Biodiversity Action Plan for Namaacha Wind Farm Project, Mozambique

Front cover photo: Namaacha Wind Farm Area; photo R. Tomé/TBC.

Citation: TBC (2024). Biodiversity Action Plan for Namaacha Wind Farm Project, Mozambique. The Biodiversity Consultancy, Cambridge, UK

Document information	
Document title	Biodiversity Action Plan for Namaacha Wind Farm Project, Mozambique
Document subtitle	
Project No.	GLQ03
Date	21 March 2024
Version	3
Author	REDACTED
Client name	Globeleq

Document history						
Revision no.	Author/s	Reviewer 1	Reviewer 2	Date	Comments	Final/draft
1	RT, DW, MC, VK	MC		8 January 2024		Draft 1
2	RT, DW, MC, VK	MC		15 January 2024		Draft 2
3	RT, DW, MC, LM, VK	MC		21 March 2024		Draft 3

THE BIODIVERSITY CONSULTANCY

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Executive Summary

This document is the Biodiversity Action Plan (BAP) for the Namaacha Wind Farm Project. According to the Critical Habitat Assessment (CHA) (TBC 2024), three bird species, whose presence has been confirmed in the Project area, qualify for Critical Habitat (CH): the White-backed Vulture (*Gyps africanus*), Martial Eagle (*Polemaetus bellicosus*) and Bateleur (*Terathopius ecaudatus*). A further 20 species (16 birds, three reptiles and one plant) have been identified as priority biodiversity features in this BAP, as they are of stakeholder concern and their presence in the Project area has been confirmed or assumed likely. Additionally, 14 bat species, which show higher susceptibility to collisions, are also considered priority. Two threatened ecosystems qualify as CH and are likely to be affected by the Project: Lebombo Summit Sourveld (CR) and Western Maputaland Clay Bushveld (EN). The Project does not overlap with any Legally Protected and Internationally Recognized Areas (as per IFC PS6 definition), however, it overlaps with the Namaacha Tropical Important Plant Area (TIPA) which holds botanical significance.

The main expected residual impacts of the Project (assuming that all mitigation commitments will be implemented) include:

- Bird and bat collisions with the turbines and the transmission line: annual residual impacts for the 19 CH and priority bird species range from ~0 to 12 individuals. Based on a review of wind farms in South Africa (Aronson 2022), the annual residual impact to all bats may vary between 12-1,824 individuals.
- Habitat loss under the Project footprint and surrounding areas: the Project is estimated to directly affect (100% loss) 28.65 ha of critical natural habitat (under the two CH ecosystems mentioned above), and 22.62 ha of non-critical natural habitat. Residual impacts have been calculated in Quality Hectares (QH) and they consider the 100% direct loss under the Project footprint and additional loss in habitat quality around the Project footprint. Critical natural habitat residual impacts are estimated to be 50.48 QH and residual loss of non-critical natural habitat is estimated to be 48.06 QH.

The CH-qualifying species, White-backed Vulture, Martial Eagle and Bateleur, require Net Gain (NG), and 16 other priority bird species require No Net Loss (NNL). Offset targets are 1-2 individuals/year for the CH-qualifying birds and range from 1 to 12 for other priority birds. Regarding bats, mitigation, as committed to in the ESIA, should be implemented to ensure that impacts do not exceed the thresholds (MacEwan et al. 2020). No offset action is currently proposed for bats.

Three different offsets are proposed to demonstrate NG and NNL for priority biodiversity on this Project:

- One offset targets the protection and enhancement of the critical natural habitats within the Lebombo Summit Sourveld and Western Maputaland Clay Bushveld ecosystems, as well as non-critical natural habitats affected by the Project. This offset aims to generate >106.11 QH (>58.05 QH of critical natural habitat and >48.06 QH of non-critical natural habitat) through actions such as decreasing grazing pressure, restoring degraded habitats and eradicating

non-native flora. The Namaacha Tropical Important Plant Area (TIPA) will be favoured as the implementation area for these actions.

- A second offset aims at reducing threats and increasing habitat quality for, and consequently the breeding success and number of individuals of Martial Eagles and Bateleurs. Maputo Special Reserve and Namaacha TIPA are the preferred implementation areas for actions such as nest protection and guarding, installation of artificial nesting structures, and habitat restoration and management for increasing the populations of main prey of raptor species.
- Finally, a third offset targeting at reducing mortality by poisoning of White-backed Vultures is proposed to be implemented probably in the Limpopo National Park area. This offset will involve the development of an awareness campaign around the illegality of killing vultures, the supporting to law enforcement, and the supporting of alternative livelihood options to community members engaged in illegal poisoning as an economic activity.

1. Introduction

1.1 Background

This document is the Biodiversity Action Plan (BAP) for the Namaacha Wind Farm project (the Project), located near Namaacha, in southern Mozambique. The Project is being developed by Central Eléctrica da Namaacha (CEN), a consortium comprised of Globeleq Africa Limited (Globeleq), Source Energia, and Electricidade de Moçambique, E.P (EDM). Globeleq will be the lead member of the consortium responsible for operation. Project alignment with the International Finance Corporation's (IFC's) Performance Standard 6 (PS6) on Biodiversity Conservation and Sustainable Management of Living Natural Resources (IFC 2012, 2019) is required to meet Globeleq's corporate standards and the Project lenders' requirements.

1.2 Purpose and objectives of the BAP

The purpose and aim of this BAP is to describe a series of actions by which the Project will demonstrate biodiversity Net Gain (NG) for Critical Habitat-qualifying features and No Net Loss (NNL) for Natural Habitat (NH). NNL will also be demonstrated for other priority biodiversity values that do not trigger Critical Habitat (CH). The BAP also sets out the approach for how the mitigation hierarchy will be followed, and the roles and responsibilities for internal staff and external partners.

The objectives of this BAP are to:

- Identify the priority biodiversity values in the Project area that are subject to NNL/NG targets;
- Identify and engage with key stakeholders relevant to the implementation of the BAP;
- Summarise the mitigation measures for implementation during construction and operation phases;
- Estimate residual impacts to priority biodiversity values; and,
- Set out a framework for biodiversity offsets, as well as monitoring and evaluation to enable the Project to demonstrate achievement of the NNL/NG targets.

This BAP has been prepared in-line with IFC PS6 and IFC Guidance Note 6 (IFC 2012, 2019), World Bank Group's Environmental Health and Safety (EHS) Industry General and Sectoral Guidelines on Wind Energy (World Bank Group 2015), Mozambique's National Biodiversity Strategy and Action Plan (https://www.cbd.int/countries/?country=mz) and other international/ national guidance (e.g. IPIECA 2022). The BAP actions are devised in-line with the mitigation hierarchy: i.e., avoid, minimise, restore and offset. Biodiversity offsetting measures are identified and developed following IFC PS6 requirements, and guidance published by the Business and Biodiversity Offsets Programme (BBOP 2012). The Mozambique Directive on Biodiversity Offsets (Ministry of Land and Environment 2022) has been also considered in this BAP.

It is important to note that BAPs are 'living' documents, i.e. intended to be reviewed and updated on a regular basis. Regular review and update will take place as Project implementation

progresses, and as more information becomes available on the status and ecology of priority biodiversity values, the impacts on these values and the effectiveness of mitigation actions. This adaptive management approach will be informed by the Project's Biodiversity Monitoring and Evaluation Plan (BMEP), which will be included in Version 3 of this BAP and all subsequent versions.

1.3 Spatial and temporal scope of the BAP

The spatial (geographical) scope covered by this BAP includes:

- Project Area of Influence, including the full extent of the Overhead Transmission Line (Figure 1)
- Ecologically Appropriate Areas of Analysis (EAAA) for the threatened ecosystems, as defined in the Critical Habitat Assessment (CHA) for this Project (TBC 2024) (Appendix 1)
- Other areas beyond the EAAAs, which are considered for offset implementation (see Section 8 and Appendix 3)

This BAP includes actions over the proposed lifespan of the Project (i.e., 25 years), with actions ending at different times depending on the priority biodiversity feature and target.

1.4 Stakeholder engagement

IFC's PS6 strongly recommends projects to develop partnerships with recognised and credible conservation organisations, academic institutes, biodiversity experts and the relevant government agencies, to seek their advice during the development and implementation of a BAP. This is especially important for projects located in NH and CH, or in legally protected and internationally recognised areas (IFC 2019). Engagement with government, community and any local NGO representatives early and through the Project will help ensure that potential offsets receive broad support and avoid unplanned costs or delays in progress towards NNL or NG. It will also ensure that the Project can learn and incorporate useful elements from other conservation programmes elsewhere in the region.

As part of the Environmental and Social Impact Assessment (ESIA) for the Namaacha Wind Farm Project, a public participation process was conducted in 2019 (Matos, Fonseca & Associados 2022). A first public consultation session was carried out in February, on the basis of a "draft" Environmental Pre-feasibility and Scoping Study (EPDA) and Terms of Reference (ToR), which set out the main issues to be addressed in the ESIA and were disclosed to the public in general, and to involved (national and local) stakeholders in particular. The results of this public consultation were taken into account in the preparation of the final EPDA and ToR and which had the favourable opinion of the Ministry of Land, Environment and Rural Development (MITADER). These formed the basis for preparing a draft ESIA report, which was subject to a second public consultation in early December 2019. Importantly, the questions addressed during the public participation process focused mainly on socio-economic concerns, with no specific questions or requirements on biodiversity aspects being raised in any session (Matos, Fonseca & Associados

2022). The ESIA was subsequently approved by the Ministério de Terra e Ambiente (MTA) in 2022.

The Environmental and Social Impact Assessment for the 66 kV Overhead Transmission Line (OHTL) between the Namaacha Wind Farm and the Boane substation also incorporated a wide Public Participation Process (PPP). This was carried out between December 2022, during the Environmental Pre-Feasibility Study and Scope Definition (EPDA) phase, and October 2023, after the disclosure of the draft ESIA, and involved several meetings with the general public as well as national and local stakeholders (Consultec 2023). While the large majority of topics discussed in the PPP sessions focused on socio-economic aspects, some participants raised their concerns about potential deforestation activities associated with the construction and maintenance of the OHTL, as well as about potential impacts on wildlife from increased traffic in new accesses that will be built. These concerns will be addressed through adequate mitigation measure (see Section 6 and Table 11).

To inform the CHA (TBC 2024), consultation was undertaken with a regional expert on flora, habitats and ecosystems (Ibis) through Ibis's role as the Lenders Environmental and Social Advisor for the Project.

For the development of this BAP, several stakeholders were contacted (Table 1), especially those holding responsibility on the designation and management of Protected Areas, those involved in the development and implementation of Mozambique's offset strategy, or those that have in-country experience in developing conservation work and community engagement (Table 1). While some preliminary communication took place remotely, most significant meetings were held during the in-country visit by Globeleq and TBC, between 19th and 22nd March 2024. During the initial meetings, the Namaacha Tropical Important Plant Area (TIPA) (see Section 4.2.7), overlapping the Project, was identified as a likely preferential area to implement offsets (see Appendix 3). Therefore, this area was also visited, and contacts with local stakeholders held, during the in-country visit. Appendix 2 presents summary minutes of the main meetings held during the in-country visit.

Table 1. Identified Stakeholders potentially relevant to the BAP implementation and engagement status up to March 2024.

Stakeholder	Contact	Current engagement status
Transfrontier Conservation Areas – Southern African Development Community	https://tfcaportal.org/	Contacted via email on 12/12/2023; no response was obtained
ANAC - National Administration for Conservation Areas/Administração Nacional das Áreas de Conservação	https://www.anac.gov.mz/anac/	Contacted via email on 19/12/2023; no response was obtained
Prof. in Department of Biological Sciences, University of Eswatini)	REDACTED	Contacted via email on 19/12/2023; responded on 25/12/2023 providing contacts of biodiversity experts in Mozambique.
WCS Mozambique KBAs and Red Lists Technical Coordinator	REDACTED	Contacted via email in January 2024, took part in several remote meetings to discuss the best approach for developing offsets for the Project, and the importance of Namaacha TIPA.
WCS – Wildlife Conservation Society Mozambique; Marine Programme Director	https://mozambique.wcs.org	Contacted 28/12/2023, participated in several remote meetings, providing valuable advice and information on Mozambican environmental legislation, and on the national strategy for offsets implementation (which has been developed with significant support by WCS); also facilitated in-country contacts with several other stakeholders and the in-person meeting with BIOFUND.
BIOFUND – Biodiversity Conservation Foundation/Fundação para Conservação da Biodiversidade; Director for Innovative Financing	https://www.biofund.org.mz/en/	Contacted via email on 28/12/2023; an in-person meeting was held in Maputo on 20/02/2024 (Appendix 2).

Stakeholder	Contact	Current engagement status
Peace Parks Foundation; Programme Manager: Great Limpopo and Lubombo Transfrontier Conservation Areas); Chief Investment Officer	https://www.peaceparks.or	Contacted via email on 28/12/2023, with subsequent communication during February 2024; are interested in collaborating and await a remote meeting to be scheduled.
Eswatini National Trust Commission – Administrative Authority Lubombo Biosphere Reserve	https://en.unesco.org/biosphere/africa/lubombo	Contacted via email on 28/12/2023; no response was obtained.
DINAB - National Directorate of Environment (part of the Ministry of Land and Environment (MTA)); Technical Advisor for Biodiversity Offsets	https://www.mta.gov.mz/ ;	Contacted via email on 18/01/2023. Took part in a remote meeting and attended an in-person meeting in Maputo on 20/02/2024 (Appendix 2).
IIAM – Institute for Agriculture Research / Instituto de Investigação Agrária de Moçambique	https://iiam.gov.mz/ ;	Contacted via email on 15/02/2024, with subsequent communication during February; are interested in collaborating and await a remote meeting to be scheduled.
Dr. D. M. (expert ornithologist, MSc., researcher on vultures)	REDACTED	Contacted via email on 13/02/2024. In-person meeting held on 19/02/2024 (Appendix 2).
VIDA; Projects Coordinator	https://vida.org.pt/en/	Contacted via email on 16/02/2024. In-person meeting held on 19/02/2024 (Appendix 2).

Stakeholder	Contact	Current engagement status
Owner or property in Namaacha TIPA	REDACTED	Contacted via email on 15/02/2024. In-person meeting held on 21/02/2024 (Appendix 2).
EWT – Endangered Wildlife Trust	https://ewt.org.za/; ewt@ewt.org.za	Contacted via email on 15/03/2024; no response was obtained to date.
Expert ornithologist, Natural History Museum of Mozambique	REDACTED	Contacted via email on 13/02/2024; no response was obtained.
AWF – African Wildlife Foundation	https://www.awf.org/country/mozambique	Not contacted to date.
Aga Khan Development Network/Foundation	https://the.akdn/en/where-we-work/eastern-africa/mozambique	Not contacted to date.
Province of Maputo / District of Namaacha Government;	https://www.pmaputo.gov.mz/ ; https://www.pmaputo.gov.mz/por/content/search?SearchText=Namaacha	Not contacted to date specifically regarding BAP.
WWF Moçambique – World Wildlife Fund	https://www.wwf.org.mz/	Not contacted to date.

2 Project description

The Project is proposed to be developed near the town of Namaacha, 50 km west of Maputo, in southern Mozambique. This location is 2.5 km from the border with South Africa, and 6 km from the border with Eswatini (former Swaziland), in the geomorphological unit Terras Altas of the Libombos Chain Complex (Matos, Fonseca & Associados 2022) (Figure 1). This unit is marked by the Libombos mountain range, which extends in a north-south direction along the border between Mozambique, South Africa and Eswatini. The Project extends along a plateau surface along two ridges, with altitudes between 500 m and 600 m, and the Project covers approximately 855 ha (Figure 1, Figure 2) (WSP 2023).

The 120 MW Project consists of 20 turbines proposed in an approximate "T-shape", comprising a short row of turbines aligned in generally NNE-SSW, and a perpendicular, longer, row of turbines aligned generally E-W (Figure 3). The Project also has associated infrastructure including a series of access roads, on-site cabling, substation and control building and a 66 kV (high-voltage) transmission line connecting the Project to the national grid in Boane, 32 km to the south-east (Figure 1). The transmission line is comprised of two separate lines for redundancy. The 330 m closest to the Boane substation will be buried, but the remainder of the line will be an OHTL. The 4.1 km of the OHTL closest to Boane will be of a monopole design (with both lines running on single poles), whilst the remaining 29 km approaching Namaacha will consist of two separate lines running in parallel. There will be a 20 m wide strip with a 5 m wide maintenance road between the two lines in the double line section. The OHTL extends over altitudes between 500 m (close to the wind farm) and a minimum of c. 12 m a.s.l. (4 km west of Boane). Full technical specifications of the Project can be found in the various ESIA documents (Matos, Fonseca & Associados 2022; Consultec 2023; WSP 2023).

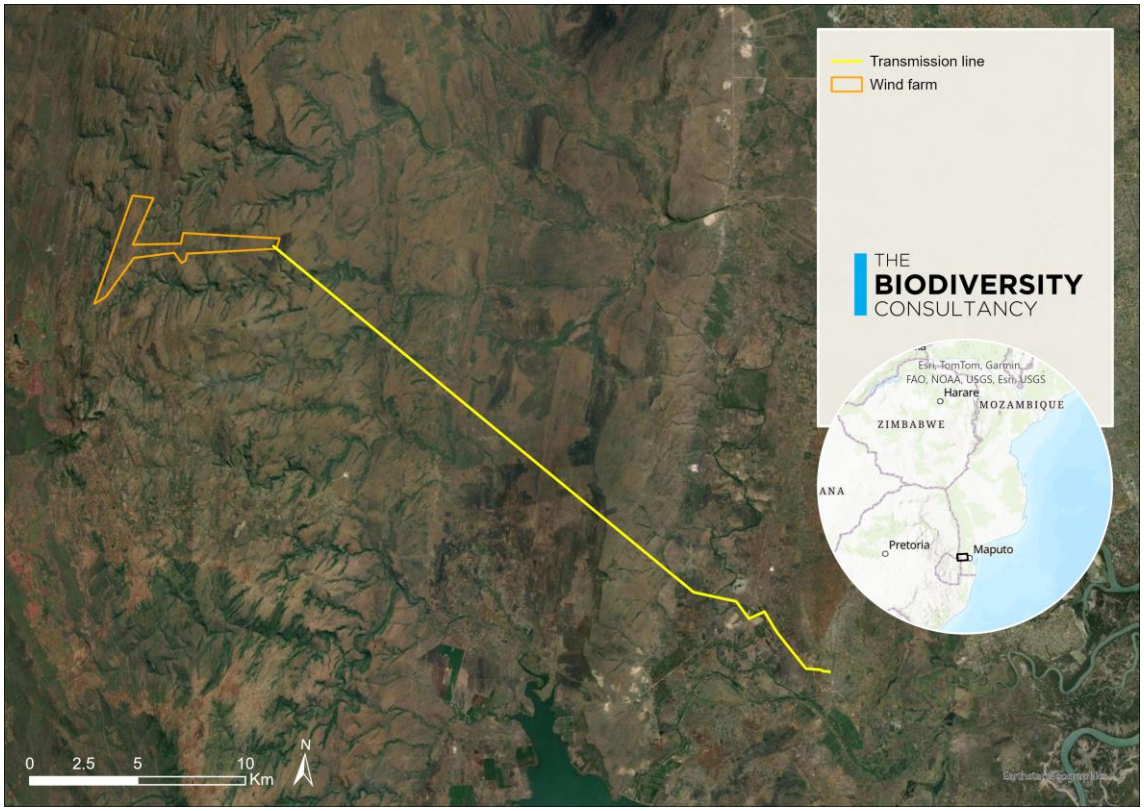

Figure 1. The location of the planned Project infrastructure, in Mozambique (source: client-provided data).

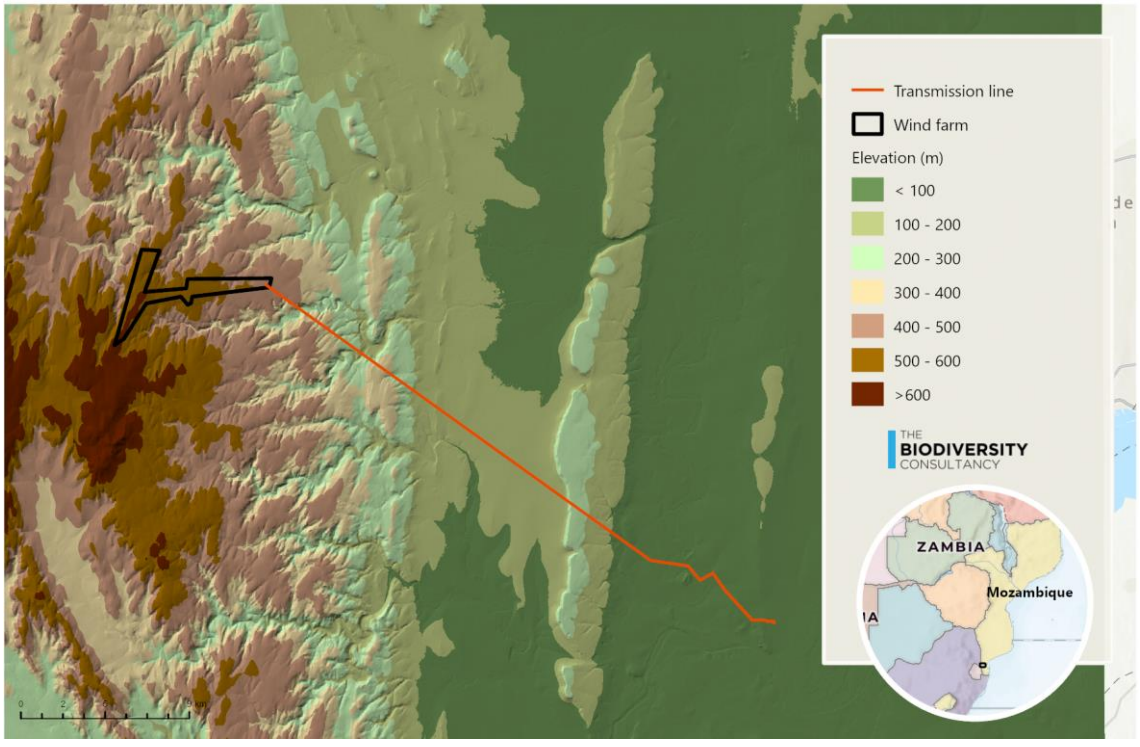

Figure 2. Topography in the Project area.

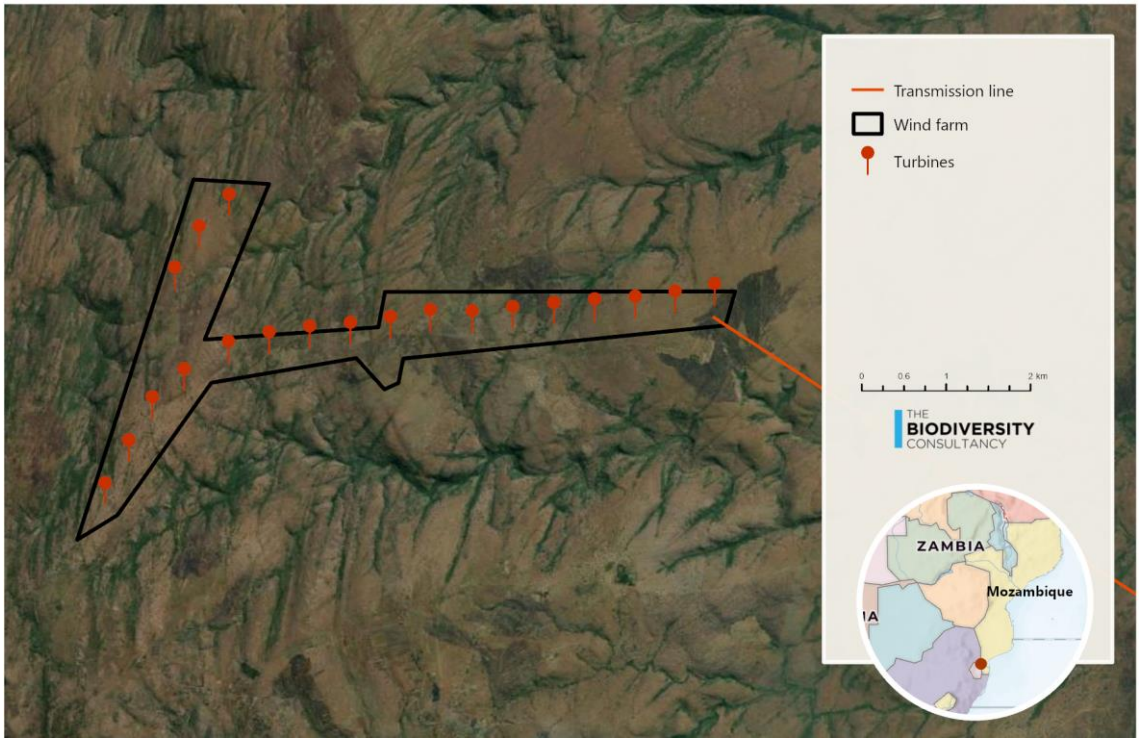

Figure 3 . Close view of Project layout and location (source: client-provided data).

3 Legislative, regulatory, policy and lender requirements

3.1 National legislation

The Mozambique institutions and legislation described in Table 2 below are relevant to this BAP.

Table 2. National institutions and legislation relevant to the BAP.

Institution / Legislation	Description
Ministry of Land and Environment (MTA)	Established by Presidential Decree No. 1/2020, of 17 January, MTA 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.
MTA's Provincial Environmental Services (SPA)	At the provincial level, MTA is represented by the SPA. EIA applications are managed by MTA through SPA at the provincial level.
MTA's National Directorate of Environment (DINAB)	Has responsibility for proposing environmental policies and regulations, promoting sustainable development, controlling and

Institution / Legislation	Description
	protecting environmental quality and manage and monitor ESIA processes at the national level.
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.
National Administration for Conservation Areas (ANAC)	Is responsible for the management of conservation areas
National Environmental Policy, Resolution No. 5/95 of 6 December 1995	This resolution lays the foundation for all environmental legislation, with the main objective is to ensure sustainable development.
Environment Law, Law no. 20/97, of 1 October 1997	This law sets out the legal basis for the proper utilisation and management of the environment for the sustainable development of the country and applies to all public and private activities that directly or indirectly affect the environment. This law also requires an Environmental Management Plan will includes adequate mitigation to minimise the Project's impacts on biodiversity.
Law on Forests and Wildlife (Law No 10 of 1999 of 07 July)	Establishes the basic rules and principles for the protection, conservation and sustainable use of forest resources and wildlife and requires that no protection area, as defined by this Law, is interfered with by the Project.
Regulation of the Forestry and Wildlife Act (Decree No 12/2002)	This regulation applies to the protection, conservation, use, exploitation and production activities of flora and fauna resources. The Proponent shall notify MITADER if a species listed in this regulation is affected or disturbed.
Decree No. 25/2008 Regulation for the Control of Invasive Alien Species	This decree prohibits activities involving invasive alien species without prior authorisation, and the National Environmental Authority (MTA) may prohibit any activity which may involve the spread of invasive alien species. The decree suggests that adequate methods must be implemented to control and eradicate invasive alien species.
Decree No. 54/2015, of 31 December, which approves the Regulation on the Environmental Impact Assessment Process	Describes the scope and requirements for undertaking an Environmental Impact Assessment.

Institution / Legislation	Description
Decree No. 51/2021, of 19 July, which approves the Regulation on Protection, Conservation and Sustainable Use of Avifauna	Establishes e.g., the list of protected bird species, the list of bird species that can be hunted legally, and the possibility of establishing Important Bird Areas, Key Biodiversity Areas and other areas important for congregatory migratory birds, endangered birds or endemic birds, as Protection Areas for Avifauna
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 if significant residual impacts to key biodiversity areas, critical habitats or threaten species or ecosystems are identified. This Directive came into force already after the completion of the ESIA process for the Project.
Ministry of Land and Environment, Ministerial Order No 55/2022. Directive on Biodiversity Offsets.	This Directive establishes the principles, methodologies, requirements and procedures for the proper implementation of Biodiversity Offsets as part of environmental impact assessment procedures. The Directive stipulates that biodiversity offsets must be designed to achieve Net Gain (defined as a minimum 15% increase compared to No Net Loss) where any significant residual negative impacts of the project in its area of direct or indirect influence occur in i) Key Biodiversity Areas, ii) Critical Habitats according to IFC or High Conservation Value Areas according to the Forest Stewardship Council (FSC), and iii) any threatened species or ecosystems. On the other hand, offsets must target No Net Loss where significant residual negative impacts occur on a wider set of biodiversity features (e.g., legally protected species, ecosystems/habitats, ecosystems/habitast which favours conditions for the existence of significant concentrations of migratory and/or congregating species) listed in the Directive.

3.2 Corporate framework and policies

Globeleq holds to a global HSESS (Health, Safety, Environment, Social and Security) policy and high environmental, social and governance (ESG) standards, which are in-line with the IFC Performance Standards, including PS6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources (Globeleq 2022).

Potential new projects are screened for environmental risks, including any potential impact on biodiversity. Negative impacts from projects are addressed at local level and the company also looks for opportunities to enhance biodiversity around project sites.

3.3 Lender requirements

The Project intends to align with IFC PS6 (IFC 2012, 2019) and other good international industry practice (GIIP) guidance such as the World Bank Group's Environmental Health and Safety Industry General and Sectoral Guidelines on Wind Energy (World Bank Group 2015), and OS6 (Environmental and Social Operational Safeguard 6) in the African Development Bank Group's Integrated Safeguards System (AFDB 2023). Specific PS6 requirements applicable to this BAP are highlighted in the relevant sections of this document. As part of these requirements, NG is required for those biodiversity values for which the Project is in an area of CH. Gains can either be generated via biodiversity offsets (that achieve measurable, additional outcomes) where the Project has impacts to CH-qualifying values or via supporting additional conservation activities that are focused on CH-qualifying values for which the Project has no impact. NNL is required, where feasible, for NH.

4 Biodiversity context

The Project is within the *Terras Altas* geomorphological unit of the Libombos Chain Complex, a series of mountain ranges stretching 800 km north-south and ~100 km east-west in north-eastern South Africa, Eswatini and south-western Mozambique. Within this unit, the Project is sited on a plateau of flattened ridges at an altitude of ~500 m in the east to ~600 m in the west. The plateau is crossed by a multitude of deep valleys, which form the tributaries of the Maxongoluluane, Mixumene, Mitesandene, Libunzene and Macuabane rivers. There are two well-defined seasons in the Project area: a warm, high rainfall season between October and April and a cooler, drier season between May and September.

Project components occur in three mapped ecosystems, of which two represent CH for the Project: the Lebombo Summit Sourveld, and Western Maputaland Clay Bushveld (TBC 2024) (Figure 6). These consist of wooded grasslands with varying height and density of canopy trees: these ecosystems are fully described in Lötter *et al.* (2021). Most of the Project area is likely to be subject to regular wood-cutting, grazing by livestock and be degraded to some extent.

The Project area does not overlap with any Legally Protected Areas or Internationally Recognised Areas. However, the Project (20 wind turbines and c. half of the OHTL extension) overlaps with the Namaacha Tropical Important Plant Area (TIPA)[1], which holds botanical significance due to presence of undisturbed forest patches, as well as the occurrence of succulent species, including *Aloe* and *Euphorbia* species, in rock outcrops. According to

[1] https://tipas.kew.org/site/namaacha/

Mozambican national environmental authorities, this TIPA is likely to be classified in the future as KBA.

4.1 Baseline and monitoring studies

Apart from literature review and expert consultation, flora and fauna surveys have been carried out as part of the EIA for the wind farm (Matos, Fonseca & Associados 2022), with additional bird (AfriAvian Environmental 2023) and bat (Arcus 2023) monitoring being conducted to the level expected by international good practice. Biodiversity surveys were also conducted along the transmission line (Consultec 2023). A summary of all biodiversity surveys conducted to date in the Project area is presented in Table 3.

Table 3. Biodiversity surveys conducted in the Project area.

Biodiversity group	Methods	Area	Sampling period	Context (source)
Flora and vegetation	• Transects	Wind Farm area	Oct 2018 Feb 2019	Wind Farm EIA (Matos, Fonseca & Associados 2022)
Amphibians and reptiles	• Visual inspection and net sampling of water point • Day and night transects	Wind Farm area	Oct 2018 Feb 2019	Wind Farm EIA (Matos, Fonseca & Associados 2022)
Birds	• Day Transects • Vantage points • Night transects • Visual inspection of dam	Wind Farm area	Oct 2018-Aug 2019 (every two months)	Wind Farm EIA (Matos, Fonseca & Associados 2022)
Non-flying mammals	• Day and night transects	Wind Farm area	Oct 2018 Feb 2019	Wind Farm EIA (Matos, Fonseca & Associados 2022)
Bats	• Static acoustic detection with automatic detectors* • Acoustic detection with hand-held detectors • Roost surveys • Mist-netting	Wind Farm area	Oct 2018-Jul 2019* Oct 2018; Feb 2019	Wind Farm EIA (Matos, Fonseca & Associados 2022)
Flora and vegetation	• Transects in sampling plots	OHTL area	Oct-Nov 2022 Mar 2023	OHTL EIA (Consultec 2023)
Amphibians and reptiles	• Transects • Targeted searches in suitable microhabitats	OHTL area	Nov 2022 Mar 2023	OHTL EIA (Consultec 2023)
Birds	• Transects • Point counts at water bodies and rivers	OHTL area	Nov 2022 Mar 2023	OHTL EIA (Consultec 2023)
Non-flying mammals	• Transects • Enquiries to local communities	OHTL area	Nov 2022 Mar 2023	OHTL EIA (Consultec 2023)
Bats	• Roost survey • Enquiries to local communities	OHTL area	Nov 2022 Mar 2023	OHTL EIA (Consultec 2023)
Bats	• Static acoustic detection with automatic detectors • Acoustic detection with hand-held detectors • Roost surveys	Wind Farm area	Jun 2021–Jun 2022	Bat Pre-Construction Monitoring (Arcus 2023)

Biodiversity group	Methods	Area	Sampling period	Context (source)
Birds	• Vantage points • Car and walk transects	Wind Farm area and control area	Nov 2022 Feb-Jun 2023	Bird Pre-Construction Monitoring (AfriAvian Environmental 2023)

4.2 Priority biodiversity values

4.2.1 Overview

This BAP focuses on habitats and species that require special management measures rather than all biodiversity. The priority species for this BAP are those within at least one of the categories below (elaborated in subsequent sections), and which are likely to be affected by the Project:

- Potential Critical Habitat-qualifying species;
- Species of stakeholder concern; or,
- Species of high sensitivity to collisions with turbines and OHTLs.

The following habitats, ecosystems and designated areas, which are likely to be affected by the project, are also priorities in this BAP:

- Critical and natural habitats;
- Threatened ecosystems; and,
- Legally protected areas and internationally protected areas.

4.2.2 Potential Critical Habitat-qualifying biodiversity

Areas of "high biodiversity value" are termed Critical Habitat by the IFC. Such a designation is based on the presence and/or quantity of significant types of biodiversity (e.g., threatened species, highly threatened ecosystems) and is independent of the condition of the habitat. The criteria to determine CH are summarised in Table 4. In addition, IFC PS6 gives special attention to certain internationally recognised areas of high biodiversity value.

Table 4. IFC PS6 Critical Habitat criteria.

Criteria	Nature of thresholds	Units
Criterion 1 (C1): Critically Endangered and Endangered species	Quantitative	Percentages of global and national population sizes combined with – whenever available - minimum numbers of reproductive units [2]
Criterion 2 (C2): Restricted-range species		
Criterion 3 (C3): Migratory/congregatory species		
Criterion 4 (C4): Highly threatened and/or unique ecosystems		Percentage of global extent
Criterion 5 (C5): Key Evolutionary Processes	Qualitative	Presence of landscapes with high spatial heterogeneity, environmental gradients and features of demonstrated importance to climate change adaptation

TBC undertook a separate CHA and the priority species identified in Table 5 are based on that assessment (TBC 2024). Three bird species possibly qualify as CH. These species are 'possibly CH' as the range overlap is close to the threshold, or there is the potential for the EAAA to have a higher proportion of the population than average, and the species' presence has been confirmed in the Project area (TBC 2024). Based on the assumptions made during the CHA (namely assuming an uniform habitat suitability within the EAAA, and that the number of pairs present in the EAAA is similar to that reported from studies in other areas in Africa; (TBC 2024).), the thresholds for CH would be exceeded and therefore these species are treated as CH in this BAP.

Table 5. Species assessed as qualifying for Critical Habitat (TBC 2024).

Taxa	Scientific name	English name	IUCN Cat.	CH-criteria	Presence in EAAA
Birds	*Gyps africanus*	White-backed Vulture	CR	C1, C3	Confirmed – recorded during pre-construction avian surveys. No nests found in Project area; nearest colony is 30-35 km away (AfriAvian Environmental 2023).
	Polemaetus bellicosus	Martial Eagle	EN	C1	Confirmed – recorded during pre-construction avian surveys. Observed

[2] The IUCN KBA Standard uses the following definition for *reproductive unit*: "the minimum number and combination of mature individuals necessary to trigger a successful reproductive event at a site (Eisenberg 1977). Examples of five reproductive units include five pairs, five reproducing females in one harem, and five reproductive individuals of a plant species."

Taxa	Scientific name	English name	IUCN Cat.	CH-criteria	Presence in EAAA
					behaviour indicated a high probability of a nest just north of the Project area (Matos, Fonseca & Associados 2022).
	Terathopius ecaudatus.	Bateleur	EN	C1	Confirmed – recorded during pre-construction avian surveys. No nests found in Project area (AfriAvian Environmental 2023).

4.2.3 Species of stakeholder concern

A list of potential species of stakeholder concern was compiled from those species with confirmed, or assumed likely presence[3], in the Project area and which were:

- Identified as priority species during pre-construction avian surveys (AfriAvian Environmental 2023);
- Classified by IUCN as CR/EN/VU (that had not triggered CH);
- Listed as CR/EN/VU in national red lists;
- Used for the classification of overlapping/neighbour PAs/IRAs; or,
- With cultural/economic or other interest and that have been flagged by stakeholders.

Following this approach, 20 species were identified as of stakeholder concern (Table 6). While most of these species do not qualify for CH, it is good practice to include such species as priority species in the Project's BAP to ensure that appropriate mitigation measures for these species are developed and applied.

Table 6. Priority species of stakeholder concern.

Taxa	Scientific name	English name	IUCN Cat.	Presence in EAAA
Reptiles	*Kinixys natalensis*	KwaZulu-Natal Hinged-back Tortoise	VU	Presence confirmed in the Project area during the ESIA (Matos, Fonseca & Associados 2022).
	Smaug warreni	Lebombo Dragon Lizard	LC (restricted-range)	Presence not confirmed in Project area during ESIA but has been assessed as potential (Matos, Fonseca & Associados 2022) or probable (for the wider area; WSP 2023) due to suitable habitat and insufficient survey effort to rule out presence. A recent record (2021) is just 3.5 km from the Project area (GBIF).
	Platysaurus lebomboensis	Lebombo Flat Lizard	LC (restricted-range)	Presence not confirmed in Project area during ESIA but was considered probable for the wider area (WSP 2023), due to suitable habitat and

[3] This included species for which suitable habitat occurs in the Project area and for which insufficient survey effort has been completed to confirm absence.

Taxa	Scientific name	English name	IUCN Cat.	Presence in EAAA
				insufficient survey effort to rule out presence. Two recent records (2022) are 6 km from the Project area (GBIF).
Plants	*Barleria lebombonensis*		EN	This species has been discovered recently in Eswatini (Darbyshire *et al.* 2017). Presence not confirmed in the Project, but considered as highly likely (Warren McCleland, pers. comm.), since the habitat in the wind farm location is very similar to that where the species is found. The type locality is about 37 km from the Project OHTL and 41 km from the proposed wind farm location.
Birds	*Polyboroides typus*	African Harrier-Hawk	LC	Recorded during pre-construction avian surveys (AfriAvian Environmental 2023).
	Aquila spilogaster	African Hawk Eagle	LC	Recorded during pre-construction avian surveys (AfriAvian Environmental 2023).
	Cicconia nigra	Black Stork	LC	Recorded during pre-construction avian surveys (AfriAvian Environmental 2023).
	Lissotis melanogaster	Black-bellied Korhaan	LC	Recorded during pre-construction avian surveys (AfriAvian Environmental 2023).
	Circaetus pectoralis	Black-chested Snake Eagle	LC	Recorded during pre-construction avian surveys (AfriAvian Environmental 2023).
	Elanus caeruleus	Black-winged Kite	LC	Recorded during pre-construction avian surveys (AfriAvian Environmental 2023).
	Circaetus cinereus	Brown Snake Eagle	LC	Recorded during pre-construction avian surveys (AfriAvian Environmental 2023).
	Buteo buteo	Common Buzzard	LC	Recorded during pre-construction avian surveys (AfriAvian Environmental 2023).
	Buteo rufofuscus	Jackal Buzzard	LC	Recorded during pre-construction avian surveys (AfriAvian Environmental 2023).
	Falco biarmicus	Lanner Falcon	LC	Recorded during pre-construction avian surveys (AfriAvian Environmental 2023).
	Falco peregrinus	Peregrine Falcon	LC	Recorded during pre-construction avian surveys (AfriAvian Environmental 2023).
	Scleroptila shelleyi	Shelley's Francolin	LC	Recorded during pre-construction avian surveys (AfriAvian Environmental 2023).
	Anthus brachyurus	Short-tailed Pipit	LC	Recorded during pre-construction avian surveys (AfriAvian Environmental 2023).
	Hieraaetus wahlbergi	Wahlberg's Eagle	LC	Recorded during pre-construction avian surveys (AfriAvian Environmental 2023).
	Stephanoaetus coronatus	Crowned Eagle	LC	Recorded during pre-construction avian surveys (AfriAvian Environmental 2023).
	Aquila rapax	Tawny Eagle	VU	Recorded in a single occasion in field surveys conducted at the Project area (Matos, Fonseca & Associados 2022). Occasional records inside the EAAA and seen more frequently close to the EAAA boundaries (eBird)

4.2.4 Species of high sensitivity to collisions with turbines and OHTLs

Some bird and bat species show higher susceptibility to collisions with wind turbines or the OHTL, and/or where any fatalities may have a greater population-level effect due to small

population sizes or slow reproductive rates. The list of priority species in the bird survey report already considered those which are more susceptible to wind energy impacts (AfriAvian Environmental 2023: page 17) and so are considered in the section above: as such, this section considers only bats as the other species group with potentially high sensitivity to collision with turbines and OHTLs.

For bats, priority species were considered as those which are primarily open-air foragers (as defined in Monadjem *et al.* 2010) or fruit-bats, both traits which correspond to high collision risk, or had the highest fatalities in South Africa (Aronson 2022), and that were confirmed from, or potentially occur in, the Project area (Table 7).

Table 7. Priority bat species for the Project. Species with impact thresholds of zero or one following South African guidelines (MacEwan et al. 2020) are shown in bold.

Scientific name	English name	IUCN Cat.	Presence in EAAA and Project area (Arcus 2023)
Miniopterus natalensis[4]	Natal Long-fingered Bat	LC	Confirmed presence in the Project area.
Neoromicia capensis	Cape Bat	LC	Confirmed presence in the Project area.
Neoromicia nana	Banana Pipistrelle Bat	LC	Confirmed presence in the Project area.
Neoromicia zuluensis	Zulu Pipistrelle Bat	LC	Confirmed presence in the Project area.
Eidolon helvum	**African Straw-coloured Fruit-bat**	**NT**	**Potential presence in the Project area.**
Epomophorus crypturus	**Peters's Epauletted Fruit Bat**	**LC**	**Potential presence in the Project area.**
Epomophorus wahlbergi	**Wahlberg's Epauletted Fruit Bat**	**LC**	**Potential presence in the Project area.**
Tadarida aegyptiaca	Egyptian Free-tailed Bat	LC	Confirmed presence in the Project area.
Chaerephon ansorgei	Ansorge's Wrinkle-lipped Bat	LC	Confirmed presence in the Project area.
Chaerephon pumilus	Little Free-tailed Bat	LC	Confirmed presence in the Project area.
Mops condylurus	Angolan Mops Bat	LC	Confirmed presence in the Project area.
Otomops martiensseni	Large-eared Free-tailed Bat	NT	Confirmed presence in the Project area.
Scotoecus albofuscus	**Light-winged Lesser House Bat**	**DD**	**Confirmed presence in the Project area.**
Taphozous mauritianus	Mauritian Tomb Bat	LC	Confirmed presence in the Project area.

[4] Natal Long-fingered Bat *Miniopterus natalensis* was also flagged as potentially of concern in the Bat Monitoring Study (Arcus 2023, due to the presence of a roost with 14,000 - 16,000 individuals 10.2 km to the south of the Project.

4.2.5 Critical and natural habitats

There are no habitats qualified as CH due to the presence of non-avian CH species. CH birds are not used to classify specific (suitable) areas of habitat as critical, due to their wide-ranging movements and high likelihood of occurring over the large majority of the habitats in the Project area and its vicinity. The only CH habitats on this Project are those that overlap with the distribution of the threatened ecosystems that trigger CH (see Section 4.2.6).

Based on aerial imagery (Zanaga *et al.* 2022: imagery from 2021) information from previous field work assessments in the Project area, and expert consultation, the Project is located in an area mostly consisting of NH (NH occupies >88% of the area within a 20 km buffer around the wind farm boundary and a 10 km buffer area around the OHTL route) (Table 8, Figure 4 and Figure 5). Most areas of NH have some level of livestock grazing, however these impacts are unlikely to have disrupted the area's primary ecological functions or species composition. Likewise, many areas of NH are likely to have some presence of small-scale traditional and subsistence agriculture, with the main agricultural products being corn, cassava, cowpea, peanut, and sweet potato (Matos, Fonseca & Associados 2022, Consultec 2023). Larger areas of Modified Habitat (MH), consisting mostly of more intensive croplands and dwellings, are present near the OHTL substation (Boane area) and to the west of the Project, in South Africa (Figure 4 and Figure 5).

Note that Globeleq commissioned an ecologist to conduct a detailed habitat mapping survey at the wind farm area and along the proposed OHTL routing in February-March 2024, which was not completed at the time of writing this BAP draft, but will be used to refine the habitat classifications used in future revisions of this BAP.

Table 8 provides and overview of the habitats present in the BAP study area and their status as either natural or modified habitat. This information is to illustrate the habitats available for the priority species in the wider area. The calculation of the actual habitat losses likely to be caused by the Project is presented in the residual impact assessment below (Section 7).

The habitat calculations employ a hybrid approach, merging data from two distinct sources. The more precise and detailed forest classifications from the ESA Worldcover dataset, at a resolution of 10 meters, are integrated with the broader spectrum of vegetation classes from the IUCN Terrestrial Habitat Dataset, at a resolution of 100 meters. This integration takes advantage of the accuracy and granularity of the ESA dataset in identifying various forest types while ensuring the inclusion of detailed information on non-forest vegetation classes from the IUCN dataset. The

data is merged in a Geographic Information System (GIS), to enable spatial analysis and synthesis of the combined datasets.

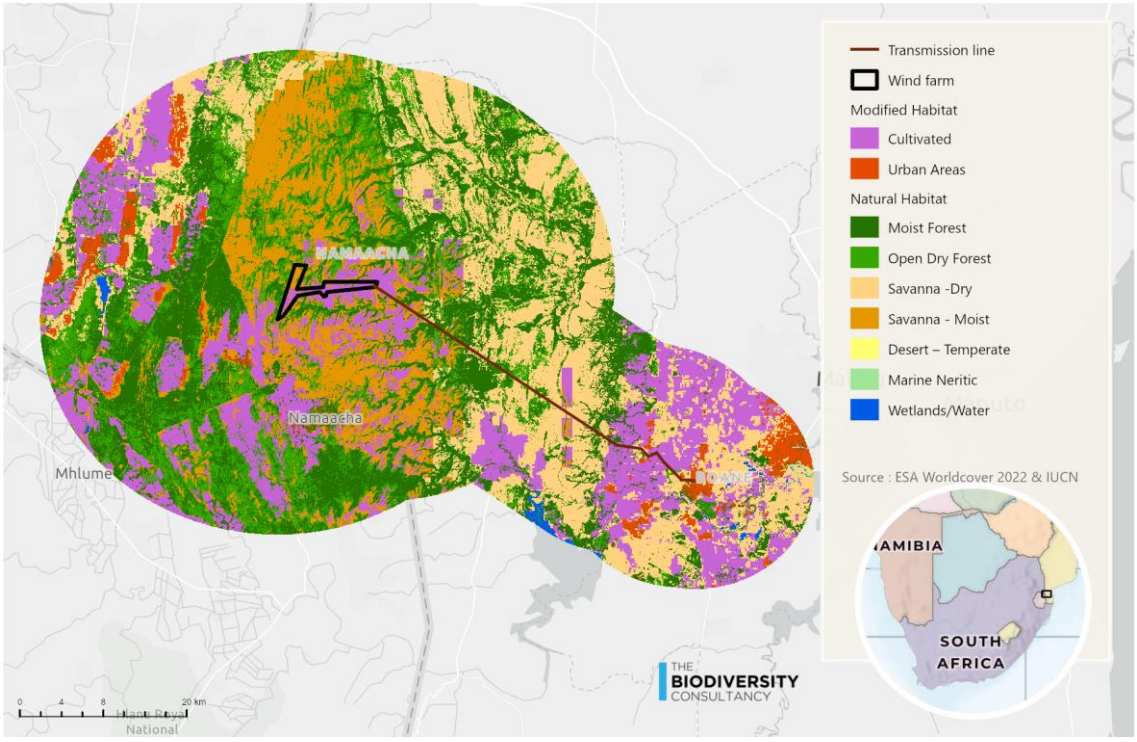

Figure 4. Map showing land cover (ESA WorldCover 2022 plus IUCN terrestrial habitats 2021) within a 20 km buffer around the wind farm boundary and a 10 km buffer around the OHTL route.

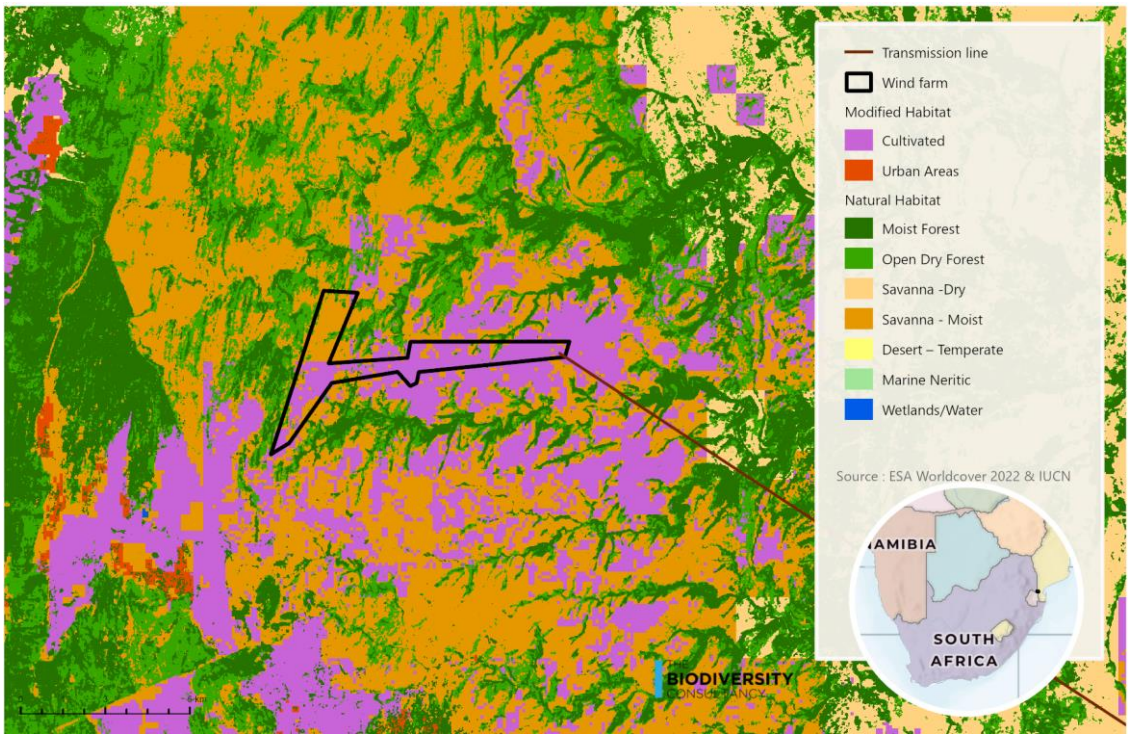

Figure 5: Land cover (ESA WorldCover 2023 and the IUCN Terrestrial Habitats 2021) at the closer vicinity of the wind farm.

Table 8. Land cover types (ESA WorldCover 2022 and the IUCN terrestrial habitats 2021) classification as Natural Habitat (NH) or Modified Habitat (MH), and their occupation within a 20 km buffer around the wind farm boundary and a 10 km buffer around the OHTL route.

Type name	NH/MH	Area in EAAA (km^2)	% of EAAA
Cultivated	MH	518.94	19.54
Urban Areas	MH	77.40	2.91
Moist Forest	NH	621.07	23.38
Open Dry Forest	NH	427.38	16.09
Moist Savanna	NH	366.57	13.80
Dry Savanna	NH	633.98	23.87
Desert – Temperate	NH	0.07	0.00
Marine Neritic	NH	0.78	0.03
Wetlands	NH	10.08	0.38

4.2.6 Threatened ecosystems

Based on the Red List of Ecosystems assessment for Mozambique (Lötter *et al.* 2021) and associated publicly-available data, four threatened ecosystems were initially considered for assessment (Figure 6) (TBC 2024). However, the Lebombo-KwaZulu Natal Scarp Forest (CR) shows a very patchy distribution along the Lebombo Mountains in Eswatini, South Africa and Mozambique (Figure 6) that does not overlap with any infrastructure associated with the Project nor with areas that will be influenced by the Project. Also, the Subtropical Coastal Salt Marshes (EN) were historically present in Boane, which nowadays is heavily transformed and urbanized.

Field survey results from the wind farm area (Matos, Fonseca & Associados 2022), transmission line area (Consultec 2023) and observations made by the Globeleq environmental team suggest that the two remaining threatened ecosystems may have been already modified or degraded in some parts of the Project area. A habitat survey in the wind farm area and along the transmission line was commissioned in February-March 2024 but it was not completed at the time of writing this BAP draft. A precautionary approach was used in this BAP, assuming that the threatened ecosystems have the extent and condition as described in the Red List of Ecosystems assessment for Mozambique (Lötter *et al.* 2021).

The priorities in this BAP comprise two threatened ecosystems that qualify as CH and are likely to be affected by the Project:

- Lebombo Summit Sourveld (CR),
- Western Maputaland Clay Bushveld (EN)

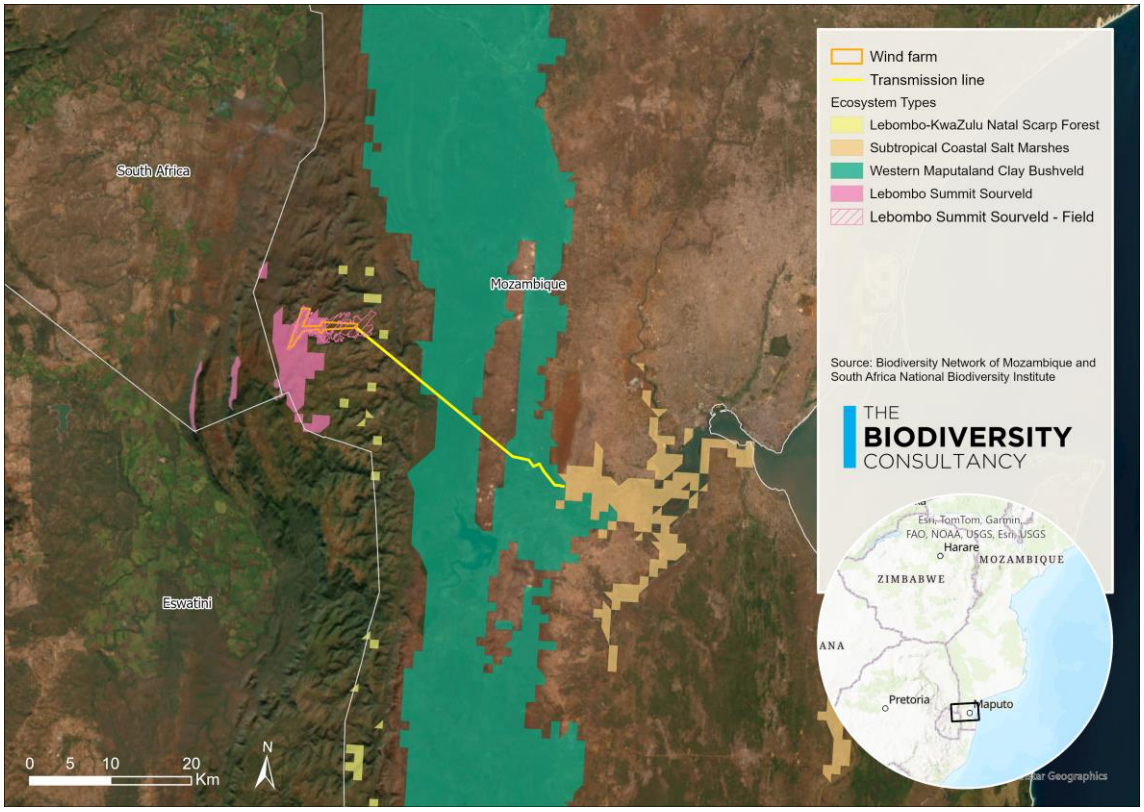

Figure 6. Distribution of ecosystem types in Mozambique, as assessed in the Red List of Ecosystems assessment for Mozambique (Lötter et al. 2021). The pink crossed out polygon represents an additional area of occurrence of Lebombo Summit Sourveld ecosystem, identified in field works in the Project area (W. McCleland, pers, comm.). CR ecosystems: Lebombo Summit Sourveld; Lebombo-KwaZulu Natal Scarp Forest. EN ecosystems: Western Maputaland Clay Bushveld; Subtropical Coastal Salt Marshes.

4.2.7 Legally protected and internationally recognised areas

The Project does not overlap with any Legally Protected and Internationally Recognized Areas as per IFC PS6 and IUCN definitions[5] (Figure 7). It is located close to the boundaries of the following designated areas:

- The Lubombo Biosphere Reserve (https://en.unesco.org/biosphere/africa/lubombo) covers an area of 294,020 ha in Eswatini (Figure 7). 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 (https://www.keybiodiversityareas.org/site/factsheet/49182; https://www.keybiodiversityareas.org/site/factsheet/49181) extends over 6,854 ha in Eswatini and 39,626 ha in South Africa (Figure 7). It has been classified based (legacy criteria)

[5] https://www.protectedplanet.net/en

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 (https://www.keybiodiversityareas.org/site/factsheet/6887; https://www.keybiodiversityareas.org/site/factsheet/49180) occupies 31,482 ha in Eswatini and 3,078 ha in South Africa (Figure 7). 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.

Lubombo Transfrontier Conservation Area (LTCA) spans across Mozambique, Eswatini and South Africa (https://www.peaceparks.org/tfcas/lubombo/). It comprises a number of legally protected areas and internationally recognised areas, but it is not classified as a protected area as a whole.

The Project (20 wind turbines and *c.* half of the OHTL extension) overlaps with the Namaacha Tropical Important Plant Area (TIPA)[6], 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.

The Namaacha TIPA is targeted as a biodiversity offset implementation area for this Project and further details are provided in Section 8.5. The other designated areas mentioned above are not priorities for the implementation of offsets on this Project because they are located outside Mozambique.

[6] https://tipas.kew.org/site/namaacha/

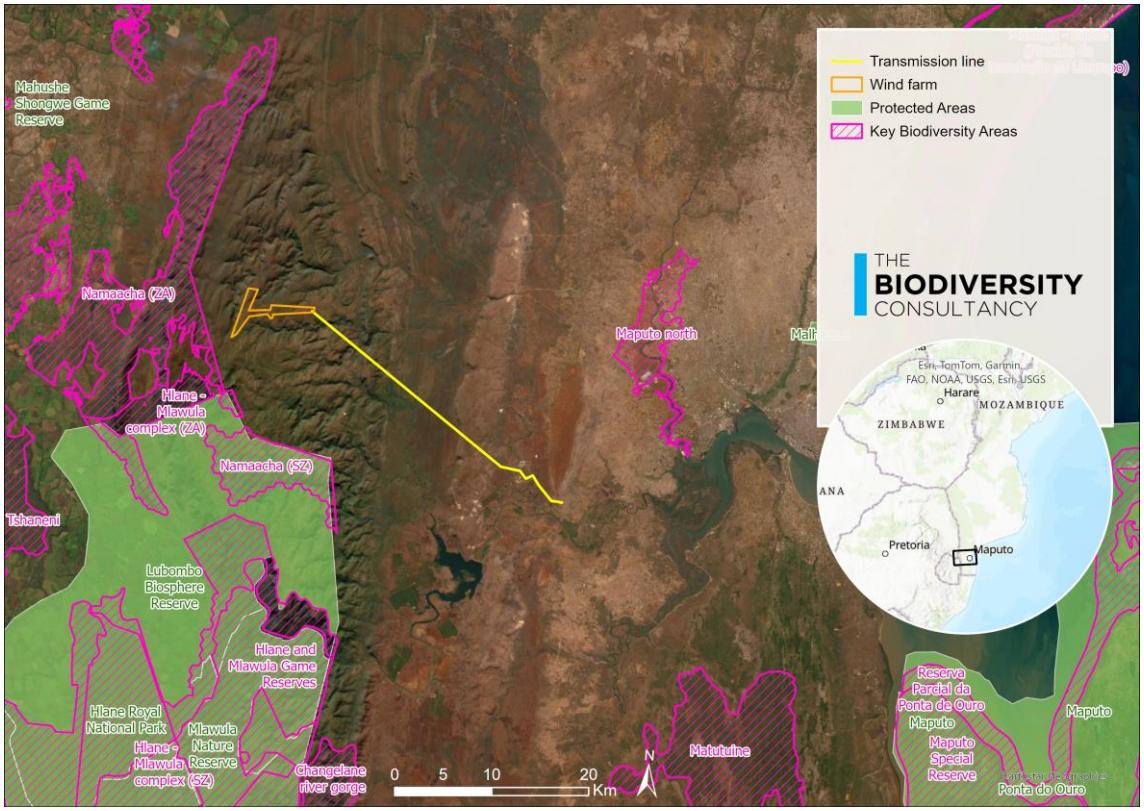

Figure 7 Protected Areas and other Internationally Recognised Areas of high biodiversity value located in the Project's region.

5 Potential impacts on biodiversity

This section provides an overview of potential biodiversity impacts related to the wind farm and transmission line for the construction and operation phases of the Project. The impacts mentioned below are taken from the relevant Project ESIA and supporting documents (Matos, Fonseca & Associados 2022; AfriAvian Environmental 2023; Consultec 2023; WSP 2023). Mitigation measures for the predicted impacts are presented in Section 6 and a quantitative residual impact assessment, assuming the successful implementation of the mitigation measures, is presented in Section 7 of this BAP.

5.1 Construction impacts

For both the wind farm site and along the transmission line, the primary impact will be the loss of, and degradation to, terrestrial habitats and direct loss of flora and fauna species, from the installation of turbines, transmission line pylons and associated infrastructure (e.g., access roads, hard stands, building). These activities will also result in disturbance to more mobile fauna species, and may alter, or be a barrier to, their regular movement patterns (Table 9). Most of these impacts will be permanent; however, all areas of temporary vegetation loss will be restored with native species.

Construction activities may also impact the freshwater habitats as vegetation clearance will result in exposed soil with potential for erosion by runoff and sedimentation. However, these impacts are not considered to be significant.

Table 9. Summary of the Project's construction impacts.

Impact type	Project activity associated with the potential impact
Wind farm site	
Loss and degradation of terrestrial habitat, plant species and habitat for fauna species	Clearing of vegetation for turbines and buildings. Construction or upgrading of access roads Disposal of excavation and surplus materials
Loss of, or disturbance to, fauna species	Clearance of vegetation for project infrastructure, or access to project infrastructure.
	Movement of vehicles
Barriers to movement for mobile fauna	Construction of turbines and access roads.
Transmission line	
Loss and degradation of terrestrial habitat, plant species and habitat for fauna species	Clearing and stripping of vegetation within the transmission line corridor. Construction or upgrading of access roads. Disposal of excavation and surplus materials.
Loss of, or disturbance to, fauna species	Clearing of vegetation for transmission pylons. Construction or upgrading of access roads. Disposal of excavation and surplus materials.
Barriers to movement for mobile fauna	Construction of the transmission line and access roads.

5.2 Operational impacts

5.2.1 Wind farm

The main impact of the operational wind farm is the collision of susceptible bird and bats with moving turbine blades. Turbines may also act as a barrier to the normal movements of some bird and bat species.

Vehicle traffic and maintenance activities may cause disturbance to susceptible birds, reptiles and terrestrial mammals, and has the potential to introduce or spread invasive species in the wider area of the Project (Table 10).

5.2.2 Transmission line

Once operational, vegetation along the transmission line will require periodic maintenance (e.g., height management) which could both directly affect a range of small bird species, reptiles and terrestrial mammals (through loss of habitat) and alter their normal movement patterns (if suitable habitat is no longer available which would facilitate movement between different areas). Maintenance activities also have the potential to introduce or spread invasive species in the wider area of the Project.

Electrocutions of birds and bats may also occur at transmission pylons, while collisions of birds may occur with wires of the transmission line. The transmission line may also act as a barrier to the normal movements of some bird and bat species (Table 10).

Table 10. Operational impacts by the Project.

Potential Impact	Project activity associated with the potential impact
Loss and degradation of terrestrial ecosystems, plant species, fauna habitats and introduction of alien species	Easement maintenance
Bird, bat and arboreal mammal collisions and electrocutions	Operation of turbines and energy delivery to the grid through the transmission line
Barrier and fragmentation effects for bird and bat movements	Operation of turbines and energy delivery to the grid through the transmission line

5.3 Cumulative impacts

The ESIA for the wind farm determined there were no planned projects that could have cumulative impacts with the Namaacha Power Plant Project' (Section 9.15: Matos, Fonseca & Associados 2022) while the transmission line ESIA did not discuss cumulative impacts (Consultec 2023). The Project is not aware of any other proposed projects along the transmission line route at an advanced planning stage either. As this Project is the only wind farm development in the region, the cumulative effects of the Project's predicted impacts are likely to be low and not considered further in this BAP.

6 Mitigation strategies

6.1 Mitigation hierarchy

The mitigation measures adopted by the Project will follow the mitigation hierarchy: avoid, minimise, restore, and compensate/offset (Figure 8). Avoidance entails 'designing out' an impact or risk (e.g., through relocating a project component, avoiding a harmful activity, employing alternative technology), preventing their expected impacts on biodiversity. Minimisation reduces the severity of impacts on biodiversity by controlling or limiting the source of that impact. Such actions reduce the likelihood or magnitude of biodiversity impacts, but do not completely prevent them.

Restoration seeks to recreate the original (pre-project) habitat type or to actively enhance the rate of recovery of degraded habitats on the actual Project site, with a focus on areas affected temporarily during construction. Where significant residual impacts remain, compensation/offset actions to achieve an overall NNL for NH, where feasible, and NG for CH-qualifying features will need to be developed.

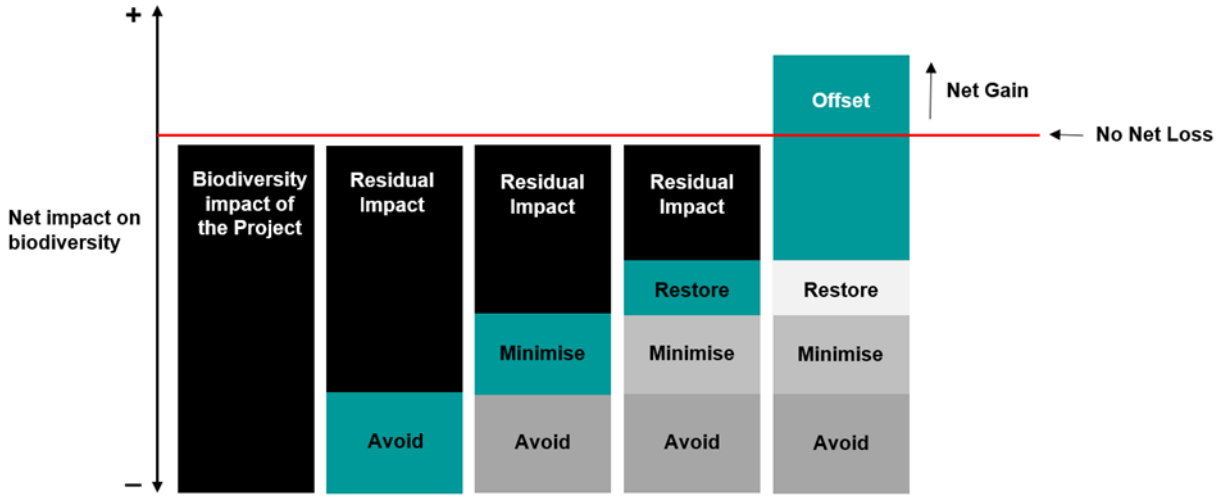

Figure 8. The Mitigation Hierarchy and delivery of net positive impact on biodiversity.

6.2 Mitigation actions

A range of good-practice mitigation actions were included in the Project's ESIAs (Matos, Fonseca & Associados 2022; Consultec 2023; WSP 2023) and supplementary documents. Additional measures were provided by Globeleq and TBC where necessary.

The ESIA mitigation actions are detailed in Table 11. In summary:

- In the ESIA or the transmission line, five alternatives were originally considered with the selected option considered as having the lowest biodiversity impact (Table 4.4: Consultec 2023);
- For the wind farm, sensitive biodiversity was identified too late in the project design to fully explore avoidance measures; however, potential nesting sites identified in the Avifauna study were specifically avoided when selecting the resettlement host areas.
- Most actions are focused on impact **minimisation** through controls on clearance or degradation of vegetation and disturbance of fauna;
- **Restoration** of habitats using native species is required as soon as possible following the end of impacts;
- **Compensation** is not described in the ESIAs[7], however compensation actions to address residual impacts are presented in Section 8 of this BAP.

The mitigation actions summarised above and in Table 11 have been collated from the various ESIA documents (Matos, Fonseca & Associados 2022; Consultec 2023; WSP 2023). Note that the mitigation measures from the original ESIA and ESMP were updated as part of the ESIA Addendum (WSP 2023).

[7] Compensation is described in the ESIAs, however only in relation to social impacts – not biodiversity.

*Table 11. Summary of the Project's general mitigation actions planned during construction and operations contained in the ESIAs (Matos, Fonseca & Associados 2022; Consultec 2023; WSP 2023) and additional mitigation actions to which the Project has also committed to (marked in **bold**).*

Impact type	Project phase	Mitigation hierarchy	ESIA mitigation action and details	Plan(s)	Responsibility
Wind farm site					
Clearing, stripping and/or vegetation removal	Construction	Minimise	Limit the removal of vegetation to the areas strictly necessary for the execution of the works and preserve the largest number of trees and shrubs. Avoid land clearance activities within 500 m of rivers and 200 m of drainage lines. Promote awareness-raising among workers not to harvest or damage plant specimens and address the ecological value of flora, vegetation and habitats and train them in environmentally-appropriate procedures to be followed on site. All tree and shrub species that do not affect the execution of the work should be safeguarded.	Construction Environmental Management Plan	Project Environmental Management EPC contractor
Clearing, stripping and/or vegetation removal	Construction / Operation	Restore	Implement a landscape restoration plan that includes the use of native species belonging to the vegetation type described in this report. Carry out landscape restoration as soon as possible after the end of the operations on temporarily-impacted land and other areas that have been affected by the work (e.g., construction site area, substation surroundings). Develop maintenance actions in the areas under restoration to ensure that conditions are created for the normal development of natural habitats.	Landscape Restoration Plan	Project Environmental Management EPC contractor
Direct impacts to, and disturbance of, fauna	Construction / Operation	Minimise	Concentrate works in time, especially those that cause the greatest disruption and avoid conducting construction activities in the evening (i.e. after 22:00). Plan the timing of the works to minimise impacts on the different species of species relevant to this area. If the use of explosives is necessary, precutting techniques and the use of micro-retarders should be used, thus attenuating the intensity of the vibrations produced. Train staff and contractors in environmentally-appropriate procedures to be followed on site. Car circulation at low speed (below pre-defined speed limit) in Project roads/accesses to reduce the likelihood of road kills of fauna.	Construction Environmental Management Plan Works Environmental Monitoring Plan	Project Environmental Management EPC contractor
Collision of bird and bat priority biodiversity values	Operation	Minimise	Lighting of wind turbines should be reduced to the minimum recommended for aviation safety; If there is considerable mortality of sensitive bat species, or very considerable mortality of other species, more direct mortality risk minimisation measures should be assessed, such as the use of acoustic deterrents to ward off chiropterans. All wind turbines are to be subjected to standard blade feathering (up to 3.5 m/s) during spring and summer from the date of project inception. This should be	Bird and Bat Adaptive Management Plan	Project Environmental Management

Impact type	Project phase	Mitigation hierarchy	ESIA mitigation action and details	Plan(s)	Responsibility
			implemented throughout the lifespan of the project, with specific parameters (seasonality and wind speed) being updated throughout the course of an operational bat monitoring campaign, as more fatality and acoustic data becomes available. For any turbines located within the high sensitivity buffer areas (See Figure 4 of the ESIA Addendum), suitable minimisation techniques (i.e. curtailment or ultrasonic deterrents) are to be implemented from the start of operation, in accordance with the parameters defined in Table 24 of the ESIA Addendum. If unacceptable impacts to megabats are identified through ongoing monitoring, then curtailment (following the parameters detailed in the ESIA Addendum (WSP 2023) should be implemented. Implement an Automated Shut-down-on-Demand system for turbines using a camera system such as Identiflight®. This should be implemented for the Red Listed species as a minimum. Noise deterrents will be installed on all turbines to help promote bird avoidance behaviours If estimated collision rates indicate unacceptable mortality levels of priority bird species, the Automated Shut-down-on-Demand system should be expanded to include these species as well. Should a mortality of a Red List species be recorded, an observer led shutdown on demand (SDoD) programme should be considered in addition to the Automated Shutdown-on-Demand programme. All wind turbines must have one blade painted according to a local civil aviation authority approved pattern Livestock carcass and prey-availability management programme to be implemented.		
Transmission line					
Degradation of wetlands and riverine systems	Construction	Avoid/Minimise	Prioritise locating transmission pylons away from riverbanks, wetlands, and floodplains. 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 with native vegetation. All pylons will be located at least 30 m from the nearest water source to avoid polluting the waters and to reduce the flow of sediments. 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	Construction Environmental Management Plan Emergency Response Plan Waste Management Plan	Project Environmental Management EPC contractor

Impact type	Project phase	Mitigation hierarchy	ESIA mitigation action and details	Plan(s)	Responsibility
			the servicing or refuelling takes place to prevent contaminants from entering wetlands or riverine systems. 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. Limit the movement of machines and vehicles to within work areas. Forbid any disturbance outside site boundaries.		
Direct loss of vegetation	Construction	Avoid/Minimise	Strictly limit the clearing of vegetation to the required areas, with particular emphasis on this measure in areas of natural habitat, and forbid vegetation control outside the designated maintenance boundary. Prioritise siting of construction lay-down areas and borrow pits outside of areas of natural habitat. High sensitivity biodiversity areas will be mapped in advance of any ground clearance and vegetation clearance activities will be monitored. Whenever possible new and temporary access should be created based on existing access points/routes.	Construction Environmental Management Plan	Project Environmental Management EPC contractor Biodiversity Specialist
Direct loss of vegetation	Construction	Restore	Rehabilitate temporary work areas as soon as practical (i.e., once work is concluded in each segment), to reduce the duration of the impact. Prioritise the use of native species for rehabilitation works.	Landscape Restoration Plan	EPC contractor
Direct and indirect impacts to fauna	Construction	Avoid/Minimise	Vegetation clearing areas will be scouted in advance of construction and vegetation removal activities by a suitably trained professional with the aim of locating animals or roosting and nesting sites close to the construction area. If any animal or nesting sites with eggs or chicks/juveniles are identified they will be removed and relocated. 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. Limit machinery and vehicles speed limit to 30km/h to reduce the risk of collisions with animals, and place signs along access roads informing speed limits and possible animal presence. Limit non-Project vehicle entrance and circulation along the Right of Way (RoW), as much as possible, through the placement of signage. 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.	Biodiversity Management Program	Project Environmental Management EPC contractor

Impact type	Project phase	Mitigation hierarchy	ESIA mitigation action and details	Plan(s)	Responsibility
			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 minimise 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.		
Loss of fauna habitat	Construction	Avoid/Minimise	Vegetation clearing, topsoil removal, and earthmoving activities should be minimised as much as practical and limited to the strictly needed areas. Avoid locating towers and access roads in wetlands and riverbeds and on banks. 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.	Biodiversity Management Program	Project Environmental Management EPC contractor
Introduction/spread of invasive species	Construction	Avoid/Minimise	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. Limit non-Project vehicles entrance in the construction area to avoid invasive and ruderal species dispersion. Whenever possible, new and temporary access points should be created based in existent access points/routes	Construction Environmental Management Plan	EPC contractor
Collision of avian priority biodiversity values	Operation	Minimise	Bird flight diverters should be installed on all the overhead line sections for the full span length according to the applicable International Best Practice standards at the time. Underground cabling should be used as much as is practically possible, to minimise risk of powerline collisions.	Bird and Bat Adaptive Management Plan	EPC contractor
Electrocution of avian priority biodiversity values	Operation	Minimise	Install anti-landing devices in pylons close to wetlands, rivers, and waterbodies, to avoid birds nesting. If the use of overhead lines is unavoidable due to technical reasons, the Avifaunal Specialist must be consulted timeously to ensure that a raptor friendly pole design is used, and that appropriate mitigation is implemented pro-actively for complicated pole structures.	Bird and Bat Adaptive Management Plan	Project Environmental Management EPC contractor

7 Residual impact assessment

7.1 Scope of this assessment

The residual impacts were estimated for the Project components, which are described in Section 2 and illustrated in Figure 2. Impacts from temporary components were treated in the same way as the permanent ones in this assessment given that the scope of the on-site habitat restoration has not been defined yet.

This residual impact assessment focuses on priority biodiversity values likely to be affected by the Project, as these values are subject to NG and NNL requirements under IFC PS6. Priority biodiversity values are presented in Section 4.2 above.

The scope of this assessment includes the main direct impacts of the Project, which include:

- Bird and bat collisions with the turbines and the transmission line;
- Habitat loss under the project footprint;
- Habitat disturbance from noise, dust and vibrations; and,
- Fragmentation of habitat.

The indirect impacts of the Project on biodiversity from increased numbers of people in the area working on the Project or attracted to the area in search of work are addressed through awareness raising, training and education programmes for both the Project workers and the local communities (see Additional actions to support conservation, Section 8.5.5 of the BAP).

The Project is located in a landscape with existing land use activities including villages, roads, development activities, and agriculture. Despite the likely ongoing background declines to biodiversity, a static baseline has been used in the quantification of residual impacts; this is considered to be a precautionary approach.

To address the impacts summarised in Section 5 above, the Project has committed to implementing mitigation measures as described in the ESIA and summarised in Section 6 and Table 11 of the BAP. These mitigation measures include avoidance, minimisation and on site-restoration, which have been taken into consideration when assessing the residual impacts of the Project. This residual impact assessment assumes that all those mitigation commitments will be implemented.

This residual impact assessment makes the following broad assumptions about the scale of impacts, and responses of priority biodiversity values to these impacts:

- This assessment is based on the Project design described in the ESIA and the .kmz file provided by Globeleq on 12 December 2023. Any modifications to infrastructure design may change the residual impacts predicted in this BAP, and modifications should be reflected in future versions of the BAP;

- This assessment does not take into account cumulative impacts (see Section 5.3 for more details); and
- This assessment assumes that all impact avoidance and minimisation actions as outlined in the ESIA are implemented as planned.

7.2 Birds

Impacts to birds will primarily result from collisions with turbines and from collisions with, or electrocutions on, the transmission line connecting the Project to the grid. Nineteen species of birds have been identified as either potentially CH-qualifying or priority biodiversity values in this BAP (Section 4). Where possible, species with common biological attributes or responses to the Project have been assessed for residual impacts using the same approach, as outlined below (also see Table 12).

For most species, the impact of most relevance will be collision with turbine blades (see Table 11) and residual impacts have been calculated assuming that all mitigation measures are implemented (e.g., camera-based automated shut-down-on-demand; Table 11) and show some effectiveness (for a discussion on the likely variation in effectiveness associated to different types of mitigation see TBC 2023a). Two approaches were used to calculate residual impacts, depending on whether, in the Project area, the species is:

- Wide-ranging, migratory or nomadic (e.g., vultures, raptors and some storks). Individuals of these species move over vast areas, and so there is the potential for a large proportion of the population to interact with the wind farm and for most flights to be of different individuals; or,
- Resident (primarily raptors, bustards and southern ground hornbill). These species hold permanent territories in the Project area and most flights will represent a very small number of individuals.

For wide-ranging, migratory or nomadic species with sufficient activity within the area of interest, fatalities can be estimated through a collision risk modelling approach by knowing the passage rates of the species (i.e. flights per hour within the wind farm, ideally collected through field surveys on site), the technical specifications of the wind farm and species' basic biological attributes. These parameters can be entered into a collision risk model (e.g. the 'Band' model: (Scottish Natural Heritage 2000) to derive an annual fatality estimate. When there is very low, or no, activity for a species recorded within the Project area, a collision risk approach is not relevant, and residual impacts can be assumed to be 'much less than 1' (see TBC 2023a for a detailed description of the approach taken for the Project).

For resident species, most observed flights will be of territorial individuals, and so the number of fatalities will be related to the number of individuals present rather than passage rates as most

flights will be of the same resident individuals. Under a worst-case scenario[8], both individuals of all resident pairs are assumed to, within the first year, eventually collide with turbine blades or abandon their territories due to disturbance[9]. The first operational year impact for a resident species from the Project can then be estimated as twice the number of territories present (if information from field surveys is available), or by calculating the maximum number of territories that could fit within the Project area[10]. Fatalities during subsequent years of operation then represent wandering individuals that enter the wind farm from other areas, as either immatures exploring beyond their natal territory, or as adults looking for breeding territories. For these individuals, the number of individuals moving through the Project area will likely scale with the number of preconstruction territories of each species in the Project area (as the presence of a greater number of territories implies better habitat to attract roaming individuals). Ongoing annual fatalities are assumed to approximate the number of preconstruction territories of resident species (see Cordeiro *et al.* 2012 for an example of this with common kestrel, while this is also the case at the Kipeto wind farm: TBC unpublished data).

For electrocutions on the transmission line, it is assumed that the proposed mitigation (see Section 6) will reduce the likelihood of electrocution to ~0 for all species. Most collision with the transmission line is a low risk for almost all avian priority biodiversity values, and the proposed mitigation (see Section 6) will further reduce impacts by 50% for these species (Bernardino *et al.* 2019). Only one avian priority biodiversity value is at high risk of collision with the transmission line: the Buff-bellied Bustard *Lissotis melanogaster* and BFDs are known to not reduce collision rates among bustards (Shaw *et al.* 2021). It is also not possible to estimate collision fatalities on transmission lines from pre-construction activity monitoring (and this information was also not collected for this species along the transmission line). For this species, the fatality estimate was based on reported *per km* rates from the related Karoo Korhaan *Heterotetrax vigorsii* in South Africa. A fatality rate of 0.05-0.37 individuals/km/year (95% confidence intervals) were estimated for that species (Shaw et al. 2018), which when adjusted for the 32 km of transmission line for Project is an estimated annual fatality of 2-12 individuals/year.

For two species, Shelley's Francolin and Short-tailed Pipit, collisions with turbines or transmission lines are unlikely, and the largest impact is likely to be habitat loss during

[8] These values present worst case scenarios. The proportion of the Project area over which activity occurs affects the likelihood of the worst case scenario occurring but does not change the value of the worst case scenario (i.e. the more turbines over which a species' range overlaps, the greater the likelihood that the worst case scenario will occur, but the worst case remains the same).

[9] It is also possible that resident species will modify their territory to avoid areas with turbines, in which case no fatalities would result (e.g. Nishibayashi *et al.* 2022).

[10] For simplicity, the death of any dependent chicks as a result of the death of one or both territorial adults is not considered here as (i) this scenario would only be realised for a small portion of the year, (ii) not all resident species will breed every year and (iii) including this factor portrays a much higher precision than the likely reality, especially given the level of assumptions that have been made for other components required to estimate fatalities from the project.

construction. For these species, NH has been used as a proxy to estimate the impacts from the Project (described in Section 7.4).

For all avian priority biodiversity values, a robust Post-Construction Fatality Monitoring Program (PCFM) is required, as presented in the ESIA Addendum (WSP 2023). This monitoring will incorporate the approach detailed in the PCFM Good-practice Handbook (IFC *et al.* 2023). Importantly, monitoring must cover both the turbines and transmission line, and should be expected to occur for at least the first three years of operations. PCFM will also allow the Project to validate the impacts predicted in the document, re-evaluate the magnitude and/or coverage of any conservation actions, evaluate the effectiveness of proposed mitigation and contribute to the adaptive management process.

Table 12. . Residual impacts, calculation approach and justification, and recommended offset targets for bird priority biodiversity values. (offset targets for each bird species set to be at least double the predicted maximum losses – see Section 7.2). For migratory species, the main period of occurrence in the area is shown in the Movement status column (eBird data). Potential Critical Habitat-qualifying features, which require a Net Gain (NG) are shown in bold. All other features have a No Net Loss (NNL) target. QH – Quality Hectares (see section 7.4.2).

Species/Habitat	Impact pathway	Movement status	RIA approach	Residual impacts (Year 1/Year 2+)	Project target	Offset target	Justification[11]
White-backed Vulture (*Gyps africanus*)	**Collision with turbines**	**Wide-ranging**	**Activity-based**	**~0/~0**	**NG**	**1-2**	**Fatalities estimated in TBC** (2023a)**, based on field survey information.**
Martial Eagle (*Polemaetus bellicosus*)	**Collision with turbines**	**Resident**	**Territory-based**	**<2/<1**	**NG**	**1-2**	**Fatalities estimated in TBC** (2023a)**, based on field survey information.**
Bateleur (*Terathopius ecaudatus*)	**Collision with turbines**	**Resident**	**Territory-based**	**1/<1**	**NG**	**1**	**Fatalities estimated in TBC** (2023a)**, based on field survey information.**
African Harrier-Hawk *Polyboroides typus*	Collision with turbines	Resident	Territory-based	<2 / <1	NNL	1	Very few records during field surveys, and so it is unlikely that the Project overlaps with more than one territory of this species.
African Hawk Eagle *Aquila spilogaster*	Collision with turbines	Resident	Territory-based	<2/<1	NNL	1	Based on the location and levels of activity recorded during avian surveys and inter-nest distances of 4.7 km (Hustler & Howells 1988), one territory is likely to be present.
Black Stork *Cicconia nigra*	Collision with turbines and transmission line	Migrant	Activity-based	1-3	NNL	3	Collision risk modelling used (i.e. Band 2012), with relevant species information sourced from EoIDist and BirdID websites.
Black-bellied Bustard/Korhaan *Lissotis melanogaster*	Collision with transmission line	Resident	Distance-based	2-12/2-12	NNL	12	Collision estimates based on the per km rates reported in South Africa for Karoo Korhaan *Heterotetrax vigorsii* of 0.05-0.37/km/year (Shaw *et al.* 2018) and a transmission line length of 32 km. This approach assumes that all habitat along the transmission line is suitable for this species., that both species occur at similar

[11] Information used in the justification is from the various Project reports (Matos, Fonseca & Associados 2022; AfriAvian Environmental 2023; WSP 2023) unless stated otherwise.

Species/Habitat	Impact pathway	Movement status	RIA approach	Residual impacts (Year 1/Year 2+)	Project target	Offset target	Justification[11]
							densities and are similarly susceptible to collisions.
Black-chested Snake Eagle *Circaetus pectoralis*	Collision with turbines	Resident	Territory-based	6 / 3	NNL	3	Based on high levels of activity across the site recorded during avian surveys, and a density of 5.8 km^2 per pair for the closely related Short-toed Snake-eagle in Macedonia (Velevsky & Grubač n.d.), a maximum of three territories are likely to be present.
Black-winged Kite *Elanus caerulus*	Collision with turbines	Resident	Territory-based	~0 / ~0	NNL	1	Very few records during field surveys, and so it is unlikely that the Project overlaps with any territories of this species.
Common Buzzard *Buteo buteo*	Collision with turbines	Migrant	Activity-based	1-4	NNL	4	Collision risk modelling used (i.e. Band 2012), with relevant species information sourced from EoIDist and RSPB websites.
Jackal Buzzard *Buteo rufofuscus*	Collision with turbines	Resident	Territory-based	2/1	NNL	2	Commonly recorded on field surveys, and observation locations suggest the project overlaps with two territories.
Lanner Falcon *Falco biarmicus*	Collision with turbines	Resident	Territory-based	~0 / ~0	NNL	1	Very few records during field surveys, and so it is unlikely that the Project overlaps with any territories of this species.
Peregrine Falcon *Falco peregrinus*	Collision with turbines	Resident	Territory-based	~0 / ~0	NNL	1	Very few records during field surveys, and so it is unlikely that the Project overlaps with any territories of this species.
Shelley's Francolin *Scleroptila shelleyi*	Habitat loss	Resident	Habitat-based	15.16 QH	NNL	15.16 QH	Likely to occur throughout the project area based on observations on transects. Habitat as proxy (in this case open forest; see section 7.4.2 and Table 15) suggested as an appropriate method for tracking losses and gains for this species, supported by PCFM to determine if fatalities occur.
Short-tailed Pipit *Anthus brachyurus*	Habitat loss	Resident	Habitat-based	56.49 QH	NNL	56.49 QH	Only one record from transects within the Project area, although easily overlooked. Habitat as proxy (in this case dry and moist savanna;; see section 7.4.2 and Table 15) suggested as an

Species/Habitat	Impact pathway	Movement status	RIA approach	Residual impacts (Year 1/Year 2+)	Project target	Offset target	Justification[11]
							appropriate method for tracking losses and gains for this species, supported by PCFM to determine if fatalities occur.
Walhberg's Eagle (*Hieraaetus wahlbergi)*	Collision with turbines	Migrant, but territorial during breeding - likely at site (Aug-Apr)	Territory-based	<2/<1	NNL	1	Territories elsewhere in Africa have been estimated at 12-16 km^2 (Meyberg *et al.* 1995) and so two territories are possible within the Project area. This is supported by activity data, which shows flights of this species across the whole Project area.
Crowned Eagle *Stephanoaetus coronatus*	Collision with turbines	Resident	Territory-based	1/<1	NNL	1	Fatalities estimated in TBC (2023a), based on field survey information.
Tawny Eagle *Aquila rapax*	Collision with turbines	Resident	Territory-based	<1/<1	NNL	1	Confirmed as present in the ESIA, but not recorded during bird surveys. Likely to be sufficiently rare that, considering the Project's mitigation and likely level of avoidance behaviour, <1 death/year is reasonable.

7.3 Bats

The correlation between bat activity and fatality rates at operational wind farms is poorly understood, and there is currently no proven method to estimate fatality rates for any bat species from preconstruction activity data (e.g. Solick *et al.* 2020). There is good information on bat fatalities at wind farms in South Africa, and while not directly applicable to the project site, does provide some indication of the bat fatalities which could be caused by the Project. A review of 25 wind farms in South Africa (Aronson 2022) reported an annual fatality rate for all bats of 213 (114-489) bats/facility/year (mean, lower and upper 95% confidence interval) and 2.8 bats/MW/year[12]. Applying the same ratio to the confidence bounds as to the mean value gives an upper and lower estimate of 1.5-6.4 bats/MW/year, and applying this value range to the Project, the annual residual impact to all bats is likely to fall within the range of 180-768. It is also important to highlight that individual wind farms had extremely different annual bat fatality rates: as low as 0.1 bats/MW/year and as high as 15.2 bats/MW/year. If these rates were considered as a 'best' and 'worst' case scenario, it is possible that the Project could have an annual residual impact to all bats of 12-1,824 bats. This calculation assumes that the data above was derived from wind farms in South Africa that applied comparable mitigation measures to those that will be implemented in Namaacha Project (e.g., seasonal blade feathering; Table 11).

Bat fatalities at the Project will not be equally distributed across all bat taxa present due to differences in abundance and behaviour, although all priority species potentially occur or have been recorded in the Project area during pre-construction surveys (Arcus 2023). If the fatality patterns from South Africa are repeated at the Project, most fatalities will be of *Tadarida aegyptiaca*, *Neoromicia capensis* and *Miniopterus natalensis*: these three species are predicted to be present in the Project area and represented 97% of the carcasses that could be identified to species in South Africa (Table 7: Aronson 2022).

7.4 Habitats

7.4.1 Methodology

The direct footprint of all infrastructure components of the Project (Figure 1) was based on the design provided by Globeleq in a .kmz file. The impact to terrestrial habitat (critical and natural) was calculated by overlaying the Project footprint layer with the land-cover/habitat map. This map used the detailed forest classifications from the ESA Worldcover 2023 dataset (resolution of 10 m), integrated with the broader spectrum of vegetation classes from the IUCN Terrestrial Habitat Dataset (resolution of 100 m).

[12] The per MW values from South Africa are very similar to those reported from the United States, where median bat fatalities at 271 facilities were estimated at 3.0 (1.47-7.72) bats/MW/year (AWWI 2020)..

The Project design was being refined at the time of writing this BAP version, and therefore the residual impacts on habitats may need to be updated in the future.

A section of the transmission line will be a double line and the rest a single line. There will be a 20 m wide strip with a 5 m wide maintenance road between the two lines in the double line section. For the purpose of this residual impact assessment, the reduction in habitat extent and quality was considered to include the Project components presented in Table 13.

The locations of the pylons were not known at the time of writing this BAP, and therefore no distinction is made between permanent habitat loss (i.e. around pylons) and temporary loss (i.e. along the line between pylons) of habitat.

The additional loss in habitat quality in the 50 m buffer around Project components was included to account for the construction impacts that spread outside the Project footprint, including: dust and nitrogen deposition on vegetation around the Project footprint during construction, disturbance to animal species through noise and artificial lighting during construction and operation.

Table 13. Summary of expected reduction in habitat extent and quality

Project Component	100% Reduction in extent and quality	50% Reduction in quality	25% Reduction in quality
Around Wind Farm Site	30 m radius area (2,826 m^2) around each turbine (x 20) 10 m wide access roads within the DUAT	Potential laydown and office area (600 m^2) – to be restored after construction	50 m buffer around the footprint of each turbine
Around T-Line Route (pylon locations are unknown at this stage)	Buried line section: None (330 m length) Single line section: 5 m width directly under the line (4.1 km length) Parallel line section: 5 m width for access road (29 km length)	Single line section: 25 m either side of the line (4.1 km length) Parallel line section: 25 m either side of each line (29 km length)	Single line section: 25 - 50 m either side of the line (4.1 km length) Parallel line section: 25 m – 50 m either side of each line (29 km length)

Project Component	100% Reduction in extent and quality	50% Reduction in quality	25% Reduction in quality
	Parallel line section: 5 m width directly under each line		

Habitat 'area × condition' metrics or quality hectares (QH), is a common and widely accepted means to account for habitat complexity through a standardised approach (e.g., (Parkes *et al.* 2003); (Temple *et al.* 2012)). In this metric, a theoretical "benchmark" habitat is considered the highest quality, at 100% condition. A degraded habitat is then considered at a lower percent condition. For example:

- 10 ha of highest possible condition habitat (100% quality) = 10 × 1 = 10 QH
- 10 ha of degraded habitat at 50% quality = 10 × 0.5 = 5 QH
- 10 ha of highly degraded habitat at 25% quality = 10 × 0.25 = 2.5 QH

This Residual Impact Assessment (RIA) includes a calculation of QH for critical NH and NH (not classified as critical) likely to be affected by the Project. According to the Final CHA (TBC 2024), the only CHs likely to be affected by this Project are the NHs that fall under the extent of the Lebombo Summit Sourveld and the Western Maputaland Clay Bushveld threatened ecosystems. There are no critical MHs on this Project, and MHs that are not CH fall outside the scope of this RIA as NG or NNL are not required under IFC PS6.

In the absence of suitable ESIA survey data that describe and quantify habitat quality in the Project area, this RIA used the professional opinion of TBC specialists and a precautionary approach to allocate scores of habitat quality/condition which are required in the metric mentioned above. The habitat condition categories and scores are presented in Table 14.

This estimated measure of habitat quality will be refined through field surveys that started in February 2024 and to will completed before the start of vegetation clearance in the Project area. The RIA will then be updated using the refined (ground-truthed) scores of habitat quality in future BAP revisions.

Table 14. Habitat condition categories, characteristics and scores (TBC unpublished).

Condition categorisation	Characteristics	Habitat condition scores
Intact natural habitat	Unmodified habitat. Floristic composition in natural state. Native wildlife well represented. Negligible sign of human disturbance.	1
Largely intact natural habitat	Floristic and faunal composition mostly native, primary structure slightly disturbed and with minor signs of human disturbance.	0.8
Disturbed natural habitat	Primary structure altered. Floristic and faunal composition mostly native, with some allochthonous/alien component. Evidence of some human disturbance.	0.6
Highly disturbed natural habitat	Primary structure heavily altered. Floristic and faunal composition includes substantial allochthonous/alien component. Evidence of significant human disturbance.	0.4
Modified habitat	Anthropogenic area, e.g., human settlements, agricultural crops, tree plantations	0.2

7.4.2 Results

The Project is estimated to directly affect (100% loss) 28.65 ha of critical NH (Table 15). In addition, there will be a loss of 22.62 ha of NHs that are not classified as critical. The loss of MHs (there is no critical MH on this Project) is not presented in the residual impact assessment as this habitat category is not a priority in this BAP, and there are no IFC PS6 requirements to demonstrate NG or NNL for these habitats.

Quality scores for all habitat types affected by the Project were estimated using the approach described in Section 7.4.1. Residual impacts to critical NH are estimated to be 50.48 Quality Hectares (QH) (Table 15). The Project will also cause the loss of an additional 48.06 QH of non-critical NH.

Biodiversity offset targets to deliver an overall NG in biodiversity are indicated in Section 8.4.2.

Table 15. Summary of residual impacts to critical and natural terrestrial habitats

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)
Critical natural habitats	**28.65**	**n/a**	**17.19**	**95.63**	**n/a**	**28.69**	**30.65**	**n/a**	**4.60**	**50.48**
Forest	5.23	0.60	3.14	19.16	0.30	5.75	0.70	0.15	0.11	8.99
Open Forest	5.42	0.60	3.25	18.34	0.30	5.50	3.79	0.15	0.57	9.32
Savanna - Dry	14.36	0.60	8.62	56.80	0.30	17.04	0	0.15	0.00	25.66
Savanna - Moist	3.64	0.60	2.18	1.33	0.30	0.40	26.16	0.15	3.92	6.51
Natural habitats (non-critical)	**22.62**	**n/a**	**15.07**	**82.46**	**n/a**	**32.98**	**0**	**n/a**	**0**	**48.06**
Forest	9.26	0.60	7.4	32	0.30	12.8	0	0.15	0	20.21
Open Forest	2.47	0.60	1.98	9.67	0.30	3.86	0	0.15	0	5.84
Savanna - Dry	7.11	0.60	5.6	26.49	0.30	10.59	0	0.15	0	16.20
Savanna - Moist	3.78	0.60	2.4	14.30	0.30	5.72	0	0.15	0	8.12
Total	**51.27**	**n/a**	**32.26**	**178.96**	**n/a**	**61.67**	**30.65**	**n/a**	**4.60**	**98.54**

7.5 Threatened ecosystems

As presented in Section 4.2.6 above, two threatened ecosystems that trigger CH are priorities in this BAP. The expected loss in habitat extent and quality have been calculated and they are presented in Table 15 using the Project components and assumptions in Table 13. This uses a precautionary approach as current evidence suggests that these threatened habitats been already modified or degraded in some parts of the Project area (see Section 4.2.6).

The component NHs of these CH threatened ecosystems are presented in Table 16 and are based on the description in Lötter *et al.* 2021. The areas of the component NHs are already considered in the loss of CH and NH in Section 7.4.2. Therefore, Quality Hectares are not calculated for threatened ecosystems to avoid double counting.

Table 16. Areas of CH threatened ecosystem loss (natural habitat only).

Ecosystem name	Component natural habitats	IUCN status	Expected 100% loss in habitat extent and quality (ha)	Expected 50% loss in habitat quality (ha)	Expected 25% loss in habitat quality (ha)
Lebombo Summit Sourveld	Forest, open forest, moist savanna, dry savanna	CR	4.05	1.33	30.65
Western Maputaland Clay Bushveld	Forest, open forest and dry savanna	EN	24.6	94.3	0
Total			**28.65**	**95.63**	**30.65**

7.6 Legally protected and internationally recognised areas

There are no legally protected or internationally recognised areas overlapping with the Project area and therefore no residual impacts are anticipated from the Project.

Given the distance between the Project and the internationally recognised areas presented in Section 4.2.7, and assuming the mitigation summarised in Section 6 is implemented, any residual impacts of the Project on these designated areas are unlikely. Project's impacts on the bird qualifying values of these internationally recognised areas are assessed using a species-based approach in Section 7.2 above.

8 Offset strategy

8.1 Offset approach

Biodiversity offsets and/or other forms of compensation are required to ensure overall NG of CH and NNL for NH, in line with IFC PS6 and Mozambique national requirements (Ministry of Land and Environment 2022).

Offsets should be used as the last resource in the mitigation hierarchy, if significant residuals impacts remain after the previous steps (avoidance, minimisation, restoration) have been implemented (e.g. CSBI & TBC 2015). Offsets can include off-site habitat restoration and actions that increase a species' survival or productivity (restoration offsets), and/or measures to stop the

ongoing degradation and loss of biodiversity in existing designated sites or sites proposed for designation (averted loss offsets). Additional conservation actions and other support enabling conservation are also considered in this BAP.

The identification and development of offset actions in this BAP follows IFC Guidance Note 6 and recognised GIIP (e.g. BBOP 2012; CSBI & TBC 2015; IPIECA 2022). The offsets are targeted to priority biodiversity values with residual impacts (see Section 7).

8.2 Offset principles

The offset actions developed in this BAP follow good practice (BBOP 2012; ICMM & IUCN 2013; Ledec & Johnson 2016), Ledec & Johnson 2016), including the ten BBOP offset principles for achieving NNL/NG (BBOP 2012):

- Adherence to the mitigation hierarchy: A biodiversity offset is a commitment to compensate for significant residual adverse impacts on biodiversity identified after appropriate avoidance, minimisation and on-site rehabilitation measures have been taken according to the mitigation hierarchy;
- Limits to what can be offset: There are situations where residual impacts cannot be fully compensated for by a biodiversity offset because of the irreplaceability or vulnerability of the biodiversity affected;
- Landscape Context: A biodiversity offset should be designed and implemented in a landscape context to achieve the expected measurable conservation outcomes taking into account available information on the full range of biological, social and cultural values of biodiversity and supporting an ecosystem approach;
- NNL: A biodiversity offset should be designed and implemented to achieve *in situ*, measurable conservation outcomes that can reasonably be expected to result in NNL and preferably a NG of biodiversity;
- Additional conservation outcomes: A biodiversity offset should achieve conservation outcomes above and beyond results that would have occurred if the offset had not taken place. Offset design and implementation should avoid displacing activities harmful to biodiversity to other locations;
- Stakeholder participation: In areas affected by the project and by the biodiversity offset, the effective participation of stakeholders should be ensured in decision-making about biodiversity offsets, including their evaluation, selection, design, implementation and monitoring;
- Equity: A biodiversity offset should be designed and implemented in an equitable manner, which means the sharing among stakeholders of the rights and responsibilities, risks and rewards associated with a project and offset in a fair and balanced way, respecting legal and customary arrangements. Special consideration should be given to respecting both internationally and nationally recognised rights of indigenous peoples and local communities;
- Long-term outcomes: The design and implementation of a biodiversity offset should be based on an adaptive management approach, incorporating monitoring and evaluation,

with the objective of securing outcomes that last at least as long as the project's impacts and preferably in perpetuity;
- Transparency: The design and implementation of a biodiversity offset, and communication of its results to the public, should be undertaken in a transparent and timely manner; and,
- Science and traditional knowledge: The design and implementation of a biodiversity offset should be a documented process informed by sound science, including an appropriate consideration of traditional knowledge.

8.3 Offset governance

Biodiversity offsets are more likely to be feasible in contexts with clear institutional arrangements, good governance and management responsibility, including a high level of stakeholder involvement throughout. This provides a good basis for long-lasting implementation conservation actions. Important design principles for establishing this type of management system approach are:

- Use existing governance structures wherever feasible;
- Ensure any new structures that are created are appropriate to the scale and stakeholders involved;
- Develop downward as well as upward accountability (implementation and financial) for all management structures; and,
- Ensure there is sufficient capacity and technical assistance within the governance and management structures to function efficiently.

8.4 Offset requirements and targets

8.4.1 Species-based approach

8.4.1.1 Birds

Estimated annual residual impacts for bird priority biodiversity values vary from ~0 to 12 individuals per species (Table 12). PS6 requires offsets for significant impacts, however as the significance of the estimated impacts has not been determined for any species, each species' residual impact as estimated in this BAP is assumed as the initial target value for any offset actions to meet a NNL or NG target (i.e. the full extent of impacts must be compensated). In addition, Mozambique national legislation defines a NG in biodiversity as "…that which exceeds the result of No Net Loss by at least 15%" (Ministry of Land and Environment 2022). For CH-qualifying species, which have a NG requirement, the initial target value for offsets should be adjusted by 15% to ensure that the national requirement are met – this applies to White-backed Vulture, Bateleur and Martial Eagle. For all other species, there is sufficient uncertainty in the pre-construction fatality estimates that an additional gain of 15% does not result in a material increase in the offset targets of any species.

Almost all species' impacts are predicted as 'less than' a certain value: for these species, the NNL / NG target has been rounded up to the next full integer. This conservative approach ensures that gains are likely to:

- Exceed the 15% improvement required by national legislation for Critical Habitat-qualifying species (Ministry of Land and Environment 2022); and
- Ease the demonstration of the Project's position relative to its commitments, as all impacts will be in full integers.

8.4.1.2 Bats

For bats, the annual fatality estimate is 12-1,824 individuals of all bat species collectively (Section 7.3) while a bat mortality threshold of 228 Least Concern insectivorous bats has been calculated for the Project (Arcus 2023) using the South African guidelines (MacEwan *et al.* 2020). The South African guidelines also have an impact threshold of zero or one for some species or species-groups (see Table 3 of MacEwan *et al.* 2020): species with these thresholds known to be present in the Project area are highlighted in bold in Table 7. Mitigation, in the form of curtailment or acoustic deterrents, as committed to in the ESIA, would be implemented to ensure that impacts do not exceed the relevant thresholds for any species or species-groups. Should PCFM show that fatalities exceed the relevant threshold, additional curtailment would be implemented and exceedance would possibly need to be compensated through offset actions to meet a NNL target for this species-group. Following this approach, no offset action is currently proposed for bats, however this may be required in the future.

Robust monitoring of both impacts and gains from offset actions will be required so the Project can demonstrate that it is meeting its commitment for all species. The investment in offset actions would need to increase if annual impacts exceed the predicted gains from the offset actions.

8.4.2 Habitats

The residual impacts of the Project to habitats were calculated in Section 7.4.2, with total habitat impacts for the Project shown in Table 15 and Table 17. There are no separate offset targets for CH-qualifying ecosystems to avoid double counting, as explained in Section 7.5.

According to the Mozambique Ministerial Order No. 55/2022 (Ministry of Land and Environment 2022), 'a net gain in biodiversity is considered to be that which exceeds the result of No Net Loss by at least 15%'. This is the approach used in this BAP, where an increase of at least 15% in QH has been considered compared to the estimated residual impact.

In summary, the habitat offset targets for this Project are:

- >58.05 QH of critical natural habitat to demonstrate NG
- >48.06 QH of non-critical natural habitat to demonstrate NNL

For the critical NHs, the aim will be to demonstrate offset targets for each component habitat type rather than overall. This will involve the following offset sub-targets: >10.34 QH for forest, >10.72 QH of open forest, >29.50 QH of dry savanna, and >7.48 QH of moist savanna.

Table 17. Summary of residual impacts and offset targets for habitats.

Habitat types	Total residual impact (QH)	Offset objective	Offset target (QH)
Critical natural habitats	**50.48**	**NG**	**>58.05**
Forest	8.99	NG	>10.34
Open forest	9.32	NG	>10.72
Savanna - Dry	25.66	NG	>29.50
Savanna - moist	6.51	NG	>7.48
Natural habitats (non-critical)	**48.06**	**NNL**	**>48.06**
Forest	20.21	NNL	>20.21
Open Forest	5.84	NNL	>5.84
Savanna - Dry	16.20	NNL	>16.20
Savanna - moist	8.12	NNL	>8.12
Total	**98.54**	**n/a**	**106.11**

8.5 Proposed offsets

Three main offsets have been identified as initially feasible in consultation with Globeleq, lenders and key stakeholders. These offsets have the potential to deliver the required gains so that the Project meets its NG and NNL commitments for all CH-qualifying features and priority biodiversity respectively. These offsets are summarised below, while more detailed information on the feasibility of each is included in Appendix 3 of this report.

According to the Mozambique Directive on Biodiversity Offsets (Ministry of Land and Environment 2022) biodiversity offsets must be implemented in one of the following areas:

- Conservation areas: a) which present levels of biodiversity degradation and whose financing is not sufficient to achieve the respective conservation objectives; b) which are under considerable human pressure and which require improved conservation conditions or territorial extension in order to attain or increase their conservation objectives; and,
- Areas of importance for biodiversity outside conservation areas: Key Biodiversity Areas, Ramsar Areas, Forest Reserves or other types of nationally or locally important ecological areas that are considered important areas for biodiversity.

This consideration, along with other specifications of the Directive on Biodiversity Offsets, have been considered when developing the three offsets outlined below. Appropriate monitoring will be implemented for each offset to be able to demonstrate the effect of actions described below and to quantify the gains to target and other relevant species form the actions – these are not

described below, but are briefly listed in Appendix 3 and will be further expanded in the Project's Biodiversity Monitoring and Evaluation Plan.

Offset 1: Protecting and enhancing the natural habitats within Lebombo Summit Sourveld and Western Maputaland Clay Bushveld ecosystem

This offset action has been specifically developed to deliver a NG for the two CH-qualifying ecosystems, and will also provide secondary gains to the KwaZulu-Natal Hinged-back Tortoise (VU) and all priority bird species.

The distribution of both ecosystems decreased significantly over time (≥25%; Lötter *et al.* 2021), with the main threats being are wood cutting for charcoal production, anthropogenic fires, overgrazing by cattle and conversion to small-scale cropping.

Two potential offset areas have been identified within the Namaacha Tropical Important Plant Area (TIPA)[13] which supports both CH ecosystems, and where there is potential for improvement in those ecosystems:

- A 2,300 ha parcel of land ~2 km to the northwest of the Project which is currently used to raise cattle and goats, however substantial parts of the property seem to present well-preserved habitat patches, maintaining an increased diversity of plants, including succulents and trees. The landholder has made some efforts to farm sustainably, and is open to additional conservation activities if they can be shown to produce sufficient revenue; and,
- A community-owned area of land ~14 km northeast of the Project, currently used for cattle grazing and small agricultural plots. However there are still patches of very well-preserved NH, showing a very high diversity of native plants.

Proposed actions within either/both of these offset areas would involve a combination of activities targeted at reducing or stopping current threats to the ecosystem (averted loss), as well as rehabilitation of degraded areas, including:

- Identification and mapping of key areas suitable for targeted action;
- Removal of non-native invasive plant species;
- Restoration of areas with degraded habitat;
- Fencing or protection or restoration areas;
- Development of a socio-economic plan for the provision of alternative livelihoods and income for the landholder and/or to local communities to reduce cattle grazing, wood cutting, agriculture and anthropogenic fire pressures;
- Development of education and awareness raising campaigns among local communities to reduce anthropogenic pressure on the ecosystems; and,

[13] The Namaacha TIPA represents an area of importance for biodiversity outside the existing Conservation Aras, and in-country stakeholders indicated that the area is likely be designated as a Conservation Area in the near future. As such, the two areas identified meet the requirements of the Mozambique decree for the location off offsets.

- Support for both the designation of the area as a Conservation Area, and development and implementation of a Management Plan.

Potential national implementation partners for the action have been identified as Mike Persson (who holds the DUAT licence for one of the areas), Biofund (Foundation for the Conservation of Biodiversity), VIDA (a community-focused NGO), IIAM (Institute of Agriculture Research, part of the Ministry of Agriculture and Rural Development), while key national-level stakeholders would be MTA (Ministry of Land and Environment), DINAB (MTA's National Directorate of Environment) and ANAC (MTA's National Administration for Conservation Areas).

A gradual increase in habitat quality is expected during the implementation of the activities listed above. Gains in NH will be predicted over a fixed time period (minimum 25 years), with a default value of 0.029 (2.9%) of habitat condition increment per year resulting from the restoration actions (see (Jones *et al.* 2019)) and future gains subject to a discount rate (2% by default).

The total target area for the offset is calculated using this formula $L/(c*T*D^T)$, in which:

- L = loss in QH = 106.11
- c = annual increase in habitat quality from restoration = 0.029
- T = time to target condition (years) = 25
- D = (1 – 0.2 discount rate) = 0.98

Therefore, ***the target area for this offset will be >242.53 ha***. This can be one single area or several distinct areas, and offset area(s) will be clearly mapped so that the offset can be monitored in the long-term.

Offset 2: Reducing threats and increasing habitat quality for Martial Eagles and Bateleurs

This offset action has been specifically developed to deliver a NG for two CH-qualifying raptors: Martial Eagle and Bateleur and will also provide secondary gains for other priority raptor species and Shelley's Francolin.

Both target species are widely distributed in southern Africa, including across the Project area, where they inhabit a broad range of woodland and savannah ecosystems. Threats to both species include direct persecution (shooting and trapping by farmers, poisoning, nest disturbance), electrocution and collisions on power lines and habitat loss and degradation.

Two areas have been identified as appropriate sites for the implementation of actions under this offset:

- Within the Namaacha TIPA at sufficient distance from the wind farm. While there is no information on the abundance of these two target species across this area, both are considered likely to be present based on observations from the Project and the presence of suitable habitat; or,

- The existing Maputo Special Reserve, an existing Conservation Area, ~40 km southeast of the Project, where both species are regularly recorded (Cornell 2023).

Proposed actions within either/both of these offset areas would target the reduction of current threats to the species' survival and improving their habitat quality and/or breeding success, including:

- Identification and mapping of existing territories of Martial Eagle and Bateleur, and of vacant areas with seemingly favourable habitat;
- Protection of nests during the breeding period to avoid poaching or disturbance;
- Provision of anti-predator nest platforms (artificial nests);
- Development of education and awareness raising campaigns among local communities to reduce direct persecution, poisoning and cutting of nesting trees;
- Training and financial/logistic support of rangers/guards from the Conservation Area and/or local community;
- Implementation of minimization measures in mortality hotspots along transmission infrastructure (e.g., retrofitting or installation of bird-friendly structures);
- Habitat management directed at the enhancement of ecological suitability for their main prey species (especially hares, guineafowl, and small antelopes).
- Support for both the designation of the area as a Conservation Area (if relevant), and development and implementation of a Management Plan.

Potential national implementation partners for this offset have been identified as Biofund (Foundation for the Conservation of Biodiversity), VIDA (a community-focused NGO), IIAM (Institute of Agriculture Research, part of the Ministry of Agriculture and Rural Development), EWT (Endangered Wildlife Trust) and Domingas Matlombe (researcher with expertise in Mozambican raptors and vultures) while key national-level stakeholders would be MTA (Ministry of Land and Environment), DINAB (MTA's National Directorate of Environment) and ANAC (MTA's National Administration for Conservation Areas).

Offset 3: Reducing mortality by poisoning of White-backed Vultures

This offset action has been specifically developed to deliver a NG for the CH-qualifying White-backed Vulture, and will also provide secondary gains for other priority raptors and other vultures.

White-backed Vultures inhabit a variety of savannah, woodland and arid areas in sub-saharan Africa, and in Mozambique, the species occurs across the country, however records are highly concentrated in protected areas, likely due to prey availability and reduced disturbance. The main threats to the species in southern Africa are direct hunting, persecution and poisoning for use in cultural practices, with the loss of habitat for conversion to agro-pastoral systems and loss of wild ungulates leading to a reduced availability of carrion.

While these threats are likely to be present at many sites across Mozambique, the Limpopo National Park has been identified as a priority location for this action due to the high number of White-backed Vulture records in the area. The Maputo Special Reserve may also be a secondary

option, especially if this site is chosen for offset two, although White-backed Vultures have not been recently reported from this area.

Proposed actions within the offset area would be a combination of community-based activities encouraging the reduction in intensity or cessation of current threats, awareness-raising of the plight of vultures and support to alternative livelihood options for community members currently involved in poisoning/poaching, including:

- Interviews with community members, and other relevant organisations, to understand the motivations behind poisoning and explore alternatives to poisoning;
- Development and roll-out of an awareness campaign around the illegality of killing vultures;
- Support to law enforcement agencies and/or conservation area staff to implement relevant laws; and,
- Support programs to community members to provide alternative medicinal or livelihood options.

Potential national implementation partners for the action have been identified as Biofund (Foundation for the Conservation of Biodiversity), VIDA (a community-focused NGO), the Peace Parks Foundation, EWT (Endangered Wildlife Trust) and Domingas Matlombe (researcher with expertise in Mozambican raptors and vultures) while key national-level stakeholders would be MTA (Ministry of Land and Environment), DINAB (MTA's National Directorate of Environment), ANAC (MTA's National Administration for Conservation Areas) and relevant government agencies responsible for social/community programs and law enforcement.

8.6 Additional actions to support conservation

In addition to mitigation and offsets, it is good international industry practice for development projects to support conservation actions to contribute to the knowledge and enhancement of biodiversity in the country. These actions can cover a wide range of positive biodiversity interventions, or provide supporting information to inform future conservation actions, and are not intended to provide measurable gains that can be set against significant impacts.

To further the understanding of biodiversity relevant to the Project's impacts, the Project will fund a local/ national NGO or academic institution to undertake a program of long-term scientific research on biodiversity and/or biodiversity monitoring. This program will focus on some of the priority species listed in Section 4 of this BAP, while data deficient species listed in the CHA (TBC 2024) will be also considered in this programme. The output from the research and monitoring program will increase knowledge of those priority species at national level and will help to understand population trends and threats, which in turn will inform the establishment and implementation of conservation programmes. The data from this research and monitoring will be shared widely and published, which will contribute to the national and global knowledge and databases on biodiversity. Where there are existing monitoring program being undertaken in the wider area for Project priority species, the Project will also consider support to those programs.

The Project will also conduct an education and awareness programme in the Namaacha area, focused on the importance of preserving the existing biodiversity, and the resulting socio-economic benefits for the local community, with the goal of reducing potential indirect impacts from an increased number of local and non-local people in the area.

8.7 Road map for BAP update and offset development

This section includes a 'road map' of next steps needed to finalise the BAP and to further develop the feasibility study for the offsets listed above.

8.7.1 Additional biodiversity surveys at the Project site

An additional habitat survey started in March 2024 in the wind farm area and along the transmission line. This will be used to improve the baseline information and the residual impacts for the areas likely to be affected by the Project.

8.7.2 Update of BAP

It is currently planned to update the BAP to incorporate the additional biodiversity surveys being conducted, finalisation of the proposed Project footprint (pending selection of EPC contractors), and completion of detailed offset development and/or confirmation of offset actions.

During the implementation of the Project, the BAP should be updated regularly to incorporate:

- Changes in the Project design;
- Significant findings from the biodiversity monitoring;
- Recorded fatalities for each priority bird or bat species at the wind farm and along the transmission line; and,
- Progress with the offset implementation and gains achieved.

8.7.3 Detailed offset investigations

This BAP presents three offsets which would collectively deliver the Project's NG or NNL commitment for all CH-qualifying and priority species. These actions are necessarily high-level, and if agreed as suitable between the Project and the lenders, would require detailed investigations, the results of which would form the Biodiversity Offset Management Plan (see below) for the Project. For each action, investigations should:

- Confirm the location of, and area to be covered by, the offset;
- Determine in detail the actions that will occur to deliver the required gains for target features;
- Describe the monitoring required to demonstrate the level of gains achieved by the action;
- Confirm the implementing party/parties, any other relevant organisations and the governance structure of the action; and,
- Estimate costs, and identify any other support required, to effectively implement the actions and required monitoring.

For the final set of agreed actions, Globeleq and the implementing agency(ies) should agree on:

- The scope of support – i.e., level of funding, time period, responsibilities; and,
- A set of financial and management indicators to demonstrate that the action is functioning as intended and likely to deliver the assumed gain.

8.7.4 Biodiversity Offset Management Plan

Following final agreement on offset actions, a Biodiversity Offset Management Plan (BOMP) will be prepared to describe the specific activities of implementing, managing and monitoring the offsets. The BOMP is a requirement for projects implementing offsets according to the Mozambique Directive on Biodiversity Offsets (Ministry of Land and Environment 2022).

The BOMP should ideally be produced and offset implementation should start prior to the start of construction. However, as construction of this Project is planned to start soon after financial close, and offsets are long-term actions outside the Project affected area, the development of the BOMP may need to continue after the start of construction. The BOMP will include the management of all final and feasible offsets and additional conservation actions. The BOMP will have specific objectives and actions, with targets, indicators and responsibilities for each action.

8.7.5 Biodiversity Management Plan

A Biodiversity Management Plan (BMP) is a practical document detailing all mitigation measures to be implemented during the pre-construction, construction and operational phases. The Project will develop a BMP to provide a description of the mitigation measures, the implementation schedule, the responsible party, and the key performance indicator to verify their implementation. Mitigation measures will be aligned with those presented in the ESIA/ESMP documents and identify additional measures required for NH and/or CH-qualifying features and to align with good international industry practice. When the Projects develops a BMP the long list of non-CH priority bird and bat species (Table 6 and Table 7) will be reviewed and finalised, based on any updated information available.

8.7.6 Biodiversity monitoring and evaluation

A framework BMEP will be included in the Final BAP.

9 BAP Implementation

9.1 Roles and responsibilities

The principal roles and responsibilities for the implementation of this BAP are outlined below. As the Project moves towards operation, additional plans may be required to operationalise the commitments made in this BAP. The responsibilities for the offset actions (Section 8) will be specified in the updated OFS and BOMP.

The Project Company's Environmental Manager will have overall responsibility for 1) coordinating the implementation of the BAP; 2) coordinate subsequent BAP updates after the Final BAP; and 3) communicate the BAP requirements to all relevant Project personnel and

contractors. The Operations Manager will ensure that all parties comply with the requirements set out in this BAP, and will approve sufficient resources for the implementation of the BAP.

The biodiversity mitigation measures described in the ESIA and summarised in Section 6 of this BAP will be integrated and detailed into the Construction Environmental Management Plan to be developed and implemented by the EPC Contractor. The Environmental Manager of the EPC Contractor will be responsible for the implementation of the construction and site-related mitigation measures, and they will report to the Project Company's Environmental Manager.

The key to a successful BAP is the continuous monitoring of its actions and evaluation of their effectiveness in meeting the BAP objectives. The Project Company will employ a suitably qualified biodiversity specialist to monitor whether the specific actions in the BAP are being implemented and highlight requirements for adaptive management. The actual biodiversity monitoring will be detailed in the BMEP which will be developed once the offset actions are sufficiently advanced.

Annual reports on the BAP implementation will be prepared and made available to regulatory bodies and financing parties, and where appropriate to research institutes and nature conservation NGOs.

The Project will also consider sharing biodiversity data, such as those collected during surveys with the Global Biodiversity Information Facility (as recommended by Equator Principles 4).

9.2 Budget considerations

The actual budget will be developed separately by Globeleq. Table 18 includes a list of the main cost categories for the biodiversity studies and implementation of plans.

Table 18. Cost categories for offset studies and implementation.

Cost category	Comments
Biodiversity mitigation measures during construction	The costs for biodiversity mitigation measures will be included in the EPC Contract. These measures are described in the ESIA and other documents and summarised in Section 6 of this BAP. The EPC Contractor will detail these mitigation measures in a Construction Environmental Management Plan.
Additional surveys	Additional surveys (see Section 8.6.1).
Offset Feasibility Study (OFS)	The OFS is included in the current TBC contract, and forms Appendix 3 of this document.
BAP updates	The current TBC contract covers four BAP versions, including a Final BAP. However, some additional updates are likely to be required in the future (see Section 8.6.2 above).

Cost category	Comments
Biodiversity Offset Management Plan (BOMP)	The BOMP costs will be estimated after the offset actions have been confirmed.
Offset implementation	These costs will be estimated once the offset actions have been confirmed.

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Appendix 1 EAAAs used in the Namaacha Wind Farm CHA (TBC 2024).

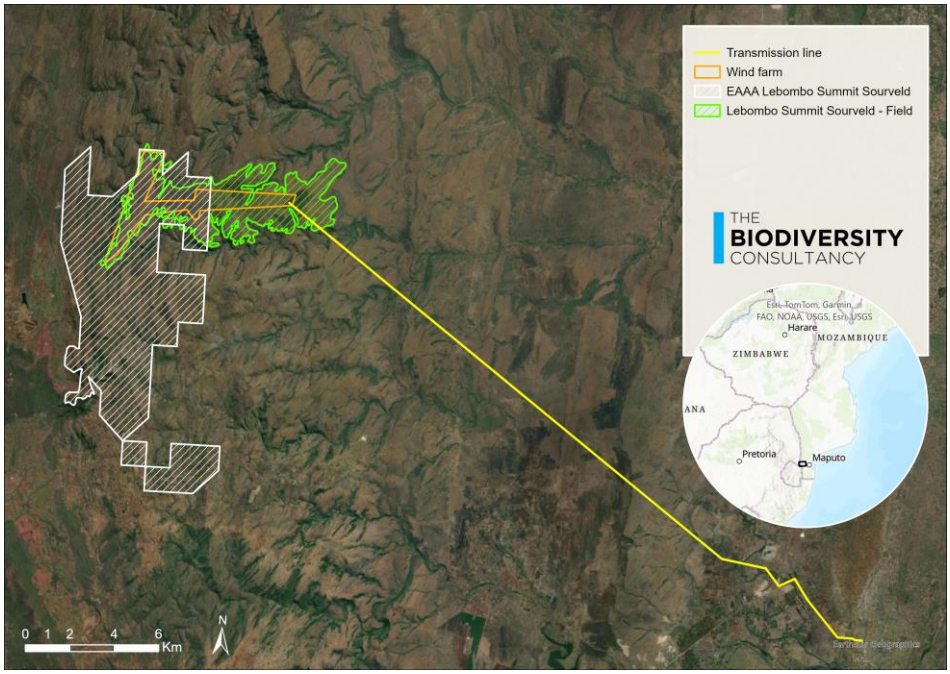

Figure 9 EAAA used to assess CH for Lebombo Summit Sourveld ecosystem. The green polygon was included in the EAAA and represents an additional area of occurrence of Lebombo Summit Sourveld ecosystem, identified in field works in the Project area (W. McCleland, pers, comm.).

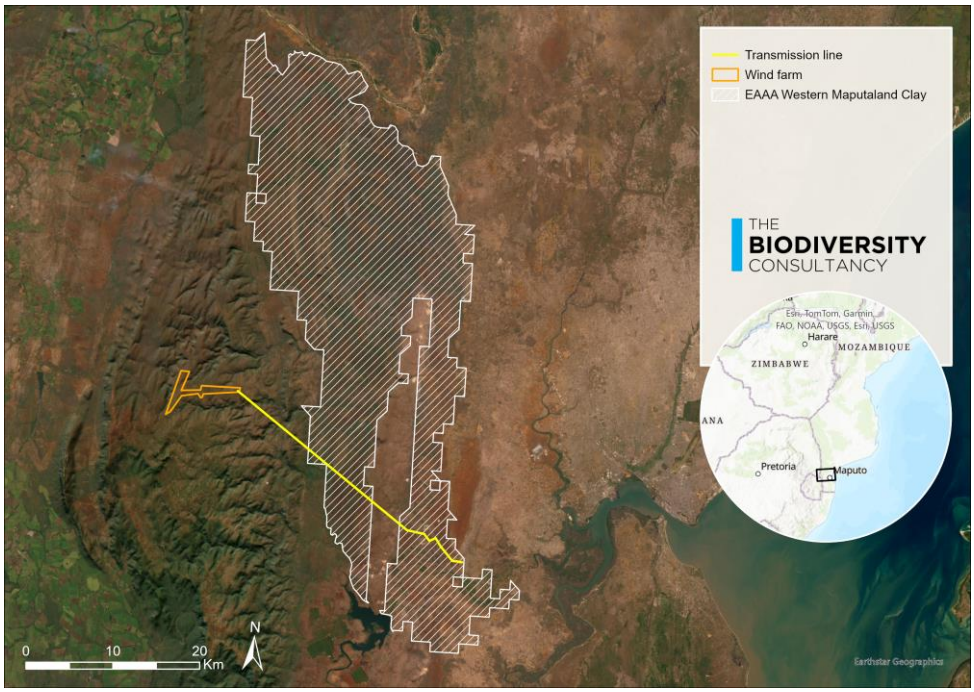

Figure 10 EAAA used to assess CH for Western Maputaland Clay ecosystem.

Appendix 2 Summary minutes of in-country meetings

Permanent attendants: Marli Schoeman (Globeleq), Ricardo Tomé (TBC)

1. Meeting with D.M. (vultures expert)

19/02/2024, Maputo

- White-backed Vultures and Hooded Vultures are still relatively abundant also in the South of Mozambique. White-backed Vultures also breed sparsely in the region.
- Main threat to vultures in Mozambique (all species) is poisoning for medicinal purposes (for selling parts). Goats are used as poisoned baits to attract/kill vultures. Poisoning may be frequent in some regions. Healers use parts of vultures for healing, spiritual power (but they say they just found them)
- In some cases, vultures may be poisoned simply because people don't like them, consider them as bad luck. Poachers may also purposedly poison vultures to reduce the signalling by vultures of carcasses of illegally killed wildlife species.
- Incidental poisoning (e.g., aiming at mammalian predators, done by cattle raisers) doesn't happen - predators usually don't come near communities/livestock.
- Poisoning through carbofuran (a highly toxic agricultural pesticide) or diclofenac (a non-steroidal anti-inflammatory drug often used for livestock) is probably not a problem im Mozambique, as most communities wouldn't be using them (can't afford to buy them).
- Shooting or nest poaching should be rare – ammunitions are expensive and nests are very difficult to find.
- Another threat is the lack of food in some areas (e.g., Maputo Special Reserve), due to the lack of carnivores (that would provide remains (carcasses) of wildlife).
- People in general/ rural communities don't like vultures in general. Perception may change through environmental education.

- The Namaacha area is also frequently used by vultures. White-backed Vultures are even likely to breed the area, in very undisturbed areas (therefore very difficult to find). Main threats in Namaacha region similar to other regions in the country.
- Wild herbivores are likely available in Namaacha area. But probably there is a lack of carnivores that could make carcasses available for vultures.
- Main threat to Martial Eagles in rural environment is direct persecution: people think they will come to take their chickens. However, this threat shouldn't be significant: it mostly occurs "incidentally"/"opportunistically", when eagles attack chickens. But people would frequently use slingshots and wouldn't get to kill them.
- Domingas would be interested in getting involved in the development of the Namaacha offset strategy in the future.

2. Meeting with VIDA

19/02/2024, Maputo

- VIDA (with funding from Fundação Camões, Portugal) mostly works with communities to make their economical actions more sustainable. They develop agro-ecology, forestry and sustainable agriculture projects. For instance, reducing cattle (cows and goats) number/pressure or forestry activities based on exotic species, and directing the familes' economies to more diversified activities (therefore less dependent on a single revenue/product). These activities may include e.g., honey production, paper and ink production from the bark of some trees, basketry, cultivation of different species of vegetables and trees (partly non-native, for wood production, partly native for production of fruits, etc.).
- The change to other activities/income sources relies on engagement work with the communities, to convince them on the benefits of diversification and lower dependency on raising livestock.
- Honey production is associated with a specific tree species, likely to be present also in the Namaacha area.

- Altogether VIDA projects involve 500 families and 120 students. They also conduct environmental education activities with "secondary" school students (12-13 years to adults). These include practical classes and demonstration camps.
- One of their projects is an offset for carbon emissions. This project have been designed by MTA. They have been involved in the forestation with native trees and subsistence/food crops (and leaving some proportion of the area for the cultivation of exotic, faster growing, species).
- Most of the actions are being implemented in the district of Matutuíne, neighbour of Namaacha and Maputo districts. Maputo special reserve is also in Matutuíne district.
- They have one technician for Matutuíne district, supervised by Merson. Altogether, VIDA employes 5 staff, including administration and one technician for community work.
- Have developed project MOZBIO2, with World Bank funding and in cooperation with BIOFUND (management partner).
- So far they have not developed projects in Namaacha region, but would be interested in supporting some of the Project offsets.

3. Meeting with DINAB

19/02/2024, Maputo

- Offsets should cover all species defined in IFC PS6, plus the list of Protected Species in Decree n.º 51/2021, Decree n° 1212002 and Decree nº 34/2016 of 24 August on CITES regulation, even if not globally threatened. CH criteria in Mozambican Law are the same as in PS6.
- All protected species require NG if the project is in an important area for biodiversity (like Namaacha TIPA).
- If the offsets are to be implemented in the Namaacha TIPA (which is not a Protected/Conservation Area), the creation of a Conservation Area will be required.

Globeleq should evaluate different options, and propose to DINAB in the letter of intention.

- The new Conservation Area doesn't need to be larger than the necessary for compensating the QH needed (according to PS6 plus the extra15% required by the Mozambican law). For instance, it wouldn't need to cover the whole TIPA. However, Globeleq would need to financially support the creation of the Area's initial managerial structure.

- There are different types of Conservation Areas, that are usually small (e.g., Sanctuaries, Official Game Reserves). Restrictions to activities by local communities depend a lot on the type of Conservation Area.

- Offsets could possibly be implemented in Maputo Special Reserve, instead. The Project should confirm if that would be aligned with the management plan of this Conservation Area.

- There are lots of wild herbivores in Maputo Special Reserve, but no carnivores. Therefore, there isn't enough food (carcasses) for vultures.

- The creation of a new Conservation Area would likely take significant time and need Globeleq to support salaries of dedicated staff to the area, etc. The process requires, by law, several rounds of public discussion. The creation of a Conservation Area also demands a long-time commitment and establishment.

- Globeleq (or the partners contracted by Globeleq) will be managing and implementing the offset actions in the new Conservation Area, in compliance with the Management Plan of the Conservation Area. But the developer doesn't need to fund other activities in the Conservation Area that are not directly related with the offsets.

- All documents to be issued to DINAB should be in Portuguese.

- When Globeleq sends a letter of intent to DINAB, another letter of intent should be sent to ANAC, also.

- To renew the Project's operational license (every 5 years), at least 50% of the pre-defined offset targets need to have been attained.

- After the issuing of the operational license for the wind farm and the transmission line, Globeleq has 2 years to issue the BOMP.
- The Offsets Monitoring Committee is paid by the developer, that has also one representative.

4. Meeting with BIOFUND and WCS

19/02/2024, Maputo

- BIOFUND: is a permanent foundation/national fund for conservation (CTF – Conservation Trust Funds – model) working closely with the Government.
- They are a full partner in Combo Project; and also operate in other African countries.
- All money for conservation in Mozambique (> 20 M€), mostly from EU, cmes via BIOFUND – mostly it is applied on PAs or KBAs. BIOFUND has a good reputation with DINAB, with whom they have been working for years.
- They have the capacity of managing/supervising the offsets implementation. BIOFUND is now starting to work with the private sector as well.
- Options to receive offsets: Maputo NP, Lucuatí Forest Reserve (not a Conservation Area yet). WCS is preparing these areas to receive aggregated offsets.
- Maybe BIOFUND can support preparing the foundations for receiving offsets in other areas (e.g., Namaacha TIPA).
- A Community Conservation Area in Namaacha (< size) could be a potential approach. But regulation on Community Conservation Areas (community benefit-sharing system, etc.) needs to be prepared still. BIOFUND have already some analogous projects in Niassa region.
- A Community Protected Area needs to have a significan community benefit stream.

- Limpopo National Park is co-managed by Peace Parks Foundation. Biodiversity/ecosystems there are different from those at the Namaacha area.
- Perhaps a new Conservation Area for Namaacha area could be applied as a Sanctuary (private-community partnership) or a Game Reserve. Globeleq should evaluate the different option for Conservation Areas.
- Michael Persson's property could be an option. Another DUAT may be necessary, if Michael's property is not suitable.
- Michael would likely still need to apply to change the purpose of use of his land.
- The offsets core area could be in Michael's property with some involving Community Conservation Area associated.
- Types of land ownership: i) Private DUAT; ii) Individual Rights; iii) Community Rights.
- Terra Firma Lda – company that does land delimitation/registration to the household level.
- BIOFUND could do the management/supervision of the offsets implementation – but not the implementation/operation of offsets on the ground. BIOFUN could act as the Biodiversity Offset Manager.
- In Maputo National Park, the number of predators could be increased (through reintroduction) to increase the number of carcasses (food) available for vultures.

5. Meeting with landowner in Namaacha TIPA

21/02/2024, Namaacha TIPA

- Michael's property comprises 2,300 ha. Maximum altitude is ~500 m, similar to the that in the Namaacha Wind Farm area.
- The property borders river Umbuzini, a tributary of river Umbuluzi.

- Lots of wildlife occurs in the property, including elephants, wildebeest, greater kudu, buffalo, zebra, reedbuck, wild dog, pangolin, ratel, civet, jackal, steenbok, mongoose (several species), clawless otter, baboon, galagos (two species); occasionally cheetah. Also several species of diurnal and nocturnal birds of prey.

- The property holds 400 cows and 300 goats. Cattle are from the *Ngnui* breed (native of Southern Africa). Water is the limiting factor preventing a larger number of cattle.

- Most of the area is used for cattle grazing, using a rotational system.

- He has a mixed DUAT + Special License (50 years lease) under a Law that started in 1994.

- When he got the license for the use of land, the property was by local communities for wood cutting (for charcoal). Also hunting, poaching and illegal harvesting of succulents. Gradually he has been engaging the community to work with him and stop those activities (e.g., he has paid people not to cut well-grown trees). This has allowed the natural regeneration of trees and the re-appearance and increase in number of several wildlife species.

- One part of the property is less accessible (rough terrain, higher altitude, less accesses) and the cattle never goes there – that would be the preferred area for implementing offsets if they would require cattle exclusion.

- There is a large property in the vicinity, also used for cattle grazing, that the owners could also be receptive to change to other land use types.

- Michael has a conservation background and is very receptive to the idea of using part of his property for offsets/conservation. He thinks the development of offsets in his property could be associated with a sustainable ecotourism project, the production of honey, the certification of *Nguni* meat, a nursery for native succulents an other activities that would allow for an interesting income.

Appendix 3: Offset feasibility study

Appendix 3: Offset feasibility study

1 Introduction

This report is the Offset Feasibility Study for the Namaacha Wind Farm (the Project), which is being developed in alignment with International Finance Corporation (IFC) Performance Standards (PS), including Performance Standard 6 (PS6) on Biodiversity and Natural Living Resources. The Project has previously completed a Critical Habitat Assessment (TBC 2024) which determined that the Project was in an area of Critical Habitat (CH) for three species of birds (White-backed Vulture *Gyps africanus*, Martial Eagle *Polemaetus bellicosus* and Bateleur *Terathopius ecaudatus*) and two threatened ecosystems (Lebombo Summit Sourveld and Western Maputaland Clay Bushveld), and the Project will also impact areas of Natural Habitat (NH). A Biodiversity Action Plan (BAP) has been prepared, which determined that offsets would be required to compensate for significant residual impacts to CH-qualifying features and NH to meet respectively a Net Gain (NG) or No Net Loss (NNL) target. This document describes three offsets selected to attain the biodiversity gains required to meet the BAP objectives, following initial stakeholder discussions held with relevant in-country individuals and organisations.

2 Screening of offset options

Given the number of biodiversity features with either a NG or NNL target commitment, a range of potential offset projects could be supported by the Project to meet their commitments under the BAP. A high-level set of conceptual offset options were presented in the BAP (see Section 8.5 of that document). These initial options were further explored as to their potential to deliver the required gains and feasibility (both political and implementation[1]), through engagement with the client, in-country stakeholders and lenders.

The consensus from those discussions was that three offsets should be investigated in detail: these are described in the sections below. The following aspects are presented under each offset:

- Target feature(s);
- Context for the offset;
- Proposed area for the offset;
- Actions to be implemented for the offset;
- Key implementing partners and other relevant stakeholders;
- Likelihood of demonstrable gain;
- Political feasibility;

[1] Note that financial feasibility was not considered at this stage.

- Implementation risk; and
- Any other benefits or relevant information.

Relevant criteria have been given a score (scale 1-5), with lower scores indicating areas of higher risk that the offset will not deliver the intended outcome of a NG/NNL for the relevant feature. Summary scores for all three offset options are provided in Table 1: note that these are not summed or comparable across options, as actions and desired outcomes are different for each option.

Table 1. Risk scoring for each of the three offsets for the Namaacha Wind Farm.

Offset	Target biodiversity	Implementation areas		Demonstrable gain	Political feasibility	Implementation risk	Other benefits
		Option 1	Option 2				
Offset 1	4	3	1	4	3	4	4
Offset 2	4	4	1	4	4	3	3
Offset 3	3	3	NA	2	4	2	3

3 Description of proposed offsets

3.1 Offset 1: Protecting and enhancing the natural habitats within Lebombo Summit Sourveld and Western Maputaland Clay Bushveld ecosystem

***Target biodiversity**: Lebombo Summit Sourveld ecosystem (CR), Western Maputaland Clay Bushveld ecosystem (EN), secondary benefits to KwaZulu-Natal Hinged-back Tortoise (VU), Lebombo Dragon Lizard (LC, restricted-range), Lebombo Flat Lizard (LC, restricted-range), Barleria lebombonensis (EN) and all priority bird and bat species.* **Score: 4.**

3.1.1 Context

The Critically Endangered Lebombo Summit Sourveld ecosystem has a very small distribution area in South Africa, Mozambique and Eswatini, along the summit of the Lebombo Mountains at higher altitudes (530 to 750 m a.s.l.; (Lötter *et al.* 2021). Its historical distribution overlaps with most of the Namaacha Wind Farm (see Figure 6 in BAP), although its present condition in this area has not yet been assessed.

This ecosystem consists of altitude wooded grassland (see Table 16 in BAP), with characteristic native trees including different *Acacia* species (*Acacia burkei* (Lebombo form), *A. caffra, A. davyi A. gerrardii*), *Dombeya rotundifolia* and *Protea caffra ssp. caffra*, and native shrubs including *Psoralea latifolia, Crotalaria natalitia, Diospyros dichrophylla, D. lycioides* subsp. *nitens* and *Grewia monticola*. The herbaceous layer includes *Gnidia caffra, Crossandra greenstockii, Diospyros galpinii, Ruellia cordata, Andropogon gayanus, Aristida transvaalensis, Elionurus muticus, Themeda triandra, Brachiaria serrata, Cymbopogon caesius, Hyparrhenia filipendula,*

Hyperthelia dissoluta, Argyrolobium adscendens, Berkheya insignis, Crabbea hirsuta, Gerbera ambigua, Vernonia oligocephala, Indigofera hilaris and *Eulophia parviflora* (Lötter *et al.* 2021).

The historical distribution of the Endangered Western Maputaland Clay Bushveld ecosystem extends over a very long (> 230 km), but relatively narrow (< 20 km), stripe, from KwaZulu-Natal in South Africa, northwards along the base of the Lebombo mountains as far north as the Uanetze River, at altitudes of 20 to 210 m a.s.l. (Lötter *et al.* 2021). It overlaps with a section of the Project's Overhead Transmission Line (OHTL) route (see Figure 6 in BAP), but its present condition in this area has not yet been assessed.

The Western Maputaland Clay Bushveld ecosystem consists of dry, mixed deciduous open woodland, or wooded grassland (see Table 16 in BAP), dominated by the genus *Acacia*, mainly *A. burkei, A. borleae, A. exuvialis, A. gerrardii* subsp. *gerrardii, A. grandicornuta, A. luederitzii var. retinens, A. nigrescens, A. nilotica* subsp. *kraussiana, A. senegal* var. *rostrata, A. swazica, A. tortilis* subsp. *heteracantha, A. welwitschii* subsp. *delagoensis* and *A. xanthophloea.* The diversity of trees, riparian trees, shrubs and climbers is typically very large in this ecosystem. Grasses are often dominant in the landscape, and include *Alloteropsis cimicina, Andropogon gayanus* var. *polycladus, Aristida congesta* subsp. *barbicollis, Bothriochloa insculpta, Brachiaria eruciformis, Cenchrus ciliaris, Dinebra retroflexa* var. *condensata, Enneapogon cenchroides, Eragrostis barbinodis, E. cilianensis, E. cylindriflora, E. superba, Heteropogon contortus, Hyperthelia dissoluta, Leptochloa eleusine, L. panicea, Panicum coloratum, P. deustum, P. maximum, Perotis patens, Schoenefeldia transiens, Sehima galpinii, Setaria incrassata, Sorghum versicolor, Sporobolus pyramidalis, Themeda triandra,* and *Urochloa mossambicensis* (Lötter *et al.* 2021).

The distribution areas of both the Lebombo Summit Sourveld and the Western Maputaland Clay Bushveld have decreased significantly over time (>25%: Lötter *et al.* 2021). Main threats that likely contributed to this decrease are wood cutting for charcoal production, anthropogenic fires and overgrazing by cattle. The conversion of area previously occupied by the ecosystems into cropland (e.g., maize, cassava, sweet potato, potato: Matos, Fonseca & Associados 2022) probably also contributed to the decrease in distribution area, particularly of the Western Maputaland Clay Bushveld, which occurs in lower altitude areas where larger patches are used for agriculture (e.g., near Boane and Mafuiane: Consultec 2023).

The Namaacha Project will directly affect 4.05 ha natural habitats within the Lebombo Summit Sourveld and 24.6 ha of natural habitat within the Western Maputaland Clay Bushveld, due to the direct footprint of the wind farm infrastructure components. Additional reduction in habitat quality around Project components will occur during construction and operation phases. A total of 50.48 Quality Hectares of critical natural habitat will be lost under these two CH ecosystems (see Sections 7.4 and 7.5 in BAP).

3.1.2 Offset implementation areas

Mozambique has developed a legal framework that establishes the principles, methodologies, requirements and procedures for the proper implementation of Biodiversity Offsets as part of environmental impact assessment procedures (the Ministerial Order nº 55/2022, that approves

the Directive on Biodiversity Offsets; see also section 3.1 in BAP). According to this Directive, offsets must be implemented in:

- Conservation Areas (which correspond generally to legally protected areas as recognised by IUCN and IFC PS6); or,
- Areas of importance for biodiversity outside Conservation Areas (KBAs, Ramsar Areas, Forest Reserves or other types of nationally or locally important ecological areas that are considered important areas for biodiversity).

Importantly, the implementation in areas outside Conservation Areas shall preferably be carried out in an area adjacent to an existing conservation area in order to contribute to the expansion of the area or to connect it to another conservation area or may even result in the creation of a new Conservation Area, in accordance with the applicable law.

3.1.2.1 Offset 1-Option 1

Implementation area within the Namaacha Tropical Important Plant Area (creation of a new Conservation Area)

Offsets for the Lebombo Summit Sourveld and Western Maputaland Clay Bushveld ecosystems would be implemented within the Namaacha Tropical Important Plant Area (TIPA)[2] (see section 4.2.7 in BAP), probably in the two areas pre-identified during the field visit (Figure 1) (see section 1.4 in BAP).

[2] https://tipas.kew.org/site/namaacha/

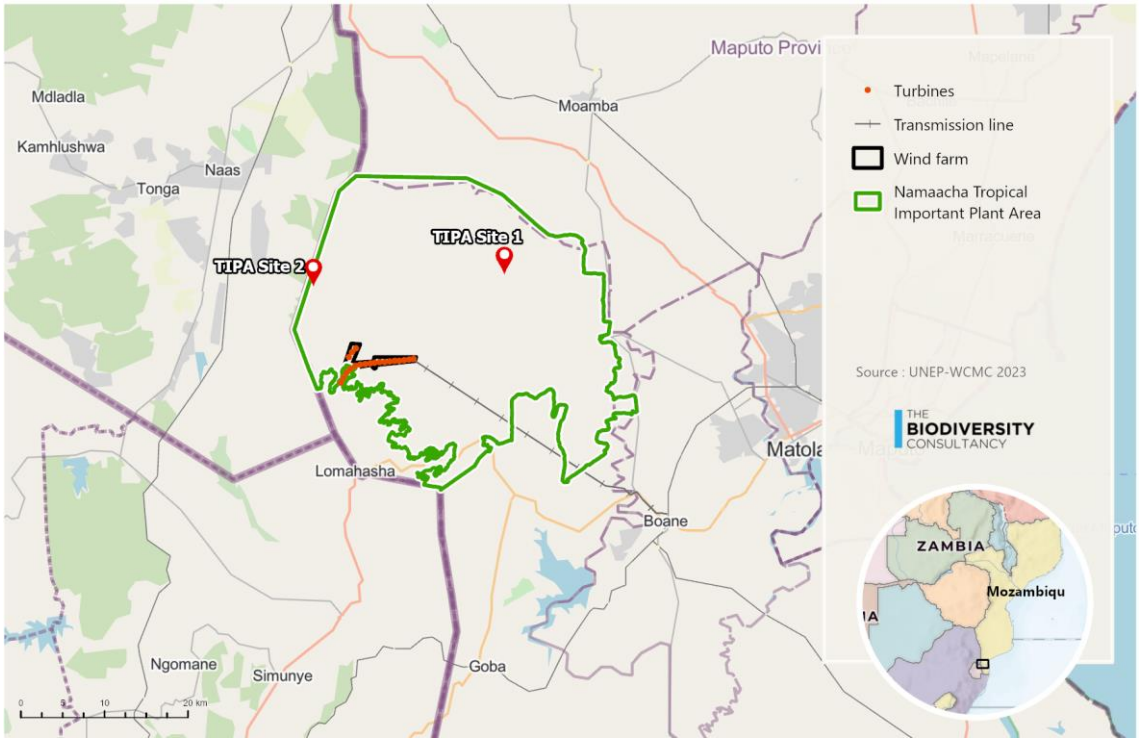

Figure 1. The location of the Namaacha Tropical Important Plant Area and the two potential offset implementation sites (Site 1 – neat Bomucuba settlement; Site 2 – Mr. Persson's property).

One area consists of a property with 2,300 ha located at a minimum distance of ~2 km of the Namaacha Wind Farm, to the northwest, in the Pambane/Bemassango area (Figure 1). The land is managed by an expatriate (Mr. Michael Persson) under a mixed DUAT (*Direito de Uso e Aproveitamento da Terra* – Land Use and Benefit Rights) and Special Licence regime. Land in Mozambique is property of the State and cannot be sold, mortgaged or charged. However, occupation and access to land through DUATs and/or Special Licenses can be granted and are regulated by Law No. 19/97 of 1 October (Land Law) and Decree No. 66/98, of 8 December (Land Law Regulation). Mr. Persson benefits from a definitive DUAT that secure land possession for up to 50 years, renewable for a further 50 years.

The property is mostly used for raising livestock, holding ~ 400 cows (of the *Nguni* race, native from Southern Africa) and ~300 goats. The number of cattle heads is mainly limited by the amount of water available. Most of the land is used as pasture for cattle, in a rotational basis, although some more rough and inaccessible terrains have been left without cattle. The impact of grazing is substantial and notorious in several areas, leading to a reduction in the diversity of herbaceous plants, a lack of natural regeneration of tree and bush species, and an increased coverage by non-native invasive species (especially *Chromolaena odorata*). However, substantial parts of the property seem to present well-preserved habitat patches, maintaining an increased diversity of plants, including succulents and trees (Figure 2). Both the altitude range at which the property is located (~ 380-535 m) and the habitats present suggest that the area is suitable for the Lebombo Summit Sourveld ecosystem.

Figure 2. Potential offset implementation area in Namaacha Tropical Important Plant Area (Mr. Persson's property).

Mr. Persson has a conservation background and a genuine concern about preserving biodiversity, while keeping land use profitable. When he was granted the DUAT, wood cutting (for charcoal making), incidental fires and wildlife poaching were frequent in the property. Throughout time, he has been raising awareness among the local community about these impacts on biodiversity and gradually decreasing their frequency, often by paying compensations for not logging well-developed trees. He is convinced that his efforts are paying off and that there has been an increase of natural regeneration of trees, as well as an increase in wildlife in his property (where e.g., Elephants, many ungulates, Wild dogs, Cheetahs and Spotted Hyenas have been reported). He is willing to get involved in the offset implementation plan for Namaacha Wind Farm (his willingness to turn the cattle farm into a biodiversity conservation-oriented business has also been acknowledged in the Namaacha TIPA factsheet[3] provided that he can still obtain some economic advantage of such collaboration: options such the development of certified ecotourism activities or production of certified products (e.g., honey, a nursery of succulent plants or *Nguni* meat) were briefly discussed. However, the exact conditions for accessing Mr. Persson's property still need to be negotiated and agreed by Globeleq.

A second area was identified in Namaacha TIPA at ~14 km to the northeast of the Namaacha Wind Farm boundaries and close to Bomucuba settlement (Figure 1). The land is used by the

[3] https://tipas.kew.org/site/namaacha/

local community, for cattle grazing and small agricultural plots with e.g., maize and cassava. Charcoal is sold along most of the accesses in the area, indicating that firewood cutting for making charcoal is frequent. Nonetheless, there are still some patches of very well-preserved NH, showing a very high diversity of native plants (including in the spot identified in Figure 1. The NHss found in the area and the altitude it is located (~ 125 m) suggest that the area is suitable for the Western Maputaland Clay Bushveld ecosystem.

The local community chief has been identified and approached during the field visit to the Namaacha TIPA (see section 1.4 in BAP). Although he has shown an obvious interest and enthusiasm by biodiversity, no detailed conversation took place on the possibility of implementing offset actions in the area and how that could be linked with sustainable livelihoods by the community.

Figure 3. Potential offset implementation area in Namaacha Tropical Important Plant Area (Bomucuba settlement area)).

The two potential offset areas mentioned above comprise areas of seemingly similar habitats (or likely in better conservation condition) to those found in the Namaacha Wind Farm area (and therefore to the Lebombo Summit Sourveld ecosystem) and along the Project's OHTLs, where it overlaps with the Western Maputaland Clay Bushveld ecosystem. However, these similarities, and the consequent adequacy of the proposed areas for implementing the offsets for the two threatened ecosystems, should be validated on the ground by expert botanists. In the case that

such adequacy is not confirmed, alternative areas should be identified within the Namaacha TIPA.

The selection of one or more areas within the Namaacha TIPA for the implementation of offsets will require the creation of at least one new Conservation Area, according to Mozambican legislation. There are 10 types of Conservation Areas, according to Mozambican Law nº 5/2017 (Table 2).

Table 2 Types of Conservation Areas in Mozambique (Law nº 5/2017).

Type	Summary description
Total Conservation Areas	Areas of public domain targeting the preservation of ecosystems and species, without activities for extraction of natural resources, and where the indirect use of natural resources is allowed under a few exceptions listed in the present Law
Integral Nature Reserve	Aims the preservation of nature, the maintenance of ecological processes, ecosystems functions, and threatened and rare species. Several activities (e.g., hunting, fishing, camping, forestry/agriculture and mining, earth-moving, changes in the vegetation) are strictly forbidden, except for scientific purposes, for auditing, or observation tourism, provided that no infra-structures are developed.
National Park	Aims the preservation, protection, conservation, propagation and management of flora and wildlife, as well as the protection of sites, landscapes or geological formations of particular scientific, cultural or aesthetic value, in the interest of and for public recreation, and that are representative of the national patrimony. Several activities (see Integral Nature Reserve) are strictly forbidden, except for scientific or management purposes. The presence of man is admitted according to the management plan and if not threatening the preservation of natural resources and biodiversity. Scientific research and the monitoring of natural resources are allowed for management purposes. The management of flora and fauna species, including population control, is allowed to maintain the ecological balance.
Cultural and Natural Monument	Areas of public, municipal, community or private domain comprising one or more element with exceptional or unique natural, aesthetic, geological,

	religious, historical or cultural value, in an area < 100 ha, that, due to its singularity and rarity, requires its conservation and maintenance of its integrity. Also includes trees with ecological, aesthetic, historical and cultural value. Monuments target i) the protection or conservation of specific natural or cultural elements, ii) the development of ecotourism, recreation, education and research activities, iii) to ensure the preservation and reproduction of rare, endemic, protected and endangered species, iv) prevent or eliminate any type of occupation or exploitation incompatible with the Monument objectives, and v) contribute to local economic and social development through the promotion of tourism and the engagement of local communities in the benefits from those activities. Management activities follow the traditions, limitations, principles and necessities inherent to the Monument's conservation.
Conservation Areas for Sustainable Use	Areas of public or private domain targeting conservation, subject to integrated management where activities for extraction of natural resources are allowed in compliance with sustainable limits, defined by management plans
Special Reserve	Areas of public domain aiming the protection of a particular species of flora or fauna that is rare, endemic, endangered, declining or presents recognized cultural and economic value. Can be defined as holding national or provincial interest, depending on the values it aims to protect. The same permissions and prohibitions as for a National Park apply in this case. The exploitation of natural resources is forbidden, except when permitted by the management plan.
Environmental Protection Areas	Areas of public domain managed in an integrated way, where the interaction between human activities and nature model a landscape with specific and exceptional aesthetic, ecological or cultural qualities, resulting in important ecosystem services to its residents and neighbours. These areas target i) the protection and preservation of environment, and the maintenance and improvement of the ecosystems with recognized ecological and socio-economic value, ii) maintaining an harmonious relationship

	between nature and culture, protecting the landscape and ensuring traditional ways of land occupation and construction, as well as the expression of socio-cultural values; iii) encouraging livelihoods and socio-economic activities that are sustainable, and the preservation of cultural values of local communities; iv) maintain the diversity of landscapes and habitats, as well as of the associated species and ecosystems; v) prevent or eliminate any type of land occupation and activities considered incompatible that, due to its dimension or scale, put at risk the landscape protection goals; vi) provide open air recreational areas to citizens, compliant with the Conservation Area attributes; vii) contribute to the local sustainable development, through the promotion of tourism and the engagement of local communities in the benefits from those activities. The exploitation of natural resources is permitted in these areas, provided they comply with the integrated development plan.
Official Game Reserve (*Coutada*)	Areas of public domain aiming at the development of hunting activities, and the protection of species and ecosystems. The right to hunt is recognized through a concession contract between the State and the operator. The use of forest and wildlife resources by local communities is permitted, provided that with subsistence goals and conducted in a sustainable way, compliant with the objectives of the Conservation Area. Restoking of game populations is permitted, provided it complies with the national legislation and the Area's management plan. The management of the Official Game Reserve should follow a management plan approved by the administrative authority of Conservation Areas.
Community Conservation Area	Areas of communal public domain, managed by one or more local communities, that hold the right to use the land, which is aimed for the conservation of fauna and flora and for the sustainable use of natural resources. These areas target i) the protection and conservation of natural resources in the area of customary use by the community, including the conservation of natural resources, sacred forests and other sites of historical, religious or spiritual importance, and of cultural use by the local community; ii) ensure the sustainable management of natural resources to generate local sustainable development; and iii) ensure the access to and perpetuity of plants with medicinal use and of biodiversity in general. The permitting for exploiting natural resources by a third party depends on previous consent by local communities.

	The management of the existing natural resources is done in compliance with the customary rules and practices by the local communities, without prejudice to the national legislation.
Sanctuary	Areas of public or private domain, targeting the reproduction, shelter, feeding and research of particular species of fauna and flora. Natural resources, with the exception of those species that the Sanctuary intends to protect, may be exploited under a special license, in compliance with Sanctuary's management plan and the Law. Species restoking is permitted, provided it complies with the national legislation and the Area's management plan.
Fazenda do bravio (private owned)	Areas of private domain, with conditional access, targeting the conservation of fauna and flora, and where the right to hunt is limited to the holder of the right to use the land, or others benefiting from his authorization. The holder may explore certain species in a balanced way, for the production of meat, and other remains and sub-products. The holder is responsible for the feeding, health and maintenance of any animals kept in captivity. The holder owns the animals that he introduces. If he wants to own the animals found in the area, he must buy them from the State. Restoking of species is permitted, provided it complies with the national legislation and the Area's management plan.
Municipal Ecological Park	Areas of public municipal domain, targeting the conservation of sensitive ecosystems in the urban or village context. These areas target i) the protection of nature elements essential for the ecological balance of the municipality, including wetlands, mangroves, slopes, dunes and forested areas; ii) the protection and conservation of endemic, rare or threatened species and ecosystems; iii) prevent the random occupation and uncontrolled and unregulated urbanization of green areas in municipalities; iv) contributing to quality of life of municipalities; v) foster environmental education and recreation of resident, as well as the development of ecotourism; vi) the regeneration of species essential to the subsistence of populations; and vii) fostering scientific research, especially in association with educational and research institutions.

	The presence of Man is permitted in a Municipal Ecological Park, provided that it does not put at risk the objectives of its creation.

All the different types of Conservation Areas are delimited and/or fenced in some way, and some types may be delimited within other Conservation Area types of larger size. The best approach for creating a new Conservation Area within the Namaacha TIPA will need to be discussed with the governmental environmental authorities, namely MTA (Ministry of Land and Environment) and DINAB (MTA's National Directorate of Environment) (see section 3.1 in BAP). Depending on the exact area selected for implementation, the types of Conservation Areas that would probably best accommodate the implementation and management of the offset actions targeting the protection and rehabilitation of the Lebombo Summit Sourveld and Western Maputaland Clay Bushveld ecosystems include the Sanctuary, Official Game Reserve (*Coutada*), *Fazenda do bravio*, Environmental Protection Area or Community Conservation Area (Table 2). **Score: 3**

3.1.2.2 Offset 1-Option 2

Implementation area in an existing Conservation Area

An alternative option for the required offset actions for the Lebombo Summit Sourveld and Western Maputaland Clay Bushveld threatened ecosystems would be to implement them in an existing Conservation Area (as per the the Ministerial Order nº 55/2022). However, due to the geographic distribution of these ecosystems in Mozambique (and, in the case of Lebombo Summit Sourveld, the very limited distribution area), they would not overlap with existing Conservation Areas. The closest Conservation Areas[4] to the Project are Licuáti Forest Reserve (~ 50 km to the south-southeast of the Project), Maputo Special Reserve (~40 km to the southeast) and Limpopo National Park (~210 km to the north) (Figure 4), none of them sharing similarities in habitat and ecosystem composition with the Lebombo Summit Sourveld or Western Maputaland Clay Bushveld (Lötter *et al.* 2021). Therefore, any gains generated through offsets in these Conservation Areas would be to different biodiversity aspects than those impacted by the Project. **Score: 1**

[4] https://www.biofund.org.mz/mocambique/areas-de-conservacao-de-mocambique/

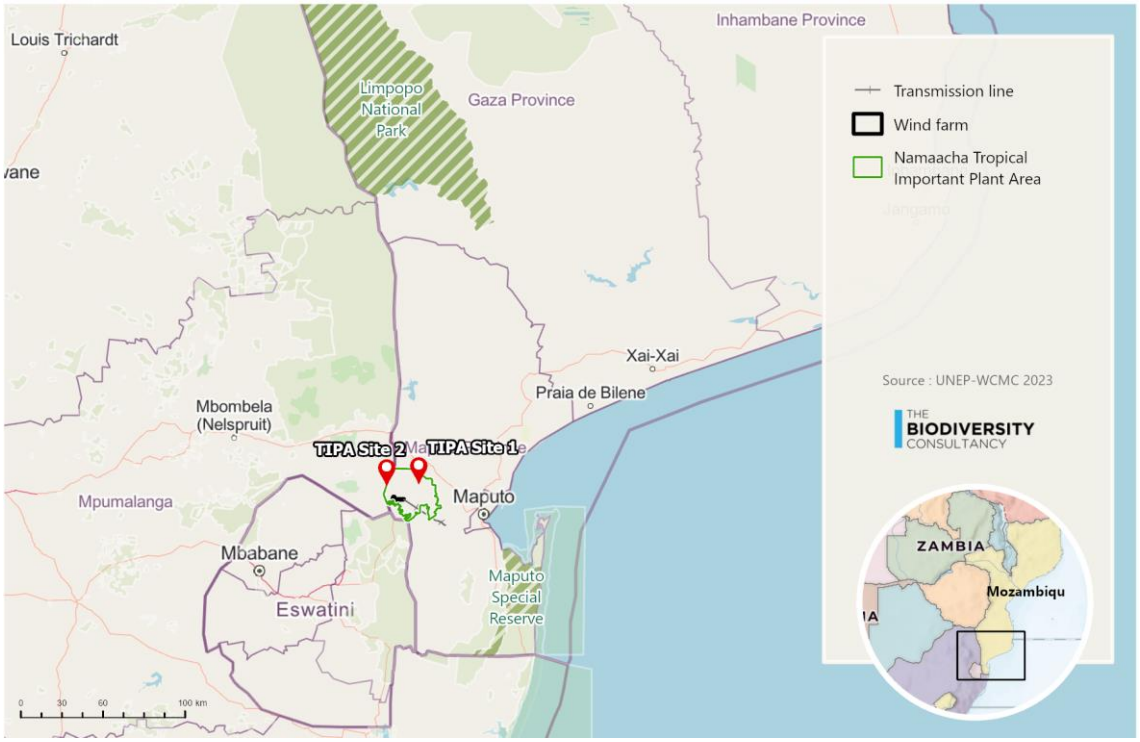

Figure 4. The location of the Namaacha Tropical Important Plant Area with two potential offset implementation sites and of the Mozambican Conservation Areas closer to the Project.

3.1.3 Offset actions

This offset would involve a combination of activities targeted at avoiding or minimising current threats to the ecosystem's habitats (averted loss), as well as at rehabilitating degraded areas in the historical distribution area of the ecosystems:

- Identification and mapping of suitable areas (i.e., with degraded or well-preserved, but under threat, areas of the target ecosystems) for offsets implementation;
- Removal of non-native invasive plant species (e.g., *Lantana camara, Chromolaena odorata*);
- Restoration of areas with degraded habitat (wooded savannah, open woodland) through afforestation with adequate native tree and bush species (plants can be translocated from other areas or cultivated in nurseries);
- Fencing or protection or restoration areas;
- Development of a socio-economic plan for the provision of alternative livelihoods and income to local communities (based on alternative products, e.g., honey, certified meat, basketry or dyeing from native plants, nursery of succulents or medicinal plants for selling, ecotourism), to reduce cattle grazing, wood cutting, agriculture and anthropogenic fire pressures;
- Provision of support to increase the protection of the new or existing Conservation Area to increase natural regeneration and reduce wood cutting/grazing/fire pressure (through the training and financial/logistic support of rangers/guards);

- Development of education and awareness raising campaigns among local communities to reduce anthropogenic pressure on the ecosystems;
- Support the development and implementation of a Management Plan for the new or existing Conservation Area; and,
- Continuous monitoring of biodiversity gains in the offset and implementation of adaptive management measures throughout the lifetime of the offset.

3.1.4 Key partners

Key stakeholders for this offset are:

- MTA (Ministry of Land and Environment) – the central authority for the implementation of policies and laws on environment and biodiversity, that coordinates the management and conservation of environment, the sustainable use of natural resources and the management of Conservation Areas in Mozambique;
- DINAB (MTA's National Directorate of Environment) – has the responsibility, within the MTA, of leading the evaluation and monitoring of offsets and the application of the Ministerial Order nº 55/2022 (that approves the Directive on Biodiversity Offsets); and,
- ANAC (MTA's National Administration for Conservation Areas) – holds responsibility for the conservation of biodiversity and the sustainable development of ecotourism, mostly through the planning, coordination and implementation of actions within Conservation Areas.

Preferred implementation partners include:

- Biofund (Foundation for the Conservation of Biodiversity) – can act as Biodiversity Offsets Manager, supporting the coordination and supervision of offsets implementation. Have experience in allocating and managing financial resources exclusively for the conservation of biodiversity in Mozambique. Biofund was also involved in the development of the offsets legislation and implementation manual (Ministério da Terra e Ambiente, WCS & BIOFUND 2023);
- VIDA (NGO) – have wide experience on community benefit sharing initiatives in Mozambique, especially in Matutuíne district (neighbour to Namaacha district), through the development of e.g., agro-ecology systems, sustainable livelihoods, recovery of native forest;
- IIAM (Institute of Agriculture Research, part of the Ministry of Agriculture and Rural Development) – have experience in sustainable agriculture and food production and on protection of plant's diversity;
- Peace Parks Foundation – are implementing the Trans-frontier Conservation Areas project, including the co-management of Protected Areas in Mozambique (Maputo National Park/Special Reserve and Limpopo National Park). Have experience in community-based conservation projects in Africa (including Mozambique), based on e.g., sustainable agriculture, livestock management/herding, ecotourism and environmental education); and,

- Mike Persson – holds a DUAT that secures land possession of one of the selected offset implementation areas and is willing to engage and collaborate in the offsets implementation (see Context, above).

3.1.5 Demonstrable biodiversity gain

The Project must demonstrate NG for the critical natural habitats under the footprint of the two CH ecosystems, and NNL for other non-critical NHs outside the distribution of the CH ecosystems. This should be achieved through the protection and/or restoration of:

- >58.05 QH (Quality Hectares) of critical natural habitats, of which >10.34 QH for forest, >10.72 QH of open forest, >29.50 QH of dry savanna, and >7.48 QH of moist savanna) (Table 17 in BAP), AND
- >48.05 QH of non-critical natural habitat

The proposed protection and restoration actions, involving local communities and supporting a change to sustainable alternative livelihoods where needed, is likely to result in the targeted NGs.

The extent (area) and condition of the Lebombo Summit Sourveld ecosystem affected by the Project infrastructures (see section 7.5. in BAP), as well as that of the offset areas with comparable habitats will be quantified before the start of the works on the Project site, by applying a QH metric (see section 7.4. in BAP), to ensure there is equivalency between impacts and offsets. The loss-gain calculations will be updated and refined at that stage. Systematic and continued monitoring of the development of vegetation communities in the offset areas, using the same metrics as before offset implementation, will allow for the quantification of improvements in the habitats condition and assess the accomplishment of the NG target. **Score: 4**

3.1.6 Politically feasible

Globeleq has started an engagement and discussion process with the Government environmental authorities (DINAB) to understand and define the best approach to develop an offset strategy for the Namaacha Wind Farm project (see section 1.4 in BAP). The general implementation sites and associated process described above (i.e., the selection of areas within an existing Conservation Area and/or the creation of a new Conservation Area) are compliant with the Mozambican laws and have also been discussed and agreed in principle with DINAB. However, and even though the process, requirements and procedures for implementing Biodiversity Offsets are clearly established by the Mozambican legislation (Ministerial Order nº 55/2022) and a dedicated implementation manual (Ministério da Terra e Ambiente, WCS & BIOFUND 2023), it is likely that the final acceptance and permitting by the national competent authorities will still require some time. An additional difficulty may rely on the novelty of the process and on the lack of dealing with similar previous examples by the national authorities, namely ANAC, which holds responsibility for the for the management of Conservation Areas (see Table 2 in BAP). **Score: 3**

3.1.7 Implementation risk

The proposed habitat management and enhancement actions are similar to actions commonly carried out for the management and conservation of natural or protected areas, and therefore no significant technical implementation risks are identified. A close engagement with the land holders/users and local communities, including the discussion and agreement of mutual benefits, will be crucial to ensure that the offset goals are accomplished. **Score: 4**

3.1.8 Other benefits

The conservation, enhancement and effective protection of significant areas of Lebombo Summit Sourveld and Western Maputaland Clay Bushveld would likely result also in low-moderate benefits (due to increased quality in habitat and consequent higher breeding and survival rates) for a variety of flora and fauna species associated with these ecosystems, including priority species in the BAP, such as KwaZulu-Natal Hinged-back Tortoise, Lebombo Dragon Lizard, Lebombo Flat Lizard, *Barleria lebombonensis*, Black-bellied Korhaan, Shelley's Francolin, Short-tailed Pipit and several raptors and bats (see Table 6 and Table 7 in BAP). **Score: 4**

3.2 Offset 2: Reducing threats and increasing habitat quality for Martial Eagles and Bateleurs

Target biodiversity: *Martial Eagle (EN), Bateleur (EN), secondary benefits to other priority raptor species and to Shelley's Francolin***. Score: 3.**

3.2.1 Context

Martial Eagles are still widely distributed across Central and Southern Africa, although the species has suffered a rapid decline across much of this range over the last decades (BirdLife International 2020). The species also occurs in the Namaacha Wind Farm area and its immediate vicinity, where 1-2 pairs were confirmed (Matos, Fonseca & Associados 2022; WSP 2023).

Main threats to this species are direct persecution (shooting and trapping) by farmers and indirect poisoning. Electrocution and collisions on power lines, habitat alteration and degradation and nest disturbance are other significant threats. Poisoning is largely carried out by a few large-scale commercial farmers, but is also a problem in tribal small-stock farming communities, in retaliation for the predation of domestic livestock decades (BirdLife International 2020). In Mozambique, intentional poisoning is thought to be rare, but the species is seen as a threat to poultry and livestock by rural communities (Domingas Matlombe, *pers. comm*.). Apart from direct persecution, the scarcity of prey (e.g., small-medium size mammals and gamebirds) due to human hunting has also been indicated as threat to the species in Mozambique (Parker 1999).

Bateleurs show a similar distribution area to that of Martial Eagles, being present over a wide range in Central and Southern Africa. Similarly, Bateleurs also suffered from significant

population declines across much of its range during last decades (BirdLife International 2024). Based on bird surveys conducted at the Namaacha Wind Farm, it is likely that the area is used by a single pair of Bateleurs (TBC 2023).

Main threats and reasons for declines include poisoned baits, pesticides, trapping for international trade, nest disturbance from spreading human settlements, and increased intensification and degradation of agricultural land (BirdLife International 2024).

Main impacts from the Namaacha Project on Martial Eagle and Bateleur may arise from collisions with wind turbines. For the Martial Eagle, it is estimated that up to two individuals in the 1st operational year, and up to one individual / year in the following years may get killed due to collisions. The fatalities estimate is slightly lower for the Bateleur, with one fatality estimated for the 1st year and up to one/year in the following years (see Table 12 in BAP).

3.2.2 Offset implementation areas

Offsets for these two species should be implemented sufficiently distant from the Project as to not increase the species collision risk. As for the threatened ecosystems (see section 3.1), offsets for Martial Eagle and Bateleur can be developed within existing Conservation Areas or in areas of importance for biodiversity outside Conservation Areas, provided they are located distant enough from the Project.

3.2.2.1 Offset 2-Option 1

Implementation area in an existing Conservation Area

The nearest Conservation Area to the Project where both Martial Eagles and Bateleurs occur (Cornell 2023) is Maputo Special Reserve, at ~40 km distance (Figure 4). There are no available estimates on the number or distribution of territories in this Conservation Area. Published information from~20 years ago reported both species were rare on uncommon in Maputo Special Reserve, with an estimate of 3-4 Bateleur pairs (Parker & de Boer 2000). **Score: 4**

3.2.2.2 Offset 2-Option 2

Implementation area within the Namaacha Tropical Important Plant Area (creation of a new Conservation Area)

An alternative area for implementing offset actions targeting Martial Eagle or Bateleur could be considered within the Namaacha TIPA (Figure 1), provided it is located at sufficient distance from the Project infrastructures. Considering the maximum home range radius for both species (9.5 km; see TBC 2024) as the minimum distance recommended from the Project, such area could be in the northern, northeastern and eastern portions of the TIPA. For convenience and efficiency related to the creation of a new Conservation Area (see section 3.1.), the most appropriate location would be the offset area for the Western Maputaland Clay Bushveld (see section 3.1., Offset 1-Option 1), in case such area would be the selected option for addressing the NG goals for this threatened ecosystem. Although the habitat in this area (and in other areas within Namaacha TIPA) seems suitable for both raptor species (i.e., open woodland, wooded

savanna, grasslands: BirdLife International 2020, 2024), targeted surveys by expert ornithologists would be required to validate the presence of the species and the adequacy of the area to receive the proposed offset actions. **Score: 1**

3.2.3 Offset actions

This offset would involve different actions targeted at avoiding current threats to the species survival, as at improving habitat quality and increasing their breeding success. While the typology of proposed activities is similar for both Martial Eagles and Bateleurs, they require adaptation depending on the species-specific ecological requirements:

- Identification and mapping of existing territories of Martial Eagle and Bateleur, and of vacant areas with seemingly favourable habitat;
- Detection of nests and provision of surveillance and protection (delimiting a buffer zone with limited human activity) during the breeding period, to avoid poaching or disturbance. This should involve the training and financial/logistic support of rangers/guards from the Conservation Area and/or local community;
- Development and installation of anti-predator nest platforms (artificial nests) for Bateleurs as a large proportion of Bateleur nests are predated due to long periods spent flying/foraging by the adults, and the species also uses old bases of other birds 'nests for breeding (Ferguson-Lees & Christie 2005);
- Installation of nest platforms (artificial nests) for Martial Eagles as the species nests in artificial nesting sites, including power line pylons (Ferguson-Lees & Christie 2005; BirdLife International 2020);
- Development of education and awareness raising campaigns among local communities to reduce direct persecution, poisoning and cutting of nesting trees. Training and financial/logistic support of rangers/guards from the Conservation Area and/or local community for law enforcement and detection/prevention of poisoning/shooting/trapping events;
- Bird fatalities monitoring along transmission and distribution power lines to access the impact of collisons/electrocutions on Martial Eagles and Bateleurs. Implementation of minimization measures in mortality hotspots (e.g., retrofitting or installation of bird-friendly designed structures in distribution lines, installation of Bird Flight Diverters (BFDs) in transmission lines);
- Restoration of areas with degraded habitat (wooded savannah, open woodland) through afforestation with adequate native tree and bush species (plants can be translocated from other areas or cultivated in nurseries);
- Fencing or protection or restoration areas;
- Habitat management directed at the enhancement of ecological suitability for main prey species for Martial Eagle and Bateleur, especially hares, Guineafowl, small antelopes - e.g., Steenbok – mongooses and monitor lizards (Ferguson-Lees & Christie 2005; BirdLife International 2020, 2024). A preliminary, site-specific, assessment of the presence and abundance of the different potential prey needs to be conducted before the design of adequate habitat management actions. Nonetheless, likely actions would include e.g., the creation of a shrubland/grassland mosaic, the rehabilitation of gallery

forest and riparian vegetation, the construction of artificial shelters for fauna and the creation and maintenance of pastures/croplands of pre-selected herbaceous species;
- Long-term monitoring of the number of territories, nest-site occupancy and breeding success (number of fledged offspring) of Martial Eagle and Bateleur;
- Long-term monitoring of the population size and habitat use by prey species for Martial Eagle and Bateleur;
- Provision of support to the new or existing Conservation Area to increase the protection of offset implementation sites and the effectiveness of offset actions (through the training and financial/logistic support of rangers/guards);
- Support the development and implementation of a Management Plan for the Conservation Area, including the promotion of ecotourism; and,
- Continuous monitoring of biodiversity gains in the offset and implementation of adaptive management measures throughout the lifetime of the offset.

3.2.4 Key partners

Key stakeholders for this offset are (see also section 3.1. for responsibilities and roles):

- MTA (Ministry of Land and Environment);
- DINAB (MTA's National Directorate of Environment); and,
- ANAC (MTA's National Administration for Conservation Areas).

Preferred implementation partners include (see also section 3.1. for responsibilities and roles):

- Biofund (Foundation for the Conservation of Biodiversity);
- VIDA (NGO);
- IIAM (Institute of Agriculture Research, part of the Ministry of Agriculture and Rural Development);
- Peace Parks Foundation;
- EWT (Endangered Wildlife Trust) – this NGO based in south Africa has been conducting extensive work and research in Southern Africa on raptors ecology and conservation, including habitat management and community engagement; and,
- Domingas Matlombe – researcher, with expertise in Mozambican raptors and vultures. Has done a MSc. on the ecology and movements of vultures in the Gorongosa National Park (Mozambique).

3.2.5 Demonstrable biodiversity gain

The Project is required to demonstrate a NG for both Martial Eagle and Bateleur, with an annual required gain estimated at 1-2 individuals for Martial Eagle and 1 individual for Bateleur.

A baseline of the number of pairs, number of breeding pairs and breeding success (i.e., number of fledged young) for both species would need to be established initially at the offset implementation area, to compare against the effect of future offset actions.

The measurement of resulting gains should be based on the monitoring of the same metrics (i.e., number of pairs, number of breeding pairs and breeding success) in the years following the offset implementation.

As both Martial Eagles and Bateleurs are generalist raptors with relatively broad ecological requisites (habitat and food), the implementation of actions preventing/discouraging the main threats due to direct human persecution/disturbance, together with those targeting an increase in prey availability, seem likely to result in an increase in the species breeding success and in the number of individuals.

While there is a lack of studies with African species, research done on Europe has shown that an increase in prey populations and/or their availability (for instance managing habitats to create open patches – more favourable hunting grounds to raptors – within densely wooded areas) can raise the number of raptors in the area (Selås 1997; Bakaloudis *et al.* 1998; Ontiveros *et al.* 2005). Likewise, there are several examples where the protection of raptors nests by warrens resulted in increased breeding success (Bagyura *et al.* 1994; Negro *et al.* 2007; Demerdzhiev *et al.* 2015; Oppel *et al.* 2016). **Score: 4**

3.2.6 Politically feasible

The discussion and alignment process with the Government environmental authorities (DINAB) regarding the best approach and process to develop the Project offsets in an existing or new Conservation Area in Mozambique have already been initiated by Globeleq (see section 3.1 for details). Importantly, the Management Plan for Maputo National Park (Administração Nacional das Áreas de Conservação 2021) already considers some of the proposed offset actions (e.g., strengthen law enforcement and prevention of poaching/illegal hunting, management of natural habitats, etc.) but lacks the capacity and/or resources to implement these actions. Moreover, there is ongoing work to prepare this Conservation Area to receive aggregated offsets from multiple projects in Mozambique (WCS, *pers. comm.*). **Score: 4**

3.2.7 Implementation risk

The involvement of local communities will be essential for reducing anthropogenic threats to Martial Eagles and Bateleurs and ensure that NGs are achieved. Inhabitants of offset implementation areas would be engaged in the process from the start, through education and awareness raising campaigns, and through the involvement in surveillance, management and monitoring actions. Communities' awareness should highlight that an increase in the raptor's prey populations resulting from the offset would also be positive for local communities, that would benefit from increased game resources. **Score: 3**

3.2.8 Other benefits

Habitat enhancement and the fostering of populations of medium-sized mammals, birds and reptiles will very likely benefit other species of avian predators considered as priorities in the BAP (see Table 6 in BAP). Habitat management actions will also likely be favourable for Shelley's Francolin. The installation of artificial nesting sites, and the protection of their occupants, may also

benefit other priority birds (Black Stork and raptors) that frequently occupy non-natural structures for breeding. **Score: 3**

3.3 Offset 3: Reducing mortality by poisoning of White-backed Vultures

Target biodiversity: *White-backed Vulture (CR), secondary benefits to other vultures (Cape, Lappet-faced, Hooded and White-headed) and raptors (Bateleur).* **Score: 3.**

3.3.1 Context

The White-backed Vulture *Gyps africanus* is globally Critically Endangered with a range that covers most savannah, woodland and arid areas in sub-saharan Africa (BirdLife International 2017) and individuals are known to move great distances (e.g., Phipps *et al.* 2013). In Mozambique, the species occurs across the country, however records are highly concentrated in protected areas: this likely reflects both the suitability of these areas for the species (e.g., increased food abundance, less nest disturbance) and the interest of people submitting observations (Cornell 2023). The main threats to the species in southern Africa are direct hunting, persecution and poisoning for use in cultural practices, with the loss of habitat for conversion to agro-pastoral systems and loss of wild ungulates leading to a reduced availability of carrion also factors contributing to the species' decline (BirdLife International 2017). Predicted impacts from the Project are the deaths of an estimated maximum of 1-2 individuals annually through the collision with turbine blades (see Table 12 in BAP).

3.3.2 Offset implementation areas

In line with the national legislation, offsets must be implemented in either Conservation Areas (which correspond generally to legally protected areas as recognised by IUCN and IFC PS6) or in areas of importance for biodiversity outside Conservation Areas (KBAs, Ramsar Areas, Forest Reserves or other types of nationally or locally important ecological areas that are considered important for biodiversity) (see section 3.1). Any offset actions should also be sufficiently distant from the Project as to not increase the collision risk at the Project of White-backed Vultures attracted to the offset site.

As White-backed Vultures range widely and have been recorded across the country, offset actions in any Conservation Areas or similar areas, are likely to have the potential to generate gains for this species. It may be more useful to target offset actions in areas with the highest threat and where this threat can feasibly be addressed, rather than locations with the highest numbers of White-backed Vultures. While identification of areas with highest threats would require further in-country expert engagement, the Limpopo National Park (Figure 4) represents a priority for investigation as it is frequently used by White-backed Vultures and is the closest Conservation Area to the Project (approximately 200 km north). Maputo Special Reserve (Figure 4) should also be initially considered due to its proximity to the consumer markets of Maputo and where the lack of mammalian predators means vulture food sources are limited and vultures may be more readily attracted to poisoned bait. **Score: 3**

3.3.3 Offset actions

This offset would likely require a combination of community-based activities encouraging the reduction in intensity or cessation of current threats, awareness-raising of the plight of vultures and support to alternative livelihood options for community members currently involved in poisoning/poaching with the purpose of selling vultures body parts for cultural/religious purposes:

- Identification of suitable areas for implementing the offset action (i.e., areas with high threats or density of White-backed Vultures, and receptive communities);
- Interviews with community members, and other relevant organisations, to understand the motivations behind poisoning and explore alternatives to poisoning;
- Regional surveys of markets and community members to establish a baseline for the levels of poisoning;
- Development and roll-out of an awareness campaign around the illegality of killing vultures;
- Support to law enforcement agencies and/or conservation area staff to implement relevant laws; and,
- Support programs to community members to provide alternative medicinal or livelihood options.

3.3.4 Key partners

The key implementing partner would a social and/or community-focused and/or environmental NGO with a proven ability to work closely with local communities, ideally in the area targeted for the offset.

Key stakeholders who would need to be involved in either developing the offset, or engaged as part of the implementation of the offset would be (see also section 3.1. for responsibilities and roles):

- MTA (Ministry of Land and Environment);
- DINAB (MTA's National Directorate of Environment);
- ANAC (MTA's National Administration for Conservation Areas);
- Other relevant government ministries responsible for;
    - Social/community programs, to ensure the offset action aligns with national goals and any other ongoing actions in the region;
    - Law enforcement, especially if a lack of capacity in enforcement has been identified as an area where improvements are possible; and,
- Communities currently engaged in poisoning/poaching within the offset action area.

Preferred implementation partners include (see also section 3.1. and 3.2 for responsibilities and roles):

- Biofund (Foundation for the Conservation of Biodiversity);
- VIDA (NGO);

- Peace Parks Foundation;
- EWT (Endangered Wildlife Trust); and,
- Domingas Matlombe.

3.3.5 Demonstrable biodiversity gain

Poisoning is acknowledged as a major concern for White-backed Vulture. Both in the IUCN Red Listing (BirdLife International 2017), and in discussion with stakeholders during the in-country visit (Domingas Matlombe, *pers. comm.* February 2024), it was mentioned that an effective anti-poisoning action is very likely to lead to gains for this species. Once an action is implemented, reductions in metric values (e.g. number of vulture parts being used or sold in the project area) between the initial baseline and subsequent surveys could be reasonably attributed to the efforts of the offset action and be claimed as a gain by the Project.

The Project is required to demonstrate a NG for White-backed Vulture, with the annual required gains estimated at 1-2 individuals. Once a target area has been identified for the offset action, an initial baseline would need to be established against which the effect of future actions could be compared. Baseline information would be needed for two complementary issues:

- Private / household use of vulture parts (i.e., collection for subsistence use). Information on this could be collected through focused interviews with community households and key individuals; and,
- The commercial trade of vulture parts (i.e., the selling and purchase by third parties). This information could be collected by regular visits to markets in the offset wider area, interviews of market stallholders, vendors and law enforcement agencies or Conservation Area staff. Key metrics would be the type and number of vulture parts available during each visit and contextual information on sales (i.e., how often are markets, what gets sold at each market, do people 'request' body parts that are not always available).

Information would need to be collected on both issues at multiple communities in and around the offset area to see regional trends (i.e., is the offset having an effect or is there a general decline in demand) and counter claims of leakage (i.e., that sellers continue to kill vultures, but sell in a different village market where there has been no awareness-raising activities). Results could then be converted into a likely number of vultures poached per survey effort. **Score: 2**

3.3.6 Politically feasible

As the intentional killing of vultures is illegal in Mozambique (under Decree n.º 51/2021, Decree n° 1212002, and Decree nº 34/2016 of 24 August on CITES regulation), actions to reduce poisoning and/or poaching are likely to be supported by the Government. This type of project also appears to fit well within the increasing political will to tackle wildlife crime more generally (e.g. a five-year USAID funded project to improve law enforcement capacity to prosecute wildlife crimes: here). **Score: 4**

3.3.7 Implementation risk

Convincing people to change their behaviours, especially behaviours which are culturally-important or provide financial benefits can be challenging and will require a long-term effort from the implementing partner. Assuming an appropriate offset area and implementing partner can be identified, the Project should enter into a long-term (i.e. of at least five years) engagement to deliver the actions.

It may also be that there are no viable alternatives to vulture parts for some of their medicinal or cultural uses – this would need to be determined as part of the initial, in-depth, investigation when developing the action. **Score: 2**

3.3.8 Other benefits

A suite of species additional to White-backed Vulture are likely to be poisoned or poached for cultural or medical purposes, and any action may have some flow-on benefits to these species. Until baseline surveys in the offset area have been completed, it is not possible to know which additional species may be involved, or the potential level of benefits which may be realised by the action. **Score: 3**

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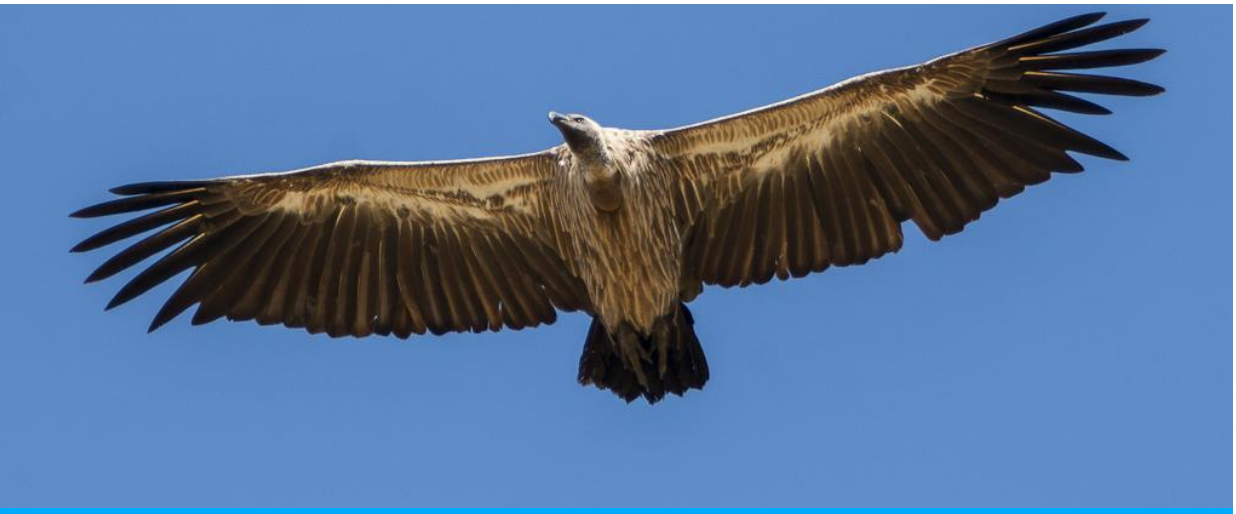
Appendix 4: Critical Habitat Assessment



Critical Habitat Assessment for the Namaacha Wind Farm project, Mozambique

The Project occurs in an area of:

- *Primarily Natural Habitat, for which mitigation designed to achieve No Net Lossis required;*
- *Confirmed Critical Habitat for two highly threatened/unique ecosystems: Lebombo Summit Sourveld and Western Maputaland Clay Bushveld, for which a Net Gain will be required; and,*
- *Possible Critical Habitat for three species (White-backed Vulture, Martial Eagle and Bateleur), for which further surveys to determine their status are recommended.*

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Front cover photo: White-backed Vulture (*Gyps africanus*), by Francesco Veronesi (https://commons.wikimedia.org/wiki/File:White-backed_Vulture_-_Mara_-_Kenya_30240_%2815444475796%29.jpg)

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Document information	
Document title	Critical Habitat Assessment for the Namaacha Wind Farm project, Mozambique
Document subtitle	
Project No.	GLQ02
Date	14 March 2024
Version	3
Authors	REDACTED
Client name	Globeleq

Document history						
Revision no.	Author/s	Reviewer 1	Reviewer 2	Date	Comments	Final/draft
1	RT, LM, VK	DW	MC	09/11/2023		1st issue to client
2	RT	MC		23/11/2023		Final report
3	RT	DW	PB	13/03/2024		Final report, after incorporation of additional comments by the IFC

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Table of contents

1 Introduction

Globeleq has commissioned The Biodiversity Consultancy (TBC) to undertake a Critical Habitat Assessment (CHA) for the Namaacha Wind Farm (the Project) in alignment with International Finance Corporation Performance Standard (PS6) on Biodiversity Conservation and Sustainable Management of Living Natural (IFC PS6, IFC 2012) and other good international industry practice (GIIP) guidance. The aim of the CHA is to identify potential Critical Habitat-qualifying species or ecosystems, based on IFC PS6 criteria and Guidance Note 6 thresholds, which will require special attention and specific mitigation planning, and to determine whether the Project is in an area of Natural or Modified Habitat (*sensu* IFC 2019).

This CHA draws on available biodiversity databases, targeted literature reviews, and on the baseline biodiversity surveys conducted for the Project (Matos, Fonseca & Associados 2022, AfriAvian Environmental 2023, Consultec 2023, WSP 2023). A regional expert on flora and ecosystems was also consulted. No primary fieldwork or additional stakeholder consultation was undertaken specifically for the CHA.

1.1 The Project

The Project is proposed to be developed near the town of Namaacha, 50 km west of Maputo, in southern Mozambique. This location is 2.5 km from the border with South Africa, and 6 km from the border with Eswatini (formerly Swaziland), in the geomorphological unit Terras Altas of the Libombos Chain Complex. This unit is marked by the Libombos mountain range, which extends in a north-south direction along the border between Mozambique, South Africa and Eswatini. The area of the Project extends along a plateau surface along two ridges, with altitudes between 500 m and 600 m (Figure 1).

The 120 MW Project consists of 20 turbines proposed in an approximate "T-shape" array, comprising a shorter row aligned in generally NNE-SSW, and a perpendicular, longer, row aligned generally E-W. It also comprises access roads, on-site cabling, substations and associated infrastructure, and a 66 kV (high-voltage) Overhead Transmission Line (OHTL) connecting the Project to the national grid in Boane, 32 km to the southeast (Figure 1). The OHTL extends over altitudes between 500 m (close to the wind farm) and a minimum of *c.* 12 m (4 km west of Boane). The CHA includes all Project components, including the OHTL.

1.2 Constraints and limitations

This CHA is based on the data available to TBC at the time of the analysis (March 2024). This includes publicly available information found through online searches, global biodiversity data obtained through the Integrated Biodiversity Assessment Tool (IBAT) and information from on-site biodiversity field surveys (Matos, Fonseca & Associados 2022, AfriAvian Environmental 2023, Consultec 2023, WSP 2023). It should be noted that field surveys did not occur throughout the year, and some assumptions have had to be made on species' presence and abundance during periods which were not surveyed. Moreover, detailed field information on the presence and

distribution of different ecosystems in the Ecologically Appropriate Area of Analysis (EAAA) was mostly lacking, and therefore the mapping and calculations of the occupation area for threatened ecosystems relied mostly on publicly-available data sources.

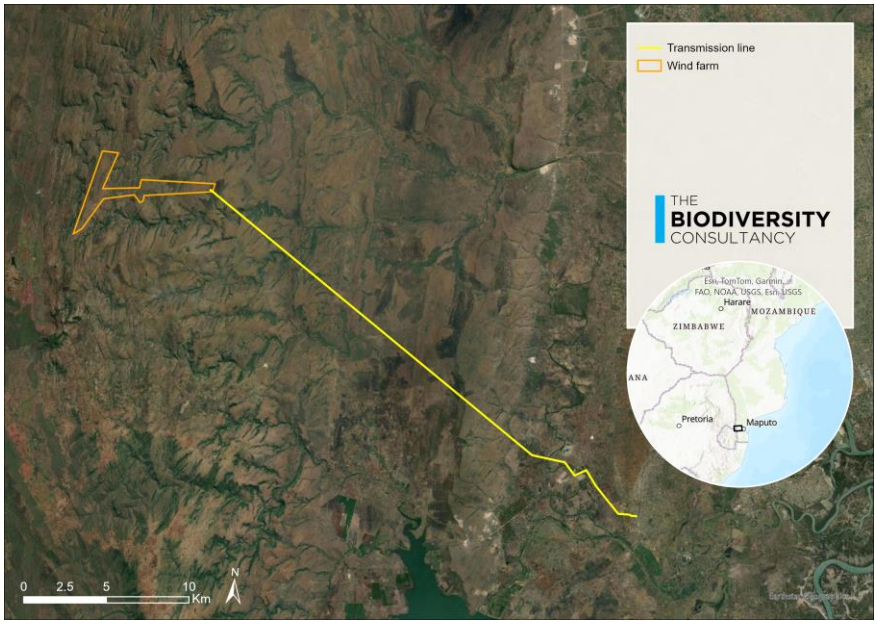

Figure 1 The location of the planned Project infrastructure, in Mozambique (source: client-provided data).

1.3 IFC Performance Standard 6

The Project aims to align with the requirements of IFC PS6. The objectives of this standard are to protect and conserve biodiversity, maintain benefits from ecosystem services, and promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities. IFC PS6 provides guidance on how to identify three classes of area based on condition and significance for biodiversity. These three classes are:

- Modified Habitat (MH);
- Natural Habitat (NH); and,
- Critical Habitat (CH).

1.3.1 Natural and Modified Habitat

Under PS6, habitat is classified as either Natural or Modified based on the extent of human modification of the ecosystem. For example, agricultural areas, plantations and urban areas show "substantial modification" and would be classed as Modified, whereas woodlands

exploited for non-timber forest products or grasslands that retain most of the original species and ecological processes and would in most cases be considered Natural Habitat (NH).

PS6-compliant projects must implement mitigation strategies that are designed to achieve No Net Loss (NNL) for NH, and this requirement for NNL can also extend to individual populations of threatened species supported by a specific habitat.

1.3.2 Critical Habitat

Areas of "high biodiversity value" are termed Critical Habitat (CH) by the IFC. Such a designation is based on the presence and/or quantity of significant types of biodiversity (e.g. threatened species, highly threatened ecosystems etc.). PS6-compliant projects must achieve a Net Gain (NG) for CH values. IFC PS6 has four criteria with defined quantitative thresholds to identify CH:

- Criterion 1: Critically Endangered (CR) and Endangered (EN) species;
    - 1a Areas that support globally important concentrations of an IUCN Red-listed EN or CR species (≥ 0.5% of the global population AND ≥ 5 reproductive units of a CR or EN species);
    - 1b Areas that support globally important concentrations of an IUCN Red-listed Vulnerable (VU) species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds in GN72(a);
    - 1c As appropriate, areas containing important concentrations of a nationally or regionally listed EN or CR species;
- Criterion 2: Restricted-range species;
    - 2a Areas that regularly hold ≥10% of the global population size AND ≥10 reproductive units of a species;
- Criterion 3: Migratory/congregatory species;
    - 3a Areas known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle;
    - 3b Areas that predictably support ≥10 percent of the global population of a species during periods of environmental stress; and,
- Criterion 4: Highly threatened and/or unique ecosystems;
    - 4a Areas known to sustain a significant percentage of the global extent.

In practice, species' populations are often poorly known, so Criteria 1-3 are often – at least in part – also assessed as percentages of global distributions (see Appendix 1 for details on how Critical Habitat thresholds are applied).

There is one qualitative criterion:

- Criterion 5 – Key evolutionary processes;
    - Areas with certain features of a landscape including high spatial heterogeneity, environmental gradients, connectivity between habitats and sites of demonstrated importance for climate change adaptation. No quantitative

thresholds exist for this criterion, so there is a reliance on expert opinion and qualitative value judgement.

Criterion 5 was not assessed as part of this CHA, but it is considered unlikely that it is relevant for the Project, as main indicators that the area would qualify are not present (e.g., large EAAA, high levels of endemism, landscape features that promote reproductive isolation, landscapes with high spatial heterogeneity, biological corridors).

PS6 also requires projects in Protected Areas and internationally recognized areas to be developed in line with any government-recognized management plans, be legally permitted, and implement additional programs to promote and enhance the conservation aims and effective management of the area.

2 Methodology

2.1 Ecological Appropriate Area of Analysis

In line with IFC PS6 Guidance Note (GN) 6 (IFC 2019), in particular GN59, a CHA should be conducted for each species with regular occurrence in the project's area of influence, or ecosystem, covered by Criteria 1-4, within an Ecologically Appropriate Area of Analysis (EAAA), defined to include large-scale ecosystems or ecological processes, and that is usually at a scale larger than a project site or impact area. This precautionary approach ensures that the EAAA captures the area in which the majority of potential risks from a Project occur.

For the present CHA, the range of biodiversity features (different biodiversity groups showing significant differences in mobility, and threatened ecosystems) present in the Project area has resulted in the application of various, group specific, EAAAs. These are described below in Table 1 and represented in Appendix 2.

Table 1: Description of the Ecologically Appropriate Areas of Analysis (EAAA) used to determine the presence of Critical Habitat for different biodiversity groups and ecosystems.

Biodiversity group	EAAA	Rationale	EAAA area (km^2)
Wide-ranging and non-resident bird species	An irregular polygon connecting the wind farm and transmission line boundaries to the border of, but not including, the nearest breeding areas for vulture species: Kruger Park[1], South Africa; Hlane National Park, Eswatini (Monadjem & Garcelon 2005); and to Goba border post area (holding the	Assumes that vultures observed in the Project area will likely originate from those areas. Such sites are probably also the nearest areas to the Project where other non-resident bird species are more frequent and/or congregate, as shown by eBird data.	2,743

[1] http://speciesstatus.sanbi.org/assessment/last-assessment/3067/

Biodiversity group	EAAA	Rationale	EAAA area (km^2)
	nearest Cape Vulture breeding colony; eBird data).		
Martial Eagle	19 km buffer radius around the wind farm and OHTL boundaries.	The proposed EAAA corresponds to a buffer distance equal to the diameter of a circular home range, as recorded for this species in Kruger National Park (282 km2: van Eeden *et al.* 2017) and represents the maximum distance from the project at which a territorial Martial Eagle could interact with the Project area.	2,791
Slaty Egret	7.2 km buffer radius around the wind farm and OHTL boundaries.	Definition of the EAAA follows the same approach as for Martial Eagle, but uses a home range size of 41 km^2 (~3.61 km radius) from *Egretta garzetta* in Hong Kong (Pang *et al.* 2020) in the absence of information for this species.	807
Southern Ground-hornbill	12.4 km buffer radius around wind farm and OHTL boundaries.	Definition of the EAAA follows the same approach as for Martial Eagle, but uses a home range of 121 km^2 (~6.22 km radius) as recorded for this species in Kruger Park (Combrink *et al.* 2020.).	1,576
Bateleur	19 km buffer radius around wind farm and OHTL boundaries.	Definition of the EAAA follows the same approach as for Martial Eagle and uses the home range values for Martial Eagle as a surrogate (considering some proximity in trophic and foraging behaviour).	2,791
Secretarybird	25.2 km buffer radius around wind farm and OHTL boundaries.	Definition of the EAAA follows the same approach as for Martial Eagle, but uses a conservative maximum home range of 500 km^2 (~12.62 km radius) as reported for arid regions and low rainfall years (Ferguson-Lees & Christie 2005).	4,178
Tawny Eagle and other resident bird species	83.8 km buffer radius around wind farm and OHTL boundaries.	Definition of the EAAA follows the same approach as for Martial Eagle, but uses a home range of 5,510 km^2 (~41.9 km radius) based on information from Rajasthan, India (Ram *et al.* 2022). This EAAA was applied to the remaining resident species, representing an assumedly conservative approach.	29,179
Reptiles, amphibians and invertebrates	1.5 km buffer radius around wind farm and OHTL boundaries.	Definition of the EAAA used an approach analogous to that for Martial Eagle, although using dispersal rather than home range information. The 1.5 km value was taken from studies on dispersal distance by the Giant Dragon Lizard African (*Smaug giganteus*) (maximum distance of 1271 m; Parusnath 2020) and very likely represents a precautionary estimate for other species.	155
Mammals	42 km buffer radius around wind farm and OHTL boundaries.	Definition of the EAAA used the same approach as for Martial Eagle, based on the maximum home range of 1,384.4 km^2 (~21 km radius) recorded	9,145

Biodiversity group	EAAA	Rationale	EAAA area (km^2)
		from studies of lion (*Panthera leo*) in Cameroon (Tumenta *et al.* 2013). This value was used for defining the EAAA for all mammalian species, representing an assumedly conservative approach.	
Lebombo Summit Sourveld ecosystem	An irregular polygon corresponding to the extent of patches of this ecosystem that overlap with the Project area, as mapped in the Red List of Ecosystems assessment for Mozambique (Lötter *et al.* 2021) and associated publicly available data[2], in South Africa's Red List of Terrestrial Ecosystems (Skowno & Monyeki 2021) and associated publicly available data[3], and in an additional contiguous area, identified in field works in the Project area (W. McCleland, pers, comm.).	This approach considers the continuity in communities, ecological functions and processes in this ecosystem, following PS6 GN59.	13.61
Western Maputaland Clay Bushveld ecosystem	An irregular polygon corresponding to the extent of patches of this ecosystem that overlap with the Project area, as mapped in the Red List of Ecosystems assessment for Mozambique (Lötter *et al.* 2021) and associated publicly available data[4], and in South Africa's Red List of Terrestrial Ecosystems (Skowno & Monyeki 2021) and associated publicly available data[5], and where the natural habitats present show continuity.	The EAAA for this ecosystem was delimited based on land cover map (ESA world cover 10m, 2021), cross-checked with 2021 Spot satellite images available from the ArcGIS map server. Areas crossed by the transmission line and all contiguous natural habitats were included in the EAAA. The southern border of the EAAA is delimited by a hydropower dam and high density of croplands and other highly modified habitats. The northern border is delimited by high density of croplands and other highly modified habitats.	1,007

It worth noting that in a previous Critical Habitat Screening for the same Project (WSP 2023), the EAAA had been defined as the area encompassing the escarpment and elevated plateau of the whole Lubombo mountain range, and any intersecting protected and important conservation areas resulting in a EAAA covering 25,150 km^2 (2,515,041 ha). The current CHA takes a less precautionary approach, especially considering the Lubombo mountain range extends over more than 600 km long across three different countries, and covers a wide range of habitats and species assemblages that are extremely unlikely to be affected by the Project.

[2] https://experience.arcgis.com/experience/578f9184d6d54320a8cf7bf886b194cf

[3] ttps://bgis.sanbi.org/SpatialDataset/Detail/501

[4] https://experience.arcgis.com/experience/578f9184d6d54320a8cf7bf886b194cf

[5] ttps://bgis.sanbi.org/SpatialDataset/Detail/501

2.2 Analysis

A list of relevant biodiversity values that overlap with each defined EAAA was obtained via the Integrated Biodiversity Assessment Tool (IBAT) [6]. These lists were further refined through the consultation of publicly available data bases (e.g., GBIF[7], eBird[8]), information from biodiversity field surveys previously conducted for the Project (Matos, Fonseca & Associados 2022, AfriAvian Environmental 2023, Consultec 2023, WSP 2023) and the consultation of one regional expert on flora, habitats and ecosystems. Species were then informally screened to discount those species which would clearly not meet relevant thresholds (e.g. due to the low level of range overlap, habitat unsuitability, known to be extinct in the EAAA, etc.). Fish and plant species were also screened out at this phase respectively because i) impacts on freshwater fishes from the Project are very unlikely (e.g., Matos, Fonseca & Associados 2022) provided that adequate standard mitigation measures (e.g., avoiding spillages or run-off of pollutants or waste) are implemented, and ii) none of the plant species with a threatened status or range-restricted distribution that could possibly trigger CH qualification has been previously identified at the Project area during the limited botanical surveys conducted to date.

The shortlist of species was then assessed against the applicable CH criteria and thresholds (Appendix 1 – following IFC 2019), noting that species may be screened against multiple criteria. Five categories of certainty were used based on the evidence that a species qualifies as triggering Critical Habitat:

- **Certain** – if data demonstrate exceedance (e.g. numbers based on field surveys);
- **Likely** – if the range overlap, or other evidence, suggests the EAAA is likely to exceed the threshold, and the species' presence has been confirmed in the Project area;
- **Possible** – if the range overlap is close to the threshold, or there is the potential for the EAAA to have a higher proportion of the population than average, and the species' presence has been confirmed in the Project area;
- **Non-conclusive** - If the outcome of the assessment would have otherwise been likely/possible CH, but the species presence has not been confirmed in the Project area; and,
- **Does not qualify** – if available evidence is that the threshold is not exceeded.

[6] IBAT is a global biodiversity dataset setup by a partnership between BirdLife International, Conservation International, the International Union for Conservation of Nature (IUCN) and United Nations Environment Program World Conservation Monitoring Centre (UNEP-WCMC), which enables the access to key biodiversity datasets, such as the IUCN Red List, IUCN/UNEP-WCMC Protected Planet, IUCN-BirdLife Key Biodiversity Areas, etc. Note that an IBAT subscription is mandatory to use any of the above-mentioned dataset for commercial purposes https://www.ibat-alliance.org/

[7] https://www.gbif.org/

[8] https://ebird.org/home

3 Results

3.1 Potential Critical Habitat-qualifying species

A total of 1,391 species were identified from IBAT with a global range which overlapped the relevant EAAAs. Of these, 40 were screened in detail against relevant thresholds (Table 2), of which **three species of birds possibly qualify the EAAA as Critical Habitat**:

- White-backed Vulture *Gyps africanus*;
- Martial Eagle *Polemaetus bellicosus;* and
- Bateleur *Terathopius ecaudatus*.

The assessment is **non-conclusive** for the Lappet-faced Vulture *Torgos tracheliotos*, and it is recommended that the results of future monitoring (during pre-construction and operation phases) by the Project should be used to re-assess this species and update its CH status if necessary.

Table 2: Species screening shortlist considered against IFC PS6 Critical Habitat criteria, and assessment conclusions. Global databases consulted: eBird[9], GBIF (Global Biodiversity Information Facility)[10].

Scientific name	English name	IUCN status	Criteria assessed	Discussion	Conclusion
Mammals					
Cercopithecus mitis ssp. *labiatus*	Samango Monkey	VU	C1b	Global range overlap with the EAAA is 0.86% for this VU mammal (EOO approx. 421,809 km^2). It was not recorded in field surveys conducted at the Project area and its potential occurrence was not assessed. The EAAA overlaps with the range of the Eswatini subpopulation. Its habitat, tropical/subtropical forest, is present in the EAAA. The global population is estimated at 35,000 mature individuals and this is declining (IUCN 2024). However, the nearest record of the species to the EAAA on GBIF is >100 km away (from 2010) and there is no evidence that this species is present within the EAAA. It is therefore unlikely that the EAAA contains numbers, the loss of which, would cause the species to be upgraded to EN, or even if upgraded to EN, the EAAA would not contain numbers to qualify the area under C1a.	Does not qualify
Redunca fulvorufula	Mountain Reedbuck	EN	C1a	Global range overlap with the EAAA is 0.32% for this EN mammal (which approaches the 0.5% threshold). It was not recorded in field surveys conducted at the Project area and its potential occurrence was not assessed. The western side of the EAAA overlaps with the species' range (EOO approx. 1,050,074 km2). The species lives on ridges and hillsides in broken rocky country and high-altitude grasslands, 1,500-5,000 m a.s.l., however this habitat is not present within the EAAA as it lies below 1,500 m, and therefore the species is unlikely to occur here. The nearest record of the species on GBIF is 20 km from the EAAA (from 2017). As the species' habitat is not present within the EAAA and there is no evidence of the presence of this species within the EAAA, it is very unlikely that the EAAA contains numbers that would exceed C1a thresholds.	Does not qualify
Hippopotamus amphibius	Hippopotamus	VU	C1b	Global range overlap with the EAAA is 0.23% for this VU mammal (EOO approx. 1,240,485 km^2). It was not recorded in field surveys conducted at the Project area and its potential occurrence was not assessed. There is one record of the species within the EAAA on GBIF (from 2023), however with an estimated global population of 115,000-130,000 and no evidence of a significant population within the EAAA, it is very unlikely to 'contain numbers, the loss of which, would cause the species to be upgraded to EN', or even if upgraded to EN, the EAAA would not contain numbers to qualify the area under C1a.	Does not qualify

[9] https://ebird.org/home

[10] https://www.gbif.org/

Scientific name	English name	IUCN status	Criteria assessed	Discussion	Conclusion
Diceros bicornis ssp. *minor*	South-eastern Black Rhino	CR	C1a	Global range overlap with the EAAA is 0.19% for this CR mammal (EOO approx. 3,634,449 km^2), as well as a very small % of its reintroduced range (in Eswatini). It was not recorded in field surveys conducted at the Project area and its potential occurrence was not assessed. The closest record of the species on GBIF is 19 km from EAAA (from 2020), near Malelane, South Africa. With no evidence of the presence of this species within the EAAA, it is very unlikely that the EAAA contains numbers that would exceed C1a thresholds.	Does not qualify
Smutsia temminckii	Temminck's Pangolin	VU	C1b	EOO approx. 7,000,000 km^2. Its occurrence is considered "possible" in the wider area (WSP 2023) and "potential" for the Project area (Matos, Fonseca & Associados 2022). However, only 0.12% of its range overlaps with the EAAA. Therefore, the EAAA does not contain numbers, the loss of which, would cause the species to be upgraded to EN, or even if upgraded to EN, the EAAA would not contain numbers to qualify the area under C1a.	Does not qualify
Giraffa camelopardalis	Giraffe	VU	C1b	EOO approx. 1,800,000 km^2. Its occurrence is considered "probable" in the wider area (WSP 2023). However, only 0.08% of range overlaps with the EAAA. Therefore, 'the EAAA does not contain numbers, the loss of which, would cause the species to be upgraded to EN, or even if upgraded to EN, the EAAA would not contain numbers to qualify the area under C1a.	Does not qualify
Panthera pardus	Leopard	VU	C1b	EOO approx. 13,000,000 km^2. Its occurrence is considered "probable" in the wider area (WSP 2023). However, only 0.02% of its range overlaps with the EAAA. It is extinct in most of the EAAA, including in the Project area. It does not qualify for CH.	Does not qualify
Panthera leo	Lion	VU	C1b	EOO approx. 3,800,000 km^2. Its occurrence is considered "probable" in the wider area (WSP 2023). However, only 0.03% of its range overlaps with the EAAA. It is extinct or possibly extinct in almost the entire EAAA, including in the Project area. It does not qualify for CH.	Does not qualify
Birds					
Egretta vinaceigula	Slaty Egret	VU	C1b	Global range overlap with EAAA 0.06%. Not recorded in field surveys conducted at the Project area, and its presence classified as unlikely in the ESIA (Matos, Fonseca & Associados 2022). Also, there are no observations reported to the EAAA (eBird). Therefore, the EAAA does not contain numbers, the loss of which, would cause the species to be upgraded to EN, or even if upgraded to EN, the EAAA would not contain numbers to qualify the area under C1a.	Does not qualify
Gyps africanus	White-backed vulture	CR	C1a, C3a	Global range overlap with EAAA is 0.02% for this CR bird. During the field surveys, the species was detected in the Project area in a single occasion (two individuals; AfriAvian Environmental 2023). However, the EAAA connects two significant breeding areas for the species; Kruger National Park, South Africa, with an estimated 904 pairs (Murn *et al.* 2013) and Hlane National Park, Eswatini, with around 200 pairs (Monadjem & Garcelon 2005, WSP 2023). Given the wide-ranging	Possible CH

Scientific name	English name	IUCN status	Criteria assessed	Discussion	Conclusion
				nature of this species (e.g. Phipps *et al.* 2013; Zvidzai *et al.* 2022) it is possible that a large number of individuals may occur occasionally in the EAAA if e.g., carcasses are available. While the current population of this species is unknown, the total population was estimated at 270,000 individuals in 1992 (IUCN 2022). At an estimated median annual of decline since then of -4.1% (Ogada *et al.* 2016), this equates to a total population of 73,726 in 2024. Hence, the occurrence of a minimum of 369 individuals would exceed the C1a threshold. Given the large breeding populations in areas surrounding the EAAA (estimated 2,208 mature individuals), it is possible that this threshold would be exceeded.	
Gyps coprotheres	Cape Vulture	VU	C1b, C3a	Global range overlap with EAAA << 0.5% for this VU migrant (0.07% of resident range and 0.01% of non-breeding range). Not recorded in field surveys conducted at the Project area, although its occurrence was classified as probable in the ESIA (Matos, Fonseca & Associados 2022). The species is listed as a legacy criterion for the Hlane-Mlawula Complex, Namaacha, and Tshaneni[11] (Eswatini) KBAs, but currently only seems to occur regularly in the former (eBird). Cape Vultures occur regularly to the north of Komatipoort and Malelane (South Africa), *c.* 10 km to the north of the EAAA boundary (eBird), and there is a breeding colony with *c.* 12 pairs just south of the Goba border post, within the EAAA boundary (WSP 2023). Given the wide-ranging nature of this species, it can be expected to regularly use the air-space within 50 km around their roosts and breeding colonies (Pfeiffer, Morgan & Ralston-Paton 2018). However, since the global population is estimated at 9,600-12,800 mature individuals (IUCN 2022), it is very unlikely that the EAAA contains numbers that would exceed C1b or C3a thresholds.	Does not qualify
Trigonoceps occipitalis	White-headed Vulture	CR	C1a, C3a	Global range overlap with EAAA << 0.5% for this CR bird (0.03% of possibly extinct range and 0.01% of resident range). Not recorded in field surveys conducted at the Project area, although its occurrence was classified as probable in the ESIA (Matos, Fonseca & Associados 2022). Previously recorded regularly in the Hlane-Mlawula Complex KBA[12] (in Eswatini) which overlaps with the south of the EAAA boundary, and with very regular presence to the north of Komatipoort and Malelane (South Africa), *c.* 10 km to the north of the EAAA boundary (eBird). Also listed as a legacy criterion for the Namaacha KBA (Eswatini and South Africa)[13]. The global population is estimated at 2500-9999 mature individuals (IUCN 2022). White-headed vultures are less wide-ranging and more restricted to smaller home ranges than most vultures. Even the non-breeding, non-territorial individuals hold ranges with an average radius of only 19 km (Scott 2020). Therefore, it is very unlikely that the EAAA contains numbers that would exceed C1 or C3 thresholds.	Does not qualify
Torgos tracheliotos	Lappet-faced Vulture	EN	C1a, C3a	Global range overlap with EAAA << 0.5% (0.02%) for this EN bird. Not recorded in field surveys conducted at the Project area, although its occurrence was classified as probable in the ESIA (Matos, Fonseca & Associados 2022). The species is	Non-conclusive

[11] https://www.keybiodiversityareas.org/site/factsheet/45572

[12] https://www.keybiodiversityareas.org/site/factsheet/49180

[13] https://www.keybiodiversityareas.org/site/factsheet/49182

Scientific name	English name	IUCN status	Criteria assessed	Discussion	Conclusion
				listed as legacy criteria in Namaacha KBA[14] and Hlane-Mlawula Complex KBA[15], and still occurs regularly in the latter KBA (eBird). Moreover, it occurs very regularly and in flocks with up to six individuals to the north of Komatipoort and Malelane (South Africa), *c.* 10 km to the north of the EAAA boundary (eBird). Although the species is mostly sedentary and its movements restricted to relatively small home ranges (8 km^2 – 43 km^2), adults are nomadic at times, foraging over considerable distances (120-700 km) (Shimelis et al. 2005). Therefore, a potentially high number of individuals could occur occasionally in the EAAA if e.g., carcasses are available. Given the low size of the global population (9,200 individuals, although this may prove to be an overestimate given current trends for the species; IUCN 2022), it is then possible that the EAAA could contain numbers that would exceed at least C1a threshold. However, as it was not recorded in field surveys, the species is classed as non-conclusive.	
Necrosyrtes monachus	Hooded Vulture	CR	C1a, C3a	Global range overlap with EAAA << 0.5% (0.02%) for this CR bird. Not recorded in field surveys conducted at the Project area, although its occurrence was classified as probable in the ESIA (Matos, Fonseca & Associados 2022). Regularly recorded in the Hlane-Mlawula Complex KBA, in Eswatini (although not listed as a triggering criterion[16]), at the southern edge of the EAAA, and also to the north of Komatipoort and Malelane (South Africa), *c.* 10 km to the north of the EAAA boundary (eBird). The global population is estimated at 131,000 mature individuals (IUCN 2022). Although Hooded Vultures can cover daily distances of up to at least *c.* 50 km (Reading *et al.* 2019), it is very unlikely that the EAAA contains numbers that would exceed C1 or C3 thresholds.	Does not qualify
Aquila rapax	Tawny Eagle	VU	C1b	Global range overlap with EAAA << 0.5% (0.15%) for this VU bird. Recorded in a single occasion in field surveys conducted at the Project area (Matos, Fonseca & Associados 2022). Although the species has been recorded occasionally inside the EAAA, and especially to the north of Komatipoort and Malelane (South Africa), *c.* 10 km to the north of the EAAA boundary, it is very unlikely that the EAAA contain numbers, the loss of which, would cause the species to be upgraded to EN, or even if upgraded to EN, the EAAA would not contain numbers to qualify the area under C1a.	Does not qualify
Aquila nipalensis	Steppe Eagle	EN	C1a, C3a	Global range overlap with EAAA << 0.5% (0.01%) for this EN migrant. Not recorded in field surveys conducted at the Project area, although its occurrence was classified as probable during the non-breeding period (October-April) in the ESIA (Matos, Fonseca & Associados 2022). The species occurs regularly, but in low numbers (reported observations involve largely single individuals), in the Hlane-Mlawula Complex KBA (in Eswatini) which overlaps with the south of the EAAA, and to the north of Komatipoort and Malelane (South Africa), *c.* 10 km to the north of the EAAA boundary (eBird). Therefore, it is very unlikely that the EAAA contains numbers that would exceed C1a or C3a thresholds.	Does not qualify

[14] https://www.keybiodiversityareas.org/site/factsheet/49182

[15] https://www.keybiodiversityareas.org/site/factsheet/49180

[16] https://www.keybiodiversityareas.org/site/factsheet/49180

Scientific name	English name	IUCN status	Criteria assessed	Discussion	Conclusion
Polemaetus bellicosus	Martial eagle	EN	C1a	Global range overlap with EAAA << 0.5% (0.02%) for this EN bird. The species was recorded several times during the field surveys conducted at the Project area, and 1-2 pairs were confirmed to occupy the Project area and its immediate vicinity (Matos, Fonseca & Associados 2022, WSP 2023). Although -the current population of this species is unknown, it had been estimated as probably "in tens of thousands" 20 years ago (Ferguson-Lees & Christie 2005). The species has been declining dramatically across the majority of its range, especially in unprotected areas. Although the overall rate of decline is difficult to quantify, it is suspected to have been very rapid over the past three generations (33 years) and is consequently placed in the band 50-79% (IUCN 2022). Therefore, a conservative estimate (considering an initial minimum population size of 10,000, the interval 2000 – 20243, and the three generations most negative trend) would result in a current population of 2,100 individuals. Considering that Martial Eagles occur at low densities with home ranges of 108–302 km^2 (Kemp *et al.* 2020) and that the EAAA covers 2,791 km^2, a conservative estimate (considering the EAAA habitat highly suitable for the species) would then result in a maximum of ~ 26 territories (or 52 individuals) in the EAAA. Hence, it is possible that the EAAA contains numbers that would exceed a conservative C1a threshold for the species (11 individuals).	Possible CH
Terathopius ecaudatus	Bateleur	EN	C1a	Global range overlap with EAAA << 0.5% (0.02%) for this EN bird, and this species was recorded during the field surveys conducted at the Project area (AfriAvian Environmental 2023). There were 19 observations of the species within the EAAA recorded on eBird in 2023. The global population has not been quantified but was suspected to be in the 'tens of thousands' 20 years ago (Ferguson-Lees & Christie 2005). The population has declined significantly over much of the species' range. Decline is believed to have been rapid over the past three generations (46 years), and is placed in the band 50-79%. Considering an initial minimum population of 10,000 *c.* 20 years ago, the interval 2000 – 2024 and the maximum rate of decline, the current population can be estimated conservatively at *c.* 6,000 individuals. Considering Bateleur home range size of 55-200 km^2 (IUCN 2022) and the 2,791 km^2 EAAA, a conservative estimate would result in a maximum of 51 territories (102 individuals) in the EAAA. Therefore, it is possible that the EAAA contains numbers that would exceed a conservative C1a threshold for this species (30 individuals).	Possible CH
Sagittarius serpentarius	Secretarybird	EN	C1a	Global range overlap with EAAA << 0.5%. Not recorded in field surveys conducted at the Project area, although its occurrence was classified as probable in the ESIA (Matos, Fonseca & Associados 2022). Regularly recorded to the north of Komatipoort and Malelane (South Africa), *c.* 10 km to the north of the EAAA boundary, usually as single individuals or pairs (eBird). It is very unlikely that the EAAA contains numbers that would exceed C1a threshold.	Does not qualify
Falco concolor	Sooty Falcon	VU	C1b, C3a	Global range overlap with EAAA << 0.5% (0.01%) for this VU migrant. Not recorded in field surveys conducted at the Project area, the species has been classified as unlikely (Matos, Fonseca & Associados 2022) or probable (for the wider area; WSP 2023) during the non-breeding period (October-April). The species has been recorded occasionally, in low numbers, in the EAAA and its vicinity (eBird). Therefore, it is very unlikely that the EAAA contains numbers that would exceed C1b or C3a thresholds.	Does not qualify
Falco naumanni	Lesser Kestrel	LC	C3a	Global range overlap with EAAA << 0.5% (0.01%) for this migrant. Not recorded in field surveys conducted at the Project area, but its presence has been assessed as probable in the ESIA (Matos, Fonseca & Associados 2022). The species is listed as a legacy criterion for the Hlane-Mlawula Complex KBA, but currently only seems to occur regularly 45 km to the north	Does not qualify

Scientific name	English name	IUCN status	Criteria assessed	Discussion	Conclusion
				of the EAAA boundary (eBird). Therefore, it is very unlikely that the EAAA contains numbers that would exceed C3a threshold.	
Bucorvus leadbeateri	Southern Ground-hornbill	VU	C1b	Global range overlap with EAAA << 0.5% (0.03%) for this VU bird. Not recorded in field surveys conducted at the Project area, although its presence has been classified as probable in the ESIA (Matos, Fonseca & Associados 2022). The global population size has not been quantified but the species has a large EOO of 7,140,000 km^2. Although the species has been detected at the edges of the EAAA (Hlane-Mlawula Complex KBA and to the north of Komatipoort and Malelane; eBird), it is very unlikely that the EAAA contains numbers, the loss of which, would cause the species to be upgraded to EN, or even if upgraded to EN, the EAAA would not contain numbers to qualify the area under C1a.	Does not qualify
Geronticus calvus	Southern Bald Ibis	VU	C1b	Global range overlap with EAAA is 0.7% for this VU bird. Not recorded in field surveys conducted at the Project area and its potential occurrence was not assessed, however it was mentioned in the ESIA in a list of "Top 20" of the most vulnerable species to wind energy impacts (Matos, Fonseca & Associados 2022). The species' range overlaps with the western edge of the EAAA. The global population of the species has been estimated at 3300-4000 mature individuals in 2015 (IUCN 2022) but has likely declined since then as the population trend is decreasing. There are 21 individuals recorded in the past 10 years within the EAAA (near western border) on GBIF. eBird records also show a concentration of the species around Mbabane, Eswatini, with over 200 individuals recorded within recent years less than 15 km from the western boarder of the EAAA. Despite c. 6% of the estimated global population within 15 km from the EAAA, there is no evidence that the EAAA itself contains globally important concentrations of this VU bird. It is therefore unlikely that the EAAA contains numbers, the loss of which, would cause the species to be upgraded to EN, or even if upgraded to EN, the EAAA would not contain numbers to qualify the area under C1a.	Does not qualify
Vanellus melanopterus	Black-winged Lapwing	LC	C3a	Global range overlap with the EAAA is <0.5% (0.28%) for this altitudinal migrant. Not recorded in field surveys conducted at the Project area, but its presence has been assessed as likely in the ESIA (Matos, Fonseca & Associados 2022). The EAAA is within the non-breeding/wintering range of the species, at the northern tip of the South African population's range. Out of the 8,184 records of the species on GBIF in the last 10 years, none are within the EAAA, and none are in Mozambique. The population is estimated at 8700-42000 mature individuals (IUCN 2022). There is no evidence that at least 1% of the global population (87-420 individuals) pass through the EAAA annually, therefore it is very unlikely that the EAAA contains numbers that would exceed C3a thresholds.	Does not qualify
Apus barbatus	African Swift	LC	C3a	Global range overlap with the EAAA is <0.5% (0.23%) for this migrant. Not recorded in field surveys conducted at the Project area, but its presence has been assessed as likely in the ESIA (Matos, Fonseca & Associados 2022). The EAAA overlaps with the north-eastern edge of the breeding range of the species. 52 individuals were recorded within the EAAA on GBIF in 2022. The global population has not been estimated but according to BirdLife International (2024), the species has a very large range and it is expected that the global population is over 10,000 mature individuals. There is no evidence that at least 1% of the global population (>100 individuals) pass through the EAAA annually, therefore it is unlikely that the EAAA contains numbers that would exceed C3a thresholds.	Does not qualify
Reptiles					

Scientific name	English name	IUCN status	Criteria assessed	Discussion	Conclusion
Kinixys natalensis	KwaZulu-Natal Hinged-back Tortoise	VU	C1b	0.18% of the range of this VU reptile (EOO of 104,235 km^2) lies within the EAAA. Its preferred habitat (dry rocky habitat in thornveld, valley bushveld, dry thicket or bushveld savanna, 50-1,200 m a.s.l.) is present in the EAAA and the presence of this species was confirmed in the Project ESIA (Matos, Fonseca & Associados 2022). However, the EAAA is at the edge of the species' range and loss of individuals within the EAAA is unlikely to lead to the species being uplisted to EN. Therefore, the species is very unlikely to qualify for CH under C1b.	Does not qualify
Smaug warreni	Lebombo Dragon Lizard	LC	C2a	LC restricted-range reptile with an EOO of 7,840 km^2. 1.53%% of its range lies within the EAAA. The preferred habitat for the species (rock outcrops along the Lebombo Mountains, 100–700 m a.s.l.) is present in the EAAA. It is listed as a legacy criterion for the Namaacha and Tshaneni KBAs. The presence of this lizard has not been confirmed in field works in the Project area, but has been assessed as potential (Matos, Fonseca & Associados 2022) or probable (for the wider area; WSP 2023) and the level of field effort undertaken for the ESIA is insufficient to rule out the presence of this species. There are recent records (2021) within the EAAA, one at only 3.5 km from the Project area (GBIF). However, considering the small range/EAAA overlap (<<10%) and the lack of evidence of significant numbers within the EAAA (at least 10% of the global population), this restricted-range species is very unlikely to qualify for CH under C2a.	Does not qualify
Platysaurus lebomboensis	Lebombo Flat Lizard	LC	C2a	LC restricted-range reptile with an EOO of 8,340 km^2. 0.95% of its range lies within the EAAA. Its preferred habitat (rock outcrops 600-800 m a.s.l.) is present in the EAAA. Although the species presence was only considered as probable for the wider area (WSP 2023), two records were obtained recently (2022) within the EAAA, both 6 km from the Project area (GBIF) and the level of field effort undertaken for the ESIA is insufficient to rule out the presence of this species. However, considering the small range/EAAA overlap (<<10%) and the lack of evidence of significant numbers within the EAAA (at least 10% of the global population), this restricted-range species is very unlikely to qualify for CH under C2a.	Does not qualify

3.2 Potential Critical Habitat-qualifying ecosystems

To qualify for CH under PS6 Criterion 4, an ecosystem within an EAAA must either (IFC 2019):

- represent >5% of the global extent of the ecosystem type meeting the CR or EN thresholds of the IUCN Red List of Ecosystem; or,
- where formal IUCN assessments have not been performed, the project may assess it by using systematic methods at the national/regional level, carried out by governmental bodies, recognized academic institutions and/or other relevant qualified organizations.

Based on the existing Red List of Ecosystems assessment for Mozambique (Lötter et al. 2021) and South Africa (Skowno & Monyeki 2021) and associated publicly available data[17][18], four CR or EN ecosystems were initially considered for assessment, but two were screened out: the Lebombo-KwaZulu Natal Scarp Forest shows a very patchy distribution along the Lebombo Mountains in Eswatini, South Africa and Mozambique (Figure 2) that does not overlap with any infrastructure associated with the Project nor with areas that will be influenced by the Project (minimum distance of 800 m between a Project infrastructure and the ecosystem); and the Subtropical Coastal Salt Marshes, which historically were present in Boane in an area that nowadays is heavily transformed and urbanized (minimum distance of 300 m between the Project's substation in Boane and the ecosystem).

The two remaining short-listed ecosystems – the Lebombo Summit Sourveld and the Western Maputaland Clay Bushveld - were then assessed against the relevant threshold above (Table 3) using the pre-defined EAAAs (Table 1, Appendix 2). This approach was precautionary, as the information available represents mostly the potential distribution range of each ecosystem, and this would ideally be validated in the field to confirm to what extent the integrity of such ecosystems is preserved (particularly along the OHTL, where anthropogenic pressure is likely to have caused degradation of the ecosystems present).

The assessment results indicate that:

- **Both ecosystems qualify the EAAA as Critical Habitat**: Lebombo Summit Sourveld and Western Maputaland Clay Bushveld.

[17] https://experience.arcgis.com/experience/578f9184d6d54320a8cf7bf886b194cf

[18] ttps://bgis.sanbi.org/SpatialDataset/Detail/501

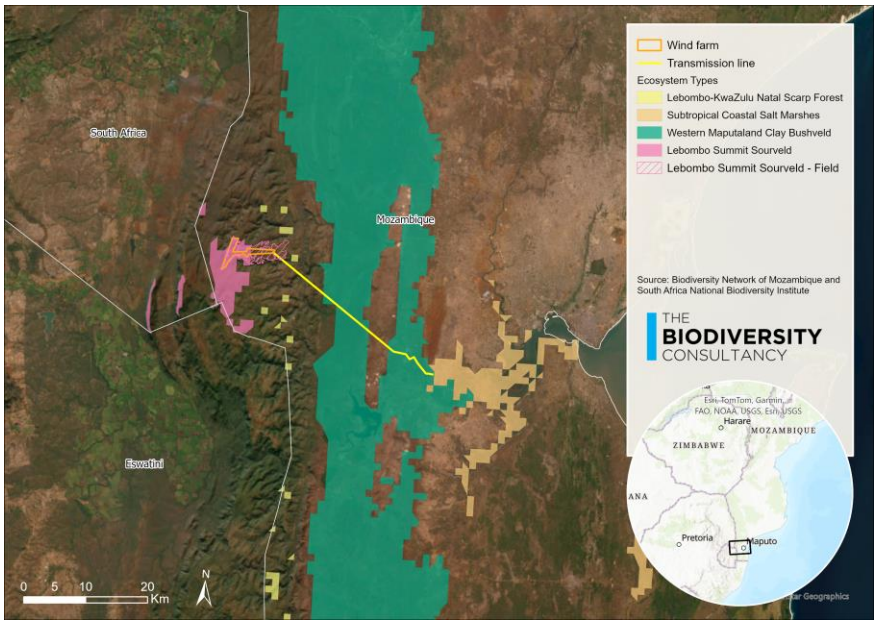

Figure 2 Distribution of ecosystem types in Mozambique, as assessed in the Red List of Ecosystems assessment for Mozambique (Lötter et al. 2021). The pink crossed out polygon represents an additional area of occurrence of Lebombo Summit Sourveld ecosystem, identified in field works in the Project area (W. McCleland, pers, comm.). CR ecosystems: Lebombo Summit Sourveld; Lebombo-KwaZulu Natal Scarp Forest. EN ecosystems: Western Maputaland Clay Bushveld; Subtropical Coastal Salt Marshes.

Table 3: Ecosystems screening shortlist considered against IFC PS6 Critical Habitat criteria, and assessment conclusions.

Ecosystem name	IUCN status	Criteria assessed	Discussion	Conclusion
Lebombo Summit Sourveld	CR	C4	Wooded grassland along summit of Lebombo Mountains at higher altitudes. Distributed along the summit of the Lebombo mountains, between Namaacha and Mbuzini, in South Africa. Also present in Eswatini. Most of the Project's wind farm area is occupied by this ecosystem (W. McCleland, pers, comm.). The actual coverage by this ecosystem is estimated at 62 km^2 in Mozambique (Lötter *et al.* 2021) and 135 km^2 in South Africa[19], i.e., 197 km^2 in total. (Figure 2). The area of this ecosystem in the EAAA totals 62 km^2, representing 31.3% of the extent in	Qualifies

[19] http://opus.sanbi.org/jspui/handle/20.500.12143/7642

Ecosystem name	IUCN status	Criteria assessed	Discussion	Conclusion
			Mozambique and South Africa, and so exceeds the threshold for C4.	
Western Maputaland Clay Bushveld	EN	C4	Dry, mixed deciduous open woodland, or wooded grassland, dominated by the genus *Acacia*, on deep clay soils. Extending from KwaZulu-Natal in South Africa, northwards along the base of the Lebombo mountain as far north as the Uanetze River. In the EAAA, this ecosystem occurs in patches in mosaic landscapes with abandoned farmland mostly along the OHTL (W. McCleland, pers, comm.). The actual coverage by this ecosystem is estimated at 3,826 km^2 in Mozambique (Lötter *et al.* 2021) and 1,648 km^2 in South Africa[20], i.e., 5,474 km^2 in total. (Figure 2). The area of this ecosystem in the EAAA totals 1,007 km^2, representing 18.4 % of the extent in Mozambique and South Africa, and so exceeds the threshold for C4.	Qualifies

3.3 Important areas for conservation

The Project does not overlap with any Legally Protected and Internationally Recognized Areas as per IFC PS6 and IUCN definitions[21] (Figure 3). It is located close to the boundaries of the:

- Lubombo Biosphere Reserve, declared under the UNESCO's Man and the Biosphere Programme (*c.* 6.5 km distance). The Lubombo Biosphere Reserve[22] covers an area of 294,020 ha in Eswatini (Figure 3). 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;
- Namaacha KBA[23] [24] (*c.* 2.5 – 6.5 km distance) which extends over 6,854 ha in Eswatini and 39,626 ha in South Africa (Figure 3). It has been classified based (legacy criteria) 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; and,
- Hlane - Mlawula complex KBA[25] [26] (*c.* 2.5 – 6.5 km distance) which occupies 31,482 ha in Eswatini and 3,078 ha in South Africa (Figure 3). The legacy criteria 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.

[20] http://opus.sanbi.org/jspui/handle/20.500.12143/7642

[21] https://www.protectedplanet.net/en

[22] https://en.unesco.org/biosphere/africa/lubombo

[23] https://www.keybiodiversityareas.org/site/factsheet/49182

[24] https://www.keybiodiversityareas.org/site/factsheet/49181

[25] https://www.keybiodiversityareas.org/site/factsheet/6887

[26] https://www.keybiodiversityareas.org/site/factsheet/49180

There is no overlap between the Project and any Alliance for Zero Extinction or UNESCO World Heritage sites, which would constitute no-go areas.

The Project (17 wind turbines and *c.* half of the OHTL extension) overlaps with the Namaacha Tropical Important Plant Area (TIPA)[27], 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.

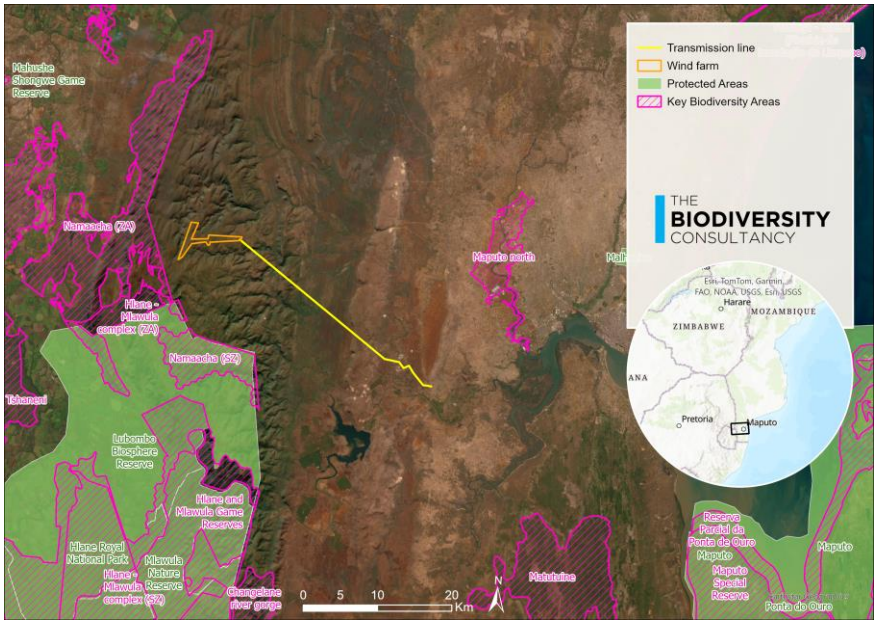

Figure 3 Protected Areas and other Internationally Recognised Areas of high biodiversity value located in the Project's region.

It is worth noting that a previous Critical Habitat Assessment for the Project (WSP 2023) reported the location of the Project within the Goba Conservancy, which is part of the Lubombo Transfrontier Conservation Area, an area that is not statutorily designated as a protected area in Mozambique and that is a focus area for community conservation areas. This was used as basis to consider that the Project EAAA would likely trigger CH qualification under criterion 4 (presence of highly threatened/unique ecosystems). The current CHA did not follow this approach to assess if Project would qualify as CH under criterion 4 (for details see Section 3.2).

[27] https://tipas.kew.org/site/namaacha/

Moreover, it is important to emphasize that the Lubombo Transfrontier Conservation Area is not a Legally Protected Area or an Internationally Recognised Area under PS6 criteria.

3.4 Determination of Natural Habitat

Based on aerial imagery (Zanaga et al. 2022 and imagery from 2022; Figure 4 and Figure 5), information from previous field work assessments in the Project area, and expert consultation, the Project is located in an area mostly consisting of Natural Habitat (Natural Habitat occupies >88% of the area within a 20 km buffer around the wind farm boundary and a 10 km buffer area around the OHTL route) (Table 4). Most areas of Natural Habitat are likely to have some level of livestock grazing, however these impacts are unlikely to have disrupted the area's primary ecological functions or species composition, as shown also by the occurrence of important threatened ecosystems in the EAAA (see Section 3.2). Likewise, most of Natural Habitat areas are likely to have some presence of small-scale traditional and subsistence agriculture, with the main agricultural products being corn, cassava, cowpea, peanut, and sweet potato (Matos, Fonseca & Associados 2022, Consultec 2023). Larger areas of Modified Habitat, consisting mostly of more intensive croplands and dwellings, are present near the OHTL substation (Boane area) and to the west of the Project, in South Africa (Figure 4).

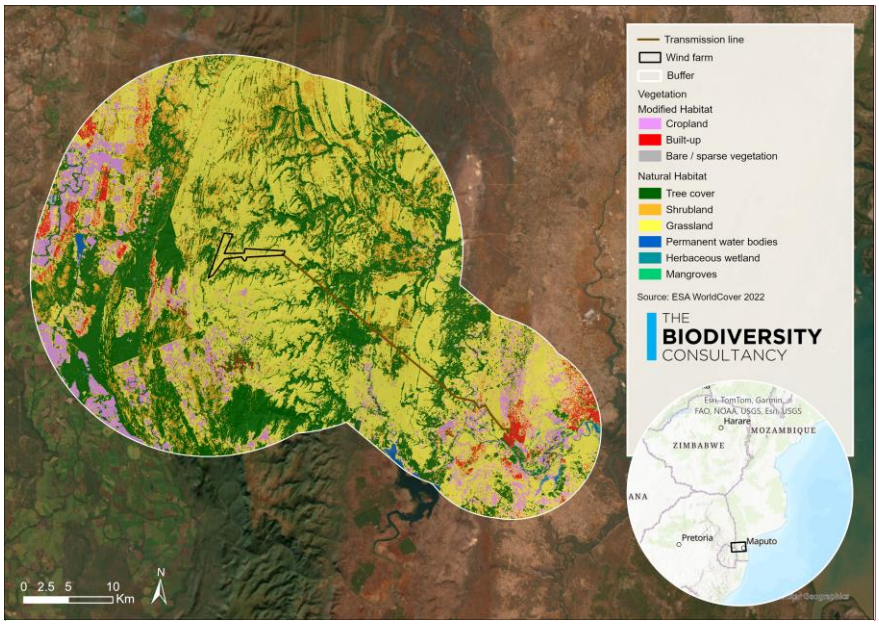

Figure 4: Map showing land cover (ESA WorldCover 2022[28]) within a 20 km buffer around the wind farm boundary and a 10 km buffer around the OHTL route.

[28] ESA WorldCover project. Contains Copernicus Sentinel data (2021) processed by ESA WorldCover consortium (Zanaga et al. 2022)

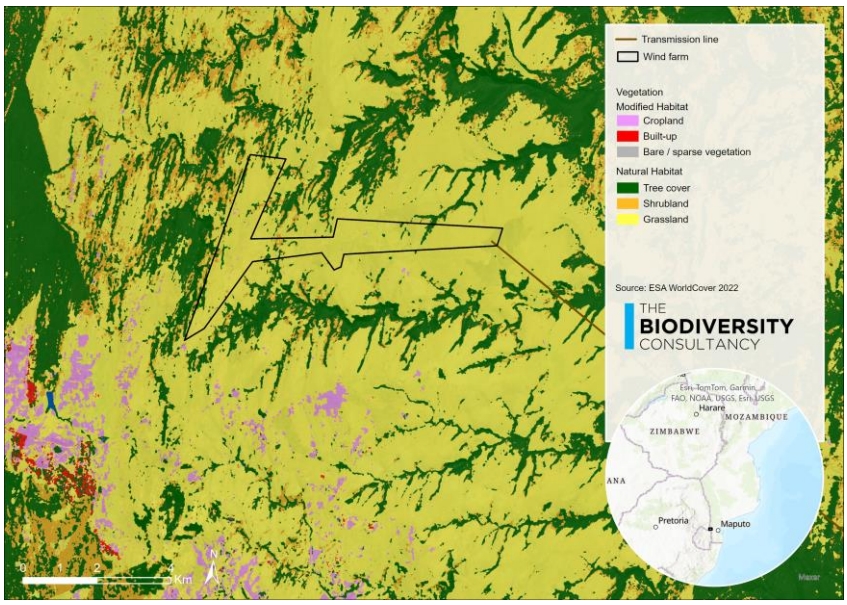

Figure 5: Land cover (ESA WorldCover 2022[29]) at the closer vicinity of the wind farm.

Table 4: Land cover types (ESA WorldCover 2022) classification as Natural Habitat (NH) or Modified Habitat (MH), and their occupation within a 20 km buffer around the wind farm boundary and a 10 km buffer around the OHTL route.

Type name	NH/MH	Area (km²)	% area
Tree Cover	NH	616.28	23.19
Shrubland	NH	424.94	15.99
Grassland	NH	1,301.64	48.97
Permanent water bodies	NH	4.39	0.16
Herbaceous wetland	NH	8.76	0.33
Cropland	MH	204.84	7.71
Built-up	MH	55.79	2.10
Bare or sparse vegetation	MH	41.36	1.55

[29] ESA WorldCover project. Contains Copernicus Sentinel data (2021) processed by ESA WorldCover consortium (Zanaga et al. 2022)

4 Conclusions and implications

Based on the available data, this assessment finds that the Project is within an area that meets the IFC definition of Critical Habitat. This was confirmed by the EAAA importance to one CR and one EN ecosystem. Additionally, the EAAA possibly qualifies as CH due to its importance to three species of raptors. The assessment was non-conclusive about the CH-qualification of the EAAA for an additional species of vulture. Additional field surveys should be conducted, focusing on the occurrence in the Project area of possibly CH-qualifying vulture species that may be affected by the Project.

The two CH-qualifying ecosystems (Lebombo Summit Sourveld and Western Maputaland Clay Bushveld) and the three possibly CH species may be negatively affected by the Project, either because their distribution (ecosystems) or home ranges (Martial Eagle and Bateleur) overlap with the Project, or because their regular presence at the Project area is expected given their wide-ranging foraging behaviour (vulture species). The expected impact pathways from the Project, evaluation of the magnitude of their effects on the species and appropriate mitigation actions above should be elaborated in a Biodiversity Action Plan.

For those biodiversity features for which the area qualifies as Critical Habitat, to align with IFC PS6, the Project cannot implement any project activities unless the following are demonstrated:

- No other viable alternatives within the region exist for development of the project on modified or natural habitats that are not critical;
- The project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values;
- The project does not lead to a net reduction in the global and/or national/regional population of any Critically Endangered or Endangered species over a reasonable period of time; and,
- A robust, appropriately designed, and long-term biodiversity monitoring and evaluation program is integrated into the client's management program.

Where the Project is able to meet these requirements, the Project's mitigation strategy will be described in a Biodiversity Action Plan which will be designed to achieve net gains of those biodiversity values for which the critical habitat was designated.

The Project is to be implemented in areas that include mostly Natural Habitat, namely shrubland and grassland (savannah). For projects operating in Natural Habitat, IFC PS6 requires project proponents to fully exercise the mitigation hierarchy, with an emphasis on measures aimed at avoiding and minimizing impacts. Where significant residual impacts remain, additional

remediation and offset measures are likely to be required, in order to achieve NNL, where feasible, on natural habitat and associated significant biodiversity[30].

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[30] As per Guidance Note 43 (IFC 2019), "significant biodiversity values" may include species of conservation concern (for example, species that are threatened, legally protected, or otherwise identified as important by stakeholders) and ecological features in the landscape that are important to stakeholders. In the present case, all species likely or possibly qualifying as CH should be seen as significant biodiversity values, even if the thresholds for CH are not exceeded.

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Appendix 1 Details on how Critical Habitat thresholds are applied

Criterion 1: Critically Endangered and Endangered species

Areas qualifying for this criterion support:

- Globally important concentrations of IUCN Red-listed Critically Endangered or Endangered species (>0.5% of the global population and > 5 reproductive units of a CR or EN species;
- Globally-important concentrations of an IUCN Red-listed Vulnerable species, the loss of which would result in the change of IUCN Red List status to EN or CR and meet the thresholds under 1a; or,
- As appropriate, areas containing important concentrations of a nationally/regionally listed EN or CR species.

In the absence of information on species' populations, the proportion of a species' distribution range that overlaps with the EAAA was used as proxy for estimating the proportion of a global population in the EAAA. When information was unclear, a precautionary approach was taken.

Criterion 2: Restricted-range species

Areas qualifying for this criterion hold ≥10% of the global population size and ≥10 reproductive units of a restricted-range species. Restricted-range refers to a species' extent of occurrence (EOO[31]), and is defined according to its habitat:

- For **terrestrial vertebrates** and **plants**, a restricted-range species is defined as those having an EOO of less than 50,000 km^2
- For **riverine** and **other aquatic species** in habitats that do not exceed 200 km width at any point (e.g., rivers), restricted range is defined as having a global range less than or equal to 500 km linear geographic span (i.e., the distance between occupied locations furthest apart). There are limited data on occupied locations of freshwater and marine species, and limited availability of those data. As such, for freshwater species this was calculated by measuring the distance the two furthest points of the catchment(s) in which the species is present.

The EAAA was screened for overlap with restricted-range species' maps from the IUCN Red List. Any such species were compared with the thresholds for Criterion 2 (IFC 2019). As for Criterion 1 species, the screening was preferentially based on the proportion of a species' population in a given area, or where unavailable, on the proportion of a species' global distribution in the EAAA.

[31] Species extent of occurrence (EOO) is the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of occurrence, excluding cases of vagrancy.

Criterion 3: Migratory and congregatory species

Areas qualifying for this criterion support either:

- ≥ 1 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle and on a cyclical or otherwise regular basis; and,
- ≥10 percent of a species' global population during periods of environmental stress[32].

Data for the list of candidate species in the EAAA were screened against IFC PS6 thresholds (IFC 2019), based on the proportion of a species' population in a given area.

Criterion 4: Highly threatened and / or unique ecosystems

IUCN defines ecosystems as complexes of organisms and their associated physical environment within a specified area (IUCN 2016). They have four essential elements:

- A biotic complex (i.e., the ecosystem is composed by a specific community of living organisms. This native biota is distinguishable between different ecosystems and has a central role in ecosystems dynamics, structure, and functions);
- An abiotic environment (i.e., the ecosystem is characterized by specific physical factors);
- The interactions within and between them; and,
- A physical space in which these operate.

Areas qualifying under this criterion hold ≥5% of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN or other areas not yet assessed by IUCN, but determined to be of high priority for conservation by regional or national systematic conservation planning. Screened ecosystems were identified checking the list of ecosystems assessed by the IUCN (IUCN 2022): no assessment has occurred for Kenya at the time of preparation of this report.

Criterion 5: Areas associated with key evolutionary processes

The key factor defining this criterion is 'the structural attributes of a landscape'. Although key evolutionary processes may operate at various spatial scales, in the sense of PS6 these are usually considered at a relatively fine scale rather than broad biogeographic regions (e.g. an unusual outcrop of a rock type that holds unique and endemic plant assemblages).

[32] Environmental stress refers to extreme environmental conditions, whether natural or anthropogenic (natural events like floods, droughts, storms, wildfires, earthquakes as well as high or low temperatures caused by global change; it can also describe the lack of food due to the bottom-up effect of environmental stress or massive die off of prey in ecosystems due to infectious disease). Definition from KBA criteria.

Appendix 2 EAAAs for different biodiversity groups and ecosystems

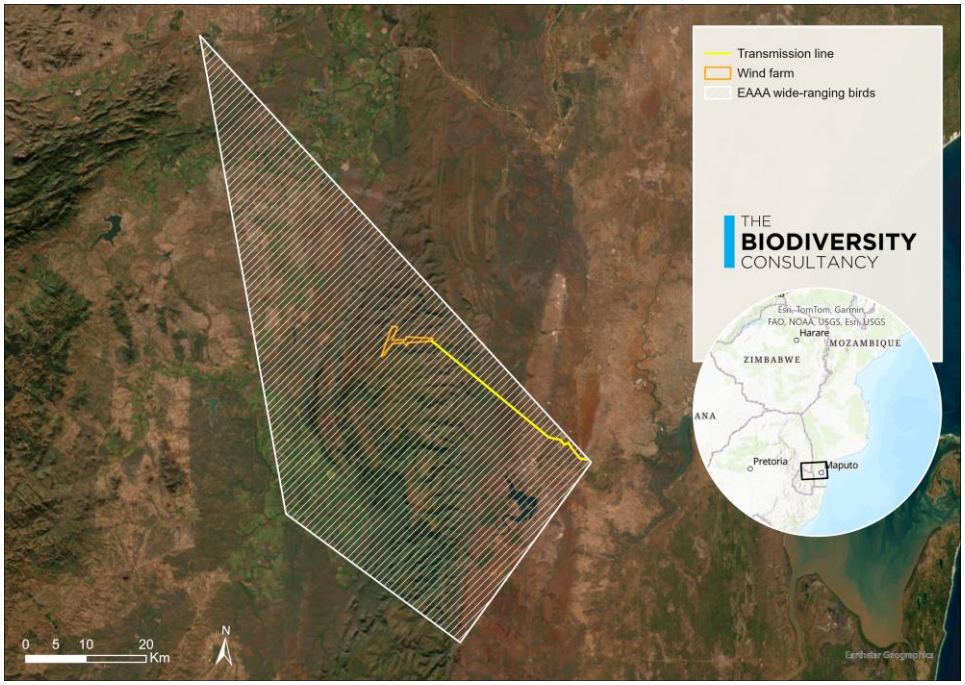

Figure 6 EAAA used to assess CH for wide-ranging and non-resident bird species.

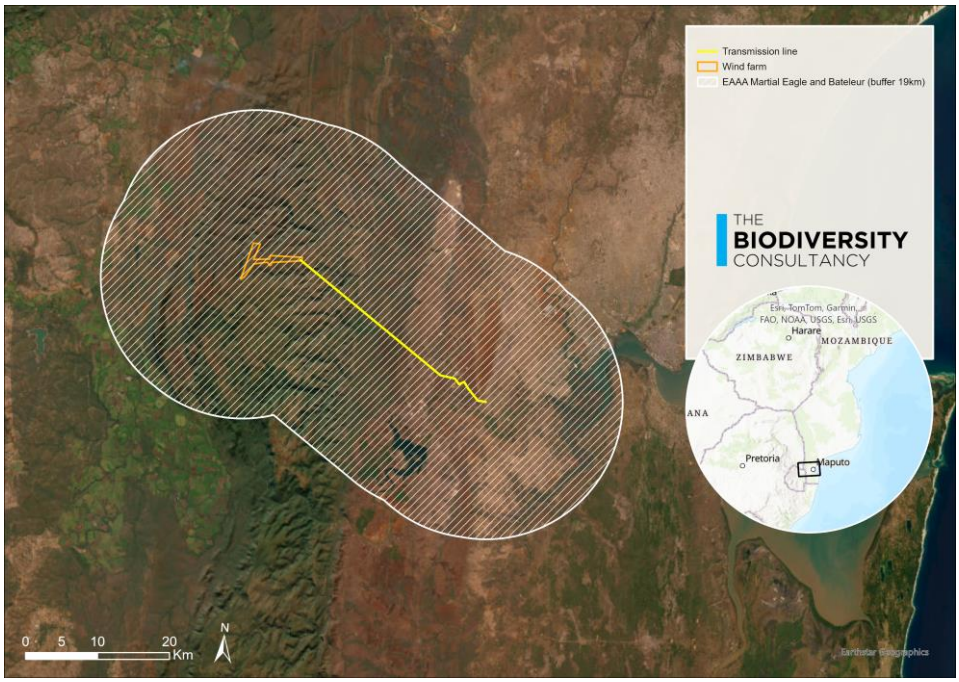

Figure 7 EAAA used to assess CH for Martial Eagle and Bateleur.

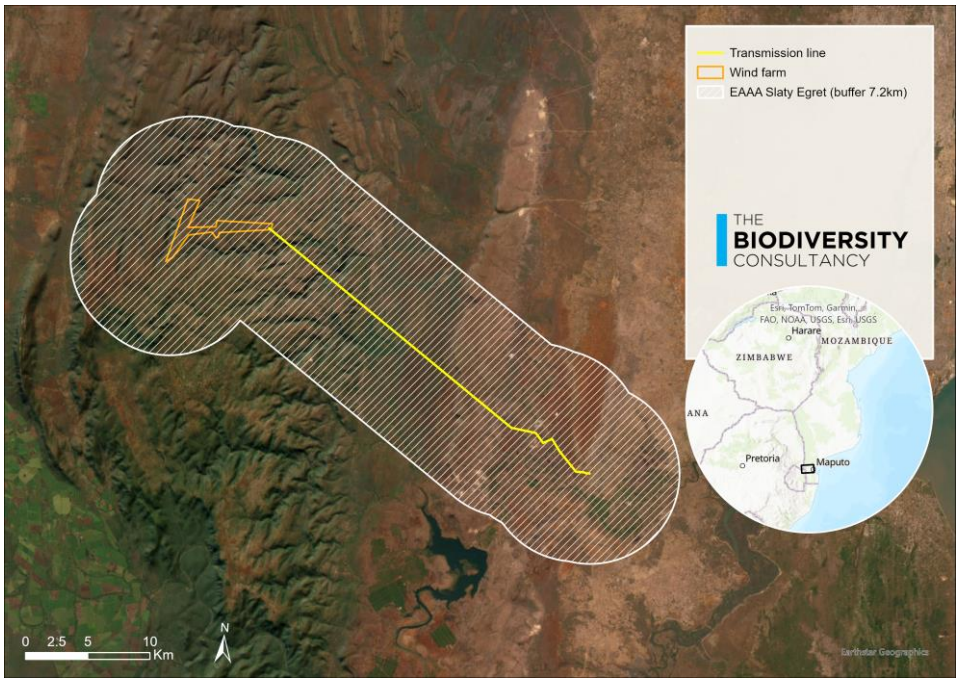

Figure 8 EAAA used to assess CH for Slaty Egret.

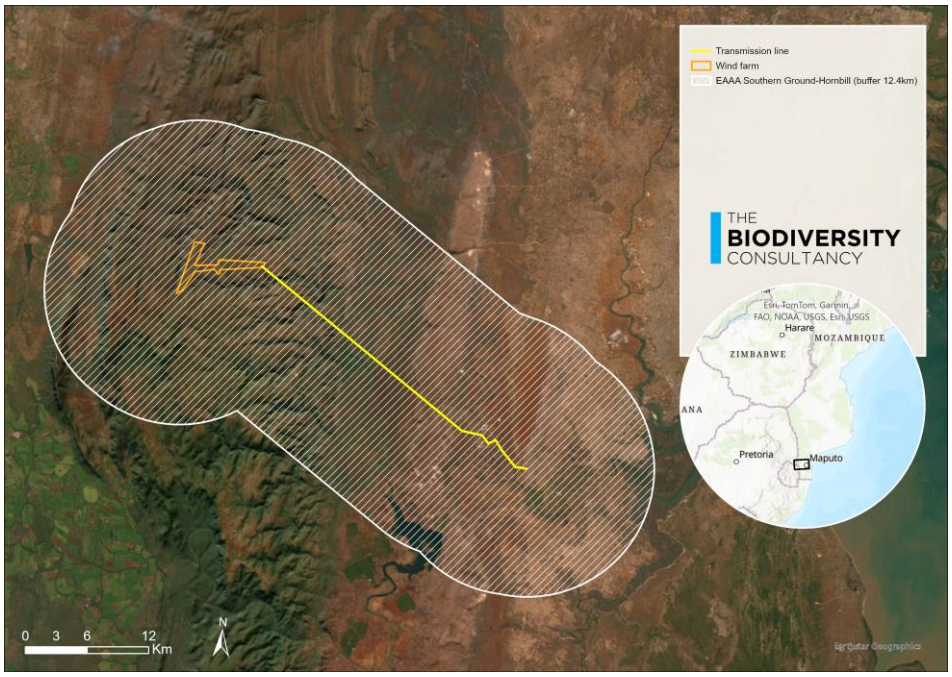

Figure 9 EAAA used to assess CH for Southern Ground-hornbill.

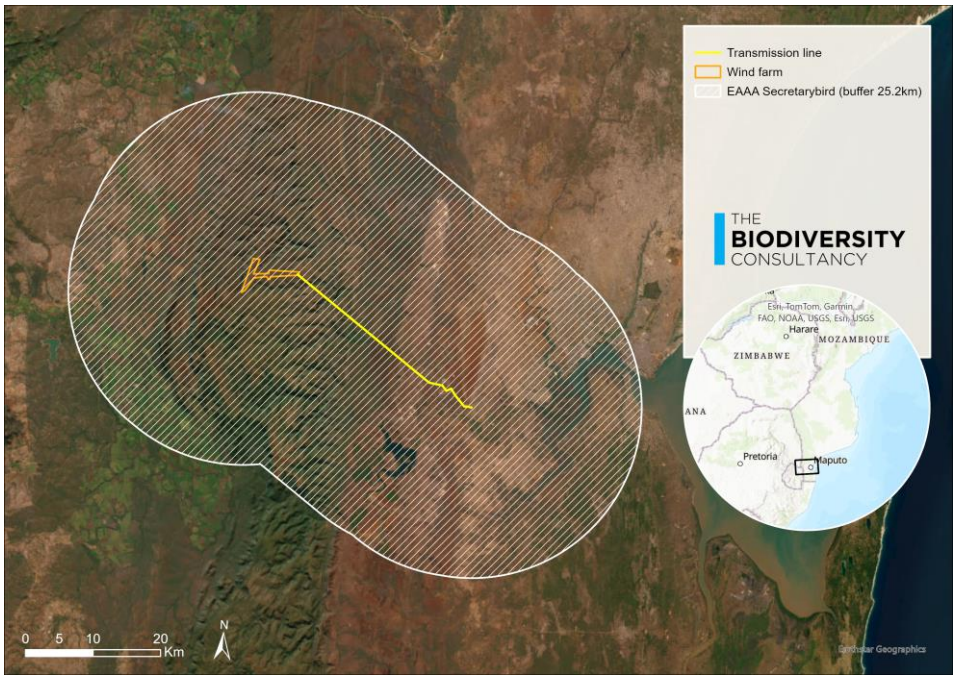

Figure 10 EAAA used to assess CH for Secretarybird.

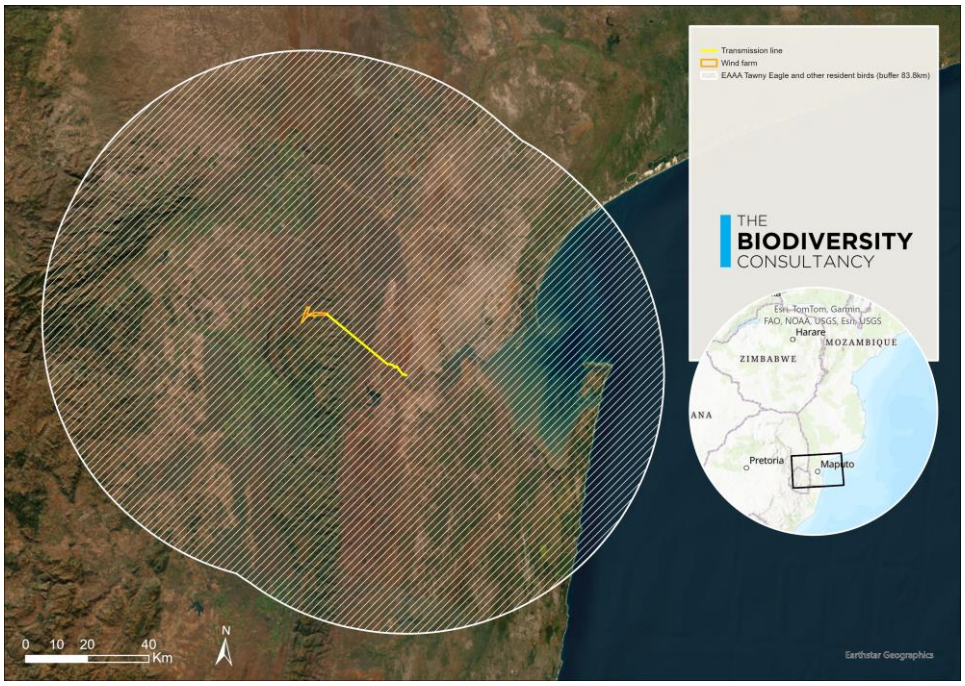

Figure 11 EAAA used to assess CH for Tawny Eagle and other resident birds.

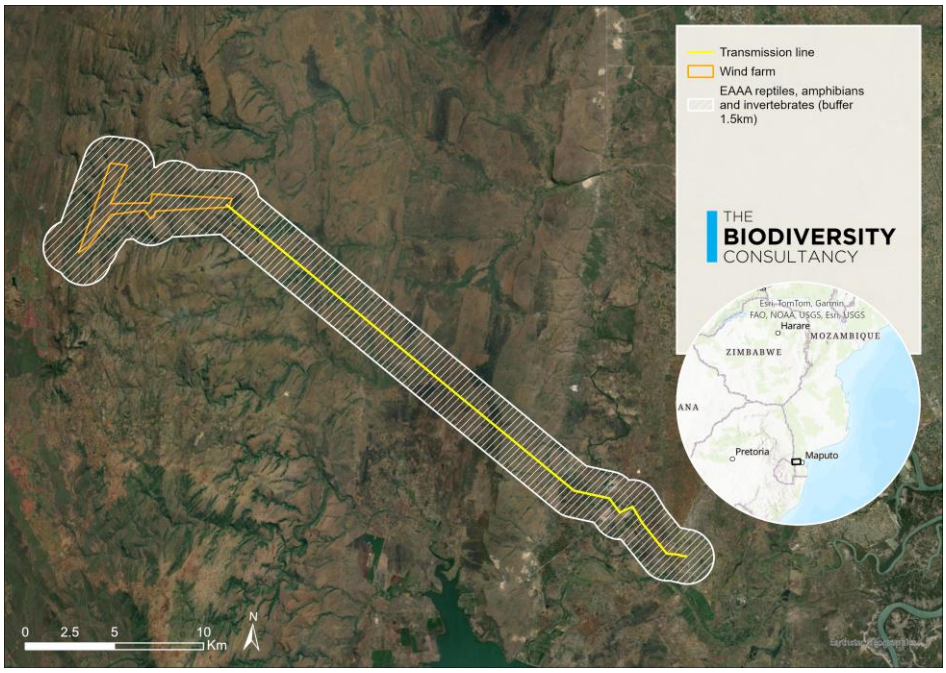

Figure 12 EAAA used to assess CH for reptiles, amphibians and invertebrates.

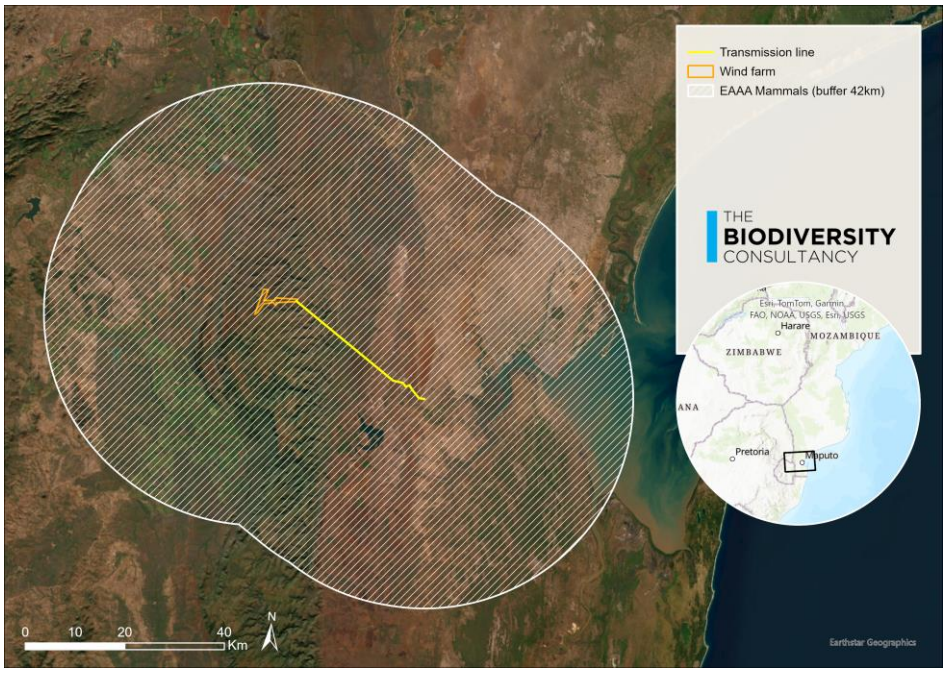

Figure 13 EAAA used to assess CH for mammals

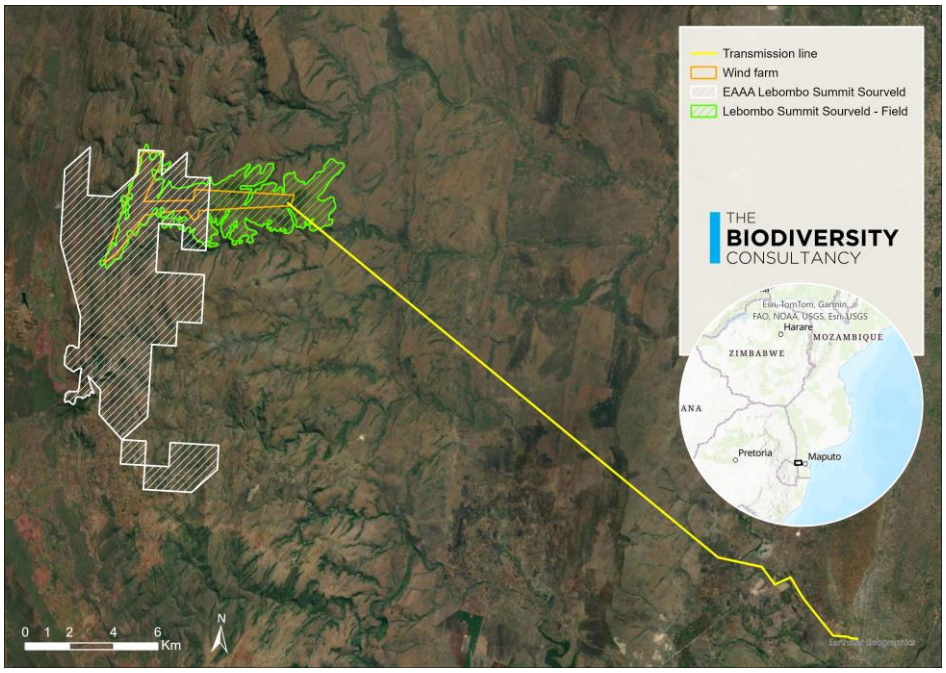

Figure 14 EAAA used to assess CH for Lebombo Summit Sourveld ecosystem. The green polygon was included in the EAAA and represents an additional area of occurrence of Lebombo Summit Sourveld ecosystem, identified in field works in the Project area (W. McCleland, pers, comm.).

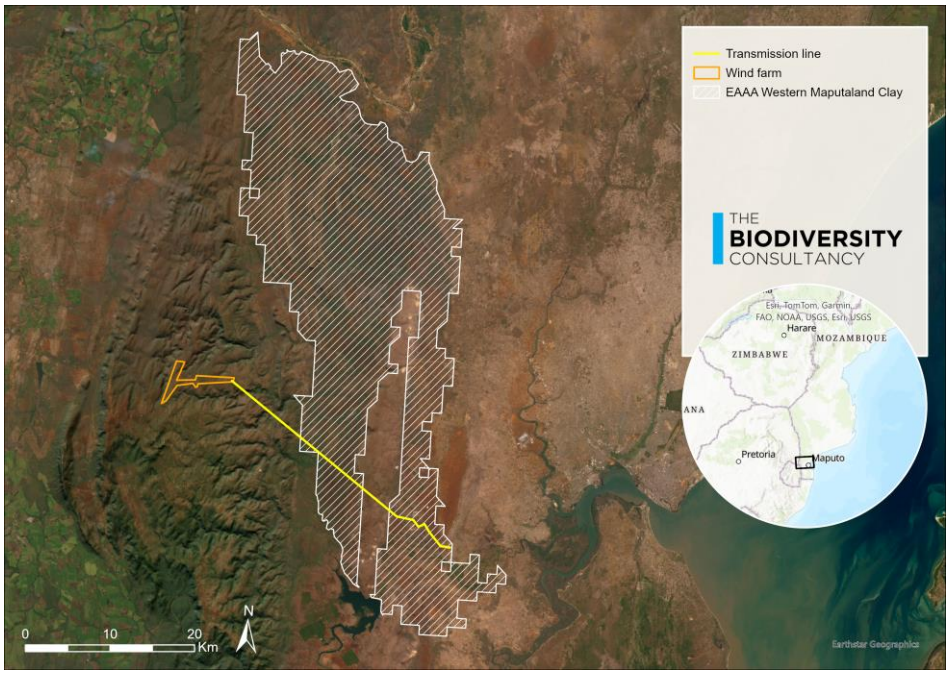

Figure 15 EAAA used to assess CH for Western Maputaland Clay ecosystem.