation Schedule

Table 6.23 presents the main required actions for the implementation of the Communication Plan.

Table 6.23 – Communication actions, description and implementation schedule

Actions	Description	Implementation Schedule	Responsibility
Engage with provincial and district authorities and stakeholders	- The provincial governments will be informed of the planned activities prior to starting the works; - Before the start of the activities on a specific District, meetings with the District Administration, as well as other relevant stakeholders, will be scheduled to advise of the proposed activities and to identify the local authorities (Administrative Post or neighbourhood chiefs) of the areas where construction activities will be carried out;	Planning phase	Proponent's CLO
Engage with local authorities	- Before starting work on a specific administrative unit (administrative post, locality), initial meetings will be held with the local authority in order to present the program of the construction activities, identify any potential social conflict and identify potential strategies to engage the community in the project. One of the issues that will be discussed in these initial meetings is the **Local Recruitment and Working Conditions Plan** developed by the Contractor;	Planning phase	Proponent's CLO / EPC Contractor
	- The Contractor will appoint a staff member to be the focal point of contact with the local authorities, during the construction phase (this will preferably be a qualified CLO);	Planning phase	EPC Contractor
	- During the execution of works, the Contractor will establish and maintain daily contact with the local authorities. This will help identify any population grievance or complaint and timely flag any potential social disturbance or conflict; - Any specific complaints and conflicts and their resolution will be reported to the Proponent and recorded as part of the GRM, and if unresolved referred to the Proponent for resolution, in accordance with the Project GRM (see section 6.6.5); - Interact with the local administration and the police to implement control mechanisms in public places to prevent crime in accordance with the **Security Management Plan**.	During construction	Proponent's CLO / EPC Contractor

Actions	Description	Implementation Schedule	Responsibility
Inform and engage with local communities	- The Contractor will appoint a liaison officer to be the focal point of contact with the local communities, during the construction phase (this will preferably be a qualified CLO, but can also be the HSEM or his field representative); - Inhabitants of local communities nearby the construction fronts will be previously informed by the Contractor regarding the upcoming construction activities, including information on the planned start of activities, their nature, location and duration; - This communication will also include information regarding the project nature and goals, jobs available and hiring procedures (**Local Recruitment and Working Conditions Plan**), skills transfer programs, adopted code of conduct for workers, and non-discrimination policies and opportunities for women; - The communication will also include information regarding the **Emergency Response Plan**, namely the potential emergency scenarios that may occur and what to do if a community member detects an emergency, including emergency communication protocols and contact number; - The Contractor will ensure constant communication with the local population, clarifying and keeping the public informed about the various actions and potential impacts related to construction;	Before starting construction work in any given area	Proponent's CLO / EPC Contractor
Inform and engage with local communities	- Develop a policy of interaction between the local community, employees, local and regional suppliers, and migrants to reduce the differences between the different groups. - Support implementation of the community awareness campaigns on community health and safety including the workers' code of conduct and Project's GRM.	Before starting construction work in any given area	Proponent's CLO / EPC Contractor
Consult local communities	- Use the same information meetings named above to consult local communities on how to avoid affecting sensitive areas and receptors and to harmonize construction and community activities, to the extent possible. This can include, for example, the community's views and preferences in what regards access road routes, traffic management procedures, location of any support infrastructure, communication channels, interactions with workforce, or any other issue of relevance in terms of community / Project interaction. Integrate community insights and requests into construction management procedures. - Discuss access to employment and any other potential benefits that EDM might provide as part of its overall plans for the community or other corporate social programs.	Before starting construction work in any given area	Proponent's CLO / Contractor
Establish and implement Project GRM	- A grievance redress mechanism (GRM) will be established by the Proponent / EDM whereby individuals or groups can submit complaints or concerns related to any Project impact or activity and receive a response. This includes any claim of any uncompensated loss of built structures, crops or other socioeconomic asset. This mechanism will be communicated to the local authorities and local communities prior to commencement of construction. Additional details on this are provided in section 6.6.5 of this EMP.	Before starting construction work	Proponent's CLO / Contractor

6.6.4 Performance and Reporting

6.6.4.1 Performance indicators

The following table lists the performance indicators to be monitored:

Table 6.24 – Performance indicators for the Communication Plan

Indicator	Target	Trend
Events planned / held	100 %	n.a.
Number of participants	n.a.(1)	Number of participants does not decrease between successive engagement actions with the same target audience
Complaints received / resolved within 30 days	100 %	n.a.
Incident reports (number)	n.a.	Number of incident reports per quarter decreases over time
Incident reports (follow-up)	100%	n.a.

Notes: (1) – the number of participants will vary too greatly, depending on type and location of engagement, to establish a target number.

6.6.4.2 Reporting

Records will be kept of all communication actions undertaken, and any grievance or complaint received, namely:

- Meetings held with district / municipal authorities;
- Meetings held with local authorities;
- Meetings held with communities;
- Complaints or grievances from local populations, and grievance resolution;
- Incident reports (any incident involving communities).

These reports will be prepared, archived and maintained by the HSEM, the ESGM/CLO and EDM, where applicable, in order to document the results of the plan's implementation. Records of relevant events will be made following the occurrence and periodic Performance Reports will be prepared, quarterly during construction and commissioning and annually after the first year of operations, reporting on the recorded events and communication results.

Any work stoppage, or incident involving security forces will be reported with a full explanation of the reasons and how it was resolved and any follow up actions.

6.6.5 Project Grievance Redress Mechanism

6.6.5.1 Introduction

All employees are required to read and understand the GM and its procedures and processes. A thorough understanding of the relevant sections of the GM by staff form part of the overall implementation of the operations Integrated Management System and processes. The Operations Managers are responsible for ensuring that their staff have read and understood the GM.

This procedure aims to address external grievances and issues associated with the facility, future expansion projects or construction projects through a transparent and impartial process.

The grievances redress mechanism procedure will enable any grievances and issues that may arise from the community surrounding the Namaacha wind farm to be properly recorded and addressed before grievances escalate. This procedure does not apply to commercial grievances and issues or employee grievances. These are dealt with by the operations Human Resources.

The grievance and issues redress mechanism (GM) allows stakeholders to submit complaints and comments at no cost, without retribution or preventing recourse to a legal process.

6.6.5.2 Key Principles of the GM

The key principles of an effective GM are:

- Culturally appropriate: Tailored to the local language (Portuguese)
- Fair: A fair and impartial approach will be taken when managing grievances
- Accessible: Accessible to all settlements and stakeholder groups within the project area
- Inclusive of vulnerable groups: Available to those less likely to have the means to voice their concerns or opinions within the Mozambique context (e.g., women, elderly, children, etc.)
- Reliable: The Developer will respond to grievances within an agreed timeframe to manage expectations
- Publicised: The Developer will publicise the GM through engagement activities and advertisements to ensure that stakeholders are aware of and understand the process
- Logged: Grievances and issues will be logged and tracked
- Confidential: Grievances and issues will remain confidential and anonymous
- Respect judicial and civil rights: A grievant may at any time stop participating in the project grievance procedure and pursue other judicial, administrative, civil, or traditional remedies

6.6.5.3 Communication Plan of the GM

At the outset, the project will disclose / communicate the GM to the local communities in the appropriate language via different methods such as:

- Pre-construction community meeting
- Project noticeboard
- Project webpage
- Pre-construction printed leaflets / notices posted in the community
- Noticeboard at municipality offices.

6.6.5.4 Overview of the GM Process

The company's approach to GM follows a two-tiered process. Tier 1 is the initial process where the company and the grievant are in direct consultation. If no mutually satisfactory resolution to the grievance is found, the grievance procedure will move to the Tier 2 level. The Tier 2 process involves a third party, where the participants agree on the process, the parties involved, and the remedies available.

The GM will include the steps listed below and elaborated in subsequent sections.

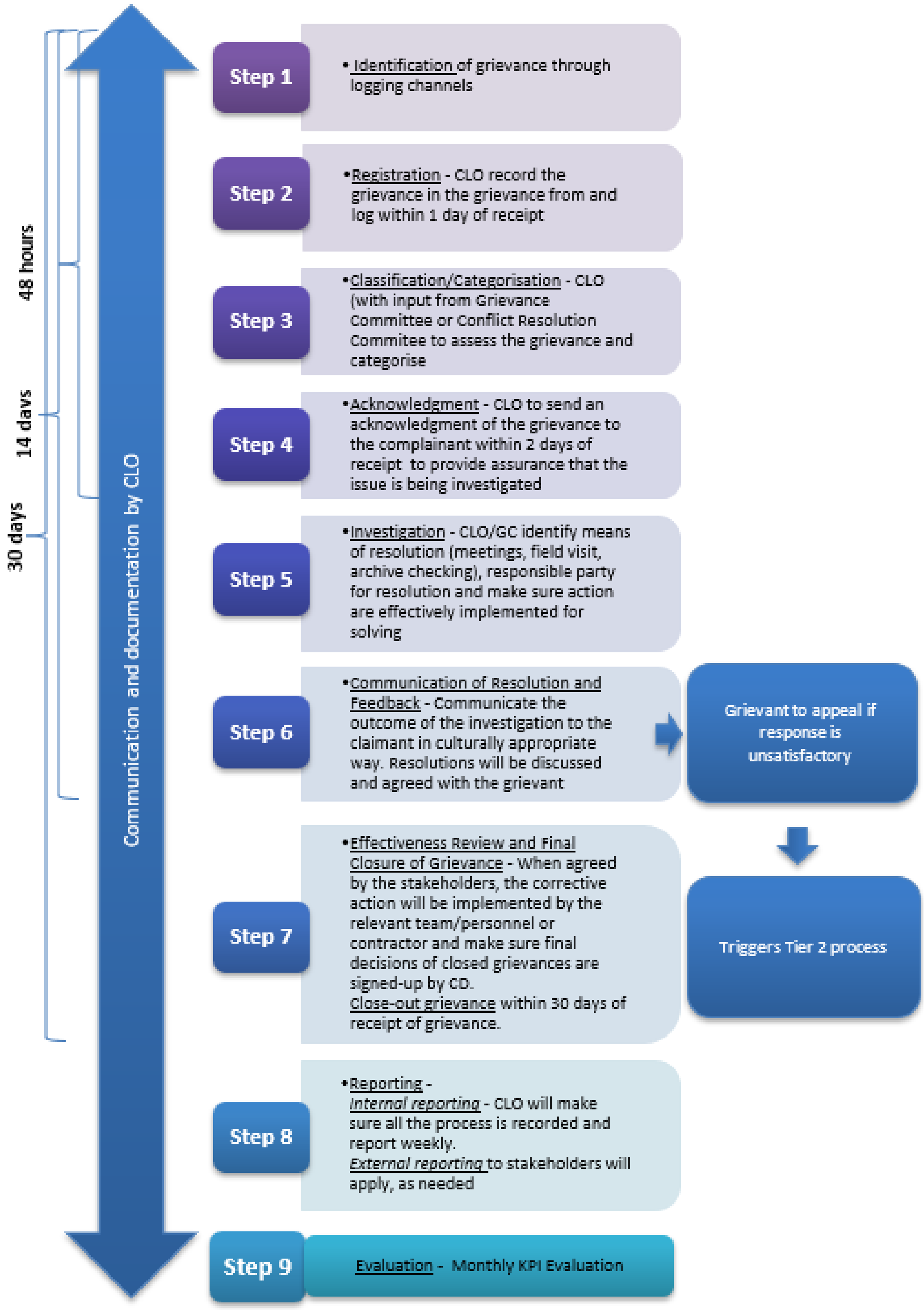


Figure 6.1 – Grievance and Issues Redress and Management Process

6.6.5.5 Tier 1 of the GM Process

In Tier 1 of the process, the underlying assumption is that the grievance will be resolved to the satisfaction of all parties, without the intervention of third parties. However, a grievant may at any time stop participating in the grievance procedure and pursue other remedies, without prejudice. Tier 1 includes the following steps:

1. Submission of grievance and issues/Grievance and issues logging
2. Registering grievances
3. Screening and classification
4. Acknowledgement
5. Investigation and consultation
6. Communication of resolution and feedback
7. Effectiveness review and final closure of grievances and issues
8. Reporting
9. Evaluation of quality and process

Step 1 – Submission of grievances and issues / logging grievances

The following options will be available to stakeholders for submitting grievances to the project:

- Face to face with CLO (CLO will hold regular consultation meetings)
- Complete the form via the project website
- Verbally to CLO via phone or text
- Verbally to the Site Manager or Contractor staff in the field
- Grievance register posted at the facility entrance
- Hand-deliver via sealed mailbox at project office (site)[4]

All grievances and issues received directly by the CLO/SED Manager or via another route will be collated and handled centrally, actioned, and closed out. The CLO will lead this process.

Step 2 - Registering grievances

Grievance and issues (received verbally or in written format) will be formally registered by the CLO/SED Manager using the project Grievance Form (APPENDIX D), ensuring that contact details are provided with the preferred method and language of communication. Besides grievances and issues, requests and suggestions[5], and social near misses[6] can also be registered. A clear description is required to be provided of the incident or grievance and issues.

[4] At each location a note will be provided indicating that grievances will be collected on a weekly basis and the contact number for the CLO/SED Manager (for urgent grievances).

[5] Request or suggestion – any other request or suggestion received from the community different from grievances and issues or concerns, or suggestions or ideas to improve (for example a request for support/donation).

[6] Social near-miss – is an event that had the potential, under different conditions and environments, to have escalated or caused a major social or medium social incident.

Step 3 – Screening and classification

Once recorded, each grievance and issue will be reviewed, assessed and classified into one of the following categories:

- Level 3 - Major Social Incident or Critical Priority Complaint: potential for significant breach of the applicable legislation, company policies, and / or negative media attention. Safety and security of the facility property, employees and stakeholders (e.g. abuse by security force).
- Level 2 - Medium Social Incident or Medium Priority Complaint: widespread and / or ongoing complaint, this can be an environmental issue. It is widespread in nature, probably affecting more than one person, group or village. It has the potential that, if not addressed, it may escalate into a major social incident. (e.g. noise, vibration and dust during construction).
- Minor Social Incident or Minimum Priority Complaint – level 1: a local, isolated, one-off complaint that could be addressed with little effort. They are small in nature and do not threaten the prevailing situation. The complaint is registered only. Usually, they are generated and motivated by individual interests.

The CLO/SED Manager will then assign a type to each grievance as per the following categories:

- Compensation grievances and issues
- Impact on livelihood/income
- Environmental concern
- Injury to employees and stakeholders
- Property damage
- Security forces abuse
- Employee/subcontractor bad behaviour
- Non-fulfilment of commitments
- Cultural heritage concerns
- Others

Step 4 – Acknowledgement

Upon receipt of the grievance at the originating point, the receiving party has a maximum of 7 days to forward the respective grievance and issues to the CLO/SED Manager. Within 48 hours of receiving the grievance / issue from the entry point, the CLO/SED Manager will acknowledge to the complainant that the grievance has been received and formally registered. The complaint will then enter the GM process.

This will likely be through a phone call, in person visit or written format as determined most appropriately based on local context. Where possible, information will be provided to the complainant on the next course of action and an indicative timeframe for resolution. The CLO/SED Manager will track the grievance investigation and resolution progress and respond in writing as appropriate to the complainant. Irrespective of the manner in which the acknowledgement was made, it should be logged in the GM database. The method of communicating, date and time must be captured as well. The purpose is to have sufficient information to service proof of acknowledgement if a dispute emerges later.

Step 5 – Investigation and consultation

The CLO/SED Manager, in consultation with the CEN's engineer / construction contractor and other relevant persons, will:

- Evaluate the legitimacy of the compliant. Non-legitimate complaints could include: complaints which obviously are not related to the project, criminal activity not related to the project, labour related grievances (refer to workers' grievance mechanism), contractual disputes (use redress methods in contracts), issues related to government policy or procedures (the complainer should be directed to the relevant routes).
- Identify required action to resolve the grievance / issue and the responsible person/party. If unable to deal with the grievance / issue directly, they will assign it to the appropriate company/project employee or team or Head of Department/ contractor for resolution. The identified individual or team will assist with the grievance / issue redress process.
- If required, support identifying an appropriate investigation team with the right skills to review the issue raised.
- Decide whether it is project-related or whether it is more appropriately addressed by a third party (e.g. relevant authority, other company).
- Support the investigation, including (where appropriate) performing a field visit, holding a consultation, and archive checking with the concerned person and company representatives.
- Investigate whether the incident leading to the grievance / issue is a singular occurrence or likely to reoccur.
- Identify activities, procedures, equipment and training to address and prevent reoccurrence.
- Make sure that any request to a head of a unit, which could help to resolve the issue, is correctly delegated to them.
- Remain responsible for tracking grievances and issues and ensuring they are adequately addressed.

Step 6 - Communication of resolution and feedback

The CLO/SED Manager will communicate the outcome of the investigation to the complainant and request feedback (if possible) on the resolution. They will ensure all grievances and issues are responded within 14 days of being acknowledged. All grievances and issues of a level 3 – critical priority will be responded to within 72 hours. Responses shall be in writing though a verbal response will also be provided where appropriate. If the complainant disagrees, an internal appeal process can be initiated.

Note: If the Tier 1 process does not resolve the grievance to the grievant's or the company's satisfaction or if broader third party consultation is necessary, the grievance procedure may enter the Tier 2 process.

Step 7 – Effectiveness review and final closure of grievances and issues

Implement the corrective action as per the resolution action plan. Note that if there are deviations, delays or unexpected events that will influence the implementation and schedule of the resolution, the grievant must be informed as a matter of urgency.

The CLO/SED Manager and the responsible person/party identified for resolution will ensure that the corrective actions recommended are effectively implemented efficiently and timely. The CLO will inform stakeholders of the progress of implemented corrective actions. For all level 3 grievances, when no further attention is required, the SED Manager, the Site Manager, or an assigned senior employee will close the grievance. The closed out date will be recorded in the company integrated electronic grievances and issues database. The project will aim to do this within 30 days of receiving a grievance. A summary of all grievances will be regularly reported to the CEO/senior management. The project will guarantee anonymity in all external reporting.

Step 8 – Reporting

The SED Manager will ensure that internal reporting rules are set defining report frequency to monitor performance, monitoring indicators, methods and responsibilities. External reporting will be issued as per contractual requirements. All reports will be prepared using pre-defined templates.

Step 9 – Evaluation of quality and process

The SED Manager will ensure clear rules for evaluating the quality of the grievances and issues redress mechanism, and compliance with the process are set. This will include frequency (weekly, monthly, quarterly, bi-yearly or yearly), evaluation indicators, methods, and responsibilities.

The GM process may be revised if so required, based on the evaluation outcomes. Any such revisions would be subject to consultation with Affected Communities and PAPs.

6.6.5.6 Tier 2 of the GM Process

If the Tier 1 interaction leads to an unsuccessful outcome or broader consultation is required, the GM may enter the Tier 2 process. This would usually be triggered prior to the effectiveness review and final closure. As mentioned above, the grievant may at any time cease to participate in the grievance process and pursue other avenues of redress, without prejudice. If a grievant chooses to cease to participate, any further costs and arrangements are for the account of the grievant. In such a case, the grievant will be recorded as no longer part of the GM process, logged and closed.

Tier 2 includes the following steps:

1. Agree to Initiate the Tier 2 process.
2. Develop a Tier 2 roadmap.
3. Implement the Tier 2 process.
4. Address the outcome of the Tier 2 process.

Step 1 - Agree to Initiate the Tier 2 process

The grievant and the company must formally agree to pursue the Tier 2 process. A third party should be neutral, well-respected and acceptable to the grievant and the company. Third parties include public defenders, legal advisers, local or international NGOs or technical experts. For Tier 2 proceedings, the company's legal team must be consulted.

Step 2 - Develop a Tier 2 roadmap

When implementing the level 2 approach, the grievant, company and third party will jointly develop a roadmap with associated timelines, venues and procedures. Participants will determine what the process will look like. Any procedure deemed acceptable by the parties can be used in this process, including facilitation, mediation, arbitration, or resolution by a third party.

Step 3 - Implement the Tier 2 process

The Tier 2 centric procedure will be implemented according to the road map. The process must be documented, transparent, and inclusive.

Step 4 – Address the outcomes of the Tier 2 process

Tier 2 should result in a decision. If the outcome is acceptable to both the grievant and the company, and all further actions have been successfully completed, the CLO/SED Manager and the grievant will sign a grievance resolution form. This action will close the grievance and should be logged as such.

The grievant or the Company may choose not to accept the outcomes of the Tier 2 approach. If such a situation arises, the parties may seek other remedies, including judicial intervention. If this is the case, the company will terminate the grievance procedure and log this action as terminated.

6.7 Community Health and Safety Management Program

6.7.1 Objectives

The construction of the Namaacha – Boane 66kv OHTL Project could result in the increase of community health and safety hazards, due to increased light, noise and dust emissions, increased traffic, workforce mobilization, population influx and security personnel. Management of these risks will require implementation of the mitigation measures proposed in the EIS regarding these issues, which will be compiled in a **Community Health and Safety Management Program**. This section sets out the framework for what this Plan shall include.

Note that management of community health risks will also be supported by the implementation of other plans mentioned in this EMP, such as the Stakeholder Engagement Plan and GRM, as well as the Emergency Response Plan.

6.7.2 Scope and Responsibilities

The Proponents are the ultimate responsible for the implementation of all mitigation and management measures in order to minimize community health and safety risks and impacts to acceptable levels. Note that much of the mitigation will involve a strong participation of the Contractor, through the development of additional management plans and the management of day-to-day activities in the field, as detailed here. However, the Proponents will continuously guide and supervise the Contractor, in all issues that are related to engagement with communities and minimization of impacts on their health and safety.

6.7.3 Proposed Actions and Implementation Schedule

Table 6.25 presents the main actions for the implementation of the **Community Health and Safety Management Program**.

Table 6.25 – Community Health and Safety Management Program actions, description and implementation schedule

Actions	Description	Implementation Schedule	Responsibility	Supervision
Minimize hazard risk to communities from Project traffic	- The Contractor will develop, and submit for the Proponent approval, a **Traffic and Transportation Management Plan**, detailing the management procedures and mitigation measures to minimize traffic related hazard risks to communities. The Plan will include the mitigation provided below: o Circulation of construction heavy vehicles will be limited to pre-approved construction routes. These will be defined in order to avoid crossing residential areas, whenever feasible; o Speed limits will be set for construction heavy vehicles, for all construction circuits. This speed limit will not exceed 30 km/h in critical segments, such as when near residential areas, and never more than 80 km/h on paved roads; o Inform drivers of the set speed limits and enforce them as appropriate; o Install temporary official traffic signs on local roads around the work fronts before and during the execution of the works together with local transit authorities; o Consult with community on traffic restrictions and schedule, provide alternative connectivity where needed, and conduct regular driver and community traffic safety awareness programs; o Use manned traffic control in key sensitive areas and crossings especially near any places where people in general and children in particular congregate; o Manage traffic and machinery to avoid accidents involving domestic animals and cattle. Provide for animal crossings and access to watering sites, if needed. o Reroute traffic or limit access if needed, in coordination with communities and local authorities.	Planning Phase	EPC Contractor	Proponent

Actions	Description	Implementation Schedule	Responsibility	Supervision
Minimise noise nuisance on communities	- Construction activities, in particular the noisier ones, will be limited to the daytime period (between 07:00 and 22:00) and to working week days, avoiding working during the night-time and on weekends, whenever near residential areas; - The contractor will avoid placing fixed equipment (such as cranes or compressors) in proximity to sensitive receptors; - Use of portable screens during substations construction if situated near inhabited places, where possible; - If noise complaints are received from local communities in the morning or evening periods, despite compliance with the previous measures, and if the following investigation confirms the noise impact, then further reduce the work schedule in those periods. In such cases, the work schedule will be defined in a participatory manner, through consultation with affected communities; - Any noise complaint will be addressed and resolved through the Project's **GRM**. Any noise complaint will be investigated and resolved through adequate mitigation, to be defined case by case, but following best practices in terms of noise mitigation, i.e., first acting on noise source (by stopping the activity or using less noisy technologies or methods), then on the noise propagation path (by installing temporary noise screens or similar action) and then, and only if no other option is available, on the noise receptor (such as noise insulation of buildings or temporary lodging, in extreme cases).	During Construction	EPC Contractor	Proponent
Ensure good practices in labour management and minimize risks of social conflicts with workforce	- The Contractor will develop and implement a **Local Recruitment and Working Conditions Plan**, which will include the following principles: o Create mechanisms to ensure that the recruitment and hiring procedures are conducted in a transparent and just manner, are coordinated with the community leaders and District Administration, maximize local employment including women and young workers and transfer technical skills to the local labour force; o Forbid workers from hunting, fishing or buying bush meat. Inform workers of these restrictions in the induction sessions and enforce and monitor them appropriately, including through the Code of Conduct; o Give priority to hire local workers, provided applicants have the necessary skills; o Employment opportunities will be adequately advertised, so as not to limit application opportunities; o The process of contracting staff will be transparent and follow pre-established and accepted criteria and a process coordinated with local leaders that aims to maximize opportunities for the local workforce; o Avoid hiring at the gate – establish local and regional recruitment centers and provide pick up points for applicants from communities; o Ensure respect for local labour laws and worker rights, and together with the labour policy, **Health and Safety Management Plan**, Code **of Conduct** and **Worker's GRM**, ensure safe and fair working conditions.	Planning and During Construction	EPC Contractor	Proponent

Actions	Description	Implementation Schedule	Responsibility	Supervision
Minimize risks of social conflicts with workforce	- The Contractor will have a contractually binding policy and **Code of Conduct** for all workers that includes, among other things, zero tolerance to child and forced labour, non-discrimination provisions regarding women and other minorities, and environmental good practice requirements. The **Code of Conduct** (to be explained to and signed by each worker and reinforced through training) will include a statement that workers are expected to keep and promote good standards of social interaction with the local communities and avoid any gender-based violence or sexual abuse and exploitation, particularly sexual interaction with minors, as well as follow good environmental practices in all project areas. - Elements to cover in the **Code of Conduct** (CoC) include, without limitations: o Respect for local residents and customs; o Non-Discrimination (for example on the basis of family status, ethnicity, race, gender, religion, language, marital status, birth, age, disability, or political conviction); o Compliance with applicable laws, rules, and regulations of the jurisdiction; o Zero tolerance of bribery or corruption; o Zero tolerance of illegal activities by Contractor personnel, including prostitution, illegal sale or purchase of alcohol, sale, purchase or consumption of drugs, illegal gambling or fighting; o Policy and sanctions against drunkenness and a no alcohol and drugs policy during working time or at times that will affect the ability to work or within accommodation camps, or acquired from outside the camp while accommodated in the camp; o A program for drug and alcohol abuse prevention and random testing that is equivalent in scope and objectives to the policies prescribed in the code of conduct; o Policy including sanctions against sexual harassment (for example to prohibit use of language or behaviour, in particular towards women or children, that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate); o Compliance with applicable health and safety requirements (including wearing prescribed personal protective equipment, preventing avoidable accidents and a duty to report conditions or practices that pose a safety hazard or threaten the environment); o Following good environmental practices, including strict avoidance within project areas of any hunting or fishing, bushmeat purchase, wildlife capture, unauthorized vegetation cutting or burning, free-roaming pets (which could conflict with wildlife), and littering with plastic or other non-food wastes.	Planning and During Construction	EPC Contractor	Proponent

Actions	Description	Implementation Schedule	Responsibility	Supervision
Minimize risks of social conflicts with workforce	o Policy and sanctions against violence or exploitation, including of a sexual nature (for example the prohibition of the exchange of money, employment, goods, or services for sex, including sexual favours or other forms of humiliating, degrading or exploitative behaviour); o Protection of children (including prohibitions against abuse, defilement, or otherwise unacceptable behaviour with children, limiting interactions with children, and ensuring their safety in project areas); o Policy and sanctions against sexual relations with anyone under the age of 18 (except if married prior to employment); o Description of disciplinary measures for infringement of the code and company rules. If workers are found to be in contravention of the CoC, which Contractor will explain to them and require them to sign at the commencement of their contract, workers must face proportionate disciplinary procedures; - Failure to keep by these standards will be stated in the contracts as grounds for contract termination. Inform all hired workers of these restrictions and the possible consequences of breaking them. - The Contractor will further be expected to: o Publicize the CoC in settlements potentially affected by the construction camps, as part of the community relations plan. This will help ensure that the local residents are aware of the expected behaviour of the construction staff; o Provide entertainment facilities for workers at the construction accommodation camp as well as for operational workers, and establish clear rules for conduct during leisure time as well as the need to remain within the camp boundaries during leisure time; o Provide appropriate sporting facilities, including organized sporting activities for workers at the permanent accommodation camp; o Provide schedule and transportation that allows workers to visit their families or to have leisure time in urban centers at reasonable intervals. - The Contractor will require its subcontractors to subscribe and adhere to this code and will diligently supervise its implementation at all levels, including engaging the community in confidentially and actively identifying any inappropriate behaviour.	Planning and During Construction	EPC Contractor	Proponent

Actions	Description	Implementation Schedule	Responsibility	Supervision
GBVH prevention and response framework	- The Proponent and the Contractor will work together to continuously assess risks and identify and implement prevention, response and referral processes with respect to any cases involving Sexual Exploitation and Abuse / Gender Based Violence (SEA/GBV). This will focus on: (i) training of personnel, (ii) community and worker awareness, (iii) making available safe and confidential channels of communication and complaints, and (iv) a referral system and mechanism for survivors of GBV/SEA. - Globeleq has developed a GBVH Plan template that sets out the necessary framework that will be used to address GBV/SEA issues that may arise during construction. This Plan will be customised to be Project-specific by the EPC Contractor (subject to review and approval by the Proponents) prior to construction. - The approved Project-specific GBVH Plan will then be implement throughout the construction phase by the EPC Contractor. - Reporting on the Framework implementation will be done on a monthly basis.	Planning and During Construction	EPC Contractor	Proponent
Minimize community security hazards due to interaction with security personnel	- Contractor will develop a **Security Management Plan**, detailing the security arrangements to be deployed at camps, material storage and construction sites, or any location with Project presence. This plan will be compliant with IFC's PS 4, and with the Voluntary Principles on Security and Human Rights, and will be submitted for EDM approval, prior to start of construction; - This plan will include mandatory training for all security personnel, in what regards human rights, proportionate force use and adherence Co contractor's code of conduct; - It will be noted that the use of police or military security personnel is not expected. Given the Project nature, security will almost certainly be supplied by duly licensed security firms using civil personnel only. In any event, will the Project have the need to engage with police security personnel, at any stage, EDM will make an effort to engage with the authorities, so that the any engagement with the communities is in compliance with the Voluntary Principles on Security and Human Rights.	Planning / During Construction	EPC Contractor	Proponent
Minimize workforce and community health risks	- The Contractor will develop a policy and management plan to reduce the transmission of STIs, including HIV / AIDS. This strategy will: o Make provision for awareness, counselling and testing for all Project personnel, including voluntary testing for STDs and HIV/AIDS as part of any health screening program (workers will not be denied employment or discriminated against in any way based on their HIV status); o Provide guidance and counselling to workers with HIV/AIDS to access treatment through existing health facilities or NGO campaigns or programs; o Ensure there is access to free condoms at all worker sites and accommodation; o Ensure that all Project personnel are given specific HIV and STD prevention training; o Undertake information, education and communication campaigns around safe sexual practices and transmission of STDs and HIV/AIDS as well as condom distribution at stopping locations on key transport routes targeting commercial sex workers and truck drivers; o Support public health or NGO initiatives to reduce STD transmission including working through schools, women's and youth groups;	During Construction	EPC Contractor	Proponent

Actions	Description	Implementation Schedule	Responsibility	Supervision
	○ The Contractor will encourage and allow specialized expatriate labour, or specialized labour mobilized from other provinces, to move with their families; ○ The Contractor will provide non-local workers with a schedule and transportation that avoids limiting off-time activities at nearby communities; ○ Conduct community awareness campaigns in communities crossed by the line and especially in proximity of camps and work fronts.			

6.8 Cultural Heritage Chance Finds Procedure

6.8.1 Justification and Objectives

The Project's construction will require vegetation clearance of the RoW and earthmoving activities in the tower sites and substations. These activities have the potential to impact on archaeological sites or elements occurring in the construction areas. Even though no archaeological sites have been identified within the Project RoW, these surveys are based on surface indications alone, and it is therefore possible that sites or items of heritage significance will be found during construction work.

The "chance finds" procedure covers the actions to be taken from the discovery of a heritage site or item, to its investigation and assessment by a trained archaeologist or other appropriately qualified person, so as to avoid and/or reduce project risks on cultural heritage, whilst considering international best practice.

6.8.2 Legal Framework

The "chance finds" procedure is intended to ensure compliance with relevant provisions of the Cultural Heritage Law (Law No. 10/88), that defines places or locations with archaeological or anthropologic interest as material cultural assets.

The procedure also aims to achieve compliance with best practice international guidelines, in particular IFC Performance Standard 8 (Cultural Heritage), which requires the implementation of a chance finds procedure, to outline what will happen if previously unknown heritage resources, particularly archaeological resources, are encountered during project construction or operation.

6.8.3 Chance Find Procedure

Should a heritage site or archaeological site be uncovered or discovered during the construction phase of the project, the actions detailed in **Table 6.26** will be applied.

Table 6.26 – Chance finds procedure actions and implementation schedule

Action	Responsibility
- If a heritage site or archaeological site is uncovered or discovered during the construction, work will be stopped immediately and ECO or his field representative must be notified of the discovery;	Person identifying archaeological or heritage material
- Identify the site with flag tape and determine GPS position if possible; - Determine whether work can proceed without damage to findings; - Determine and mark exclusion boundary. - Assign qualified specialist (archaeologist) for site assessment of the chance find.	C-HSEM
- Inspect site and assess scientific and cultural importance of the findings; - If findings are of scientific or cultural importance report findings to the National Directorate Cultural Heritage; - Define appropriate mitigation measures, depending on relevance of findings. These can include protection in site, excavation and them removal or simple removal from site, as may be relevant; - Request written permission from National Directorate Cultural Heritage to remove findings from work area, or to implement other relevant mitigation measures; - Recovery, packaging and labelling of findings for transfer to museum, if relevant.	Qualified Specialist (Archaeologist)

6.9 Emergency Response Program

6.9.1 Objectives

The main objective of the **Emergency Response Program** (ERP) is the systemization of the procedures to be adopted, so as to minimize the effects of possible accidents or incidents that could occur, thus managing available resources in the most adequate manner. This document is considered an essential prevention tool, having in mind:

- The identification of potential emergency situations that may arise from the Project's construction and operation activities;
- The communication process of the emergency in case of occurrence;
- The creation of Risk Scenarios; and
- Action procedures in case of accidents or emergencies;
- Reporting on emergencies: causal analysis, actions taken and lessons and preventive measures taken as follow up including dissemination.

This section provides guidelines, to guide the Contractor to further develop a detailed **Emergency Response Plan** (ERP) for the construction phase, to identify and account for all Project related risks. The Contractor will submit this ERP for Proponent approval. In what regards the operational phase, further to the procedures listed below, Proponent will also apply the already existing emergency response protocols and procedures for high voltage transmission lines and substations.

6.9.2 Emergency Communication Process

An emergency can be detected by any Project worker or community member. After the emergency has been detected, the C-HSEM will be immediately notified, either by emergency telephone or radio. Following response, the C-HSEM will register any detected emergency in a register and report it to project management, for further analysis and follow-up.

6.9.2.1 Emergency detection by workers

Workers will receive basic and mandatory training in the inspection and supervision of the systems they operate, in order to be able to detect any anomalies, such as possible spills, traces of fire, emergency prevention procedures, etc. The immediate notification of an emergency will be made by telephone and emergency radio of the enterprise.

6.9.2.2 Emergency detection by community members

Further to workers, the ERP will also allow for the detection of emergency by community members. To the effect, communities will be informed, through the communication plan included in the ERP, of potential emergency risks and of what to do and how to communicate to contractor and Proponent. Emergency contact numbers will be disclosed to the communities, in particular to the local leaderships.

6.9.2.3 Communication systems

The efficient management of an incident depends on good communications. Thus, the Project will ensure the following systems:

- VHF digital radios;
- Cell phones.

A list of cell phone numbers must be prepared, including relevant emergency contacts. These lists will be kept next to all telephones on the Project facilities, in order to assist in case of need and be shared with community leaders.

6.9.3 Emergency Scenarios

This chapter considers the response procedures to the more common emergency scenarios, in order to identify the intervening persons and define the respective specific action patterns in case an emergency occurs. These actions enable an efficient combat of the accident and minimize the respective consequences, to ensure the physical integrity of all persons working in the site, environmental protection, safety of goods and the functioning of equipment, and avoidance or minimization of any injury or damage to communities and their assets.

Thus, the following response procedures are presented:

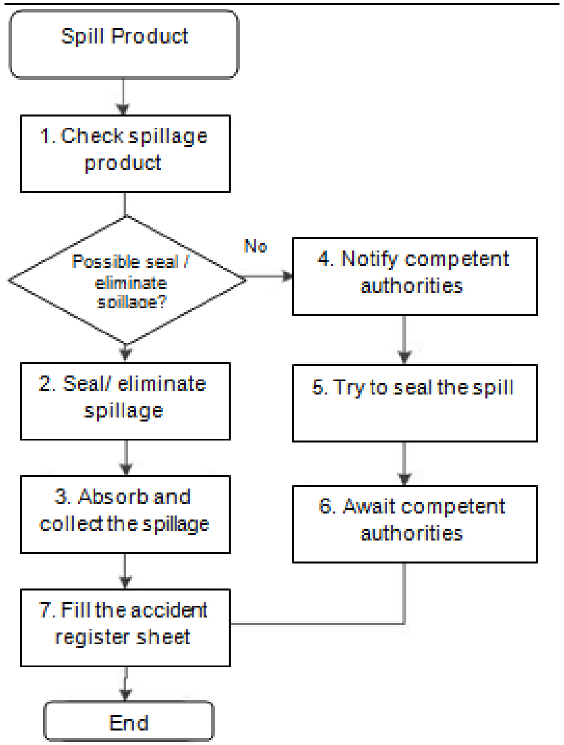
- Procedure for the spillage of hazardous products;
- Procedure to Fight Fires;
- Procedure to Assist Victims.

The Contractor will identify any additional emergency scenarios that might apply to their activities, and include them in the ERP, as needed.

6.9.3.1 Procedure for the Spillage of Hazardous Products

Various hazardous products, such as oils and lubricants, will be used during the construction and operational activities. The following emergency procedure will be followed in the event of spillage of hazardous products and substances. The application of the following procedures requires the ready availability of spill kits in the construction camps and fronts, during construction, and in the substations, during operation.

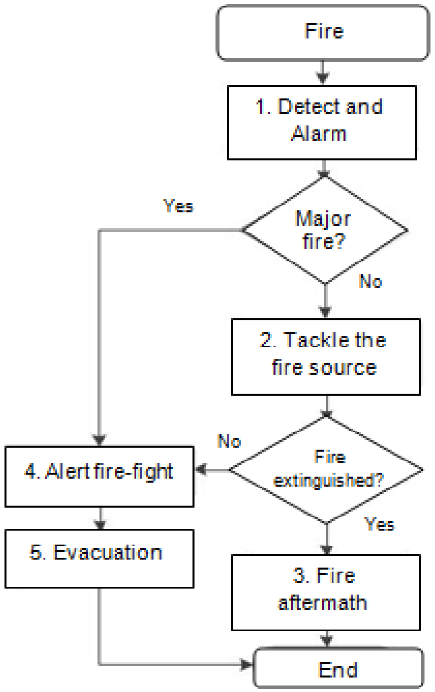
Table 6.27 – Procedure for spillages

Flow diagram	Description	Responsibilities
	1. Check and confirm which product is spilling If necessary, remove ignition sources, inflammable and oxidizing materials	Any employee
	2. Seal or eliminate the spill, always applying the necessary safety measures If necessary, isolate and sign location and prohibit access	Any employee
	3. Absorb and collect the spilled product to an appropriate container in order to eliminate it: - If a spill occurs on a permeable surface (e.g. soil), a spill kit must be used to immediately reduce the potential spread of the spill; - If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent materials. Proceed according to the product's safety data sheet and intervention card, and use the measures recommended for cleaning the spill (even in the case of small spills)	Any employee
	4. Notify the competent authorities, informing on the exact location of the accident and which product was spilled	C-HSEM or Site Director / Team leader
	5. Try to seal the spill using the available means	Any employee
	6. Await competent authorities' actions, don't abandon the location and adopt a preventive attitude regarding the possible effects from the spill	C-HSEM or Site Director / Team leader
	7. Fill out the accident register sheet.	C-HSEM

6.9.3.2 Firefighting procedures

This procedure applies to all situations in which a fire is detected in the site, as well as to accidents and incidents that could lead to the breakout of fire, taking into consideration the nature of the constructive conditions or maintenance work, or even the actions of external agent.

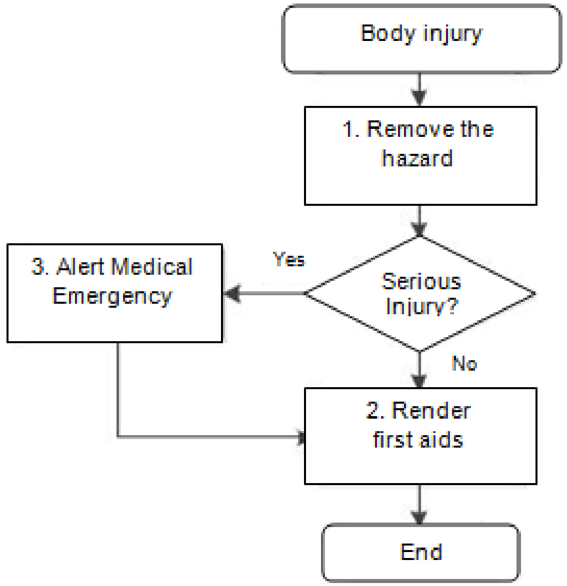
Table 6.28 – Firefighting procedures

Flow diagram	Description	Responsibilities
	1. Once fire is detected disseminate alarm system Suspend activities	Any employee
	2. Tackle the fire source immediately with an adequate fire extinguisher	Any employee
	3. Take care of the aftermath of the fire	Any employee
	4. Alert the fire-fighters, informing them of the fire's location	C-HSEM or Site Director / Team leader
	5. Evacuate the workers, in safety, to meeting point.	Site Director / Team leader

6.9.3.3 Procedure for assisting victims

This procedure applies to any situation involving victims during the construction activities, be they workers or other people. Thus, it applies to various risk situations, such as confined explosions, fires, falling over equipment, traffic accidents, etc.

Table 6.29 – Procedure for assisting victims

<table>
<tr><th>Flow diagram</th><th>Description</th><th>Responsibilities</th></tr>
<tr><td rowspan="3">
</td><td>1. Immediately suspend the operation
Remove the hazardous element away from the victim or vice-versa, to avoid a new accident or aggravation of victim's condition</td><td>Any employee</td></tr>
<tr><td>2. Render first aid, checking if there is:
- Asphyxia
- Shock
- Haemorrhage
- Poisoning
Calm the victim by talking with him/her;
Control breathing and constantly verify the pulse;</td><td>First aider</td></tr>
<tr><td>3. Alert Medical Emergency, informing them calmly about the location of the accident, number and condition of the victims</td><td>Site Director / Team leader</td></tr>
</table>

7 Environmental Monitoring and Reporting

This section outlines the environmental assessment and improvement processes associated with this EMP which constitutes environmental monitoring, inspections, audits, corrective action, and improvement. These activities form an integral part of implementing the EMP, and are necessary to:

- verify and document the implementation of the mitigation measures identified in the EMP;
- monitor and document the effectiveness of the mitigation measures and assessed impacts;
- demonstrate compliance with applicable legal and other requirements;
- evaluate the effectiveness of the EMP; and
- highlight areas in need of improvement to drive continuous improvement for all EMP activities.

This section also outlines the reporting and notification associated with implementation of the EMP. During construction, the EPC Contractor will be responsible to ensure that internal reporting and notifications are carried out as per EMP/HSE Management Plan. External reporting to Authorities and stakeholders will managed and carried out by the Project Proponent. In the operation phase the Monitoring and Reporting will be EDM’s responsibility.

7.1 Environmental Monitoring

Environmental monitoring during construction and operation phase will be carried out in different layers of entities through:

- Site inspection programs by EPC Contractors / Subcontractors
- Audit programs, coordinated by project proponent, which include independent audits by independent external auditors.
- Sampling and measurements, coordinated by the project proponent or EPC contractors / EDM to monitor the conditions of site and define effectiveness of implemented mitigation measures. Depending on the object of monitoring, this may involve site survey with sample collections for laboratory or in-situ measurements, and/or stakeholder engagement to gather factual data. Scope of this survey will be defined based on the operational scope and applicable regulations and permits.

7.1.1 Inspection

Scope of environmental inspection is governed by the scope of contract of each EPC contractor / subcontractor. EPC Contractor/subcontractor is responsible to inspect its construction site on regular basis to ensure that mitigation measures are implemented as per EIA/EMP documents. The EPC Contractor will be required to implement field-based inspection programmes that demonstrate their implementation of – and, in some instances, the effectiveness of the mitigation measures. The Project Proponents will, in turn, inspect the contractors' documents to verify that they have implemented the required programs.

Inspection programs should cover wider scope, not only environment or social matters but also occupational health and safety, housekeeping, and compliance issues.

Inspection programs, findings, and status of close-out shall be documented and reported to contractor site management.

7.1.2 Auditing

Auditing is considered to be a more structured approach to inspect and verify the site conditions and compliance with mitigation measures described in the EMP. The Project Proponent will organise for programmed audits to EPC contractors and/or subcontractors throughout the Project's construction. Also, EDM will organize independent audits by an independent external consultant throughout the project's operations. This may include environment certification audits by certifying institutions.

For internal audits, they will be carried out internally by the Project Proponents and by the Project Lenders' Environmental and Social Consultants (LESC) to ensure compliance with EMP requirements, regulatory requirements and compliance with management systems, standards, policies, and procedures.

Where applicable, periodic environmental audits by Government's Authorities are required to be established by the Regulation on Environmental Audit Process, Decree 25/2011 of June 15th. The Audit report shall be submitted to MTA (AQUA).

Audits will be performed by qualified and trained staff, and results will be described in a report that will determine the severity of non-compliances, as well as the recommended remedial action.

Regular checks and audits will be undertaken by the project proponent, who carries out periodic audits of operation contractors / subcontractors and will be responsible for monitoring, surveillance and decision-making on all operational Health, Safety and Environment (HSE) matters. In addition to assessing operational aspects and monitoring, checks should assess compliance with agreed objectives and targets, and the effectiveness of the EMP and its implementation. The EMP will therefore be subject to ongoing review and update to ensure that it remains appropriate to all aspects of the project.

All findings should be reviewed by the relevant project team and, where corrective actions are deemed necessary, specific actions (with designated responsibility and timing) should be developed and aimed at achieving continuous improvement in performance. These shall be documented.

Regular feedback meetings should be scheduled with stakeholders to provide feedback on performance and results of monitoring activities for the duration of the proposed project.

7.1.3 Site Survey and Measurements

Measurements involve mobilization of trained personnel and equipment to collect samples from strategic locations and analysis the samples for pre-defined parameters to validate the effectiveness of mitigation measures. Site survey and measurements may involve stakeholder engagement to collect factual site data on social matters.

7.2 Corrective Actions and Improvement

Tracking of corrective actions is one of the tools to facilitate progress and continual improvements. As part of the EMP, the Project will implement a formal environmental and social tracking system that will include the details of all environmental and social non-conformances, identify the corrective actions required, assign actions/timings to responsible parties, and indicate the status of the actions required. This will ensure a coordinated approach between the Project and its contractors, and drive changes for continuous improvement. Status of corrective action close-out will be reviewed and reported to the project proponent and Contractor's project management on monthly basis during monthly HSE management meeting.

7.3 Incident Notification and Reporting

Any environmental or social incident must be investigated and immediately reported to the project proponent. Depending on the severity of incident, investigation or board of enquiry team will be mobilized to investigate the root cause of the incidents and propose corrective actions.

the project proponent will ensure that all environmental and social incidents are appropriately documented that the relevant parties are notified, and that reporting requirements around the incident are met. Environmental and social incidents may include spills of hazardous materials into environment, community incidents, or major non-compliance to regulations or permit conditions.

7.4 Statutory Notifications and Reporting

The project proponent, EPC contractors and EDM will comply with all statutory notification and reporting requirements. This section will be developed based on the applicable regulatory requirements and permits which will elaborate:

- Scope of reporting;
- Schedule of reporting;
- To whom the report will be distributed and in what format;
- Report archive requirement.

Annex 2: ESIA Addendum for MTA

Environmental and Social impact Assessment for the 66 kV Power Evacuation Line from Namaacha Wind Power Project to Boane Substation

Environmental and Social Impact Assessment Addendum

Prepared for:

ELECTRICIDADE DE MOÇAMBIQUE, E.P.

Electricidade de Moçambique, E.P.

Prepared by:

CONSULTEC

ORGULHO MOÇAMBICANO MADE IN MOZAMBIQUE

Consultec – Consultores Associados, Lda

September 2024

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE 66 KV POWER EVACUATION LINE FROM NAMAACHA WIND POWER PROJECT TO BOANE SUBSTATION

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT ADDENDUM

EDM – Electricidade de Moçambique, E.P.

Av. Eduardo Mondlane Nr.1390, 5º andar,

Maputo, Moçambique

Olga Utchavo | olga.utchavo@edm.co.mz

Consultec - Consultores Associados, Lda.
Rua Tenente-General Oswaldo Tazama, No. 169
Maputo, Moçambique
Telephone: +258 21 491 555
Fax: +258 21 491 578
Contact person: Tiago Dray, Director
E-mail: tdray@consultec.co.mz

September 2024

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Executive Summary

Overview

Since developing the ESIA and Resettlement Action Plan (RAP) for the transmission line associated with the Namaacha Wind Energy Facility, several sensitivities/ constraints were identified along the original transmission line route which put the Project's desired schedule in jeopardy and/ or may pose a critical flaw to the design. An alternatives assessment, including a desk-based evaluation and physical reconnaissance, was conducted to evaluate an optimized route that minimizes adverse impacts and risks.

This ESIA Addendum describes this alternatives assessment and evaluates how the proposed route compares to the original route assessed in the ESIA.

Alternatives Assessment

In August 2024 a workshop was held between representatives from EDM, Globeleq, Source Energia and Consultec to discuss the identified constraints along the originally proposed transmission line route and potential alternative routes. From this workshop, several potential alternative routes were identified. A field survey was then conducted on the potential alternative routes to verify the environmental, social and technical sensitivities. Following this exercise, the relative environmental and social sensitivities along each potential route were assessed and an alternatives assessment was conducted comparing to the originally assessed route in the ESIA and RAP. Following this assessment, an optimized alternative route was then identified which is being taken forward as the proposed alternative route.

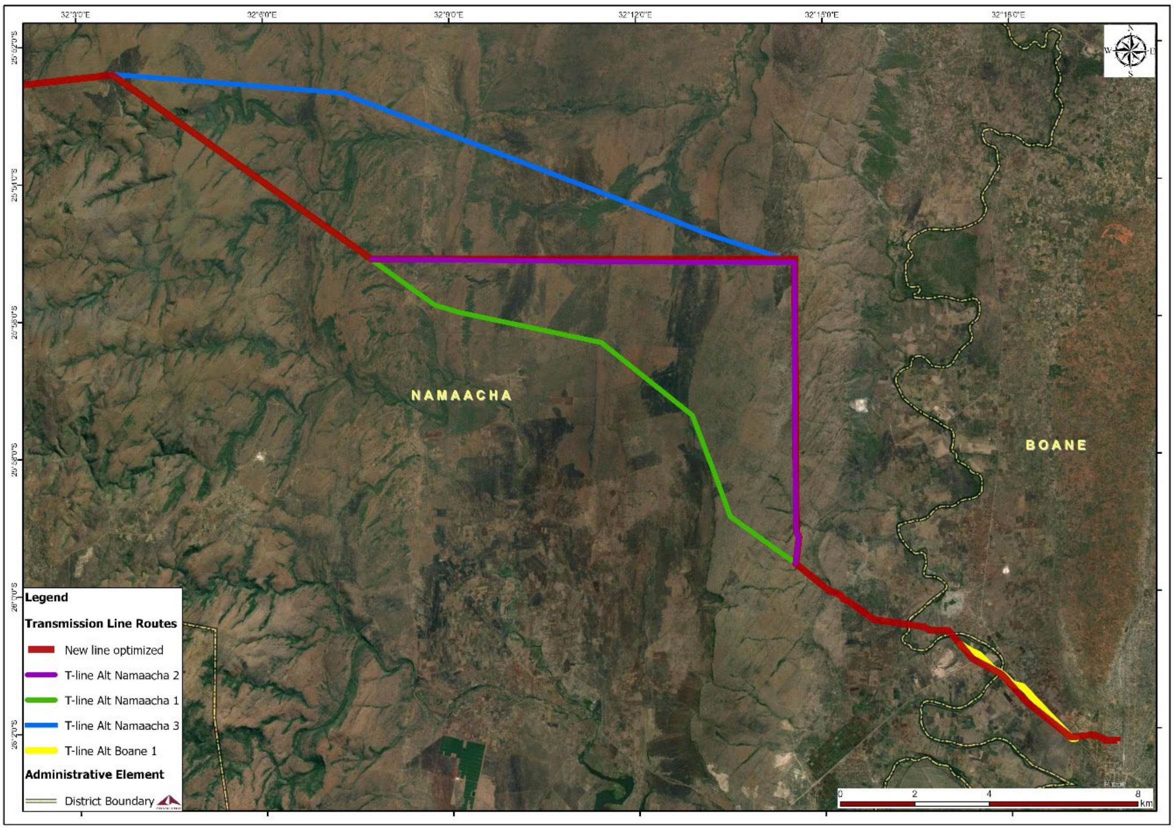


Figure 1: Transmission line alternatives considered

Project Description

Following the alternatives assessment, an optimized route was proposed that best avoids identified environmental and social sensitives.

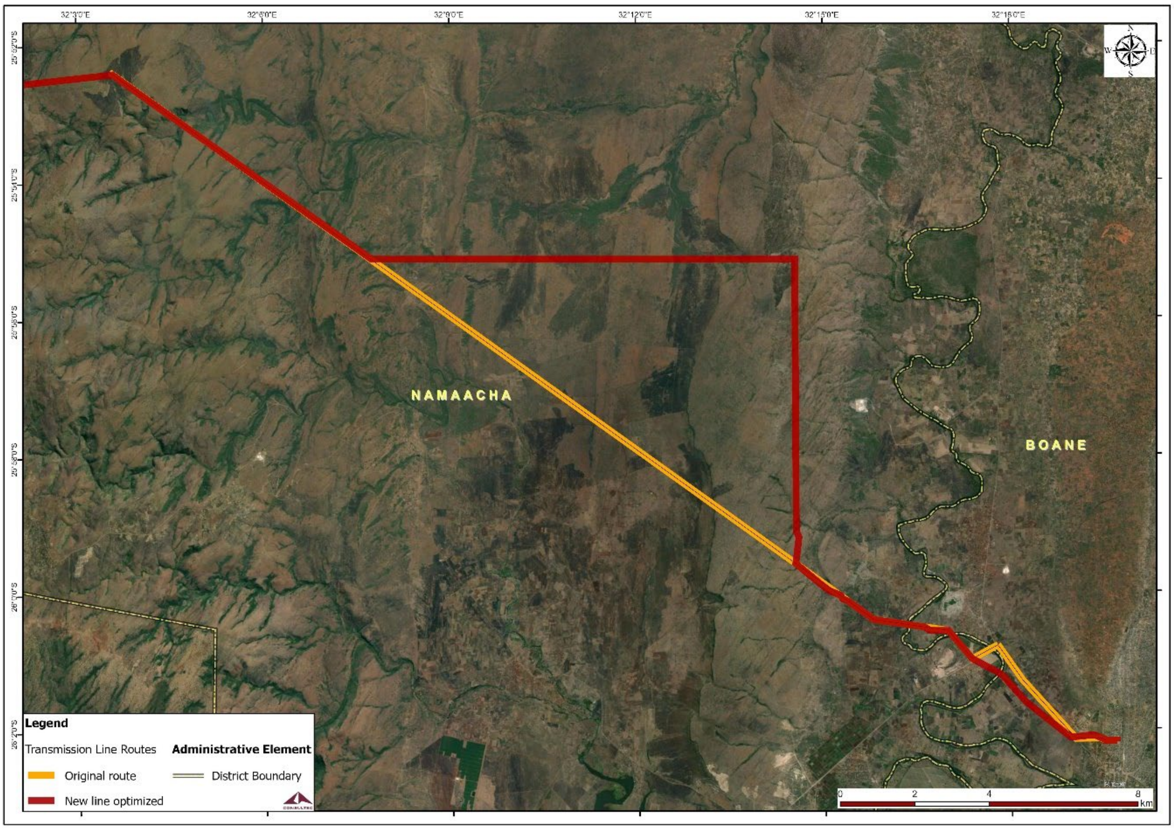


Figure 2: Proposed variation to previously assessed transmission line route

As in the original route, the section coming out of the Boane substation will be a buried cable. This revised route adds approximately ~29 m of buried cable to the Boane end of the route (now 339 m in total). For the next 5.37 km the route the transmission line will consist of monopole towers

The Project intends to follow the same approach as described in the ESIA for land take by applying a general 50 m wide corridor (25 m to either side of the line) for compensation and resettlement purposes. Where the two 66 kV lines will run parallel to each other (i.e., now the first 32.7 km after leaving the Namaacha wind energy facility site) the protection zone will be a 70 m wide corridor (25 m to either site plus a 20 m separation distance). For the rest of the overhead transmission line route (5.37 km in total) the transmission line will be installed on monopole towers (double circuit overhead line) and this corridor would be 50 m (25 m to each side). For the last 339 m on the approach to the Boane substation the line will be buried, and as such, only a corridor of 2 m will be required for this section of the route.

No other changes to the Project description presented in the original ESIA are proposed.

Area of Influence

The Direct Area of Influence has changed to reflect the revised route as shown in Figure 3 below.

The Indirect Area of Influence has not changed.

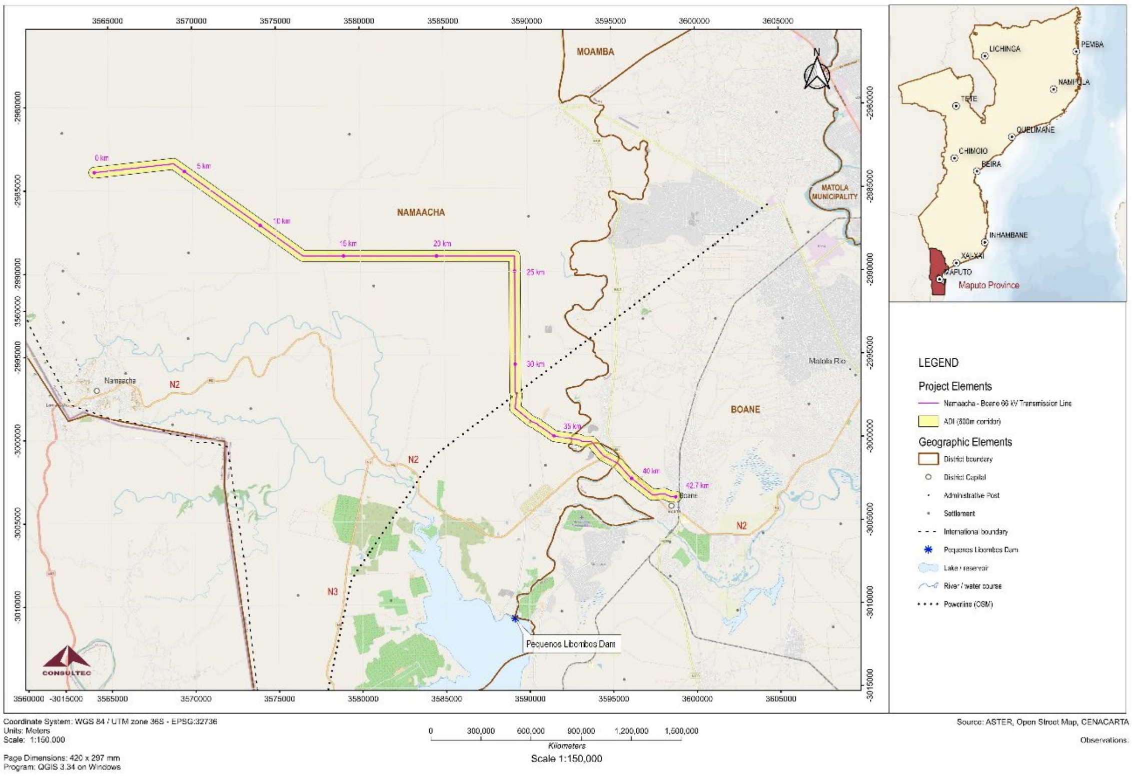


Figure 3: Revised Area of Direct Influence

Legal and Regulatory Framework

The revised route does not trigger applicability of any new regulations or international standards. It is important to note that the original route did not fully align with national regulations regarding the minimum required set back distance from national roads, but the new route does (Land Law, Law No. 19/97, dated October 1st, and its Regulation, Decree 66/98, dated December 8th).

Impact Assessment Approach and Methodology

The same methodology is considered when evaluating the relative impacts of the revised route.

Baseline Assessment

Baseline conditions for the optimized alternative route are largely similar to those presented in the ESIA. This was verified through desk-based assessment and a walkover of most of the new route with both environmental and social specialists present. The key difference is in the Project Affected People (PAPs) for physical and economic resettlement. The optimized route will result in an overall reduction in the number of PAPs (currently estimated at ~30 less PAPs). A detailed census of the newly affected areas will be conducted to determine the exact PAP numbers and the assets for compensation. No other detailed baseline surveys are proposed as a result of the new route.

Impact Assessment

There will be no change in significance for any of the impacts assessed in the original ESIA. Because the Project has applied the mitigation hierarchy to avoid identified environmental and social sensitivities wherever feasible, no new mitigation measures are proposed for the optimized route.

Environmental and Social Management

The only proposed change to the Environmental Management Plan previously approved for the transmission line is in the Project Description section to reflect the new route. A revised copy of this document is attached.

1 Introduction

1.1 Context

Consultec has been selected by Globeleq and Source Energia, as the Transmission Line Project implementation partner and on behalf of the Project Proponent – Electricidade de Moçambique (EDM) – as the Environmental Consultant, responsible for the development of environmental and social impact assessment (ESIA) and resettlement related studies covering the 66 kV transmission line.

Since developing the ESIA and Resettlement Action Plan (RAP) for the transmission line associated with the Namaacha Wind Energy Facility, several sensitivities/ constraints were identified along the original transmission line route which put the Project's desired schedule in jeopardy and/ or may pose a critical flaw to the design. To address this, the Project Proponents are now evaluating several alternatives T-line deviations.

To inform decision making, the Project Proponents first held a workshop to discuss the identified constraints and map out several potential alternative routes that would avoid these. Following the workshop, a field trip was held to ground-truth the environmental and social sensitivities of each potential route, as well as any technical consideration relevant.

In this context, EDM contracted Consultec to compile this Addendum to evaluate the relative environmental and social impacts of the various routes in comparison to the originally assessed route in the ESIA and RAP and present a preferred route that has been optimised to avoid/minimise crossing key identified sensitivities.

The alternatives evaluated in this report are sumamrised in Figure 1-1 below.

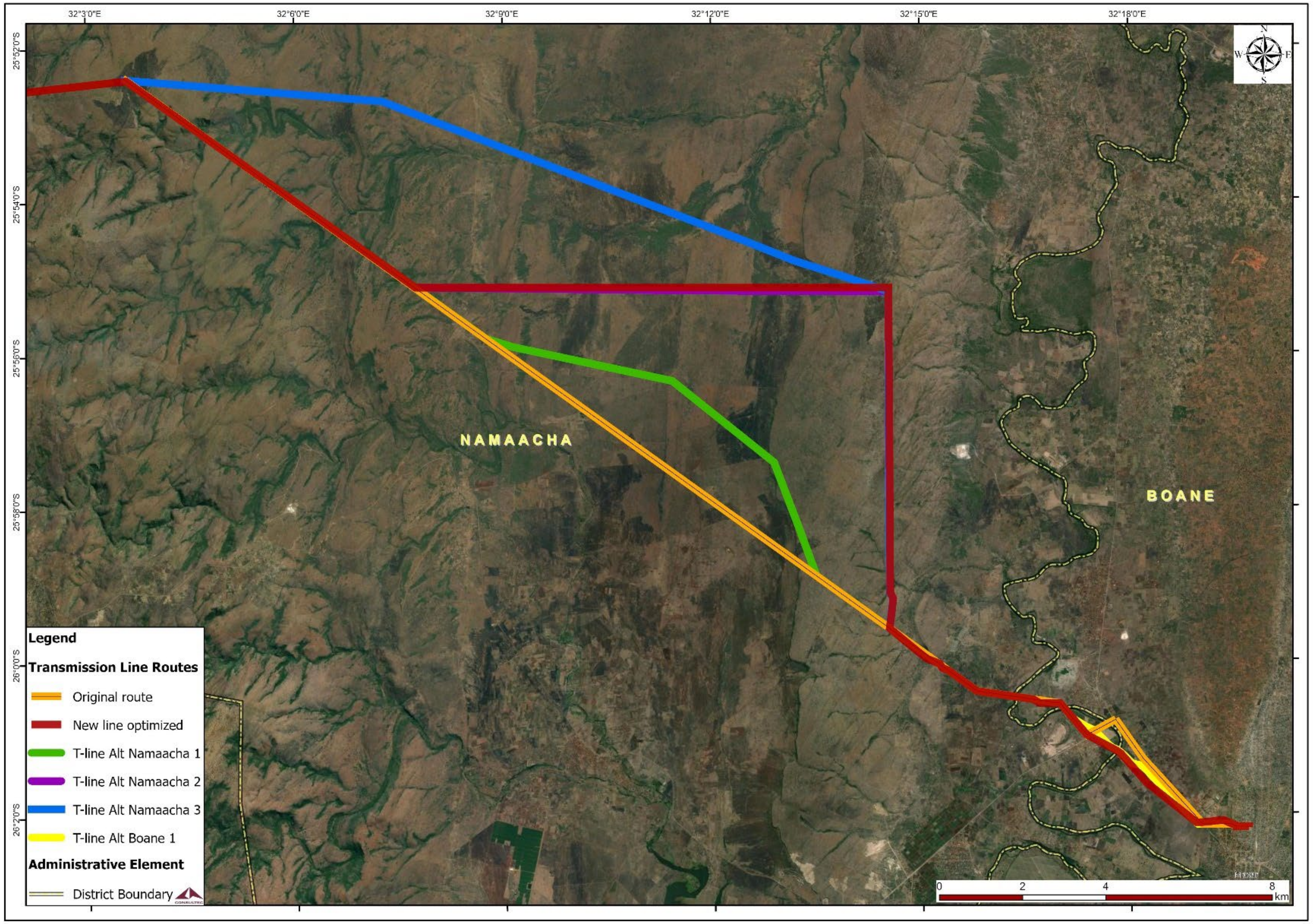


Figure 1-1 – Transmission Line alternative routes

1.2 Project Proponent

The Project Proponent is **EDM – Electricidade de Moçambique E.P.**. Contact details are provided in the following table.

Table 1-1 – Proponent Contacts

ELECTRICIDADE DE MOÇAMBIQUE, E.P.	Address	Maputo, Avenida Eduardo Mondlane no. 1390, 5º andar
	Contact person	Olga Utchavo | olga.utchavo@edm.co.mz

1.3 Environmental Consultant

Consultec – Consultores Associados, Lda. (Consultec) was appointed by the Promoters to undertake the EIA process on their behalf. Consultec is a Mozambican consulting company, that provides engineering, environmental, and social consulting services. Consultec is registered with MTA as an EIA Consultant (Certificate no. 42/2019), since 2002.

Consultec's contacts regarding this study are presented in the table below.

Table 1-2 – Consultec Contacts

	EIA Consultant	Consultec – Consultores Associados, Lda
CONSULTEC Consultores Associados, Lda	Address	Rua Tenente General Oswaldo Tazama, No. 169 Maputo, Moçambique
	Person of contact	Nuno Silva; Tiago Dray
	Contact Number	+ 258 21 491 555
	E-mail	nsilva@consultec.co.mz; tdray@consultec.co.mz;

1.4 Addendum Structure

Table 1-3 below presents the structure of the Addendum, listing the contents included in each chapter.

Table 1-3 – Summary of the Addendum Contents

Chapter	Content
Chapter 1	**Introduction** Describes the context, objectives and structure of the Addendum.
Chapter 2	**Desk-Based Evaluation** Details the evaluation to identified constraints along the originally proposed transmission line route and potential alternative routes.
Chapter 3	**Field Verification Methodology** Presents the fieldwork team and the methodology for fieldwork to identify for T-Line alternative routes and sensitivities.

Chapter	Content
Chapter 4	**Fieldwork Findings** Details the fieldwork results on the current use of alternative routes for the Transmission Line Project.
Chapter 5	**Summary** Presents the key differences between the original route and the optimized alternative route.

2 Desk-based Evaluation

On August 11, 2024 a virtual workshop was held between representatives from Globeleq, Source Energia, EDM and Consultec to discuss the identified constraints along the originally proposed transmission line route and potential alternative routes. For the purposes of this workshop the transmission line was divided into four sections for consideration:

- the area crossing the active military land (in Boane District);
- the area across the road from the military land (in Boane District);
- the area between mining concessions in Mabanja (near border of Boane and Namaacha Districts); and
- the area near the mining concessions and other sensitivities to the north (in Namaacha District).

Table 2-1 – T-Line alternative routes and sensitivities

Section	Alternative Routes Considered	Summary
1 - Section through Active Military Land (ESFA / Military Base Servitude)	To be determined following walkover	Consultec performed a walkover of this area previously but was not allowed by the military onsite to conduct a formal census. Anecdotal information from that walkover indicates that the route passes through machambas (perhaps 2 PAPs associated with the military), but this was not documented. Consultec flagged that this route does not actually fully follow the previous EDM transmission line (as intended by the Project). The route also appears to pass through a military structure and within 18 m of a house (also associated with the military).
2 - Alternative Route across the Road from Military Area (ESFA / Military Base Servitude)	**Boane Option 1** (alternative length is 4.1 km vs 4.58 km for the original route, ~130 m from original route most of the way)	This route change is proposed to avoid the PAPs currently farming on military land who are not associated with the military and whom the military does not want the Project to compensate. It is also proposed as a way to ensure the Project's compliance with nation legislation requiring a minimum 30 m set-back distance from the national road.
3 - Alternative Route between Mining Concessions in Mabanja	**Mabanja Option 1** (10.4 km for alternative vs 9.55 km for original) - *This option deviates from original route by as much as 1.6 km.* **Mabanja Option 2** (19.5 km for alternative vs 14.03 km for original)	During the workshop we also identified two micro alignment alternatives to the north of the river. These options are being considered to smooth the route (i.e. avoid unnecessary 90 degree turns) or to avoid a mining concession.
4 - Alternative Route Near Mining Concessions and Other Sensitivities to North	**Namaacha Option 1** (10.4 km for alternative vs 9.55 km for original) - *This option deviates from original route by as much as 1.6 km.* **Namaacha Option 2** (19.5 km for alternative vs 14.03 km for original) **Namaacha Option 3** (27.33 km for alternative vs 22.48 km for original) - *Alternatives 2 & 3 deviate from original route by as much as 6.5 km*	During the workshop the team reviewed the map of mining concessions and mining licenses for the area, and there is no route to fully avoid all of them. Alternatives to avoid the currently affected mining concessions by going to the east or southwest would result in extensive additional resettlement and were thrown out from additional evaluation on that basis. EDM reiterated their stance that the Project should avoid crossing the mining concessions as much as possible (especially Riolitos given past dealings) and avoid crossing the President's and Minister of Defence's farms.

Section	Alternative Routes Considered	Summary
		Three routes were taken forward for more detailed consideration: - the minimal deviation to avoid the active military area + VIP landowners; - the shortest deviation that would fully avoid Riolitos mining concession + active military area + VIP land owners; and - the route that fully avoids Riolitos mining concession + active military area + VIP land owners and results in the shortest overall T-line.

3 Field Verification Methodology

The fieldwork was conducted over 5 business days, from July 26 to August 2, 2024 and was carried out by a multidisciplinary team, as described in the table below. Note that not all participants were present for each day of the field work, although there was always at least one environmental, one social and one technical representative present.

Table 3-1 – Composition of the fieldwork team

Entity	Name	Role
Globeleq	Marli Schoeman	Biodiversity and environmental specialist
	Tim Strange	Senior development engineer
Source Energia	Cândida Macurra	ESG development and government relations
	Mathikizana Matos	Senior engineer for business and project development
	Filipe Macumbe	Electrical engineering specialist
EDM	Julião Matsinhe	Electrical engineering specialist
	Leopoldo Khadyhale	Electrical engineering specialist
Consultec	Julieta Jetimane	Forestry engineer and socioeconomics specialist
	Tania Diniz	Biodiversity and environmental specialist

In addition to the team mentioned above, the local structure of the communities of Gumbe (2), Bacabaca (2), and Mabanja (1) provided support and guidance regarding the access routes and to reach more remote locations. Overall, the fieldwork was conducted along the desktop defined alternatives for the T-Line sections in Namaacha and Boane, as presented in Table 3-2 and illustrated in Figure 3-1.

For each of the alternatives, the objective was to identify and register the potential environmental and social sensitivities along the routes, as well as access restrictions or areas with technical difficulties.

In addition to the general objective, for the military base section the team also sought to confirm the actual route of the previous transmission line (deactivated) and define a viable route that would avoid identified sensitivities and be sufficient distance from other transmission line crossing the military base.

The alternative routes mapped during initial workshop were considered indicative and the walkover team used these to establish a potential corridor to assess potential sensitivities. If an area was crossed that had significant sensitivities identified, the team widened their evaluation corridor to look at ways to avoid any such sensitivities. The assessment team took photographs of the route (georeferenced) and marked any identified sensitivities on the map. Of particular importance was identifying any machambas, physical structures, areas of cultural significance, and areas of particular biodiversity sensitivity. Any available intel on the indicative number of PAPs/PAHs was also considered.

The proposed lines were subjected to the walkover, for which the team used the available access routes to travel by car or walk in each of the sections, whenever the land conditions allowed and noting the limited timeframe to explore the areas, as is presented in Table 3-2. and is illustrated in Figure 3-1.

Table 3-2 – Walkover sections and distances

Section	Alternative Route (T-Line Alt)	Total area (desktop estimate – m)	Area Covered* by Car (m)	Area Covered through Walk (m)	Total Area Covered (m)	Area Covered (%)	Number of Days
1	Active Military Land	821	-	821	821	100%	0.5
2	Boane Option 1	4,103	3,107	996	4,103	100%	1.5
3	Mabanja Option 1	1,357	-	1,296	1,296	96%	0.5
	Mabanja Option 2	297	-	297	297	100%	
4	Namaacha Option 1	10,442	2,056	3,118	5,174	50%	0.5
	Namaacha Option 2	19,459	10,506	2,779	13,285	68%	1
	Namaacha Option 3	27,330	8,039	4,991	13,030	48%	1

*Note that all the distances presented are estimates of the actual distances covered.

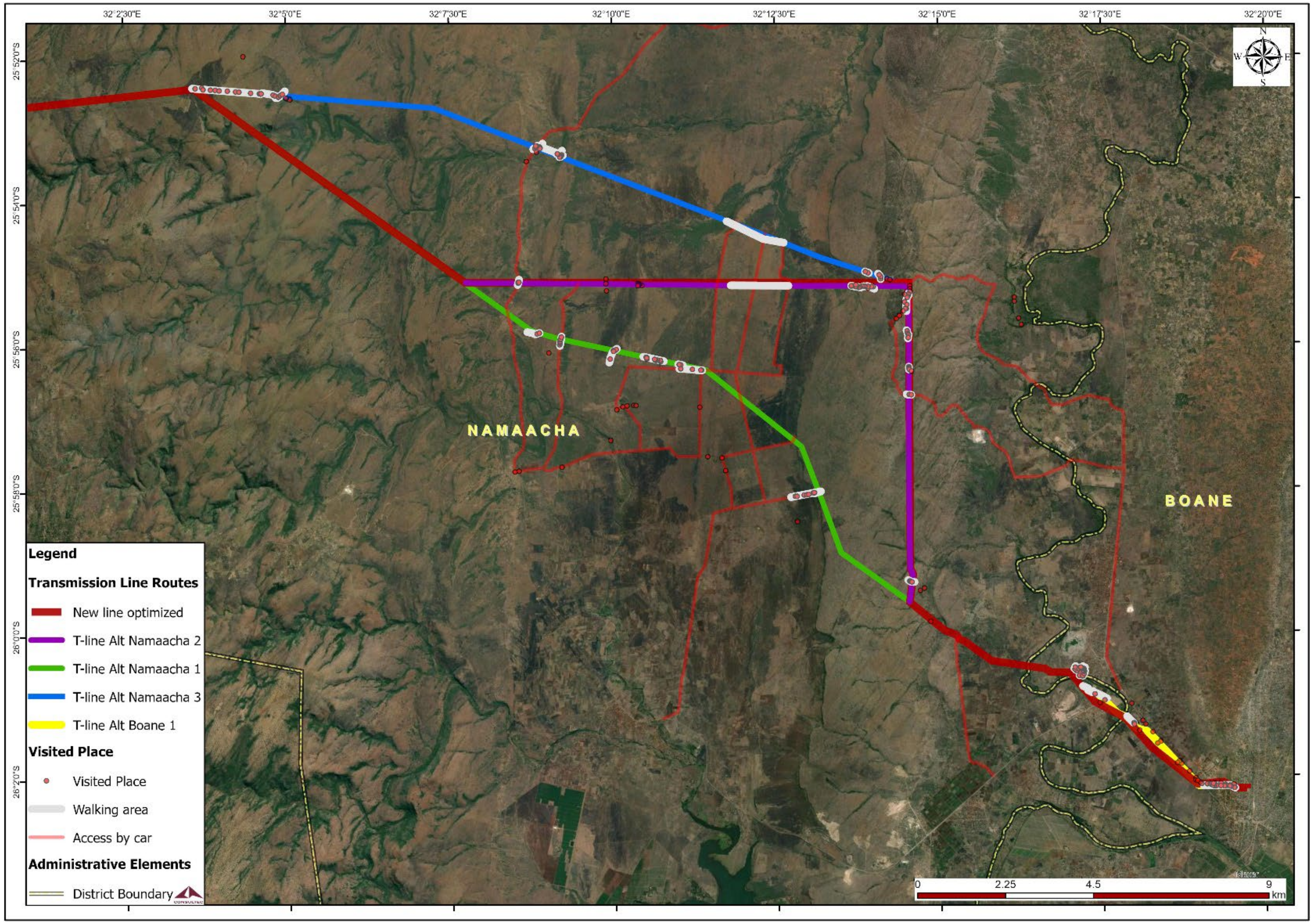


Figure 3-1 – Walkover sections along the T-line Alternative routes

4 Fieldwork Findings

The following chapter provides a detailed description of the results from the fieldwork aimed at identifying the current uses of the alternative routes for the Transmission Line Project.

4.1 Route through Active Military Land (ESFA)

4.1.1 Key Sensitivities Noted

- Other EDM transmission lines
- Sacred tree
- Military structures
- Military parade yard
- Military housing
- Military orchard
- Previous military machambas (no longer present)

4.1.2 Summary of Field Observations

The visit to the military base (*Escola de Sargentos das Forças Armadas - ESFA*) was guided by two representatives from ESFA (Lieutenant colonel and a soldier). During the visit to the military base, the team was not allowed to take any photographs of the existing infrastructure within the military area.

The team was able to walk through the entire current transmission line alignment, as well as the deactivated line and the proposed line. It was confirmed that the originally proposed route does not follow the deactivated line as thought and so an alternative route will be required through the military area. It was also possible to identify an additional medium-voltage active transmission line that runs from the village of Boane towards the substation transformer located inside the military base.

The team was formally informed that there are no machambas within the military base, as the Colonel confirmed that any previous machambas belonged to their colleagues that reside in the military houses near the proposed T-line alignment and are now not being used. The team was able to note residual evidence of two machambas that had been active during previous visits to the area that were now destroyed. Based on the military representative's assertion that there are no active machambas present, as well as the visual evidence confirming this, no compensation under the RAP is expected.

To the south of the transmission line housing is present for military personnel. The original route came within 18 m of one of these houses, but it is possible to avoid these structures with an optimised alternative route.

In terms of infrastructure, there were four (4) infrastructure identified in the section of the line that is closest to National Road 2, impacted by the original alignment buffer:

- A fence/wall with a gate;
- A substation transformer (*Poste de Transformação* – PT);
- A generator house; and
- A support house.

Apart from the fence/wall and gate, the other infrastructure is managed simultaneously by ESFA and EDM, and any relocation activities would require the approval and support of EDM.

There is an area referred to as the "military parade" (*parada militar*) where the military representatives noted that no poles should be installed, but cables would be allowed to cross.

In the section of the line closest to National Road 2, the team identified a sacred tree, a Chanfuta (*Afzelia quanzensis*), which was used by President Samora Machel for strategic planning during his mandate, as was stated by the military representatives. It was indicated by military personnel that while limbs from this tree could be trimmed, this tree cannot be removed or damaged as a result of the transmission line.

Other various trees were identified within the military area, including a lemon orchard, but according to the military representatives these are ornamental in nature and military personnel's livelihoods are not dependent on these trees. On this basis no compensation would be required under the transmission line RAP.

Figure 4-1 illustrates the sensitivities identified within the military base, except for the infrastructures.

Area near military houses

Current and deactivated transmission lines

Military base fence/wall

Overlap area of proposed and active T-line (near infrastructures)

Chanfuta – sacred tree

Lemon orchard

Medium-voltage active transmission line

Figure 4-1 – Sensitivities within the military base

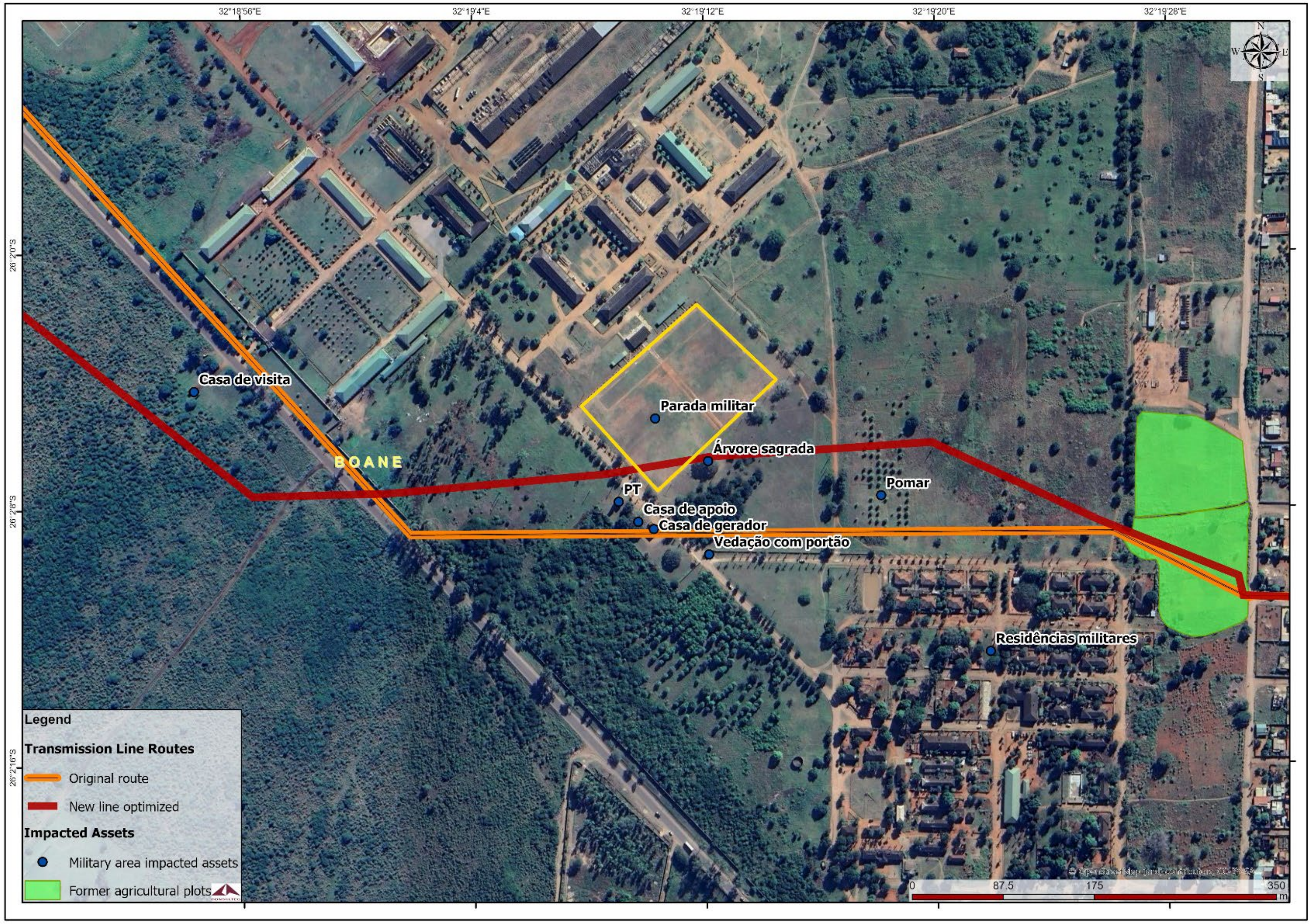


Figure 4-2 – Sensitivities identified within the military base

4.1.3 Conclusions

The site visit confirmed that the previously proposed route through the military base did not follow the decommissioned transmission line as intended. The previous alignment also impacted a number of the military structures identified and came within 18 m of military housing. After observing the sensitivities within the military base, an optimised route was identified that avoids these sensitivities. This figure below shows the originally route (in orange) and the proposed alternative. Note that the proposed alternative through the military base will include an overhead line section and a short underground cable section. The alternative route within the military base deviates from the original route by 0 – 83 m.

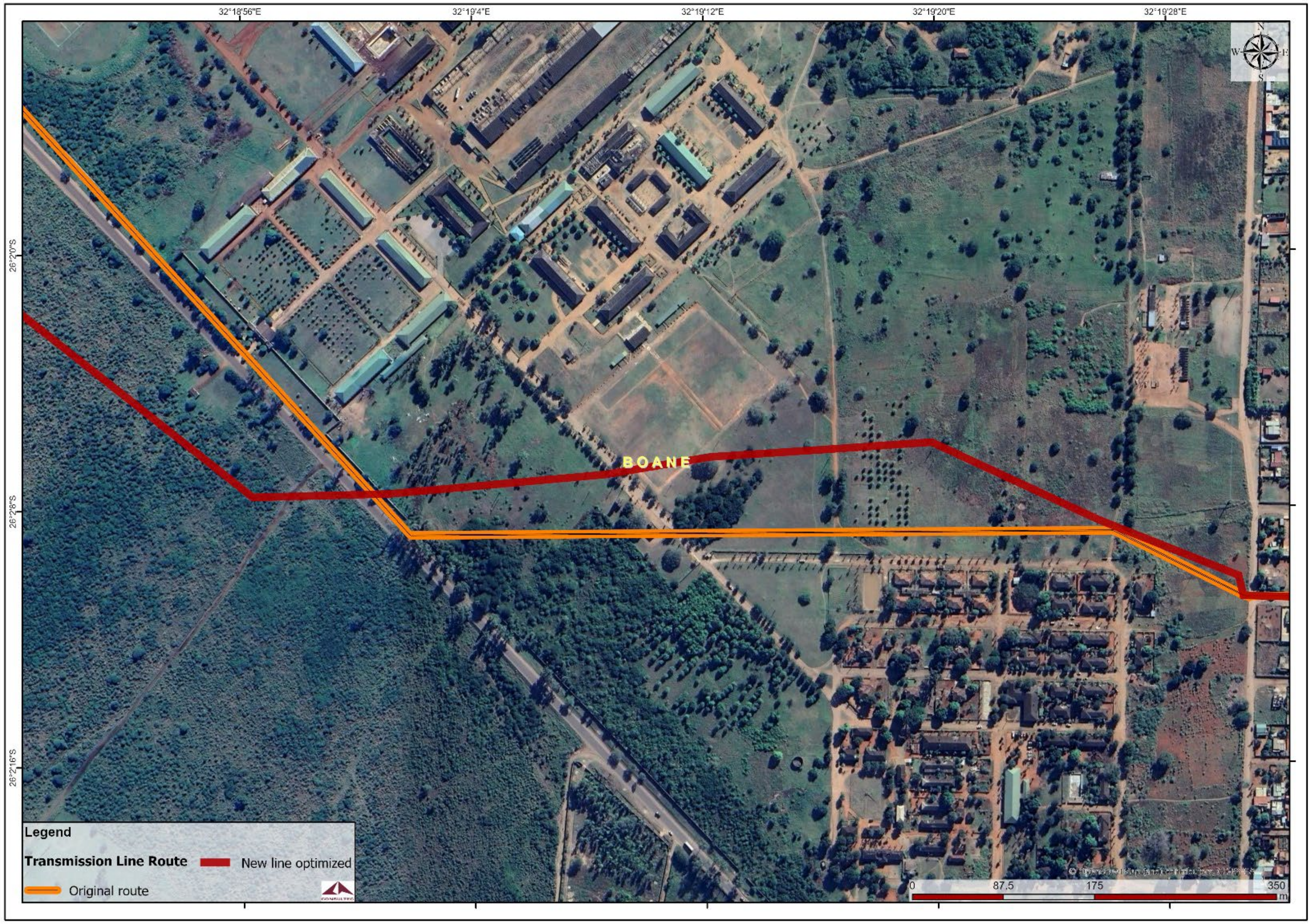


Figure 4-3 – Optimised route vs. original route

4.1.4 Comparison to Transmission Line ESIA

Physical Environment

The physical environmental conditions assessed in the transmission line ESIA included a consideration of climate, noise, air quality, geology, soils, water resources and landscape. Because the optimised route for this section remains within the military base with no change in land use and the new route is quite close to the original route (i.e. within 0 – 83 m for the entire section), there physical baseline conditions described in the ESIA are still valid for the optimised route and there would be no change in the significance of impacts on physical receptors between the two routes.

Biological Environment

The biological environmental conditions assessed in the transmission line ESIA included consideration of flora and vegetation, fauna, Key Biodiversity Areas, Performance Standard 6 habitat classifications, and ecosystem services. This entire section is actively used by the military and is considered highly modified habitat where the biodiversity sensitivity would be very low. Because both the original and optimised routes are wholly within the active area of the military base, there is no change in expected impacts on biodiversity receptors for this section between the two routes.

Socioeconomic Environment

The socioeconomic baseline in the transmission line ESIA looked at a number of different parameters, but for the most part these metrics were assessed on a project-wide scale and were not differentiated for various sections of the line. As such, the broad socio-economic conditions presented in the ESIA would equally apply between the original and optimised route for this section.

The field visit identified a number of socio-economic sensitivities that were not explicitly identified in the ESIA baseline, namely the specific military infrastructure mentioned above, other transmission line infrastructure, the sacred tree, and the military housing. The original route would have adversely impacted several military structures, would have been too close to an existing EDM transmission line and would have been too close to existing military housing. The optimised route avoids impacting these sensitivities, whilst also still avoiding the other sensitivities that the military said needed to be avoided (i.e. the sacred tree and the military parade yard). Both routes would require some trees to be cut down, but it was confirmed with the military representatives that these are ornamental and not being used by military personnel for supplement their livelihoods. As such, the alternative route represents a net improvement on socio-economic impacts (i.e. reduced impact on infrastructure and potential EMF effects on households close to the line).

4.2 Alternative Routes across the Road Military Area in Boane and Mabanja Options

4.2.1 Key Sensitivities Noted

- Military base visitor house
- Existing EDM transmission line
- Movene River
- Machambas
- Residential properties (Mabanja Options only)

4.2.2 Fieldwork Observations

Boane Alternative 1

Along this proposed alternative route, there is an infrastructure outside of the military base referred to as the "visitors' house", which is where visitors are received before entering the military base and has a small fence. The military representatives confirmed that its relocation could be negotiable. The medium-voltage active transmission line that crosses the military base and continues through this side of the road in the direction of Namaacha village, would be crossed by the proposed line.

Besides the infrastructure note above, no other infrastructure was identified along the proposed T-line alternative across National Road 2 and up until the Movene River.

A few machambas were identified in this region, however it was not possible to assess the extent of all the machambas nor their exact limits during the walkover, but they mostly seem like large scale farms. In terms of ownership, two associations were noted but it was not possible to quantify the exact number of machamba owners with the methodology used for the walkover. Some of the machambas had active crops, and others were fallow. There is also some support infrastructure within some of the machambas, but these are not likely to be impacted by the proposed line.

The powerline footprint is situated adjacent to the main highway and has been previously disturbed. The powerline crosses a perennial river and a buffer area of 10 metres should be implemented on both sides, where no pylons are to be placed. Ground truthing further from Boane confirmed that the area consists of a mosaic of small-scale agricultural lands mixed with small patches of natural vegetation, referred to as agro-mosaic vegetation type. Some crop lands are left fallow and become densely overgrown with grasses such as *Panicum maximum* (LC) and *Setaria sphacelata* (LC). Stands of alien invasive Bluegum (*Eucalyptus sp.*) and Beef wood (*Casuarina cunninghammiana*) are planted as windbreaks.

Larger indigenous trees are traditionally left to provide shade in the warm climate of the area. The main large indigenous trees are *Sclerocarya birrea* (LC), *Trichilia emetica* (LC), *Vachellia xanthoploea* (LC), *Ficus sur* (LC). Smaller trees and shrubs, particularly *Maclura africana* (LC), *Vangueria infausta* (LC), *Gossyppium herbacium* (LC), were common in the undergrowth of the riparian areas near the river with occasional individuals of *Borassus aethiopicum* (LC) (Coombs, 2024).

After crossing National Road 2, to the northwest of this section, the alternative routes enter areas previously evaluated in the ESIA and RAP census.

Mabanja Options

The Mabanja Option 1 alternative route aims to avoid the impacts within the Probrita mining concession. For the section parallel to where the current alignment crosses the concession, only one of the previously identified machambas would remain impacted.

After crossing the Movene river in the community of Mabanja, a few machambas (approximately 2 or 3 from a desktop review) were identified near the riverbank, beyond those already registered through the original census, with 13 machambas overlapping with the current alignment machambas.

Regarding infrastructure, approximately 11 houses were identified (with walls, fences and annexes impacted, as well as one informal stall), as well as a family cemetery with 4 graves.

The Mabanja Option 2 alternative route slightly deviates from the first Mabanja Option and impacts an additional two (2) machambas, which were not part of the original census.

Both Mabanja options consist of heavily modified agromosaic vegetation type and urban buildings. This section also includes a perennial river crossing, where a buffer area of 10 metres should be implemented on both sides for no pylons to be placed.

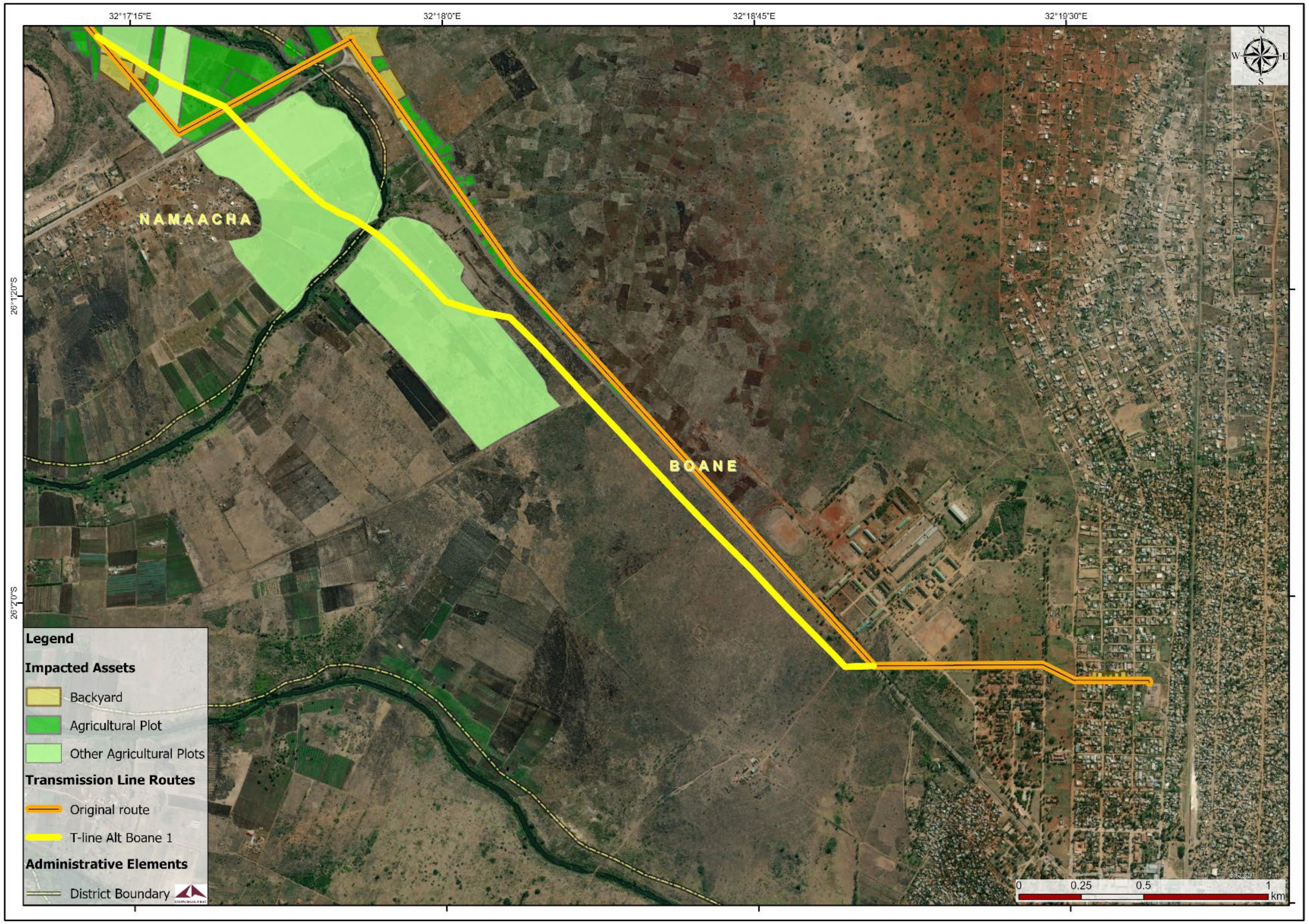


Figure 4-4 – Sensitivities identified in the T-line Boane Alternatives and Options

Figure 4--5 illustrates the machambas and infrastructure identified in the T-line Boane alternative.

Military base visitors' house

Visitors' house fence

Entrance to machambas along N2 road

Medium-voltage active transmission line

Road within machambas along N2 road

Overlap area with existing transmission line

Figure 4-5 – Sensitivities identified in the T-line Boane alternative

Figure 4-6 illustrates the machambas and infrastructure identified along the Mabanja alternative route near the Movene River.

Movene River

Machamba near Movene River

Other machamba near Movene River

Road that crosses the impacted machambas

Impacted House 1

Impacted house 2 and fence

Impacted House 3 with fence

Impacted house 4

Impacted house 5

Impacted house 6

Impacted house 7

Impacted house 8

Impacted house 9 with fence

Impacted house 10

Impacted house 11

Informal stall annex to impacted house 11

Household 10 with 4 graves

Figure 4-6 – Sensitivities identified in the Alternatives

4.2.3 Conclusions

It was noted that having a transmission line on the opposite side of the road as the military base in Boane would significantly reduce economic resettlement, as there are less machambas in this area than along the original route and impacts to roadside stalls would be avoided. Additionally, the PAPs within the military area poses a real challenge as the Project could not reach resolution with the military on being able to provide compensation (as would be required to meet the Project's lender requirements.

Whilst the Project considered the Mabanja options as a way to avoid negotiations with the mining concessions of Sulbrita and Probrita, the physical resettlement that would be required for these options make these alternatives highly unattractive to the Project. The Project will therefore not take forward these alternatives for further consideration.

Following the walkover, the Project identified an optimised alternative that is very similar to the Boane 1 Alternative. This variation (shown in red in the figure below) is what the Project proposed to take forward into detailed design. This variation does not include the Mabanja options that would require physical resettlement and instead joins the original alignment immediately after crossing National Road 2.

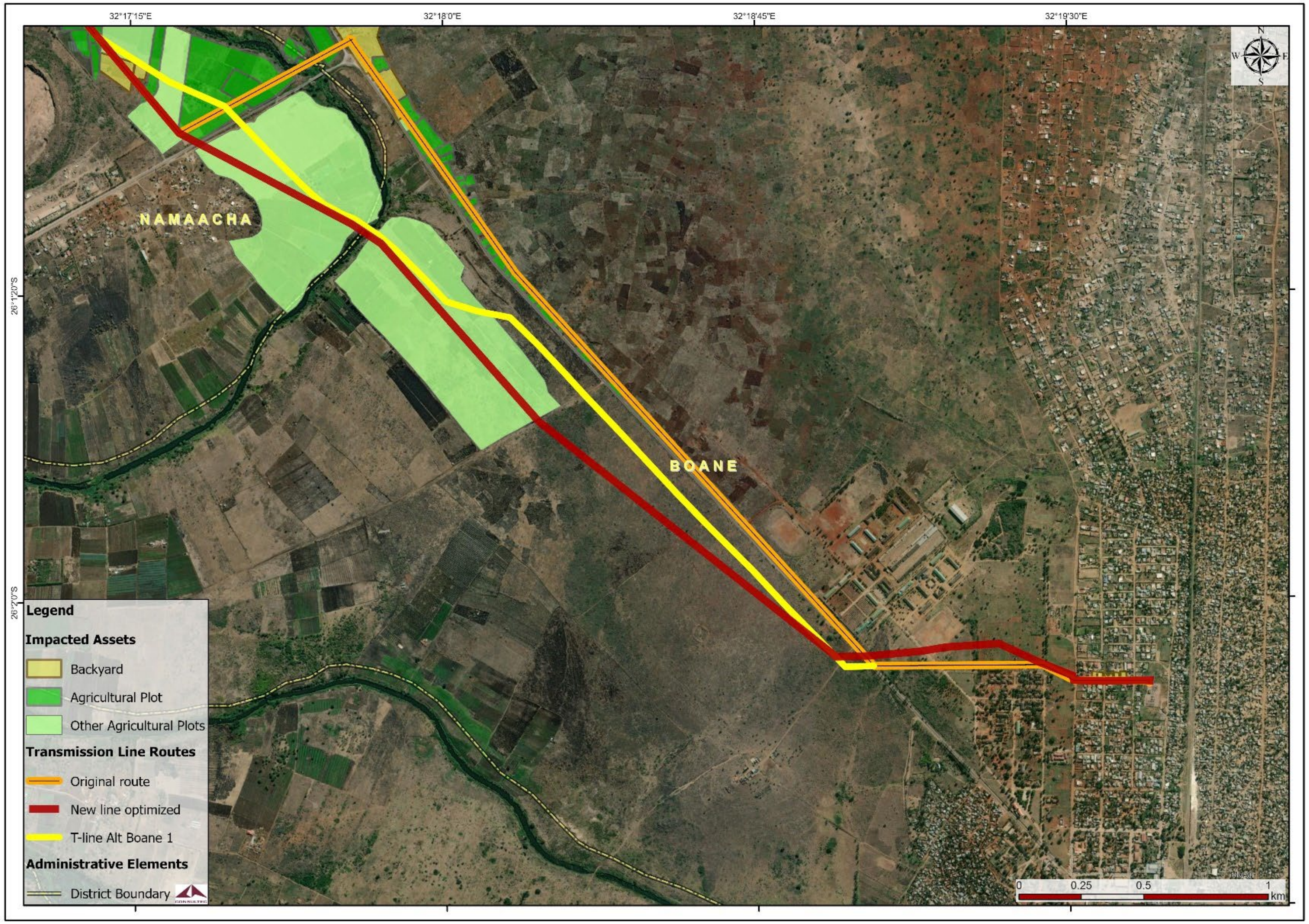


Figure 4-7 – Boane 1 Alternative and Options vs Optimised Route

4.2.4 Comparison to Transmission Line ESIA

Physical Environment

The physical environmental conditions assessed in the transmission line ESIA included a consideration of climate, noise, air quality, geology, soils, water resources and landscape. Whilst there is no change from a climate, noise, geology, and soil perspective, the optimised route does represent a change from the original route for air quality, water resources, and landscape.

The optimised route is marginally further from populated areas because it does not follow the national road, so it is not as close to people from and air quality and visual amenity perspective. This slight change does not represent a material difference though, and the impact significance and mitigation measure would remain unchanged.

From a water resource perspective, both the original route and the optimised alternative route cross the Movene River, but they cross it in different locations. The Project team did not note any material differences in sensitively between the two river crossing locations; however, so the impact significance and mitigation measures for water resources would remain the same as proposed in the ESIA.

Biological Environment

As a supplement to the biodiversity data presented in the ESIA, in March 2024 the Project commissioned an ecologist, Dr. Gareth Coombs, to conduct habitat mapping for Project’s entire Environmentally Appropriate Area of Assessment (EAAA) to inform the Project’s Biodiversity Action Plan (BAP). Dr. Coombs’ mapping included the area covered by both the original route and the proposed optimised alternative route. As shown in Figure 4-8, the area indicated in orange was mapped as a disturbed agro-mosaic habitat, whilst the area indicated in green was mapped as agro-mosaic vegetation. Note that based on field observations by the Project team, the small area of the optimised route not covered included in Dr. Coombs’ habitat mapping would also be considered as the agro-mosaic vegetation type.

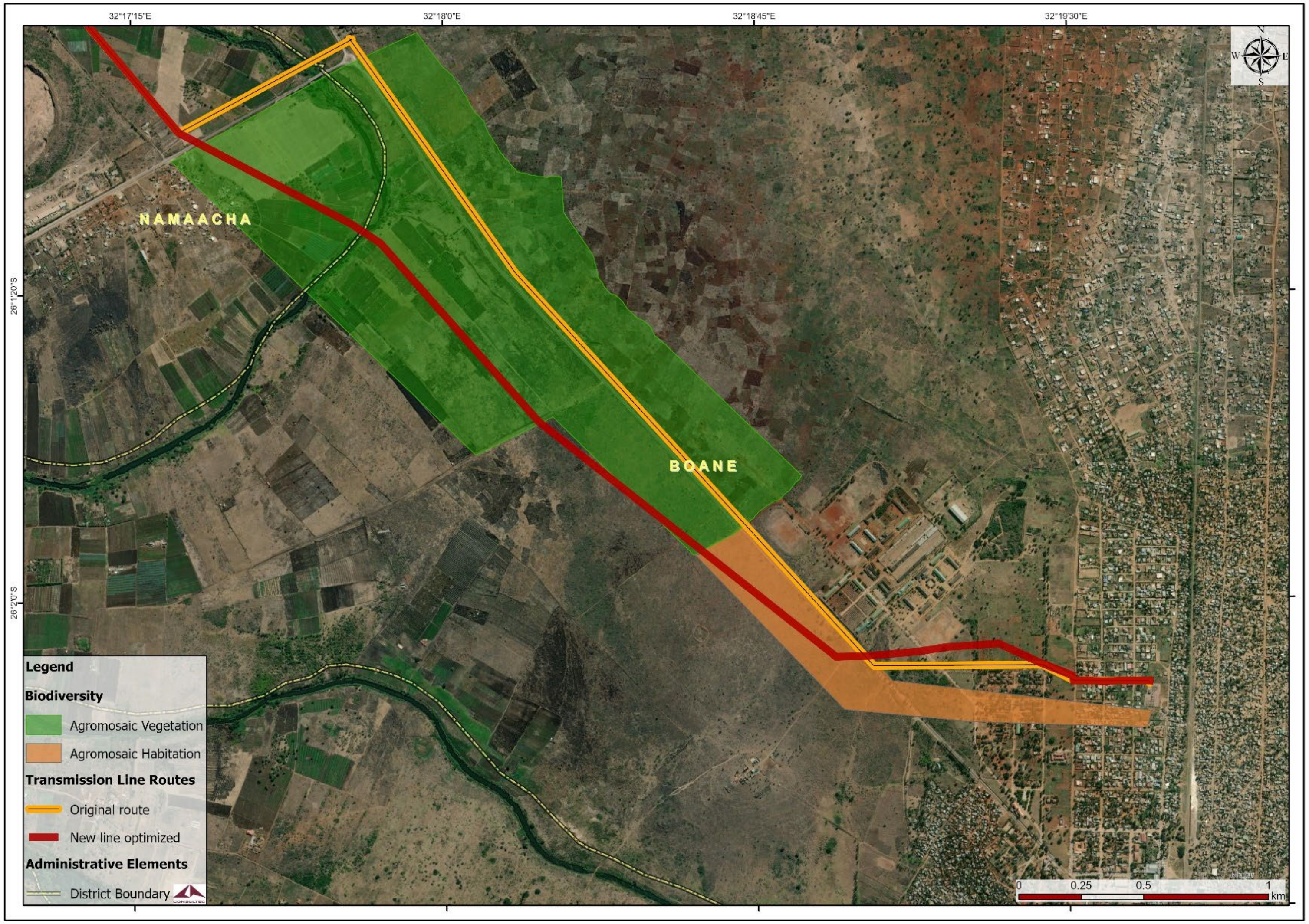


Figure 4-8 – Habitat Mapping for Transmission Line near Boane Alternative 1

Socioeconomic Environment

The socioeconomic baseline in the transmission line looked at a number of different parameters, but for the most part these metrics were assessed on a project-wide scale and were not differentiated for various sections of the line. As such, the broad socio-economic conditions presented in the ESIA would equally apply between the original and optimised route for this section.

In terms of social infrastructure, the optimised alternative route would avoid the military visitors' house, as well the existing transmission line and leave the required space of 30 m for the future expansion of National Road 2. Whilst the original route would also not impact the military visitors' house or the existing transmission line, it overlaps the area designated for the future expansion of National Road 2 (along eastern side of road).

The key socioeconomic impact for which there is a difference between the original route and the optimised alternative route through this section is resettlement. The original route for this section included economic resettlement of ~10 informal roadside stalls, machambas for ~32 households within the military servitude and machambas for ~12 households near the roundabout in Mabanja, as well as two vacant plots and several trees of economic value. Whilst the field visit was not able to confirm the exact number of households requiring economic resettlement along the alternative optimised route, it is clear from satellite imagery and the field visit that this will be much lower than for the original route (e.g. ~35 fewer households). Also of critical note is that the alternative optimised route will fully avoid the machambas within the military servitude, allowing the Project to both fully align with lender standards for resettlement without violating the military's requirement not to compensate people farming on their servitude. No physical resettlement was identified along either route (noting that the optimised alternative route does not include the Mabanja Options).

To fully characterise the predicted resettlement impacts, the Project has commissioned a resettlement specialist to conduct a RAP scoping exercise for the entire optimised alternative transmission line route. Completion of this study is expected by 27 September 2024. Following this study, the Project will conduct a detailed census and targeted stakeholder engagement with both the newly affected PAPs, as well as PAPs that would no longer be impacted by the Project following the optimised alternative route. The measures and processes set out in the transmission line RAP, including the entitlements matrix, would be applied to the newly affected PAPs in the same way as for other PAPs along the route. All socioeconomic mitigation measures set out in the ESIA would also apply for the revised route.

4.3 Alternative Routes Near Mining Concessions and Other Sensitivities to North

4.3.1 Key Sensitivities Noted

- Machambas and grazing land;
- Large farms (including one owned by the President and another by the Minister of Defence);
- Mining concessions;
- Natural habitat under IFC's Performance Standard 6;
- Wetlands and watercourses;
- Elephant and buffalo habitat;
- Military firing range.

4.3.2 Fieldwork Observations

As presented in Section 2, several alternative routes were considered along this portion of the transmission line that could reduce the current risks to the Project in Namaacha District. These were as follows:

- Namaacha Option 1 – The minimal deviation to avoid the active military area, as well as President and Minister of Defence's land;
- Namaacha Option 2 – The shortest deviation to fully avoid the Riolitos mining concession, active military area and the President and Minister of Defence's land;
- Namaacha Option 3 – A longer deviation that fully avoids the Riolitos mining concession, active military area, President and Minister of Defence's land, and results in the shortest overall transmission line.

Namaacha Option 1

There were a number of access restrictions for the field team is conducting the walkover of this option, namely:

- Access via the active military shooting range from the southeast was limited in duration, as the military personnel on-site temporarily suspend their activities at the firing range while the team conducted their study;
- The proposed line crosses large farms with modern and apparently recently installed electric fencing. Unfortunately, the team was not allowed to access these farms to identify other structures and walk through the line's full extension.;
- There is a point where the proposed line crosses over a cliff, which could not be accessed due to very high rocks and unsafe conditions.

The primary land use for this alternative consists of grazing of livestock on lands occupied by several large farms. The route avoids the farms owned by the President and the Minister of Defence, but two other large farms are crossed by this route. In particular, one of these farms has structures, likely a pasture support house, within ~100 m of the route.

This route does cross the mining concession of Riolitos, although no evidence of active mining was observed.

The vegetation type in this area is like that found during the habitat mapping conducted by Dr Coombs (2024) south of this alternative. No species of conservation concern were identified during the survey; however, the woodland seems mostly intact, presumably due to fencing of large properties which protects from over harvesting and frequent burning.

Two wetlands were identified along this route, and the project should avoid placing pylons in, or within 10 meters of the wetlands. Natural forest areas can be found along the escarpment on the eastern side of this section, as far as possible pylons in the natural forest area should be avoided, while still maintaining the structural integrity of the powerline.

Figure 4-9 illustrates the sensitivities identified along Namaacha Option 1.

Fence in northen limits of military shooting range

Cattle grazing area within military shooting range

Fence of large farm 1 – CAC_MoD

Entrance to large farm 2 - individual farm

Fence of large farm 2 - individual farm

Fence of large farm 3 – FJN PR

Wetland

Cattle resting area

Figure 4-9 – Sensitivities identified along Option 1

Figure 4-10 illustrates T-line Alternative Option 1 for the Namaacha sensitivities.

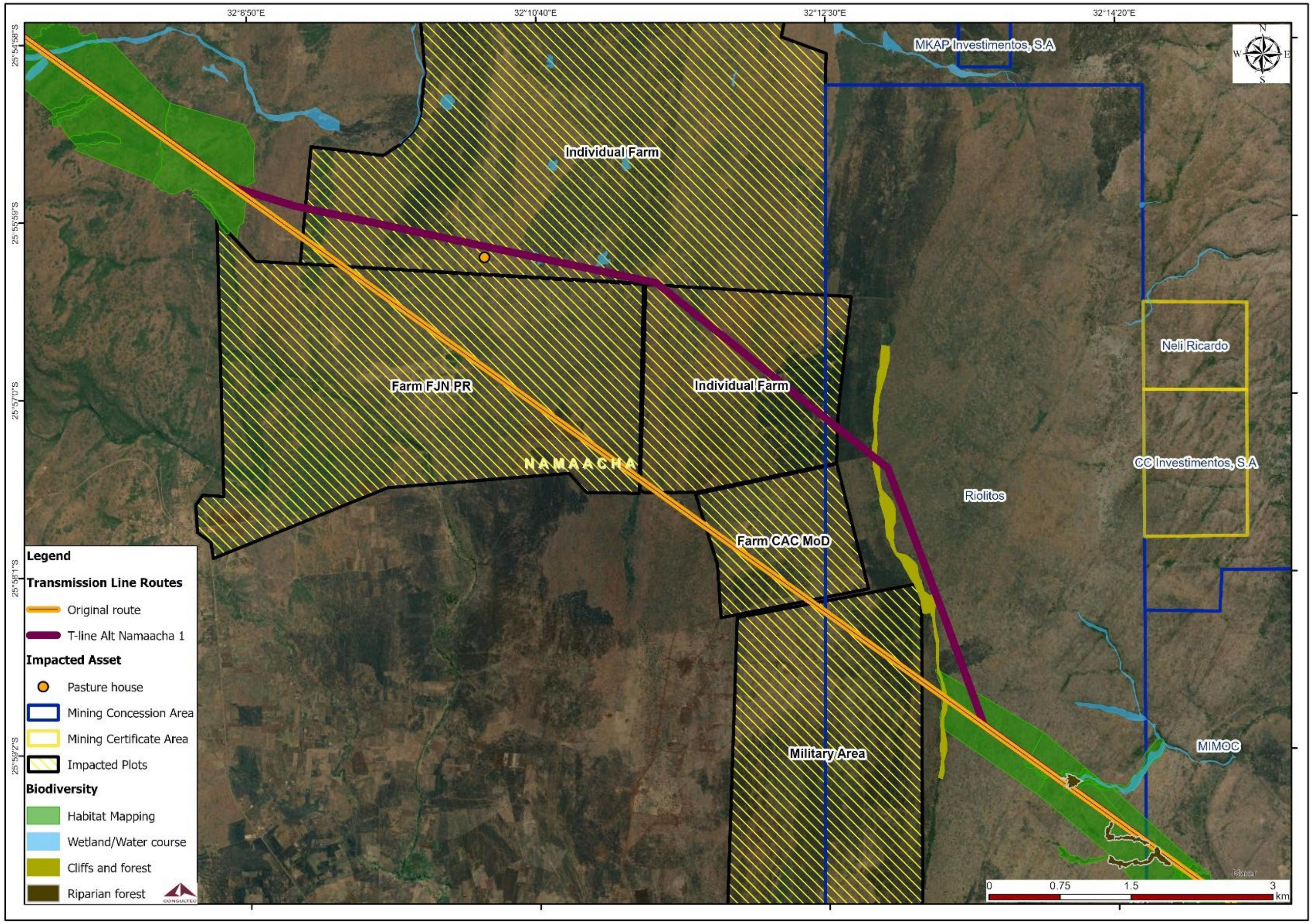


Figure 4-10 – Transmission Line Alternative – Option 1

Namaacha Option 2

The following option for this section runs along the boundaries of Riolitos mining concession, with two distinct areas: the section going north/south on the higher ground and the section going east/west on the lower lying areas. The existence of private properties, their limits and the potential owners was very hard to determine with the methodology used for the study. The area is mostly used for charcoal and firewood exploitation, with several coal furnaces detected through the proposed line.

In terms of infrastructure, only one large fence was identified, seemingly belonging to a large farm, for which the team was not allowed to access.

Whilst this route bypasses the Riolitos mining concession, there are potentially two small mining license areas crossed by the north-south section of this alternative and a small mining concession crossed by the east-west section. The exact boundaries of these areas and the details of the owners of these mining licenses/ concession are not yet known.

The habitat on the high grounds is severely degraded with frequent burning and overharvesting by communities who use the wood to make charcoal. There are several small rocky outcrops (not exceeding 10 meters in diameter) with low growing succulents and various *Aloe sp.*, however, damage to these outcrops can easily be avoided by pylon placement micro-siting.

The local leadership and some community members met along the way confirmed the presence of elephants. Elephant droppings and evidence of grazing were found where the route turns into the valley to the lower lying areas. The route crosses an elephant watering hole along the seasonal watercourse, with another watering hole identified in the buffer. See Figure 4-13 and photos below.

Across the lower lying areas surveyed the same habitat degradation is evident; the only large trees remaining are *Sclerocarya birrea* (LC) and these are found extensively throughout the area.

This option crosses several small seasonal water courses, one river that was flowing at the time of the survey and one wetland.

Figure 4--11 illustrates the fence and coal furnace identified along Namaacha Option 2.

Trees used for coal furnace production

Coal furnace

Elephant water source

Evidence of elephant presence in area

Large fence across proposed line

Figure 4--11 – Sensitivities identified along Option 2

Figure 4-12 illustrates T-line Alternative Option 2 for the Namaacha sensitivities.

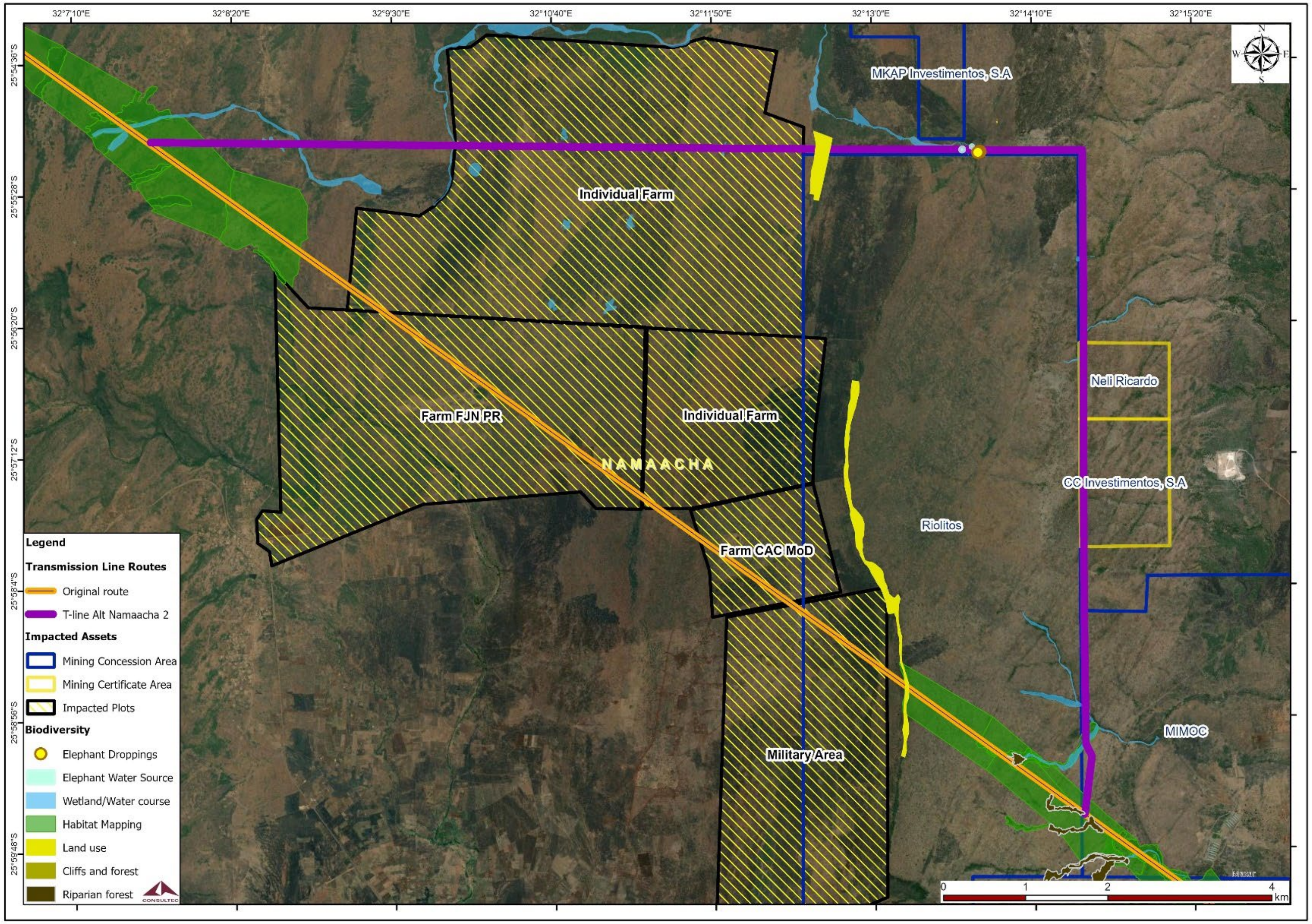


Figure 4-12 – Transmission Line Alternative – Option 2 sensitivities

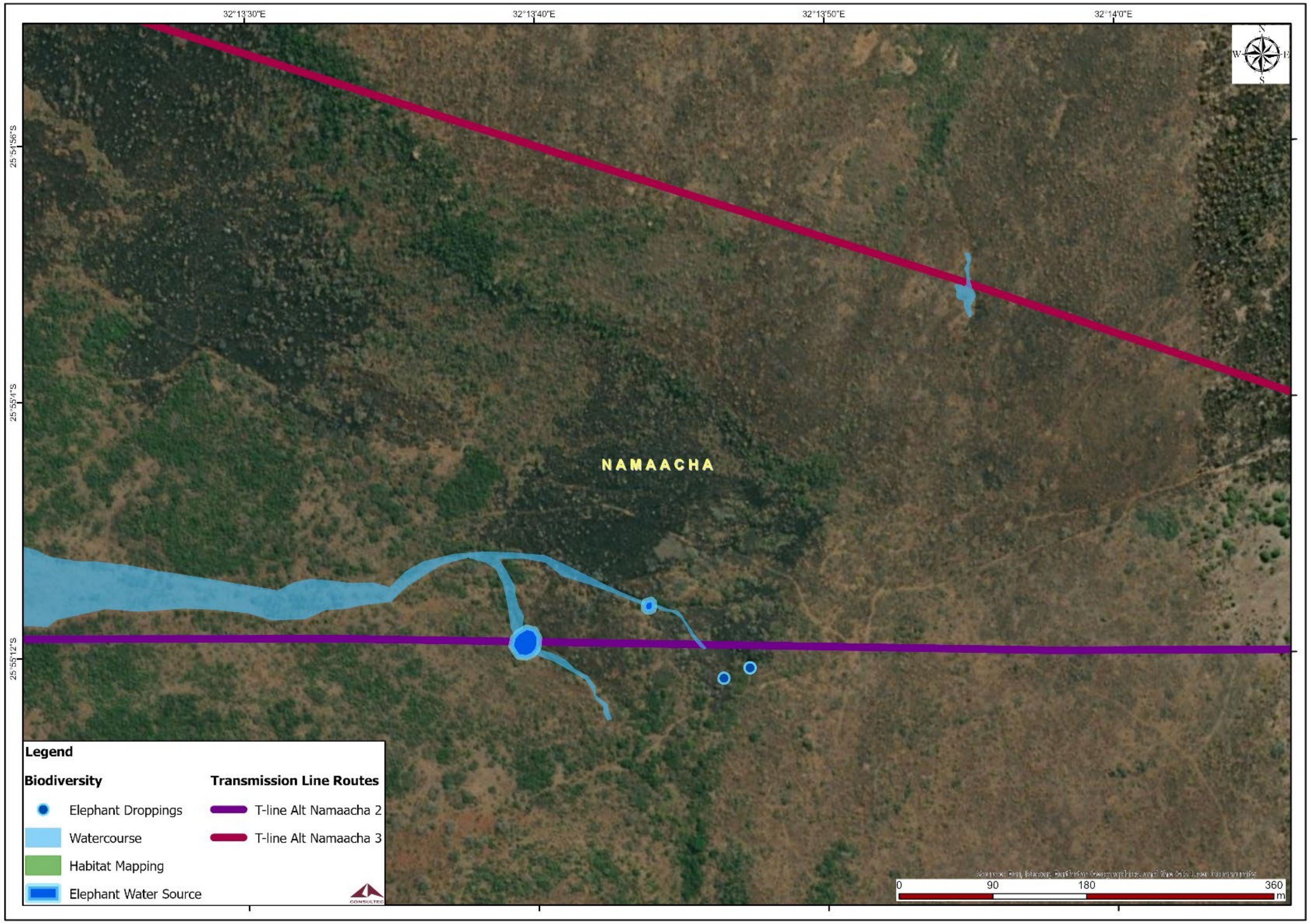


Figure 4-13 – Transmission Line Alternative Namaacha – Option 2 sensitivities

Namaacha Option 3

This alternative proceeds directly after bypassing the Riolitos mining concession to connect to the Central Eléctrica da Namaacha (CEN) windfarm, instead of connecting to the original transmission line route.

In terms of impacted infrastructure that would require physical resettlement, 1 house and 1 annex were identified in Livevene. In the neighbouring of Gumbe community, the Malhavatumuque community (in Matsequenha locality), a total of 6 main houses with their respective annexes were identified.

There is a farmers' association being financed by a Non-Governmental Organization (which the team was not able to identify) in Gumbe. The association has a cabin with materials and a large vegetable garden, as well as a beekeeping project which would be impacted by the proposed alignment.

In terms of economic displacement, a few machambas were identified in Livevene and Malhavatumuque, and there is evidence of elephant activity and charcoal makers using the area.

Whilst this route bypasses the Riolitos mining concession, there are potentially two small mining license areas crossed by the north-south section of this alternative and a small mining concession crossed by the east-west section. The exact boundaries of these areas and the details of the owners of these mining licenses/ concession are not yet known.

This line option crosses the same seasonal river system as all other routes, however, as visible in Figure 4-15, at the crossing point the flow spreads into a large floodplain with wooded areas. This area could not be accessed. Another larger river crossing was found west of the floodplains, where a community is farming along the river. Their agricultural plots are bordered by large *Kigelia africana* (LC) and indigenous fruiting trees like *Strychnos spinosa* (LC).

When walking from the wind farms side along this route, the topography drops away steeply where forests grow along the escarpment. A mountain stream was identified, with an impressive colony of *Pachypodium saundersii* (LC, but endemic to southern Africa and sensitive to illegal harvesting).

Figure 4-14 illustrates the additional infrastructure and fences identified along Namaacha Option 3.

Impacted House in Livevene

Impacted machamba in Livevene

Elephant evidence in Livevene

Coal furnace in Livevene

Farmers' association cabin in Gumbe

Farmers' machamba in Gumbe

Impacted house 1 in Malhavatumuque

Impacted house 2 in Malhavatumuque

Impacted house 3 in Malhavatumuque

Impacted house 4 in Malhavatumuque

Impacted house 5 in Malhavatumuque

Impacted house 6 in Malhavatumuque

Machamba 1 in Malhavatumuque

Machamba 2 in Malhavatumuque

Figure 4-14 – Sensitivities identified along Option 3

Figure 4-15 illustrates T-line Alternative Option 3 for the Namaacha sensitivities.

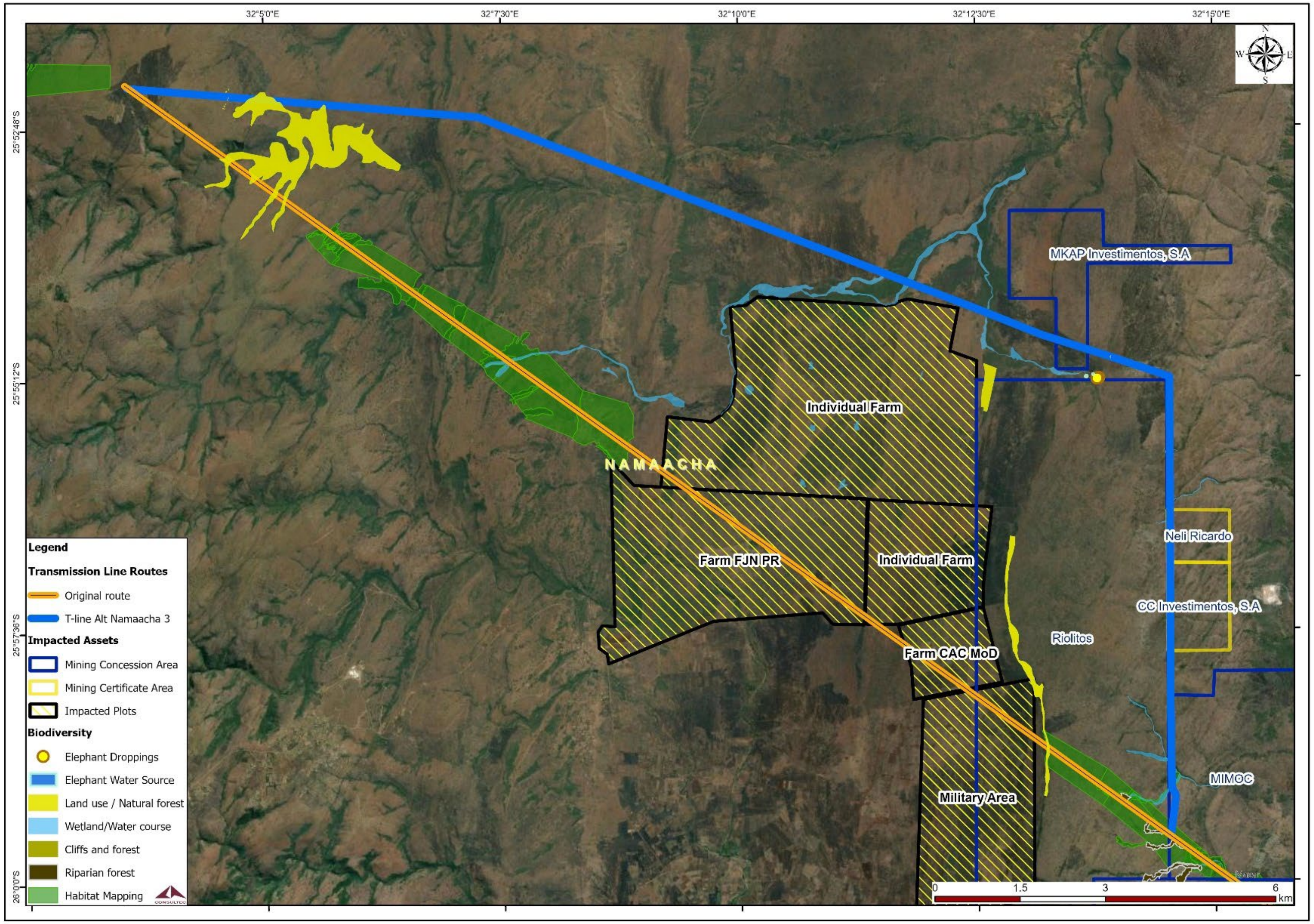


Figure 4-15 – Transmission Line Alternative – Option 3

4.3.3 Conclusions

Of the three alternatives, Option 1 and Option 2 are similar with regards to the scale of likely environmental and social impacts. Option 2 is considered the preferred option because it rejoins the original transmission line after one of the four households identified with physical resettlement impacts from the original route, so this household would be avoided with this option.

Risks associated with mining concessions are a key concern for the transmission line from a schedule, cost, and reputation perspective. Option 1 represents the shortest deviation to the original route, but EDM has raised serious concerns about the ability to reach an equitable agreement with the owner of the Riolitos mining concession that Option 1 passes through. On this basis, an alternative that does not pass through the Riolitos mining concession is preferred. Neither Option 2 nor Option 3 pass through the Riolitos mining concession; however, both cross other mining concessions/ license areas. Because the area crossed by Option 2 and Option 3 of these other mining areas is relatively small and they have not been flagged as concerns by EDM, it is presumed that either Option 2 or Option 3 would pose a lower risk to the project from this perspective. As a next step, the Project will obtain details on the new mining concession/ license areas crossed by Option 2 and Option 3 to inform discussions. The project will then prepare and share Memorandums of Understanding, consistent with those prepared for other mining concessions crossed by the transmission line route, to request access from these entities.

Whilst Option 2 and Option 3 are similar from a mining concession perspective, they are not similar from an environmental and social impact perspective. Option 3 would require the physical resettlement of the Malhavatumuque village (6 households), as well as 1 additional household in Livevene. Additionally, Option 3 crosses large floodplains of sensitive natural habitat where the river system is widely dispersed. From a biodiversity perspective, Option 2 is preferred due to the limited amount of vegetation clearing needed and the level of habitat degradation observed along this route. The main biodiversity sensitivity for Option 2 noted during the field work was the water hole used by elephants. To avoid impacts on this sensitivity, the project has proposed a slightly optimized route to the originally assessed Option 2, moving the route approximately 80 m to the north to bypass the watering hole. This optimized route is being taken forward for detailed design by the Project.

4.3.4 Comparison to Transmission Line ESIA

Physical Environment

The physical environmental conditions assessed in the transmission line ESIA included a consideration of climate, noise, air quality, geology, soils, water resources and landscape. Whilst there is no change from a climate, noise, air quality, geology, soil perspective, or landscape perspective, the selected alternative (Option 2) does represent a change from the original route from a water resources perspective. The east-west section of the alternative route runs parallel to a dried riverbed of a tributary of the Umbeluzi River. This area is subject to an increased flood risk during heavy rainfall. The proposed route is approximately 1 km from this area, so the increased risk is considered minimal; however, to better characterise this risk/impact the Project is consulting with district leaders to understand the extent of any historic flooding.

Biological Environment

There is a high degree of habitat degradation across both the original route and the preferred alternative (optimized version of Option 2). This is due to the large farms actively grazing livestock across much of the area, as well as excessive charcoal production. The habitat mapping conducted by Dr. Gareth Coombs along the original route identified mostly Southern Lebombo Bushveld habitat, with small pockets of forested areas. (Note that the area of the original line not included in the habitat mapping below was excluded due to access as these are the large, fenced farms shown in Figure 4-10 and 4-12). Given the nature of this land use, habitats in these unmapped areas are expected to be modified.) Based on the observations from the botanist on the field team, the habitat composition and sensitivity for the original route and Option 2 are similar.

It was noted that evidence of elephants was found in the east-west section of Option 2, but this was not seen further south near the original line route. The presence of the transmission line should not impact elephants visiting the area during the operational phase. To minimize any impacts on elephants during construction, the route was optimized to avoid this sensitivity. With this avoidance measure taken, it means that the mitigation measures set out in the ESIA should be sufficient to manage predicted impacts for biodiversity.

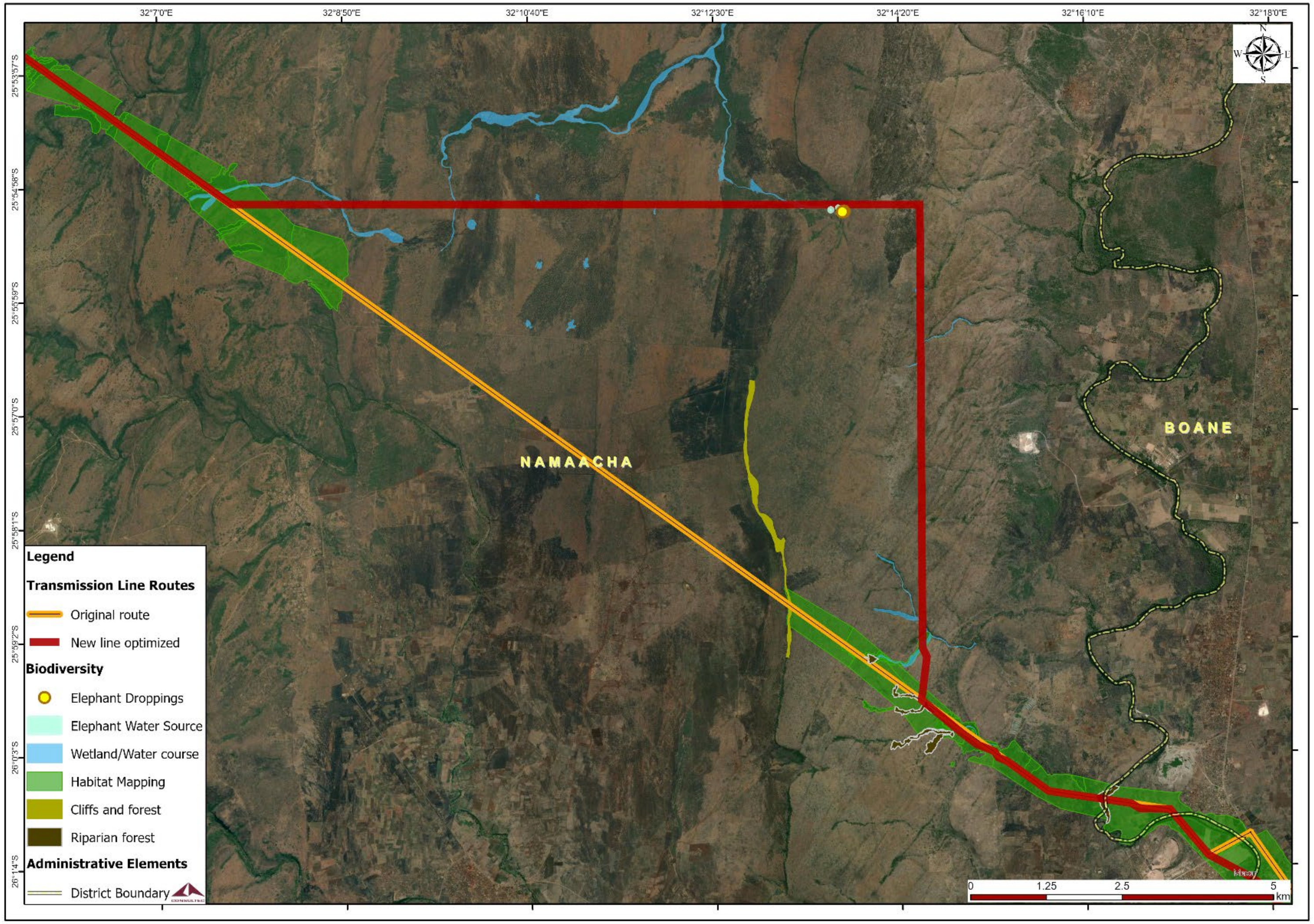


Figure 4-16 – Habitat mapping and biodiversity sensitivities form original route and preferred alternative

Socioeconomic Environment

The socioeconomic baseline in the transmission line ESIA looked at a number of different parameters, but for the most part these metrics were assessed on a project-wide scale and were not differentiated for various sections of the line. As such, the broad socio-economic conditions presented in the ESIA would equally apply between the original and optimised route for this section.

From a social infrastructure perspective, the original route passes through an area actively used by the military as a firing range. It is highly unlikely that authorisation could be obtained by the military for them to cease using this land for this purpose, posing a potential fatal flaw to the original route.

The total scale of economic resettlement for the original route and the preferred alternative are very similar; however, two of the farms crossed by the original route are owned by the President and the Minister of Defence. Neither of these land holders were identified in the census conducted for the RAP of the transmission line and the Project has not engaged with these stakeholders as yet. Given their political positions, obtaining their agreement to build the transmission line through their properties may be extremely difficult and if opposed to the Project, these stakeholders could represent a fatal flaw to the original route.

From a physical resettlement perspective, the preferred alternative has a lower impact, as one of the households identified in the census from the original route would be bypassed and now further primary households were identified from desktop review or field work.

To fully characterise the predicted resettlement impacts, the Project has commissioned a resettlement specialist to conduct a RAP scoping exercise for the entire optimised alternative transmission line route. Completion of this study is expected by 27 September 2024. Following this study, the Project will conduct a detailed census and targeted stakeholder engagement with both the newly affected PAPs, as well as PAPs that would no longer be impacted by the Project following the optimised alternative route. The measures and processes set out in the transmission line RAP, including the entitlements matrix, would be applied to the newly affected PAPs in the same way as for other PAPs along the route. All socioeconomic mitigation measures set out in the ESIA would also apply for the revised route.

5 Summary

The Project proposes to take forward the optimised route shown in Figure 5-1.

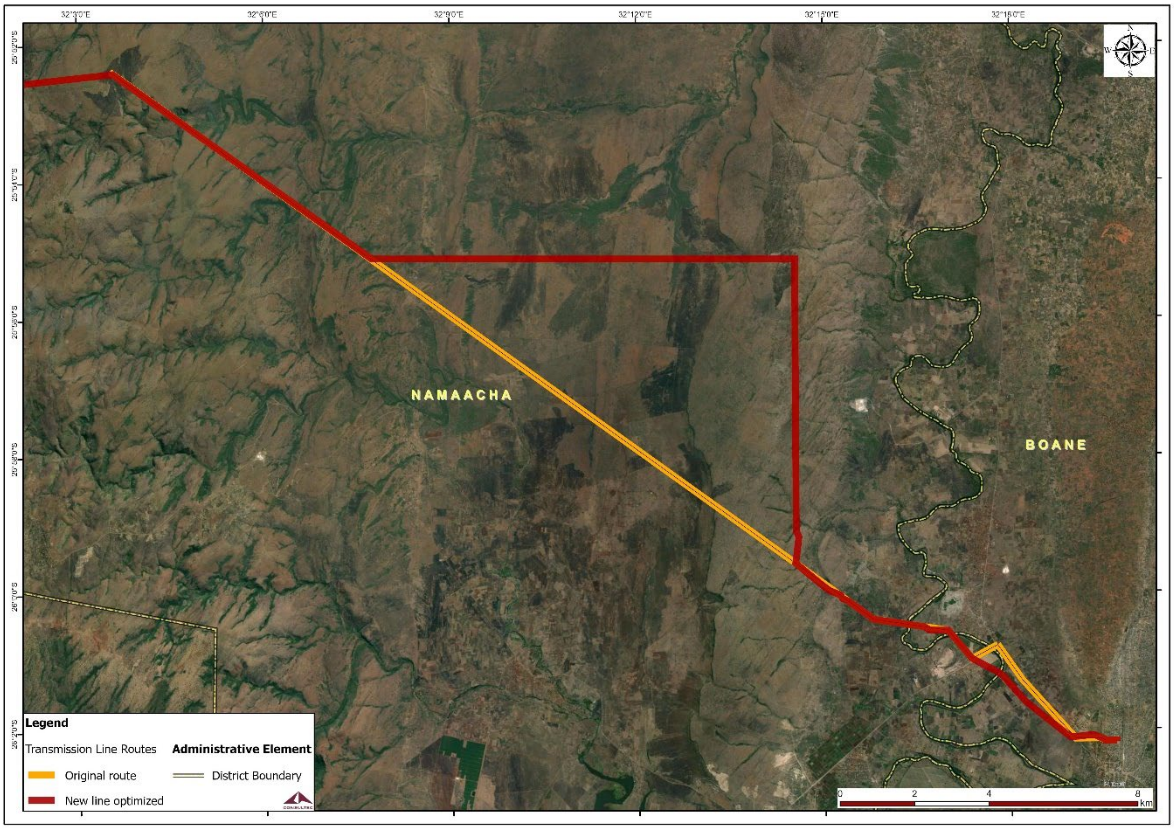


Figure 5-1 – Original route versus Optimised Alternative Route

A summary of the key differences between this route and the original route is provided in Table 5-1.

Table 5-1 – Summary of key differences between the original route and the optimized alternative route

Topic	Differences between the original route and the optimized alternative route
Length of original route and length of current route	Original: 37.3 km (33.5 km outside of windfarm DUAT). New route: 42.7 km (38.9 km outside of windfarm DUAT).
Distance separating original route to new route	The new route consists of two sections of deviations. For the Boane district deviation (~4.75 km) the distance from the original route varies between 0 and 650 m. For the Namaacha district deviation (~19.37 km in total), the distance ranges from 0 - 6.47 km (average distance is 3.24 km).
#of physically resettled households (HHs) in original and new route	Original: 4 HHs. New route: 2 HHs (estimated from satellite imagery and walkover). To be confirmed through RAP scoping exercise (~50% reduction).
# of physically resettled Project Affected People (PAPs) in original and new route	Original: 29 PAPs. New route: PAPs to be determined with a RAP scoping exercise. Using the average number of PAPs per HH from original route, ~15 estimated PAPs for new route. (~50% reduction).

Topic	Differences between the original route and the optimized alternative route
#of economically resettled households (HHs) in original and new route	Original: 111 HHs. New route: ~80 HHs (estimated from satellite imagery and walkover) To be confirmed through RAP scoping exercise (~28% reduction).
# of economically resettled Project Affected People (PAPs) in original and new route	Original: 620 PAPs. New route: PAPs to be determined with a RAP scoping exercise. Using the average number of PAPs per HH from original route, ~447 estimated PAPs for new route. (~28% reduction).
E&S sensitivities in original route vs new route (include biodiversity)	No material difference in biodiversity impacts (both routes are heavily modified habitat for the sections changing).
Infrastructure or concessions affected by new route in comparison to original route (Mining concessions, wells, roads, power lines, etc)	Original: Crosses 4 mining concessions, including one |(Riolitos) that EDM has had extreme difficulty in negotiating with previously. New route: Crosses 3 mining concessions and 2 mining license areas (note that mining licenses are a less developed classification than mining concessions). Avoid Riolitos mining concession.
Other - anything else that could be relevant e.g. military shooting range, house of minister or president, etc., etc, etc	Original: Crosses a firing range and two large cattle farms owned by political VIPs (the President and Minister of Defence). The route also overlaps part of the future expansion plans for the national road (N2). New route: Avoids these VIP plots and firing range. Outside of the national road expansion area.

Annex 3: PPP Meeting Minutes

Meeting Minutes

Minutes of the Public Consultation Meeting

Venue: Auditorium of the Namaacha Teachers Training Institute

Date: October 18th, 2023

Duration: 09:50 – 12:50

Number of participants: 40

Participants

The following institutions were present at the Public Consultation meeting held in the Auditorium of the Namaacha Teachers Training Institute:

- Ministry of Land and Environment (MTA) / National Directorate of Environment (DINAB) and Provincial Environment Service (SPA);
- Namaacha District Services / Education Department;
- Namaacha District Government;
- Namaacha District Economic Activities Services (SDAE) – Department of Agriculture and Fisheries;
- Namaacha District Planning and Infrastructure Services (SDPI);
- Municipal Council of the Namaacha Village (CMVN);
- Police of the Republic of Mozambique (PRM) - Namaacha Crossing Post;
- World Bank / International Finance Corporation (WB/IFC);
- Mozambican Tax Authority (AT) – Namaacha Delegation;
- Impacto;
- IBIS Consulting;
- Globeleq;
- Source Energia;
- Electricidade de Moçambique (EDM);
- Namaacha Wind Power Plant (CEN);
- Microbanco Confiança S.A.;
- Center for Open and Distance Education (CEAD) of Namaacha;
- Cascatas Community Radio;
- Local authorities: Head of Namaacha-Headquarters Administrative Post, Head of Kala-Kala Locality, Community Leader, Regulated, Ndonguene and Liveveni Neighbourhood Secretariat, Head of the Border Neighbourhood Block;
- Residents of Namaacha Village;
- Sulbrita, Lda.;
- CONSULTEC.

Agenda and Objectives:

The purpose of the meeting was to present the 66 kV Transmission Line Project, as well as to present the EIS prepared under the Environmental Impact Assessment (EIA) process.

Welcome

Replacing the Administrator of Namaacha Village, the Director of Namaacha District Education Services, AC, started the meeting by introducing himself, welcoming and thanking everyone for their presence in the venue. Subsequently, he gave the floor to the Consultant for the presentation of the project and the EIA process in progress.

Project Presentation

After the meeting kick-off, the consultant representative, DC, began the presentation by mentioning that the project aims to evacuate the energy produced at the Namaacha Wind Farm (the Namaacha Power Plant – CEN) through a 66 kV transmission line with about 33.5 km, to Boane substation, located in Boane District.

He explained that the project is being developed by the association of companies and Electricidade de Moçambique (EDM), Globeleq and Source Energia, being EDM the company responsible for the energy evacuation and transformation in the substations.

Then, the consultant presented the Project in an exhaustive manner, referring to its background, the main objectives, the geographical location where the energy production will be carried out (the future Namaacha Power Plant) and where it will be evacuated (the Boane substation), the main components and characteristics of the project, the activities that will characterize the Project, the EIA process phasing and the current stage of the Project, the description of the projects areas of influence, the environmental and social reference situation, and the main environmental impacts for each phase of the project, and finally, the environmental management plan foreseen for the project as a whole.

The consultant concluded that the Project is environmentally viable, so no residual negative impacts of high significance were identified and that the positive impacts outweigh the negative ones. He added that the Project is aligned with the New and Renewable Energy Development Policy, approved by the Government of Mozambique, as well as the relevant international standards and guidelines of international institutions such as the World Bank/International Finance Corporation (WB/IFC). He also concluded that the Project would stimulate regional and national economic development.

At the end of the presentation, DC opened the room for debate, comments, questions and suggestions, which are recorded below. Before the intervention of the participants, he explained that, to facilitate the registration of all the participations in the debate, it was important that each participant identified himself first, saying his name and place or the institution from which he came.

Table 1 – Summary of interventions and responses given at the public consultation meeting held at the Auditorium of the Namaacha Teachers Training Institution on October 18th, 2023

Questions (Q) / Comments (C) / Suggestions(S) asked	Replies (R) / Comments (C)
Resident **C1)** The project is very attractive and interesting, the District of Namaacha and Mozambique are to be congratulated. **Q1)** Considering the nature of this project in the context of climate change, I would like to draw attention to the issue of desertification. How will the trees that will be removed (which is a negative impact) for the implementation of the Project be replaced? **S1)** I would like to suggest that the Project should support community forests to reduce the impact of desertification.	**DC – Consultec** **RQ1)** Responding to Mr. E and Mr. T's concerns there will be, indeed, the removal of trees in the 70 m right of way. For safety reasons of the infrastructure and the communities, this area must be free of any type of vegetation. In terms of affected area, around 235 ha will be affected. In relation to the mitigation measures foreseen for this impact, deforestation was estimated only in the range foreseen for the implementation of the Project (during construction phase) and not beyond the defined range. This will ensure effective mitigation for this impact. There may be projects to replace these felled trees, but the proponent (EDM), Globeleq and Source Energia will be able to provide a better answer.
Resident **S2)** According to my calculations, at least 250 ha will be cleared completely for the implementation of the Project because it is not possible to lay electrical cables with any type of tree in the vicinity. I would like to suggest that some of these felled trees be replanted elsewhere. **Q2)** What is the protection guarantee for Namaacha given that the access roads that are planned by the project can be used also by drivers coming from Eswatini and South Africa, as well as Maputo, damaging it and harming the animals? **Q3)** What is the impact that the cars that will use this access road will have on cattle pregnancies? And what will be the impact that underground electrical cables will have inside Boane Village?	**DC – Consultec** **RQ2)** Regarding the access roads, the Project will use only the existing access roads that can enable access to the infrastructure construction area. In cases where there are no accesses, they will be created, however, the priority is the use of existing access roads. Therefore, the access road that is planned is the access road of the right-of-way that will allow the inspection and maintenance activities in the line. The protection of access roads was one of the issues raised at the first meeting for the presentation of the EPDA and it was mentioned, at the time, that within the scope of the maintenance and inspection activities of the line carried out by EDM, there will be the support of PRM in patrolling and certifying safety on access roads. I believe it will be done in the same way, but EDM will be able to subsidize in relation to this matter. **RQ3)** One of the impacts that is mentioned in the identification of impacts of the Project has to do with the issue of community security. It means that some restrictions on community movement and livestock activities will be implemented during construction activities. In terms of cattle pregnancies, no study was done because this aspect was not identified (in the EPDA phase) as a significant impact. Regarding the underground cables that have been identified as impacts of the construction phase, in principle, they will not have significant impacts on communities since they will be buried. The purpose of these meetings is also to obtain subsidies that can enrich our study. If you have any suggestions in this regard, we are available to take note and take into consideration.
Chief of Kala-Kala community **C2)** I would like to thank you for this initiative, I have heard about this company, and I can see that it is real. As a part of the Government, we would like to encourage more and more. We see positive aspects for our population, such as level access roads. **C3)** One of the positive aspects that I have been able to notice is the collection of taxes from the companies involved and their employees, which will generate revenue for our district. As well as the acquisition of local labour, which will contribute to the development of our district. We would like to thank you for this.	**DC – Consultec** **C5)** Mr. R made some considerations more related to the benefits and impacts of the Project. He specifically expressed the hope that the company will help with the issue of cattle theft and securing access roads, but specifically the issue of security. The issues are recorded, but Globeleq and EDM will still be able to provide feedback on this issue. **CM – Source Energia** **C6)** I would like to support our consultant's reply on the issue of support for businesses and community projects in Namaacha. The Project presented here is regarding the Transmission Line, however, there is another one - the Namaacha Power Station (CEN), which is the power generation project that is located in Namaacha, in the locality of Livevene. The Transmission Line project will evacuate the energy

Questions (Q) / Comments (C) / Suggestions(S) asked	Replies (R) / Comments (C)
C4) Another positive aspect is that these companies will be able to contribute to the security of access roads and the control of cattle theft. Thank you again for this explanation, it gives us insight and will help us plan our purpose which is the development of our district.	from the generation point to the grid's entry point, which is the Boane substation. For issues of support for community projects or activities in Namaacha, the CEN project is in the process of developing a social responsibility plan or community development plan that will be the coordination between the District Government and Namaacha Municipality. In terms of annual revenues, the Project will allocate a certain percentage to the Namaacha District Government to support the community projects or activities. The community development plan will consist of coordination between the District and the communities to ascertain the existing needs and priorities for the support due from the Project. This interaction to ascertain the needs and priorities of the District Government and the communities, is done through public and/or community consultations and by dedicated groups for the survey of men, women or vulnerable people in need. After this process, the District will be consulted to also raise its needs. The community development plan is officially submitted for approval in coordination with the communities. For the issue of transparency, the Project establishes a management committee composed by the District Government, the Municipality, the representatives of the Community and some companies or non-governmental organizations interested in being part of the committee to be able to coordinate and make decisions on the community development plan. This support will be provided from the moment the Project starts generating revenue, i.e., in the operational phase of the Project. During the construction period there will be no social responsibility activities, however there will be a great social impact in terms of job creation, which will be around 200 direct jobs and 600 indirect jobs for the CEN project. For the Transmission Line project, there will be about 200 direct jobs and about 400 indirect jobs can be reached. The Project will contribute to the development of the District through the revenues of the local companies providing services in the power line construction process. We are in contact with the District to identify local companies in the areas of construction, logistics and accommodation that can support the Project.
FM – Regulus **C7)** I thank you for the presence of this company in Namaacha. I pray to God that the activities of this company will come to fruition and that its objectives will be achieved. **S3)** I suggest that there be collaboration between the company and the local structures. If possible, I suggest this interaction to be carried out before the Project activities, prior to the identification of the areas where the access roads will be created to avoid the generation of land conflicts later. **S4)** I would also like to suggest that minimum conditions are created in the resettlement sites, such as the availability of water, to avoid conflicts within the resettled population.	**DC – Consultec** **C8)** Mr. F made some considerations about the collaboration between companies and local structures to avoid land conflicts due to access roads to infrastructure. Thank you for the suggestions, which are duly registered. Regarding the host areas, it should be mentioned that this is not an activity developed only by the consultant. The choice of a host area is defined jointly by a committee consisting of the Government structures through SDAE and SDPI, the proponent, the communities to be resettled and the local structures, as well as the consultant. The decision of the host area is not only made by the companies of the Project, but together, so that there is a common understanding and satisfaction of the people to be resettled. This is what the resettlement law requires. This Project is funded by companies that are partners of EDM, Globeleq and Source Energia, and some of these people are present in this meeting to monitor the process and ensure that everything is done in accordance with the established procedures.

Questions (Q) / Comments (C) / Suggestions(S) asked	Replies (R) / Comments (C)
AC – Tax Authority **Q4)** What is the tax area of the companies that will work with Globeleq and Source Energia? This is to find out if the revenues that will be generated will be taxed in the District of Namaacha or in Maputo Province. **S5)** I would like to suggest that the next time you present the table with the identified impacts and their classification, you add another column with the mitigation measures for the identified impacts.	**DC – Consultec** **RQ4)** Proponent and its partners will be able to answer this question. But what often happens is that big companies are registered at Maputo level and taxes are channelled to tax areas in Maputo. **CM –Source Energia** **RQ4)** Globeleq and Source Energia are the implementers of the CEN project. In the meantime, a company was created in 2019 dedicated to the project of the plant, which is the Central Eléctrica de Namaacha, S.A. but it has not yet started activity. The tax area of this company, at the moment, is Maputo City, but as it has not yet started its activity, the suggestion given by you for the next steps will be taken into consideration. Your suggestion is recorded and will be taken into consideration as the project progresses. **DC – Consultec** **C9)** Regarding the introduction of one more column in the table of impacts with mitigation measures, it's a pertinent observation that it would really facilitate a better understanding of the classification of impacts. Thanks for the suggestion. For your information, the complete EIA report is available on our Consultec website, where you can see all the studies that have been carried out in detail and also the mitigation measures.
DM – Sulbrita, Lda **Q5)** Will the transmission line run through our quarry? We would like to obtain this information in order to know if we should attend the specific meetings because so far, we have not received any information about it. **Q6)** What is the direct benefit of the Project to the end consumer?	**DC – Consultec** **RQ5)** Regarding the passage of the transmission line through the quarry area, I will not be able to answer whether the quarry will be covered or not, but the project manager will be able to answer. Then I will send you an e-mail answering this aspect. **RQ6)** The direct benefit to the final consumer was another issue that was raised at the EPDA meeting, and the explanation given at the time, which remains at this stage of the EIA process, is that for the final consumer there are improvements in terms of energy quality and reliability. Which means, with greater availability of energy, there will consequently be an improvement in the quality of the same that leaves the substation for the final consumer. Therefore, the biggest benefit lies in the improvement of power quality for the end consumer and greater availability of energy for the country.
Resident **Q7)** My question is regarding the access roads. We know that the towers will be installed in the mountains and our lands are located right on top of the mountains and a little further down. The access roads that lead to our lands are the same which will lead to the places where the towers will be installed. Other access routes are in riverside areas. We have heard here that these access routes will be restricted as the Project will use it for its activities. We would like to know how we will access our lands/spaces if the project restricts these access routes? **Q8)** Namaacha is a district that has serious water problems due to geological conditions (mountains and rocks). There are places where you can't find water even at a depth of 300-400m and other places where you can find wells and water holes. Some of these wells and water holes are located near the construction area of the towers' foundation. So, we would like to know what will be done about these cases? **Q9)** I would like to know how the trees that will be removed will be compensated, will it be before or after construction or the project beginning? Because we wouldn't want to	**DC – Consultec** **RQ7)** The constraints on the project area have to do with the accesses to the construction area and the transmission line itself after it is built. However, there will always be alternatives for the maintenance of access roads for continuous use by communities. This restriction is more for community safety so that there is no incident or accident during the construction and operation phases. They are only safety restrictions and not a ban on passage or use of access roads. **RQ8)** The geological and hydrogeological studies were carried out in detail to identify all the water sources that exist in the Project area and are properly mapped. The identified impacts are not geological and non-hydrological impacts, they are localized impacts and will not affect the hydrological part of the areas. The foundations will not be of great depth and the impacts are localized with little significance. **RQ9)** Regarding the suggested reforestation program, it is registered. To reinforce the topic addressed by Ms. C about the community development plan, there will be an evaluation of the areas to be reforested and a plan will be designed to cover the needs of the communities. Whether it is the issue of reforestation or another program that will benefit the communities, specialized studies will be carried out so that the programs are well executed.

Questions (Q) / Comments (C) / Suggestions(S) asked	Replies (R) / Comments (C)
just to receive the plants without prior preparation and without identified areas for planting.	
AC – Director of Education of the District Services of Namaacha **C10)** I do not have any questions, but I would like to address a few points. The project comes to bring development to the district and representatives of our villages are present in this room. I would like to know from the representatives of the community if they are satisfied with the answers given in relation to the Project, because tomorrow there may be doubts from the communities about the Project. Therefore, I suggest that you leave here with clear and complete information to respond to your villages to avoid conflicts when the Project starts.	**DC – Consultec** **C11)** Thank you very much.
RL – Government of Namaacha **Q10)** Will there be recruitment of local labour? **Q11)** How many jobs will be available and where will they be located? Will they be seasonal or permanent? **Q12)** What are the specific areas needed for jobs? **Q13)** How will these jobs be advertised?	**DC – Consultec** **RQ11)** As I presented, about 200 jobs are estimated and Ms. Cândida said that about 400 jobs will be indirectly created. These 200 jobs will be for hiring people to work on the site in the construction phase, but also there will be jobs in the camps, for drivers, etc. There will be several jobs that can be generated depending on the Project. **RQ12)** In terms of specific areas of work, I don't have this information. But considering the type of infrastructure and the type of work that will be done, it can be estimated that there will be a need for labour of bricklayers, foremen, electricians, etc. Therefore, there are several areas of work that people may need to work on the implementation of the Project. **RQ10) &13**. As I mentioned, the contractor will have specific plans for the work that he must prepare. The local recruitment plan and working conditions will be one of the plans to be drawn up by the contractor, which should include the specific required areas, the procedures for recruitment and how the jobs will be advertised. In terms of dissemination, Consultec always recommends that the dissemination of jobs to be done in coordination with local structures, as they know each of their communities. More specific information, such as the number of professionals for certain vacancies, has not yet been established.
EN – Secretary of the Ndonguene neighborhood **C12)** I welcome all the speeches made during the meeting, but I would like to agree with what has already been said by Mr. F regarding the coordination between local structures and communities, so that prompt action can be taken in the event of conflicts, avoiding unfortunate situations.	**DC – Consultec** **C13)** Thank you.
Resident **S6)** I would like to insist on the issue of deforestation, because I was not very happy about it. I believe that today, before the implementation of the Project, we did not consider it an impact, but it has a lot of influence in our community. I would suggest the drawing of a mitigation plan for this impact. The community development plan is indeed necessary and can be drawn up, but the issue of the plan to mitigate this impact is a priority.	**DC – Consultec** **C14)** Thank you for your insistence on this issue of deforestation. At the level of the Environmental Management Plan, there is a biodiversity management plan consisting of actions that will allow better management of biodiversity and the process of felling trees. The trees will have to be felled for the construction of the transmission line, but the management plan have specific procedures that will improve and/or enhance the management of this impact. Due to the insistence, we will stress with EDM and Globeleq and Source Energy to consider future actions to mitigate this impact. Once again, I say that the felling of trees is inevitable, but there will be actions to mitigate this impact - for example, community forests, that have been mentioned here, may be one of the actions to be considered by the proponent.

Questions (Q) / Comments (C) / Suggestions(S) asked	Replies (R) / Comments (C)
EM – Regulated Counsel **Q14)** I would like to address the subject of manpower as it was mentioned the possibility of 200 jobs. Will these jobs benefit the locals? **Q15)** What is the composition of the team that has been working in the project area? What if the teams have at least residents of the district? **Q16)** I would also like to know if the local structures were consulted in the hiring of these members of the teams currently in in the field?	**CM –Source Energia** **RQ14)** *Addressed earlier in RQ10-RQ13.* **RQ15)** The question that Mr. E is raising has to do with the power generation project that is the Namaacha Power Plant and not with the transmission line. It is always important to reference the project for a better answer. There was a socio-economic survey that started on the 20th of September and ended on the 13th of October and the same was undertaken based on the resettlement regulation. Based on the legislation, the technical commission must be composed of the National Directorate of Environment (DINAB), the Provincial Environment Service and also the District which is composed of the Economic Activities Services and the District Planning and Infrastructure Services. However, Consultec was hired to support the Environmental Impact Assessment process. **DC – Consultec** **RQ16)** The activity of socio-economic survey is a specific activity and has specific qualifications to be done. Companies hire companies that are qualified for the job and the human resources of these companies mobilize their employees to do these types of surveys.

After the clarifications by Consultec and the proponent, DC mentioned that further comments and suggestions could be sent to the addresses indicated in the NTS, until the 2nd of November 2023. Finally, the Director of Education of the District Services of Namaacha, AC, thanked everyone for their participation and for the public consultation meeting, closing the session.

Minutes of the Public Consultation Meeting

Venue: Boane District Government Session Room

Date: October 19th, 2023

Duration: 10:12 – 11:50

Number of participants: 38

Participants

The following institutions were present at the Public Consultation held in the Session Room of Boane District Government:

- Ministry of Land and Environment (MTA) / National Directorate of the Environment (DINAB) and Provincial Environment Service (SPA);
- Boane District Government – Permanent Secretary (SP);
- Baone District Economic Activities Services (SDAE);
- Boane District Planning and Infrastructure Services (SDPI);
- Provincial Directorate of Agriculture and Fisheries (DPAP);
- Provincial Directorate of Industry and Commerce (DPIC);
- Provincial Directorate of Culture and Tourism (DPCT);
- Provincial Directorate of Public Works, Housing and Water Resources (DPOHRH);
- Mozambique Railways (CFM) – Boane Delegation
- World Bank / International Finance Corporation (WB/IFC);
- Impacto;
- IBIS Consulting;
- Integrated Quality, Environment and Safety Systems – SIQAS;
- MozParks;
- Globeleq;
- Source Energia;
- Electricidade de Moçambique (EDM);
- Namaacha Wind Power Plant (CEN);
- Local authorities: Secretary of the OJM of the locality of Gueguegue, Chief of Block 10 (Neighborhood 1), Chief of the locality of Gueguegue, Community Leader of Neighborhood 1;
- Residents of Boane District;
- CONSULTEC.

Agenda and Objectives:

The purpose of the meeting was to present the 66 kV Transmission Line Project, as well as to present the EIS prepared under the Environmental Impact Assessment (EIA) process.

Welcome

Representing the Administrator of Boane District, the Permanent Secretary, Mr. AC, started the meeting by introducing himself, welcoming and thanking everyone for their presence in the venue. Subsequently, he gave the floor to the Consultant for the presentation of the project and the EIA process in progress.

At the beginning of the meeting, the community and its representatives were not present due to the scheduling of another public consultation meeting, for the afternoon, to present the resettlement process. Thus, there was the misperception that it was the same meeting. However, during the meeting, part of the community members and its representatives did arrive. Therefore, the consultant summarized the projects and EIA presentation, which allowed them to understand the meeting objectives and fully participate in the meeting.

Project Presentation

After the meeting kick-off, the consultant representative, DC, began the presentation by mentioning that the project aims to evacuate the energy produced at the Namaacha Wind Farm (the Namaacha Power Plant – CEN) through a 66 kV transmission line with about 33.5 km, to Boane substation, located in Boane District.

He explained that the project is being developed by the association of companies and Electricidade de Moçambique (EDM), Globeleq and Source Energia, being EDM the company responsible for the energy evacuation and transformation in the substations.

Then, the consultant presented the Project in an exhaustive manner, referring to its background, the main objectives, the geographical location where the energy production will be carried out (the future Namaacha Power Plant) and where it will be evacuated (the Boane substation), the main components and characteristics of the project, the activities that will characterize the Project, the EIA process phasing and the current stage of the Project, the description of the projects areas of influence, the environmental and social reference situation, and the main environmental impacts for each phase of the project, and finally, the environmental management plan foreseen for the project as a whole.

The consultant concluded that the Project is environmentally viable, so no residual negative impacts of high significance were identified and that the positive impacts outweigh the negative ones. He added that the Project is aligned with the New and Renewable Energy Development Policy, approved by the Government of Mozambique, as well as the relevant international standards and guidelines of international institutions such as the World Bank/International Finance Corporation (WB/IFC). He also concluded that the Project would stimulate regional and national economic development.

At the end of the presentation, Décio Camplé opened the room for debate, comments, questions and suggestions, which are recorded below. Before the intervention of the participants, he explained that, to facilitate the registration of all the participations in the debate, it was important that each participant identified himself first, saying his name and place or the institution from which he came.

Table 1 – Summary of interventions and responses given at the public consultation meeting held at the Boane District Government Session Room on October 19th 2023

Questions (Q) / Comments (C) / Suggestions(S) asked	Replies (R) / Comments (C)
AZ – CFM – Boane **Q1)** As was mentioned during the presentation, the electrical cables will be buried in some points in the village of Boane. I would like to know what are the specific places where the electrical cables will be buried? My question was to understand at which specific points will the electrical cables be buried up to the entrance of the Boane substation. For I believe that these cables will eventually pass through the railway line. **C1)** In the case of CFM, we would like to request a meeting with the proponent and the consultant to understand how the installation of the underground electrical cables will be carried out in the area that crosses the railway line and what the impact will be. Because we believe that some cables can be buried in the vicinity of the railway, and it is necessary to know how the buried cables will be maintained. **Q2)** Regarding resettlement, will there be room for the population to be resettled to do the quality control of the resettlement houses? **S1)** It was also mentioned during the presentation that in the areas where the towers will be installed, an area extension of 70 meters will be cleared and that the area itself will be 50 meters. Therefore, I would like to suggest that this right-of-way be properly controlled to prevent the local population from invading and building their homes for later demanding compensation. This will also prevent accidents and/or incidents that may occur in this area caused by the eventual detachment of the electrical cables. I also suggest that the administration and those responsible for the communities reach out to the community and install warning signs for the prohibition of construction in the right of way.	**DC – Consultec** **RQ1)** As I mentioned in the presentation, from km 0 to km 29 (at Namaacha District), there will be two parallel lines in a simple circuit, with a 20 m separation between them and with 25 m right of way on each side, which makes up the 70 meters of total right-of-way. Then, from km 29 to km 33.2 (in Boane District), there will be a single pole with a 50-meter right-of-way, i.e., 25 m on each side. Finally, from km 33.2 to km 33.5 (about 310 meters), the line will be completely buried. **CM – Source Energia** **RQ1)** The 310-metre section does not cross the railway. **DC – Consultec** **RQ1)** I would like to point out that the towers have 200 meters spacing between each other and the height of the transmission line will be 20 metres, which will ensure that there will be no direct impacts on the railway. **RQ2)** I cannot say with certainty about the material that will be used for the construction of the houses for the resettlement. But let me briefly explain the resettlement process. The resettlement process is not only conducted by the proponent, but also done with the involvement of all local structures. Prior to resettlement, there is a process of communication and involvement of the people who will be resettled in which they will provide their inputs on the type of infrastructure that should be designed. Mozambican legislation sets the standards for building a decent home. The law establishes, for example, that if a family consisting of 5 people, its replacement house must be 370 m^2 with three bedrooms, a living room, a kitchen and a bathroom, where the choice whether the bathroom will be external or internal is made by the family. The question of materials for construction transcends the environmental consultants. The consultants only present what is stated in the law on how the construction of the houses should be carried out. However, an inspection must be carried out by the proponent, the SDPI and the inspector hired by the contractor to ensure that the houses comply with the standards established by law. There may be exceptional cases, but it is believed that in this Project we will not have these cases because this Project is funded by international institutions, which are present here today, with the objective of checking and audit the process and ensuring that everything is complies with the established standards.
AC – Permanent Secretary of the Boane District Government **C2)** I would like to welcome the project, which is characterized by producing environmentally friendly energy.	**DC – Consultec** **RQ3)** Indeed, it is as EDM has in place, on its organizational structure, departments and teams that are responsible for the maintenance of the infrastructures.

Questions (Q) / Comments (C) / Suggestions(S) asked	Replies (R) / Comments (C)
S2) I would like to highlight the issue raised by Mr. Amândio regarding resettlement, which is one of the problems faced by the district. We call for seriousness in this survey that is being carried out so that we do not have conflicts related to this issue in the future. **S3)** Regarding manpower, we call for local labour to be prioritized as it would help the community to see the Project as beneficial and contribute to the success of its implementation. **Q3)** It was mentioned during the presentation that the service life of the project is 35 years and that with proper maintenance, the service life can be extended. Therefore, is the transfer of knowledge planned to ensure that the maintenance of this infrastructure is carried out by the next generations?	
JN – Director of DPIC **C3)** I would like to congratulate this initiative to bring here a second source of energy generation for our communities and our province, above all. Congratulating the presentation made, the perception of the Project itself, its benefits, its constraints, and its challenges was clear. **S4)** I would like to draw attention to the aspect of community participation. It must be in the best interest, both proponent and of the local governments, to ensure the participation of communities in public consultation meetings. Participation cannot be interpreted by communities as an option to prevent them from losing interest in participating in these meetings. I suggest that in the next public consultation this constraint be corrected, working with the local government so that everything is done in favour of the participation of the communities in the meetings, with the main participation of the community leaders. **S5)** I would like to highlight the issue of the right-of-way addressed by Mr. Amândio. I suggest that communities be sensitized to understand and comply with national laws prohibiting the occupation of protected areas. We also call on the local authorities to be vigilant in this regard and not tire of sensitizing the community to respect these laws that are for the protection of all. **C4)** We encourage the team in the field to continue working to ensure that the Project is properly implemented so that Maputo Province can finally count on more renewable energy projects.	**DC – Consultec** **C5)** Thank you very much for your valuable inputs. I´d like to clarify, as I mentioned in the beginning of the meeting, that we´ve sent the invitation letters to the District Administration and to the Administrative Post of Boane Sede to disseminate the information regarding this meeting. However, there is another meeting, organized by Consultec with the same community, that is set for this afternoon and maybe there was a miss understanding from the communities.
CC – SIQAS **Q4)** My question will relate to the safety aspects of communities that are in areas where the power cables will be buried. During the construction phase, considering that there will be no resettlement for this community, what is the safety plan foreseen for the community during the construction and maintenance phase of the transmission line? It is known that there will be earthmoving activities, the movement of machinery and vehicles, air pollution caused by the emission of particulate matter that will affect the air quality in these areas, and the issue of safety of the surrounding communities.	**DC – Consultec** **RQ4)** In terms of mitigation measures, the impacts on community safety in the construction and maintenance phase are considered. Some mitigation measures are planned, such as the protection and isolation of all excavations, placement of warning signals and information, and communication to the communities regarding the activities that will be developed, and the potential risks associated. For specific procedures, EDM may provide support for safety practices in the installation of underground cables.

Questions (Q) / Comments (C) / Suggestions(S) asked	Replies (R) / Comments (C)
AM – DINAB **S6)** I would like to emphasize the issue of community participation in public consultation meetings. The participation of the community in the meetings should not be optional, as for decision-making there is a need to listen to the community. **Q5)** I would like to have a clarification regarding the transmission line that will be decommissioned. For this project, will the same line be used, or another line will be built? **Q6)** It was mentioned that the project has a useful life of 35 years. However, Globeleq and Source Energia contract with EDM is for 25 years. What will become of the Project in the remaining 10 years? Will there be a tender for another company?	**DC – Consultec** **C6)** Regarding the issue of community participation in public consultation meetings, we duly registered your comment. **RQ5)** Now there is an EDM transmission line that is deactivated. The proposed line (the Project) will actually be placed in the route of this old line. **RQ6)** The infrastructure does have an estimated useful life of 35 years that can be extended with proper maintenance. However, the 25-year contract referred to is related to the contract for the construction and operation of the Namaacha Power Plant. The CEN dealer has a 25-year contract. After this period, Globeleq and Source Energia and EDM will deliver the infrastructures to EDM itself for the continuity of management. There may be other agreements for the extension of this period, but for now 25 years are estimated for CEN's concession contract.
ZB – Deputy Chief of the Locality of Gueguegue **Q7)** It was mentioned in the presentation that the transmission line that enters the Boane District will be buried starting in the Mabanja area, an area characterized by agricultural and livestock activity. So, how deep would it be to bury the electrical cables? **Q8)** What is the plan for the population that will be affected by the buried power cables? **Q9)** When will the activities start? **S7)** I would like to suggest that the next public consultation meetings should take place in the afternoon. In the morning, most of the community is working in the cultivation areas and returns to their homes around 2:00 p.m.	**DC – Consultec** **RQ7)** From Namaacha to the entrance of Boane District, which is from km 0 to km 29, the line will be aerial with double and parallel towers. From km 29 to km 33.2, there will be a single tower with double circuit. From km 33.2 to km 33.5, which will be only 300 meters, the line will be buried. Where there will be areas of agricultural and livestock activity, the line will be aerial, thus allowing these activities to be carried out normally. **RQ8)** *Addressed earlier in RQ4.* **Cândida Macurra – Globeleq and Source Energia** **RQ9)** Currently, we are in the finalization phase of the contracts with EDM. I would like to clarify that there are two projects that are taking place, one is the power generation project which is in the Namaacha District and the other is the transmission line of the energy produced in Namaacha to Boane substation. The power generation project, CEN, is proposed by Globeleq and Source Energia and EDM. For the transmission line project, the bidder is exclusively EDM. Globeleq and Source Energia will support the transmission line project due to the power generation project at CEN. Regarding the starting year, it is expected that all contracts with the Government of Mozambique will be finalized this year, which are the concession contracts, the power purchase and sale contracts, and the construction and maintenance contract. After the completion of the contracts, we expect that by May or June the construction of the Project will begin, which will have an expected construction period of about 18 months. The power generation project is 120 MW that will generate 200 direct jobs and 400 to 600 indirect jobs. We expect the transmission line and power generation project to be completed in the same period. This, we expect that at the end of the 18 months of construction of the power generation project, the construction of the transmission line project will be completed. Add that the transmission line project takes little construction time compared to the power generation project. Therefore, we anticipate that by the beginning of 2026 the transmission line and power generation projects will be in operation.
DQ – SDPI	**DC – Consultec**

Questions (Q) / Comments (C) / Suggestions(S) asked	Replies (R) / Comments (C)
C7) I would like to welcome the presentation, which is the result of fieldwork. This work had the involvement of communities and local leadership and the information from today's meeting was disseminated to our communities. In the meantime, the same content presented at this meeting will also be presented at the community meetings that will be held later today. And I appreciate the presence of the community and its representatives at this meeting today. **C8)** The Project is an asset for the Boane District and for the country as it is another source of energy that aims to improve the quality of energy in our country. **Q10)** Is this type of energy source, wind energy, at an early stage in the country? If the project is at an early stage, what is the outlook for the coming years? **Q11)** Some transmission line projects have the metal structure as the material of the towers. What will be the material for the towers of this project? **Q12)** It was reported that the transmission line will be 33.5 km long, covering Namaacha and Boane Districts. In this manner, what is the extension for Namaacha District and Boane District?	**RQ10)** Regarding renewable energy projects, the generation of new and renewable energy is a priority of the Government of Mozambique. The Ministry of Mineral Resources and Energy has identified several potential sites for wind power generation, and it is in this context that Globeleq and Source Energia bid and won this tender for this site in Namaacha. Similarly, there may be projects of this nature elsewhere throughout the country. It can be said with certainty that other wind energy projects will emerge as the proponents sign agreements with the Government of Mozambique and EDM as a partner. EDM will be able to subsidize in this regard. **FF – EDM** **RQ10)** Regarding this issue of renewable energies, the country has great potential to develop photovoltaic and wind projects. As an example, this site where CEN will be implemented is one of the most optimal places to develop wind power generation projects. Meanwhile, there are projects in the feasibility study phase in the province of Inhamabane (Jangamo) that will develop the wind energy project. In the solar component, there are already some large-scale photovoltaic plants in operation in Zambezia province (Mocuba), Cabo Delgado (Metoro) and recently (September 2023), the solar plant in Niassa (Cuamba) with a capacity of 15 MW was inaugurated. **DC – Consultec** **RQ11)** With the characteristics of this specific project, the material of the poles will be wood or metal. The poles made of metal material are for lines with higher voltage. **RQ12)** The length of the line from Namaacha to Boane is from km 0 to km 29, which is already inside Boane. I believe that Globeleq and Source Energia will be able to subsidize this. **CM –Source Energia** **RQ12)** I wouldn't answer more precisely, but the longest extension of the line is in Namaacha District and the extension of Boane District does not reach 8km.
AN – Leader of Gueguegue **Q13)** I would like to address the issue of the walls of the houses that will be temporarily destroyed for the implementation of the Project. What will be done to ensure the safety and preservation of the air quality of these dwellings? **Q14)** A socioeconomic survey was undertaken and included the owners of the affected agricultural areas and dwellings. However, some of the owners of these areas and registered dwellings were not present at the time of the survey. Will there be the possibility of making another survey of people who were not present at the 1st survey?	**DC – Consultec** **RQ14)** Regarding the question of security, it has already been answered (refer to RQ4). **RQ15)** It is known to the community that the construction of physical infrastructures (housing) is not allowed in the area demarcated for the implementation of the project. And early this year a socioeconomic survey was undertaken, which included all the physical infrastructures that existed. Thus, the infrastructures that are built after this survey will not be considered. The agricultural areas of the owners that were not present in the survey were registered with a note of their absence so that the registration can be updated before the implementation of the project. Therefore, there will be the inclusion of owners who were absent in the 1st survey.

After the clarifications by Consultec and the proponent, Décio Camplé mentioned that further comments and suggestions could be sent to the addresses indicated in the NTS, until the 2nd of November 2023. Having said that, the Permanent Secretary of the Government of the District of Boane, Mr. António Cossa, thanked everyone for their participation and for the public consultation meeting, closing the session.

Bacabaca 1 Focus Group Discussions of T-Line Route Change | MINUTES

Meeting date | time *01 october 2024* | *11:15 – 12:15* | Meeting location *Bacabaca 1 Community Circle*

Meeting called by	Central Eléctrica Da Namaacha, S.A. (CEN)	Attendees: See attached attendance list
Type of meeting	Information sharing	
Facilitator	Hortência Rebelo	

MEETING STRUCTURE

The meeting was divided into two focus groups: 1) The Bacabaca 1 community leaders and community representatives; 2) Newly PAPs subject to economic resettlement for the new alignment.

FGP: Leaders and Community Representatives | *11:15 – 11:45* | Gender Split: 3 M

Presentation of Route Change

Introductions and greetings were made between the Project team and community representatives.

Hortência Rebelo presented the proposed transmission line route change to the community representatives. A map was shown for the Bacabaca 1 area with the old route and the proposed new route, as well as the plots that were expected to be no longer impacts and those that would now be impacted with the route change. It was explained that the route was being changed in this area because it was identified that the previous proposed route went through an active military area that cannot be crossed to do safety and technical reasons. The community leadership were also informed that the Project is seeking a formal amendment to the previously granted environmental approval for this revised route and that this process was underway with MTA.

It was noted that the purpose of this transmission line is to evacuate power from the new wind farm that will be built in Namaacha to the Boane substation and that this type of transmission line is for the transfer of power, not for direct consumption. The footprint of the line was explained (i.e. two parallel lines with a 25 m safety buffer on each side, separated by 20 m, for a total width of 70 m). It was explained that within the 70 m corridor the Project would need to clear all vegetation and restrict access for construction, but after that time people would be allowed to regrow crops within the entire area, except for the actual footprint of the towers. It was explained that trees and structures could not be constructed within the buffer due to safety reasons. It was further explained that the Project would compensate community members for any lost structures, crops or trees within this 70 m corridor.

It was further explained that teams from Acer Africa would be visiting the area stating the end of October to complete a detailed census for the affected area. It was explained that this census process would allow community members to see exactly where the proposed 70 m corridor would be and would result in detailed PAP consent forms documenting exactly what assets would be subject to compensation.

The CLO's contact details were provided to all attendees.

Hortência then asked the community representatives if they had any questions or concerns about the proposed route change.

Community Questions/ Comments	CEN Response
The community representative thanked the project for the information provided	

FGP: Newly Economic PAPs | *09:30 – 10:00* | Gender Split: *8 M, 3 F*

Presentation of Route Change

Introductions and greetings were made between the Project team and the previously affect PAPs.

Hortência Rebelo presented the proposed transmission line route change to the previously affected PAPs. A map was shown for the Bacabaca 1 area with the old route and the proposed new route, as well as the plots that were expected to be no longer be impacted with the route change. It was explained that the route was being changed in this area because it was identified that the previous proposed route went through an active military area that cannot be crossed to do safety and technical reasons.

It was explained that those who have a farm cannot stop cultivating, when the project is about to start construction, will present the contractor to the community and inform that the activity will start.

It was also explained that during construction some jobs will be available for local people. The Project will collect a list of interested people from each affected community prior to construction and share this with the engineering contractor. Prospective worker details should be given to the CLO.

Hortência then asked the former PAPs if they had any questions or concerns about the proposed route change.

CLO contacts were provided to the community

Community Questions/ Comments	CEN Response
A PAP asked what he will gain during the period that will remain without cultivation.	It was answered that it will be compensated according to the crops found in his machamba during census.
A PAP asked what will be the treatment given if the tower be in his machamba since it will be a definitive loss of that piece of land.	He was told that he will be compensated for the lost that piece of land.
A PAP said that he lent his land to someone, so he would like to know what treatment will be given.	It was answered that the compensation of the crops will be made to the owner of the crops, the space lost if the tower is implanted will be made to the owner of the field, the trees are also compensated to the owner of the field.

Community Questions/ Comments	CEN Response
A PAP said we are asking for a job, everyone who is here is unemployed.	It was also explained that during construction some jobs will be available for local people

Mikwakene Focus Group Discussions of T-Line Route Change | MINUTES

Meeting date | time *30 September 2024* | *14:30 – 15:00* | Meeting location *Milwakene Community Circle*

Meeting called by	Central Eléctrica Da Namaacha, S.A. (CEN)	Attendees: See attached attendance list
Type of meeting	Information sharing	
Facilitator	Hortência Rebelo	

FGP: Leaders and Community Representatives | *14:30 – 15:00* | Gender Split: *18 F 7 M*

Presentation of Route Change

Introductions and greetings were made between the Project team and community representatives.

Hortência Rebelo presented the proposed transmission line route change to the community representatives. A map was shown for the Milwakene area with the old route and the proposed new route. The community was informed that initial surveys have identified no people living or farming in the Project's proposed footprint, but that they would be subject to indirect impacts consistent with those outlined the ESIA engagement that was conducted for the original transmission line route. It was explained that the route was being changed in this area because it was identified that the previous proposed route went through an active military area that cannot be crossed to do safety and technical reasons. The community leadership were also informed that the Project is seeking a formal amendment to the previously granted environmental approval for this revised route and that this process was underway with MTA.

It was noted that the purpose of this transmission line is to evacuate power from the new wind farm that will be built in Namaacha to the Boane substation and that this type of transmission line is for the transfer of power, not for direct consumption. The footprint of the line was explained (i.e. two parallel lines with a 25 m safety buffer on each side, separated by 20 m, for a total width of 70 m). It was explained that within the 70 m corridor the Project would need to clear all vegetation and restrict access for construction, but after that time people would be allowed to regrow crops within the entire area, except for the actual footprint of the towers.

It was explained that during construction some jobs will be available for local people. The Project will collect a list of interested people from each affected community prior to construction and share this with the engineering contractor. Prospective worker details should be given to the CLO.

The CLO's contact details were provided to all attendees.

Hortência then asked the community representatives if they had any questions or concerns about the proposed route change.

Community Questions/ Comments	CEN Response
The leadership wanted to know what benefits the project would bring besides jobs. Noting the presence of EDM, they wanted to	Hortencia reiterated that this transmission line is for the transportation of energy and because the voltage is high, it cannot be used to directly provide power to the

Community Questions/ Comments	CEN Response
discuss improvement to the existing line to bring power to the local communities. Because this is a power project, they said that they had an expectation of energy to the community.	communities it passes through. EDM noted that this project was important to their wider strategy for improving power supply at a national and provincial level. These plans include expanding coverage of power supply to rural areas, but no specific plans are in place for Milwakene. EDM representatives noted this request and will take it back to their organization for discussion.
The Project noted that in their walk through of the new route they saw evident of elephants in the area. From a safety perspective, the Project wanted to know if elephants are present in the area and how this affects the community.	The community representatives confirmed that elephants have occasional visited the area during the last 2 years. When his happens, the community suffers from their presence due to destruction of crops. When they are observed in the area, there is someone they can call from the District/Province to handle the elephants. They believe ~17 elephants came to the region in 2017 from Kruger National Reserve.

Madevo Focus Group Discussions of T-Line Route Change | MINUTES

Meeting date | time *30 September 2024* | *12:30 – 13:00* | Meeting location *Madevo Community Circle*

Meeting called by	Central Eléctrica Da Namaacha, S.A. (CEN)	Attendees: See attached attendance list
Type of meeting	Information sharing	
Facilitator	Hortência Rebelo	

FGP: Leaders and Community Representatives | *12:30 – 13:00* | Gender Split: *9 F 5 M*

Presentation of Route Change

Introductions and greetings were made between the Project team and community representatives.

Hortência Rebelo presented the proposed transmission line route change to the community representatives. A map was shown for the Madevo area with the old route and the proposed new route. The community was informed that initial surveys have identified no people living or farming in the Project's proposed footprint, but that they would be subject to indirect impacts consistent with those outlined the ESIA engagement that was conducted for the original transmission line route. It was explained that the route was being changed in this area because it was identified that the previous proposed route went through an active military area that cannot be crossed to do safety and technical reasons. The community leadership were also informed that the Project is seeking a formal amendment to the previously granted environmental approval for this revised route and that this process was underway with MTA.

It was noted that the purpose of this transmission line is to evacuate power from the new wind farm that will be built in Namaacha to the Boane substation and that this type of transmission line is for the transfer of power, not for direct consumption. The footprint of the line was explained (i.e. two parallel lines with a 25 m safety buffer on each side, separated by 20 m, for a total width of 70 m). It was explained that within the 70 m corridor the Project would need to clear all vegetation and restrict access for construction, but after that time people would be allowed to regrow crops within the entire area, except for the actual footprint of the towers.

The CLO's contact details were provided to all attendees.

Hortência then asked the community representatives if they had any questions or concerns about the proposed route change.

Community Questions/ Comments	CEN Response
The leadership wanted to know if jobs will be offered to locals during construction.	It was confirmed that the Project will collect a list of interested people from each affected community prior to construction and share this with the engineering contractor. Prospective worker details should be given to the CLO.
The Project noted that in their walk through of the new route they saw evident of	

Community Questions/ Comments	CEN Response
elephants in the area. From a safety perspective, the Project wanted to know if elephants are present in the area and how this affects the community.	The community representatives confirmed that elephants are regular visitors to the region. The community suffers from their presence due to destruction of crops. When they are observed in the area, there is someone they can call from the District/Province to handle the elephants. They do not think they live here but instead come from other Kruger National Reserve.

Mabanja Focus Group Discussions of T-Line Route Change | MINUTES

Meeting date | time *02 october 2024* | *12:45 – 14:45* | Meeting location *Mabanja Community Circle*

Meeting called by	Central Eléctrica Da Namaacha, S.A. (CEN)	Attendees: See attached attendance list
Type of meeting	Information sharing	
Facilitator	Hortência Rebelo	

MEETING STRUCTURE

The meeting was divided into two focus groups: 1) The Mabanja community leaders and community representatives; 2)) Previous PAPs subject to economic resettlement for the old alignment who continue to be impacted by the new line. Note that people with stalls joined the meeting of machamba impacted PAP

FGP: Leaders and Community Representatives | *12:45 – 13:15* | Gender Split: 4 M, 3 F

Presentation of Route Change

Introductions and greetings were made between the Project team and community representatives.

Hortência Rebelo presented the proposed transmission line route change to the community representatives. A map was shown for the Mabanja area with the old route and the proposed new route, as well as the plots that were expected to be no longer impacts and those that would now be impacted with the route change. It was explained that the route was being changed in this area because it was identified that the previous proposed route went through an active military area that cannot be crossed to do safety and technical reasons, and also due to the 30m safety strip required by ANE for road expansion. The community leadership were also informed that the Project is seeking a formal amendment to the previously granted environmental approval for this revised route and that this process was underway with MTA.

It was noted that the purpose of this transmission line is to evacuate power from the new wind farm that will be built in Namaacha to the Boane substation and that this type of transmission line is for the transfer of power, not for direct consumption. The footprint of the line was explained (i.e. two parallel lines with a 25 m safety buffer on each side, separated by 20 m, for a total width of 70 m). It was explained that within the 70 m corridor the Project would need to clear all vegetation and restrict access for construction, but after that time people would be allowed to regrow crops within the entire area, except for the actual footprint of the towers. It was explained that trees and structures could not be constructed within the buffer due to safety reasons. It was further explained that the Project would compensate community members for any lost structures, crops or trees within this 70 m corridor

It was further explained that teams from Acer Africa would be visiting the area stating the end of October to complete a detailed census for the affected area. It was explained that this census process would allow community members to see exactly where the proposed 70 m corridor would be and would result in detailed PAP consent forms documenting exactly what assets would be subject to compensation.

The CLO's contact details were provided to all attendees.

Hortência then asked the community representatives if they had any questions or concerns about the proposed route change.

Community Questions/ Comments	CEN Response
The community representative thanked the information shared.	

FGP: Old Economic PAPs | *13:15 – 14:15* | Gender Split: *27 F, 10 M*

Presentation of Route Change

Introductions and greetings were made between the Project team and the previously affect PAPs.

Hortência Rebelo presented the proposed transmission line route change to the previously affected PAPs. A map was shown for the Bairro 1 area with the old route and the proposed new route, as well as the plots that were expected to be no longer be impacted with the route change. It was explained that the route was being changed in this area because it was identified that the previous proposed route went through an active military area that cannot be crossed to do safety and technical reasons , and also due to the 30m safety strip required by ANE for road expansion.

It was explained that those who have a farm cannot stop cultivating, when the project is about to start construction, will present the contractor to the community and inform that the activity will start.

It was also explained that during construction some jobs will be available for local people. The Project will collect a list of interested people from each affected community prior to construction and share this with the engineering contractor. Prospective worker details should be given to the CLO.

Hortência then asked the former PAPs if they had any questions or concerns about the proposed route change.

CLO contacts were provided to the community

Community Questions/ Comments	CEN Response
No questions or comments were made	

Kalula Focus Group Discussions of T-Line Route Change | MINUTES

Meeting date | time *30 September 2024 | 13:30 – 14:00* | Meeting location *Kalula Community Circle*

Meeting called by	Central Eléctrica Da Namaacha, S.A. (CEN)	Attendees: See attached attendance list
Type of meeting	Information sharing	
Facilitator	Hortência Rebelo	

FGP: Leaders and Community Representatives | *13:30 – 14:00* | Gender Split: *13 M*

Presentation of Route Change

Introductions and greetings were made between the Project team and community representatives.

Hortência Rebelo presented the proposed transmission line route change to the community representatives. A map was shown for the Kalula area with the proposed new route. The community was informed that initial surveys have identified no people living or farming in the Project's proposed footprint, but that they would be subject to indirect impacts. The most likely adverse impacts from the original ESIA that were identified as being possible for the community were noted, i.e. impacts from dust, traffic, and presence of an external workforce in the community.'

It was explained that the route was being changed in this area because it was identified that the previous proposed route went through an active military area that cannot be crossed to do safety and technical reasons. The community leadership were also informed that the Project is seeking a formal amendment to the previously granted environmental approval for this revised route and that this process was underway with MTA.

It was noted that the purpose of this transmission line is to evacuate power from the new wind farm that will be built in Namaacha to the Boane substation and that this type of transmission line is for the transfer of power, not for direct consumption. The footprint of the line was explained (i.e. two parallel lines with a 25 m safety buffer on each side, separated by 20 m, for a total width of 70 m). It was explained that within the 70 m corridor the Project would need to clear all vegetation and restrict access for construction, but after that time people would be allowed to regrow crops within the entire area, except for the actual footprint of the towers.

It was explained that during construction some jobs will be available for local people. The Project will collect a list of interested people from each affected community prior to construction and share this with the engineering contractor. Prospective worker details should be given to the CLO.

The CLO's contact details were provided to all attendees.

Hortência then asked the community representatives if they had any questions or concerns about the proposed route change.

Community Questions/ Comments	CEN Response
Four members of the local leadership stated that lack of energy is a major problem for the	Hortencia reiterated that this transmission line is for the transportation of energy and because the voltage is

Community Questions/ Comments	CEN Response
area. For example, when butchering a cow of goat, meat is wasted because of lack of refrigeration.	high, it cannot be used to directly provide power to the communities it passes through. EDM noted that this project was important to their wider strategy for improving power supply at a national and provincial level. These plans include expanding coverage of power supply to rural areas, but no specific plans are in place for Kalula. EDM representatives noted this issue and will take it back to their organization for discussion.
One community representative stated that they were glad to hear about improvements to the energy network in the area and happy for the Project to go forward. One community representative stated they welcomed the Project to come. One community representative noted that they were glad to hear of jobs being brought to area. It was noted that some representative from the community were not present due to a funeral.	

Gumbe Focus Group Discussions of T-Line Route Change | MINUTES

Meeting date | time *30 September 2024 | 09:30 – 11:45* | Meeting location *Gumbe Community Circle*

Meeting called by	Central Eléctrica Da Namaacha, S.A. (CEN)	Attendees: See attached attendance list
Type of meeting	Information sharing	
Facilitator	Hortência Rebelo	

MEETING STRUCTURE

The meeting was divided into three focus groups: 1) The Gumbe community leaders and community representatives; 2) Previous PAPs subject to physical resettlement for the old alignment who are no longer affected; and 3) Previous PAPs subject to economic resettlement for the old alignment who are no longer affected. Note that newly affected PAPs for the Gumbe area were not available to participate in the meetings. As such one-on-one meetings will be scheduled with each of them.

FGP: Leaders and Community Representatives | *09:30 – 10:00* | Gender Split: *3 M*

Presentation of Route Change

Introductions and greetings were made between the Project team and community representatives.

Hortência Rebelo presented the proposed transmission line route change to the community representatives. A map was shown for the Gumbe area with the old route and the proposed new route, as well as the plots that were expected to be no longer impacts and those that would now be impacted with the route change. It was explained that the route was being changed in this area because it was identified that the previous proposed route went through an active military area that cannot be crossed to do safety and technical reasons. The community leadership were also informed that the Project is seeking a formal amendment to the previously granted environmental approval for this revised route and that this process was underway with MTA.

It was noted that the purpose of this transmission line is to evacuate power from the new wind farm that will be built in Namaacha to the Boane substation and that this type of transmission line is for the transfer of power, not for direct consumption. The footprint of the line was explained (i.e. two parallel lines with a 25 m safety buffer on each side, separated by 20 m, for a total width of 70 m). It was explained that within the 70 m corridor the Project would need to clear all vegetation and restrict access for construction, but after that time people would be allowed to regrow crops within the entire area, except for the actual footprint of the towers. It was explained that trees and structures could not be constructed within the buffer due to safety reasons. It was further explained that the Project would compensate community members for any lost structures, crops or trees within this 70 m corridor.

It was further explained that teams from Acer Africa would be visiting the area stating the end of October to complete a detailed census for the affected area. It was explained that this census process would allow community members to see exactly where the proposed 70 m corridor would be and would result in detailed PAP consent forms documenting exactly what assets would be subject to compensation.

The CLO's contact details were provided to all attendees.

Hortência then asked the community representatives if they had any questions or concerns about the proposed route change.

Community Questions/ Comments	CEN Response
The only question raised was to confirm that the project will still go through Gumbe and that jobs will be offered to locals during construction.	It was confirmed that the Project will still go through Gumbe. It was also explained that during construction some jobs will be available for local people. The Project will collect a list of interested people from each affected community prior to construction and share this with the engineering contractor. Prospective worker details should be given to the CLO.
The Project noted that in their walk through of the new route they saw evident of elephants in the area. From a safety perspective, the Project wanted to know if elephants are present in the area and how this affects the community.	The community representatives confirmed that elephants are regular visitors to the region, including the area of the old route and new route. The community suffers from their presence due to destruction of crops, but there have been no attacks on people. They do not kill or harm them/ just avoid when present. They have been present for 3-4 years and they think they have come from other areas (e.g. Kruger National Reserve or Maputo Elephant Reserve).

FGP: Physical Resettlement PAP No Longer Affected | *10:00 – 10:45* | Gender Split: *3 M, 1 F*

Presentation of Route Change

Introductions and greetings were made between the Project team and the previously affect PAP.

Hortência Rebelo presented the proposed transmission line route change to the previously affected PAP. A map was shown for the Gumbe area with the old route and the proposed new route, as well as the plots that were expected to be no longer be impacted with the route change. It was explained that the route was being changed in this area because it was identified that the previous proposed route went through an active military area that cannot be crossed to do safety and technical reasons.

It was also explained that during construction some jobs will be available for local people. The Project will collect a list of interested people from each affected community prior to construction and share this with the engineering contractor. Prospective worker details should be given to the CLO. It was explained that while he may no longer be affected, he would still be eligible for consideration for one of these jobs.

Hortência then asked the former PAP if he had any questions or concerns about the proposed route change.

Community Questions/ Comments	CEN Response
The previously affected PAP confirmed that he is happy with the change but wanted to make sure he was included as a candidate for employment during the construction phase.	It was explained that the Project will collect a list of interested people from each affected community prior to construction and share this with the

Community Questions/ Comments	CEN Response
	engineering contractor. The CLO's contact details were given as she will compile this list.

FGP: Economic Resettlement PAPs No Longer Affected | *11:00 – 11:45* | Gender Split: *5 M, 3 F*

Presentation of Route Change

Introductions and greetings were made between the Project team and the previously affect PAPs.

Hortência Rebelo presented the proposed transmission line route change to the previously affected PAPs. A map was shown for the Gumbe area with the old route and the proposed new route, as well as the plots that were expected to be no longer be impacted with the route change. It was explained that the route was being changed in this area because it was identified that the previous proposed route went through an active military area that cannot be crossed to do safety and technical reasons.

It was also explained that during construction some jobs will be available for local people. The Project will collect a list of interested people from each affected community prior to construction and share this with the engineering contractor. Prospective worker details should be given to the CLO. It was explained that while they may no longer be affected, they would still be eligible for consideration for one of these jobs.

Hortência then asked the former PAPs if they had any questions or concerns about the proposed route change.

Community Questions/ Comments	CEN Response
The community mentioned that roads in the area are of poor quality and they wanted to know if there would be an opportunity to improve the roads as part of the project.	Hortencia stated that the Project does not currently have any confirmed plans to improve the roads in the area, but this issue was noted and the Project will consider further.

Bairro 1 Focus Group Discussions of T-Line Route Change | MINUTES

Meeting date | time *02 october 2024* | *08:00 – 12:15* | Meeting location *Bairro 1 Community Circle*

Meeting called by	Central Eléctrica Da Namaacha, S.A. (CEN)	Attendees: See attached attendance list
Type of meeting	Information sharing	
Facilitator	Hortência Rebelo	

MEETING STRUCTURE

The meeting was divided into three focus groups: 1) The Bairro 1 community leaders and community representatives; 2)) Previous PAPs subject to economic resettlement for the old alignment who are no longer affected; 3) Newly PAPs subject to economic resettlement for the new alignment.

FGP: Leaders and Community Representatives | *08:00 – 11:30* | Gender Split:

Presentation of Route Change

Introductions and greetings were made between the Project team and community representatives.

Hortência Rebelo presented the proposed transmission line route change to the community representatives. A map was shown for the Bairro 1 area with the old route and the proposed new route, as well as the plots that were expected to be no longer impacts and those that would now be impacted with the route change. It was explained that the route was being changed in this area because it was identified that the previous proposed route went through an active military area that cannot be crossed to do safety and technical reasons, and also due to the 30m safety strip required by ANE for road expansion. The community leadership were also informed that the Project is seeking a formal amendment to the previously granted environmental approval for this revised route and that this process was underway with MTA.

It was noted that the purpose of this transmission line is to evacuate power from the new wind farm that will be built in Namaacha to the Boane substation and that this type of transmission line is for the transfer of power, not for direct consumption. The footprint of the line was explained (i.e. a double line with a 25 m safety buffer on each side, for a total width of 50 m). It was explained that within the 50 m corridor the Project would need to clear all vegetation and restrict access for construction, but after that time people would be allowed to regrow crops within the entire area, except for the actual footprint of the towers. It was explained that trees and structures could not be constructed within the buffer due to safety reasons. It was further explained that the Project would compensate community members for any lost structures, crops or trees within this 50 m corridor.

It was further explained that teams from Acer Africa would be visiting the area stating the end of October to complete a detailed census for the affected area. It was explained that this census process would allow community members to see exactly where the proposed 50 m corridor would be and would result in detailed PAP consent forms documenting exactly what assets would be subject to compensation.

The CLO's contact details were provided to all attendees.

Hortência then asked the community representatives if they had any questions or concerns about the proposed route change.

Community Questions/ Comments	CEN Response
The community representative thanked the project for the update, there are many people who did not know what situation they were in, whether or not they should continue planting crops. We thank you because from now on everyone will know that they will not lose their machamba for the project.	

FGP: Old Economic PAPs | *08:30 – 09:00* | Gender Split:

Presentation of Route Change

Introductions and greetings were made between the Project team and the previously affect PAPs.

Hortência Rebelo presented the proposed transmission line route change to the previously affected PAPs. A map was shown for the Bairro 1 area with the old route and the proposed new route, as well as the plots that were expected to be no longer be impacted with the route change. It was explained that the route was being changed in this area because it was identified that the previous proposed route went through an active military area that cannot be crossed to do safety and technical reasons , and also due to the 30m safety strip required by ANE for road expansion.

It was explained that those who have a farm cannot stop cultivating, when the project is about to start construction, will present the contractor to the community and inform that the activity will start.

It was also explained that during construction some jobs will be available for local people. The Project will collect a list of interested people from each affected community prior to construction and share this with the engineering contractor. Prospective worker details should be given to the CLO.

Hortência then asked the former PAPs if they had any questions or concerns about the proposed route change.

CLO contacts were provided to the community

Community Questions/ Comments	CEN Response

FGP: Newly Economic PAPs | *09:00 – 90:30* | Gender Split:

Presentation of Route Change

Introductions and greetings were made between the Project team and the previously affect PAPs.

Hortência Rebelo presented the proposed transmission line route change to the previously affected PAPs. A map was shown for the Bairro 1 area with the old route and the proposed new route, as well as the plots that were expected to be no longer be impacted with the route change. It was explained that the route was being changed in this area because it was identified that the previous proposed route went through an active military area that cannot be crossed to do safety and technical reasons.

It was explained that those who have a farm cannot stop cultivating, when the project is about to start construction, will present the contractor to the community and inform that the activity will start.

Hortência then asked the former PAPs if he had any questions or concerns about the proposed route change.

CLO contacts were provided to the community

Community Questions/ Comments	CEN Response
PAP asked to know where exactly the line passes, because if it passes through the middle of the field I practically lose the field	When the team of enumerators is on the field, they will show the piece of land covered by the project

Bacabaca 2 Focus Group Discussions of T-Line Route Change | MINUTES

Meeting date | time *01 october 2024* | *09:30 – 11:45* | Meeting location *Bacabaca 2 Community Circle*

Meeting called by	Central Eléctrica Da Namaacha, S.A. (CEN)	Attendees: See attached attendance list
Type of meeting	Information sharing	
Facilitator	Hortência Rebelo	

MEETING STRUCTURE

The meeting was divided into three focus groups: 1) The Bacabaca 2 community leaders and community representatives; 2) Previous PAPs subject to physical resettlement for the old alignment who are no longer affected; and 3) New PAPs subject to economic resettlement for the new alignment. Note that most of the newly affected economic PAPs for machambas are the same as those previously impacted; however, some new PAPs were not available to participate in the meetings. As such one-on-one meetings will be scheduled with each of them.

FGP: Leaders and Community Representatives | *08:00 – 08:30* | Gender Split: 7 M, 1 F

Presentation of Route Change

Introductions and greetings were made between the Project team and community representatives.

Hortência Rebelo presented the proposed transmission line route change to the community representatives. A map was shown for the Bacabaca 2 area with the old route and the proposed new route, as well as the plots that were expected to be no longer impacts and those that would now be impacted with the route change. It was explained that the route was being changed in this area because it was identified that the previous proposed route went through an active military area that cannot be crossed to do safety and technical reasons. The community leadership were also informed that the Project is seeking a formal amendment to the previously granted environmental approval for this revised route and that this process was underway with MTA.

It was noted that the purpose of this transmission line is to evacuate power from the new wind farm that will be built in Namaacha to the Boane substation and that this type of transmission line is for the transfer of power, not for direct consumption. The footprint of the line was explained (i.e. two parallel lines with a 25 m safety buffer on each side, separated by 20 m, for a total width of 70 m). It was explained that within the 70 m corridor the Project would need to clear all vegetation and restrict access for construction, but after that time people would be allowed to regrow crops within the entire area, except for the actual footprint of the towers. It was explained that trees and structures could not be constructed within the buffer due to safety reasons. It was further explained that the Project would compensate community members for any lost structures, crops or trees within this 70 m corridor.

It was further explained that teams from Acer Africa would be visiting the area stating the end of October to complete a detailed census for the affected area. It was explained that this census process would allow community members to see exactly where the proposed 70 m corridor would be and would result in detailed PAP consent forms documenting exactly what assets would be subject to compensation.

The CLO's contact details were provided to all attendees.

Hortência then asked the community representatives if they had any questions or concerns about the proposed route change.

Community Questions/ Comments	CEN Response
A community representative/ previous physical resettlement PAP said he had never seen high-voltage wires dodging houses. He said he was afraid of dying if he lives near high voltage wires.	It was explained that there is Mozambiquan regulations that require 25 m to be maintained between houses and high voltage lines for safety reasons and that the Project will fully comply with this regulation, so all houses will be a safe distance from the lines. It was also noted that in urban areas elsewhere in Mozambique it is actually common to see houses closer than 25 m to high voltage lines.
A community representative/ previous physical resettlement PAP said that the construction of their houses will be limited due to these restrictions.	It was answered that the project will compensate for the lost infrastructure and that homesteads near the line will still be able to plant crops within the protection zone. Only trees and buildings will be restricted, as these can cause a safety issue. Hortencia explained the next steps in the process, i.e. the census/ asset verification and signing of PAP consent forms. Hortencia further explained that during the census/ asset verification the PAPs would be shown the exact layout of the lines (including safety zone) so they could better visualize the impacts to their property.
A community representative/ previous physical resettlement PAP said that they have no problem with machambas and trees being affected, but they want the Project to replace the three houses that are near the line.	The Project reiterated that with the proposed changes to the route the Project is not planning to physically resettle the 3 houses in question, but that this would be confirmed as part of the detailed census/ asset verification process to commence at the end of October.
A community representative noted that this meeting was scheduled quite last minute.	The Project confirmed that future meetings would be scheduled with as much advanced notice as possible.

FGP: Physical Resettlement PAP No Longer Affected | *08:30 – 09:00* | Gender Split: 6 M, 2 F

Presentation of Route Change

Introductions and greetings were made between the Project team and the previously affect PAP.

Hortência Rebelo presented the proposed transmission line route change to the previously affected PAP. A map was shown for the Bacabaca 2 area with the old route and the proposed new route, as well as the plots that were expected to be no longer be impacted with the route change. It was explained that the route was being changed in this area because it was identified that the previous proposed route went through an active military area that cannot be crossed to do safety and technical reasons.

Hortência Rebelo explained that they continue to be impacted, but not in the same way as previously. In some cases, part of the backyard is impacted and will be compensated for the portion of the lost assets.

It was also explained that during construction some jobs will be available for local people. The Project will collect a list of interested people from each affected community prior to construction and share this with the engineering contractor. Prospective worker details should be given to the CLO. It was explained that while he may no longer be affected, he would still be eligible for consideration for one of these jobs.

Hortência then asked the former PAPs if they had any questions or concerns about the proposed route change.

Community Questions/ Comments	CEN Response
One of the PAPs said that he would like to know the easement area that affects him only after that, he will be able to say something. He said that the study done is not correct, the project should do a new study.	He was answered that during the census/ asset verification he would be shown the exact layout of the lines (including safety zone) so he could better visualize the impacts to his property.

FGP: Economic PAPs | *09:30 – 10:00* | Gender Split: *9 M, 3 F*

Presentation of Route Change

Introductions and greetings were made between the Project team and the Newly affect PAPs.

Hortência Rebelo presented the proposed transmission line route change to the previously affected PAPs. A map was shown for the Bacabaca 2 area with the old route and the proposed new route, as well as the plots that were expected to be no longer be impacted with the route change. It was explained that the route was being changed in this area because it was identified that the previous proposed route went through an active military area that cannot be crossed to do safety and technical reasons.

It was explained that those who have a farm cannot stop cultivating, when the project is about to start construction, will present the contractor to the community and inform that the activity will start.

It was also explained that during construction some jobs will be available for local people. The Project will collect a list of interested people from each affected community prior to construction and share this with the engineering contractor. Prospective worker details should be given to the CLO.

Hortência then asked the former PAPs if they had any questions or concerns about the proposed route change.

CLO contacts were provided to the community.

Community Questions/ Comments	CEN Response
A PAP noted that the messaging from this meeting is consistent with previous consultations with regards to	It was confirmed that during the census/ asset verification the Acer team would be

Community Questions/ Comments	CEN Response
activities allowed. It was further noted that they will want to see the limit of the safety zone before construction to know what crops will be affected.	able to show PAPs the exact layout of the lines (including safety zone).