Appendix G.3

TERRESTRIAL BIODIVERSITY SCOPING REPORT

PHEFUMULA EMOYENI ONE ELECTRICAL GRID INFRASTRUCTURE – TERRESTRIAL BIODIVERSITY SCOPING REPORT

WSP Group Africa (Pty) Ltd

June 2024

Submitted to:
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Acronyms and Abbreviations

Abbreviation	Explanation
AIS	Alien Invasive Species
AOO	Area of Occupancy
BI	Biodiversity Importance
CA	Conservation Areas
CBA	Critical Biodiversity Areas
CI	Conservation Importance
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
EOO	Extent of Occurrence
FI	Functional Integrity
Ha	Hectare
IBA	Important Bird Areas
MTPA	Mpumalanga Tourism and Parks Agency
MTS	Main Transmission Substation
NEMA	National Environmental Management Act
NEMBA	National Environmental Management Biodiversity Act
NFEPA	National Freshwater Ecosystem Priority Areas
OHL	Overhead line
PA	Protected Areas
QDS	Quarter Degree Square
RR	Receptor Resilience
SANBI	South African National Biodiversity Institute
SAPAD	South African Protected Areas Database
SCC	Species of Conservation Concern
SEI	Site Ecological Importance
SWSA	Strategic Water Source Areas
ToPS	Threatened or Protected Species

Contents

List of Tables

List of Figures

Details of the Expertise of the Specialist

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Summary of Past Experience	Andrew Zinn is a terrestrial ecologist with Hawkhead Consulting. In this role, he conducts varied specialist ecology studies, including flora and fauna surveys, for baseline ecological assessments and ecological impact assessments. He has over a decade of experience working in the fields of ecology and conservation research, and is registered as a Professional Natural Scientist (*Pr.Sci.Nat.*) – Ecological Science, with the South African Council of Natural Scientific Professions (SACNASP). Andrew has worked on projects in several African countries including Botswana, Democratic Republic of Congo, Ethiopia, Ghana, Mozambique, South Africa, Tanzania and Zambia.

Declaration of Independence by Specialist

I, Andrew Zinn, declare that I –

- Act as the independent specialist for the undertaking of a specialist section for the proposed Phefumula Emoyeni One Grid Connection Project;
- Do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed;
- Do not have, nor will have, a vested interest in the proposed activity proceeding;
- Have no, and will not engage in, conflicting interests in the undertaking of the activity; and
- Undertake to disclose, to the competent authority, any information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document.

1. Introduction

Hawkhead Consulting was appointed by WSP Group Africa (Pty) Ltd, on behalf of Phefumula Emoyeni One (Pty) Ltd, to compile a Terrestrial Biodiversity Scoping Report for the proposed Phefumula Emoyeni One Electrical Up to 400 kV Grid Infrastructure Project (hereafter referred to as the "Project"), near Ermelo in Mpumalanga Province, South Africa.

1.1. Purposes of this Report

This report presents a baseline description of the Terrestrial Biodiversity, Animal Species and Plant Species of the proposed Project site and areas that may be impacted by the proposed infrastructure developments and activities.

The study focused on terrestrial biodiversity, plant (flora) and animal (fauna) species - specifically mammals, herpetofauna and invertebrate species of conservation concern (SCC). Separate Avifaunal and Bat Specialist Assessments will be undertaken for the proposed Project. This report provides only a high-level comment on bird SCC occurring/potentially occurring on-site.

The report also documents the results of the scoping-level screening of the potential impacts of the proposed Project on terrestrial ecosystems and biodiversity (i.e., vegetation communities and flora and fauna species, with an emphasis on SCC), and a preliminary set of recommended measures for the mitigation of any negative impacts. These measures will be included, amongst others, in the Environmental Management Programme for the Project, to ensure that the relevant South African biodiversity legislative and policy requirements are satisfactorily met.

The Terrestrial Biodiversity, Animal Species and Plant Species specialist studies for the proposed Project are being conducted in line with National Environmental Management Act (NEMA) (Act No. 107 of 1998) including Section 24, concerning Procedures for the assessment and minimum criteria for reporting on identified themes in terms of Sections 24(5)(a) and (h) and 44 of the NEMA, when applying for environmental authorisation. Specifically, the specialist assessment studies and associated reports for Terrestrial Biodiversity, Animal Species and Plant Species which will be compiled at part of the impact assessment phase of the proposed Project, will be aligned with:

- Protocol for the specialist assessment and minimum report content requirements for environmental impacts on Terrestrial Biodiversity;
- Protocol for the specialist assessment and minimum report content requirements for environmental impacts on Animal Species; and
- Protocol for the specialist assessment and minimum report content requirements for environmental impacts on Plant Species.

1.2. Project Description

1.2.1. Project Location

The proposed Project site is located approximately 18 km north-west of the town of Ermelo in the Msukaligwa Local Municipality and Gert Sibande District Municipality, in Mpumalanga Province, South Africa (Figure 1).

The proposed Project is intended to feed the electricity generated by the proposed Phefumula Emoyeni One Wind Energy Facility (WEF) (part of a separate application for Environmental Authorisation) to the national energy grid.

1.2.2. Proposed Project Infrastructure

A proposed Project description is presented in Table 1.

Table 1: Proposed project description

Detail	Information
Up to 400kV Transmission Line	• 400kV Loop-In-Loop-Out (LILO) OHL. • Servitude width for 1 x up to 400kV transmission line is 60m for Loop-In-Loop-Out • Height of 1 x 400kV power line structure is on average 48m, but may reach up to 50m in exceptional circumstances depending on the complexity and slope of the terrain. • Minimum conductor clearance is between 8.1 and 12.6m. • Span length between pylon structures is typically up to 100 - 250m apart, depending on complexity and slope of terrain. • For up to 400kV structures footprint sizes may vary depending on design type up to 110m2 (10.5m by 10.5m), with concrete foundations of up to 80m2 and depths reaching up to 3.5m typically depending on the number and design of the foundations (to be determined during the detailed design engineering phase). The actual number of structures required will vary according to the final route alignment determined. • Pylon structures will be either monopole or lattice structures depending on what is identified as appropriate during final design. For safety reasons, transmission lines require certain minimum clearance distances. These are as follows: • The minimum vertical clearance distance between the ground and the transmission line is 6.7m. • The minimum vertical clearance to any fixed structure that does not form part of the transmission line is 9.4m - 11m. • The minimum distance between an up to 400kV transmission line and an existing road is 60m – 120m (depending on the type of road). • Any farming activity can be practiced under the conductors provided that safe working clearances and building restrictions are adhered to.
Up to 132kV Transmission Line	• The servitude width for 3x up to 132kV transmission line is 31m. A 300m corridor must be assessed (150m on either side of the centre line) to allow for micro-siting. In the case of the Loop-In-Loop-Out alternative this servitude will apply to each of the two connecting power lines. • The maximum height for an up to 132kV powerline structure is 40m. • Pylon structures will be either monopole or lattice structures depending what is identified as appropriate during final design.

Detail	Information
	• Pylon structures may require anchors with guy-wires or be anchorless. • For up to 132kV structures, concrete foundation sizes may vary depending on design type up to 80m2 (10m by 8m), with depths reaching up to 3.5m typically in a rectangular 'pad' shape. • A working area of approximately 100m x 100m is needed for each of the proposed structures to be constructed.
Main Transmission Substation (MTS) (Approx. 17.5 ha)	• A high voltage substation yard to allow for multiple 132kV and 400kV feeder bays and transformers, with infrastructure to allow for step-up to 400kV as required. • Standard substation electrical equipment, including but not limited to transformers, busbars, office area, operation and control room, workshop, and storage area, feeder bays, transformers, busbars, stringer strain beams, insulators, isolators, conductors, circuit breakers, lightning arrestors, relays, capacitor banks, batteries, wave trappers, switchyard, metering and indication instruments, equipment for carrier current, surge protection and outgoing feeders, as may be needed. • The control building, telecommunication infrastructure, oil dam(s) etc. • Workshop and office area within the collector substation footprint. • Fencing around the Substation. • All the access road infrastructure to and within the substation.
Three Distribution Substations	• Dx1-approx.6.62 Ha footprint • Dx2- approx.5.23 Ha footprint • Dx3- approx.6.13 Ha footprint
Temporary / Construction Phase Infrastructure	• Construction compound at the MTS (3ha) (site offices including conservancy tank for ablutions, stores, material laydown area, generator, fuel storage, etc.) • 3 x construction compound / laydown areas, including site office of 3ha each at each of the Dx locations (150m x 200m each) (including conservancy tank for ablutions) • Batch plant of 4-7 ha (unless a commercial source is used and concrete trucked to site, preferable to keep options open) • Portable ablution facilities will be used along the powerline routes

1.3. Delimits of the Study Areas

The 'study area' for this assessment refers to the broader area in which flora and fauna field data were collected during the field survey. This area encompasses the entire Phefumula Emoyeni One WEF project site (Figure 1).

The Project site refers to the OHL assessment corridor and associated substation footprints (hereafter referred to as the 'grid connection assessment corridor/footprints'). It is within this area

that direct and indirect impacts on terrestrial biodiversity receptors (i.e., direct habitat loss, fauna mortality) could occur. These areas are shown in Figure 1.

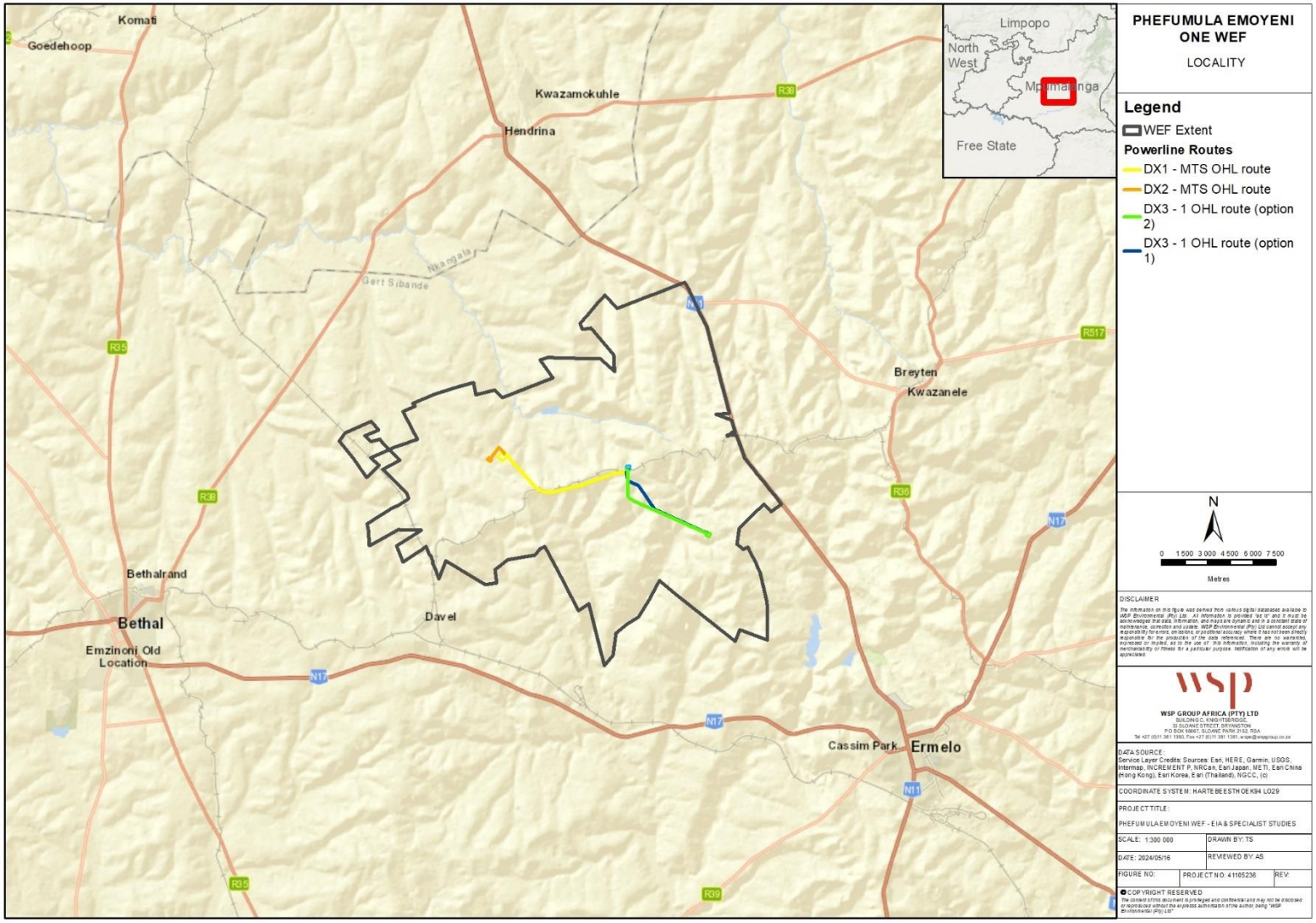

Figure 1: Location and extent of the study area and proposed grid connection assessment corridor/footprints

2. Relevant Legislation and Guidelines

Relevant international, national and provincial legislation, associated guidelines and policies that are relevant to the environmental and biodiversity, and which were used to guide the Terrestrial Biodiversity are discussed below:**Error! Reference source not found.**

- National Environmental Management Act (NEMA) (Act No. 107 of 1998) including Section 24, concerning Procedures for the assessment and minimum criteria for reporting on identified themes in terms of Sections 24(5)(a) and (h) and 44 of the NEMA, when applying for environmental authorisation;
    - Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity;
    - Protocol for the specialist assessment and minimum report content requirements for environmental impacts on Animal Species; and
    - Protocol for the specialist assessment and minimum report content requirements for environmental impacts on Plant Species.
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA), specifically:
    - ToPS – National lists of critically endangered, endangered, vulnerable and protected species (2007);
    - National list of threatened terrestrial ecosystems for South Africa (2021); and
    - National list of alien and invasive species (2016/2020).
- National Water Act (Act No. 36 of 1998);
- Mpumalanga Nature Conservation Act (Act No. 10 of 1998);
- Mpumalanga Biodiversity Sector Plan (Lötter, 2015);
- National Protected Area Expansion Strategy (2018); and
- Mpumalanga Protected Area Expansion Strategy – 20 Year Plan.

Recent, relevant South African national policies and guidance were also taken into consideration, in the development of the baseline description and impact assessment process, including:

- National Biodiversity Offset Guideline (2023); and
- Species Environmental Assessment Guideline (SANBI, 2020).

3. Study Methodology

The scoping-level Terrestrial Biodiversity, Animal and Plant Species baseline descriptions and preliminary impact assessment took cognisance of Government Notice No. 320, published in 2020 under the National Environmental Management Act (1998) concerning 'Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Theme in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (1998), when applying for Environmental Authorisation'.

In line with the assessment and reporting requirements set out in the protocol, this scoping-level assessment was based on a literature review component and a field programme, and used to inform the site sensitivity verification stage, in line with the NEMA protocols.

3.1. Desktop Literature Review

Several literature and data sources were consulted during the desk-top literature review component to provide an overview of the ecological attributes, conservation context, and flora and fauna community characteristics of the study area. These are discussed below:

3.1.1. Ecosystems and Habitats

- The South African National Biodiversity Institutes (SANBI) Final Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2018) was consulted to identify the regional vegetation types relevant to the study area;
- Mucina and Rutherford (2011) was reviewed to obtain full descriptions of the relevant regional vegetation type, while SANBI (2013) was reviewed for a biome-level description;
- The National List of Threatened Ecosystems (NEMBA Threatened Ecosystems, 2021) was consulted to determine the conservation status of vegetation types and relevant ecosystems;
- The Mpumalanga Biodiversity Sector Plan (MBSP) (2019) was reviewed to determine the status and distribution of *inter alia*, protected areas, Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA);
- The South African Protected Areas Database website (SAPAD, 2021) was reviewed to identify protected areas (legally gazetted) and conservation areas in the landscape in which the study area is located;
- National Protected Area Expansion Strategy (NPAES) (2018) and the Mpumalanga Protected Area Expansion Strategy (20 Year Plan) were assessed to identify Priority Focus Areas for protected area expansion;
- Marnewick, *et al*., (2015) was reviewed for descriptions of any Important Bird Areas (IBA) in the region;
- The Strategic Water Source Areas (SWSA) and Freshwater Ecosystem Priority Area (FEPA) databases for information on the hydrological setting of the study area;
- The DWAF spatial data of Indigenous Forest Patches was consulted to identify any indigenous forests in or in close proximity the study area; and
- Satellite imagery available on Google Earth Pro was studied to develop an understanding of general landcover, likely habitat types, and historic and current on-site disturbances.

3.1.2. Flora and Fauna Species

- A list of flora species previously recorded in the region surrounding the study area was obtained from the South African National Biodiversity Institute's (SANBI) online Botanical Database of Southern Africa (BODATSA).
- This was supplemented by an inventory of flora species of conservation concern (SCC) sourced from the Mpumalanga Tourism and Parks Agency (MTPA) for the relevant Quarter Degree Square (QDS);
- Lists of fauna species previously recorded in the region were obtained from the Virtual Museum database (Fitzpatrick Institute of African Ornithology, 2023) and from the Southern African Bird Atlas Project 2 (SABAP2) database;
- These were also supplemented with data obtained from the MTPA, and based on a screening of the species distribution maps presented in Stuart and Stuart (2007) for

mammals, Bates *et al*., (2014) for reptiles, and Du Preez and Carruthers (2009) for amphibians.

3.2. Field Programme and Site Sensitivity Verification

The field programme comprised a wet-season field survey, which was conducted from the 22nd to 26th January 2024. Field work focused on both flora and fauna assemblages occurring in the broader study area. The sampling methodologies were aligned with SANBI (2020) recommendations, and included the following:

3.2.1. Vegetation and Flora

- Vegetation was sampled using meander search transects at representative sites in the main natural habitat units identified at a desktop level prior to the field survey. Twenty-nine search transects were surveyed across the study area; and
- Data collected during flora surveys included habitat character and condition, flora species composition, evidence of disturbances, and presence of flora SCC and alien invasive species.

3.2.2. Fauna

- Mammal sampling included both active and passive sampling methodologies:
    - Active sampling included the use of baited motion-triggered camera traps for medium- and large-sized taxa, while Sherman traps were used to sample small mammals.
    - Passive sampling included direct observations (e.g., point scans, opportunistic encounters), indirect observations (identification of tracks, scats, etc.), and anecdotal evidence from local farmers;
- No formal bird sampling was conducted, as a separate avifauna specialist study is being conducted. However, any opportunistic encounters/observations of bird SCC were recorded;
- Sampling for reptiles and amphibians was based on active searches and opportunistic observations made while driving and walking in the study area. Anecdotal evidence from local farmers was also obtained; and
- Special emphasis was placed on the presence/potential presence of species of conservation concern, habitat connectivity, and sites/habitats of importance and sensitivity.

3.3. Scoping Level Screening of Impacts and Mitigation

Appendix 2 of GNR 982, as amended, requires the identification of the significance of potential impacts during scoping. In line with this requirement, an impact screening tool was used during the scoping phase (Table 2). The screening tool is based on two criteria; namely probability (Table 3) and consequence (Table 4), where the latter is based on general consideration to the intensity, extent, and duration.

Table 2: Significance screening tool

	Consequence Scale				
Probability Scale		1	2	3	4
	1	Very Low	Very Low	Low	Medium
	2	Very Low	Low	Medium	Medium
	3	Low	Medium	Medium	High
	4	Medium	Medium	High	High

Table 3: Probability scores and descriptors

Score	Descriptor
4	Definite: The impact will occur regardless of any prevention measures
3	Highly Probable: It is most likely that the impact will occur
2	Probable: There is a good possibility that the impact will occur
1	Improbable: The possibility of the impact occurring is very low

Table 4: Consequence score descriptions

Score	Negative	Positive
4	Very severe: An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated.	Very severe: An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated.
3	Severe: A long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming or some combination of these.	Severe: A long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming or some combination of these.
2	Moderately severe: A medium to long term impacts on the affected system(s) or party (ies) that could be mitigated.	Moderately severe: A medium to long term impacts on the affected system(s) or party (ies) that could be mitigated.
1	Negligible: A short to medium term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary.	Negligible: A short to medium term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary.

The nature of the impact must be characterised as to whether the impact is deemed to be positive (+ve) (i.e., beneficial) or negative (-ve) (i.e., harmful) to the receiving environment/receptor. For ease of reference, a colour reference system (Table 5) has been applied according to the nature and significance of the identified impacts.

Table 5: Impact significance colour reference system to indicate the nature of impact

Negative Impacts (-ve)	Positive Impacts (+ve)
Negligible	Negligible
Very Low	Very Low
Low	Low
Medium	Medium
High	High

4. Study Assumptions and Limitations

4.1. Data Used for the Specialist Assessment

- Data and information presented in this report is based on 1) available national and provincial datasets and published literature for the region in which the study area is located, and 2) field data collected in the study area during the 2024 wet season survey;
    - Reviewed information included extensive existing baseline datasets and literature of species and habitats in the region, supplemented by cross-referencing against the most recent species conservation assessments;
    - The flora and fauna field surveys covered the mid- wet/growing season. In summer rainfall regions, such as the study area, this period is considered an optimal time to assess flora composition and vegetation condition. Moreover, fauna presence and activity during this period are high and it is therefore also an optimal time to assess fauna composition. Seasonality was therefore not considered a limiting factor with respect to assessing the character of on-site flora and fauna communities; and
- This scoping report was prepared based on a desktop- and a field-based site sensitivity verification process that was undertaken in response to the national web-based screening report. Within this context, there are no information limitations pertaining to terrestrial biodiversity, animal or plant species impacting on this scoping level baseline description, screening of impacts, or preliminary recommended mitigation measures.

4.2. Assumptions, Uncertainties or Gaps in Knowledge

- With respects to the flora field surveys, it is possible that certain small or cryptic taxa (e.g., annuals and geophytes) that are most readily visible or distinguishable (e.g., when flowering) at other periods during the wet/growing season, may not have been detected during the field survey;
- Similarly, with respects to the fauna survey, it is possible that certain rare, cryptic, migrating, hibernating or transient fauna species may not have been present and/or observed during the field work. The absence or non-recording of a specific fauna species, at a particular time, does not necessarily indicate that 1) the species does not occur there; 2) the species does not utilise resources in that area; or 3) the area does not play an ecological support role in the ecology of that species;
- Given the difficulty of fully sampling and characterising the abundance and distribution of fauna species in the study area during the period of time allocated to field work, the baseline descriptions were qualitative; and
- The preliminary identification of potential impacts and mitigation measures focuses on those fauna and flora SCC that were observed or are likely to occur in the study area, as determined based on collected field data, existing data records and documented distribution ranges.

5. Terrestrial Biodiversity Baseline Description

5.1. Environmental Screening Tool

The proposed Project site was assessed using the National Web-based Environmental Screening Tool. The output of the sensitivity report is below:

- The Terrestrial Biodiversity Theme for the entire study area is rated 'Very High Sensitivity' due to the presence of the following features:
    - Critical Biodiversity Area (CBA) 1;
    - CBA 2;
    - Ecological Support Areas (ESA): Landscape corridor;
    - Freshwater Ecosystem Priority Area (FEPA) Sub-catchment;
    - National Protected Area Expansion Strategy (NPAES);
    - Endangered – Eastern Highveld Grassland; and
    - Vulnerable – Soweto Highveld Grassland.

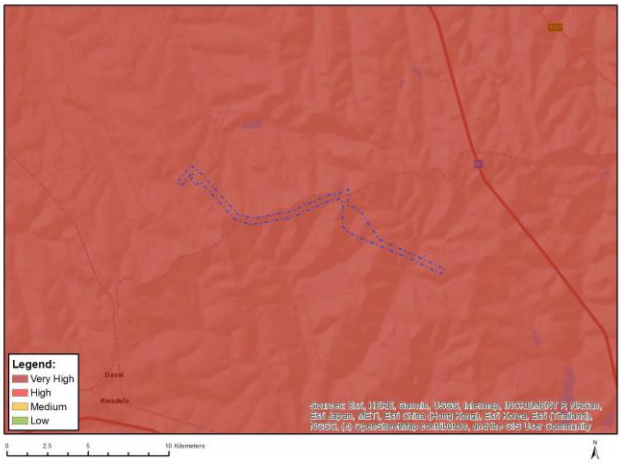

Figure 2: Screening report sensitivity for Terrestrial Biodiversity for the study area.

- The Plant Species Theme is rated 'Medium Sensitivity' due to the potential presence of the following features:
    - Sensitive species 1252;
    - *Aspidoglossum xanthosphaerum;*
    - *Miraglossum davyi;*
    - Sensitive species 41;
    - Sensitive species 691; and
    - *Pachycarpus suaveolens.*

Note: The names of specific taxa that are regarded as being susceptible to overexploitation have been redacted and are not presented in this report. These species are referred to by their assigned 'sensitive species number', as per the species assessment guidelines (SANBI, 2020).

Figure 3: Screening report sensitivity for Plant Species for the study area

- The Animal Species Theme is rated '<u>High Sensitivity</u>' due to the potential presence of the following features:
    - Southern Bald Ibis (*Geronticus calvus*);
    - Martial Eagle (*Polemaetus bellicosus*);
    - Secretarybird (*Sagittarius serpentarius*);
    - Caspian Tern (*Hydroprogne caspia*);
    - African Grass Owl (*Tyto capensis*);
    - White-bellied Bustard (*Eupodotis senegalensis*);
    - Maquassie Musk Shrew (*Crocidura maquassiensis*);
    - Spotted-necked Otter (*Hydrictis maculicollis*);
    - Oribi (*Ourebia ourebi ourebi*); and
    - Potchefstroom Blue (*Lepidochrysops procera*).

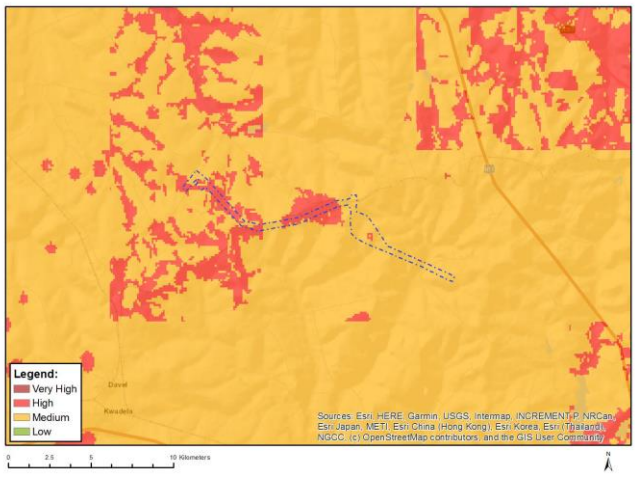

Figure 4: Screening report sensitivity for Animal Species for the study area.

5.2. Regional Terrestrial Biodiversity Context

5.2.1. Terrestrial Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs)

The Mpumalanga Biodiversity Sector Plan (MBSP) technical report (Lotter, 2015) defines five categories of conservation focus; protected areas, critical biodiversity areas (CBA), ecological support areas (ESA), other natural areas, and modified habitats. Definitions for each are listed below:

- **Protected Areas**: protected areas recognised in terms of the National Environmental Management Protected Areas Act, No. 57 of 2003, that are currently considered to meet biodiversity targets in the MBSP.
- **Critical Biodiversity Area**: areas (outside of Protected Areas) that are required to meet biodiversity targets for biodiversity pattern (species and ecosystems) and ecological processes. They should remain in a natural state that is maintained in good ecological condition. The MBSP recognises two CBA ranks, *viz*, CBA Irreplaceable and CBA Optimal (these are alternatively referred to as CBA 1 and CBA 2, respectively).
- **Ecological Support Area**: play an important role in supporting the ecological functioning of critical biodiversity areas or for generating or delivering important ecosystem services. They support landscape connectivity and resilience to climate change adaptation. They need to be maintained in at least an ecologically functional state, but some limited habitat loss may be acceptable.
- **Other Natural Areas**: often retain much of their natural character and may contribute significantly to maintenance of viable species populations and natural ecosystem functioning, and may provide important ecological infrastructure and ecosystem services. They are not, however, prioritized for immediate conservation action in the MBSP.
- **Modified**: often referred to as transformed, these areas have lost a significant proportion (or all) of their natural biodiversity and in which ecological processes have broken down (in some cases irretrievably), as a result of biodiversity-incompatible land-use practices such as ploughing, hardening of surfaces, mining, cultivation and the construction of houses or other built infrastructure.

Figure 5 shows the study area and the proposed Project site in relation to the delineations of the MBSP (2022). It is evident that the OHL assessment corridor traverses across large tracts of land designated as CBA Irreplaceable (CBA 1), with smaller patches of CBA Optimal (CBA 2) and to a lesser extent ESA, also potentially affected. As per data received from the MPTA (M. Lötter), the CBA patches across the broader study area are predicated on a combination of the following criteria:

- Eastern Highveld Grassland;
- Soweto Highveld Grassland;
- Mesic Highveld Grassland– Groups 1-3;
- Intact grassland patches;
- Several fauna SCC:
    - Giant Bullfrog (*Pyxicephalus adspersus*);
    - Blue Korhaan (*Eupodotis caerulescens*);
    - Rudd's Lark (*Hateromirafra ruddi*);
    - Botha's Lark (*Spizocorys fringillaris*);

    - White-bellied Korhaan (*Eupodotis senegalensis*);
    - African Grass Owl (*Tyto capensis*);
    - Oribi (*Ourebia ourebi ourebi*);
- Climate change land facets;
- Macro-corridor;
- Critical linkages;
- Three flora SCC:
    - *Aspidoglossum xanthosphaerum*;
    - *Khadia carolinensis*;
    - *Brachycorythis conica* subsp. *transvaalensis*; and
- Core and supporting corridors.

The continued integrity and protection of these CBAs is required to meet biodiversity targets for biodiversity pattern (species and ecosystems) and ecological processes. The presence of CBA Irreplaceable and CBA Optimal land in the study area is therefore a concern with respects to terrestrial biodiversity management.

As per the MBSP, development in CBA areas should be avoided, and it is recommended that as far as possible no proposed Project infrastructure should be sited on land designated CBA Irreplaceable and CBA Optimal. It is noted that portions of the proposed OHL assessment corridor are aligned with existing linear infrastructure (i.e., district road, farm tracks, and old railway line) which are characterised by transformed/disturbed peripheries, and thus there may be scope to micro-site some of the proposed OHL infrastructure footprints to already disturbed areas.

With respects to ESA areas, a greater range of land uses is permissible in such areas. However, the functional state of these areas should not be compromised by proposed Project infrastructure or activities.

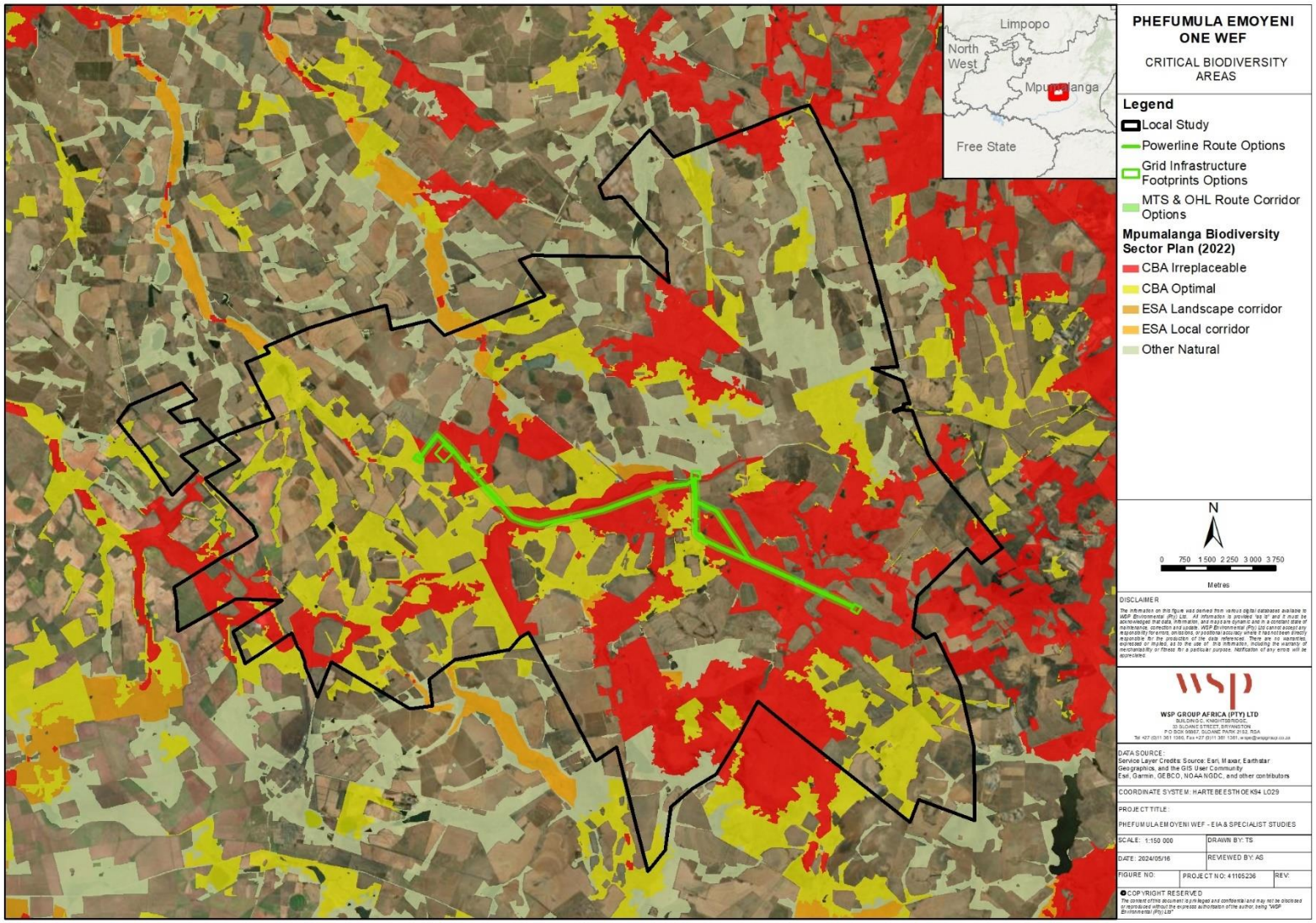

Figure 5: Study area and grid connection assessment corridor/footprints in relation to the delineations of the Mpumalanga Biodiversity Sector Plan (2022)

5.2.2. Freshwater Ecosystem Priority Area Sub-Catchment

Freshwater Ecosystem Priority Areas (FEPA) are rivers and wetlands required to meet biodiversity targets for freshwater ecosystems. Essentially, these areas were identified at a national level as priority areas for conserving freshwater ecosystems and supporting the sustainable use of water resources, as well as upstream catchment management areas (Driver, *et al*., 2012).

Figure 6 shows the study area in relation to mapped FEPAs. It is evident that the south-eastern portion of the OHL assessment corridor traverses across a designated FEPA. According to Driver, *et al*., (2012), FEPAs should be maintained in a natural/near natural condition, and anthropogenic activities in Upstream Management Areas should be carefully managed to prevent degradation of downstream FEPAs.

5.2.3. Strategic Water Source Areas

The study area is not located within a mapped Strategic Water Source Area (SWSA). The nearest SWSA is located to the south-west of the study area, as shown in Figure 7.

5.2.4. Indigenous Forests

No indigenous forest habitat occurs within the study area. The study area is dominated by cultivated fields and tracts of natural grassland and wetland habitat.

5.2.5. Protected Areas and Conservation Areas

The study area is not located within or in close proximity to a protected area. The closest protected areas are shown in Figure 8 include:

- Rietvlei Private Nature Reserve, which is located to the south of the N17 national road, approximately 12 km south of the study area; and
- Ahlers Private Nature Reserve, which is located approximately 14 km south-east of the study area.

Other noteworthy conservation areas in the surrounding landscape include the Chrissiesmeer Protected Environment. This protected environment covers a large, albeit fragmented area, approximately 23 km east of the study area (not shown in Figure 8).

5.2.6. Priority Focus Areas for Protected Area Expansion

Priority Focus Areas for protected area expansion are large, intact and unfragmented areas of high biodiversity importance, that are suitable for the creation/expansion of protected areas (Driver, *et al*., 2012). Land-use planning and decision making should avoid fragmenting Priority Focus Areas, to prevent such areas from being excluded from future protected area expansion. (Driver, *et al*., 2012).

Figure 9 and Figure 10 shows the proposed OHL assessment corridor in relation to the mapped Priority Focus Areas of the National Protected Area Expansion Strategy (2018) and the Mpumalanga Protected Area Expansion – 20 Year Plan. It is evident that the proposed corridor traverses across Priority Focus Areas recognised under both spatial datasets.

5.2.7. Important Bird Areas

The study area is located within the Amersfoort-Bethal-Carolina District Important Bird Area (IBA) (Figure 11). This IBA is 343 320 ha in extent and extends from Carolina in the north to Bethal in the east, and southward through Ermelo to Amersfoort (Marnewick, *et al*., 2015).

Several globally threatened trigger species occur in this IBA including, *inter alia*, Botha's Lark (*Spizocorys fringillaris*), Blue Crane (*Grus paradisea*), Southern Bald Ibis (*Geronticus calvus*), Black Harrier (*Circus maurus*), Black-winged Pratincole (*Vanellus melanopterus*), Secretary Bird (*Sagittarius serpentarius*) and Martial Eagle (*Polemaetus bellicosus*) (Marnewick, *et al*., 2015).

The primary threat to the Amersfoort-Bethal-Carolina District IBA is the expansion of agricultural lands (mainly maize fields), resulting in a loss of natural habitat (Marnewick, *et al*., 2015).

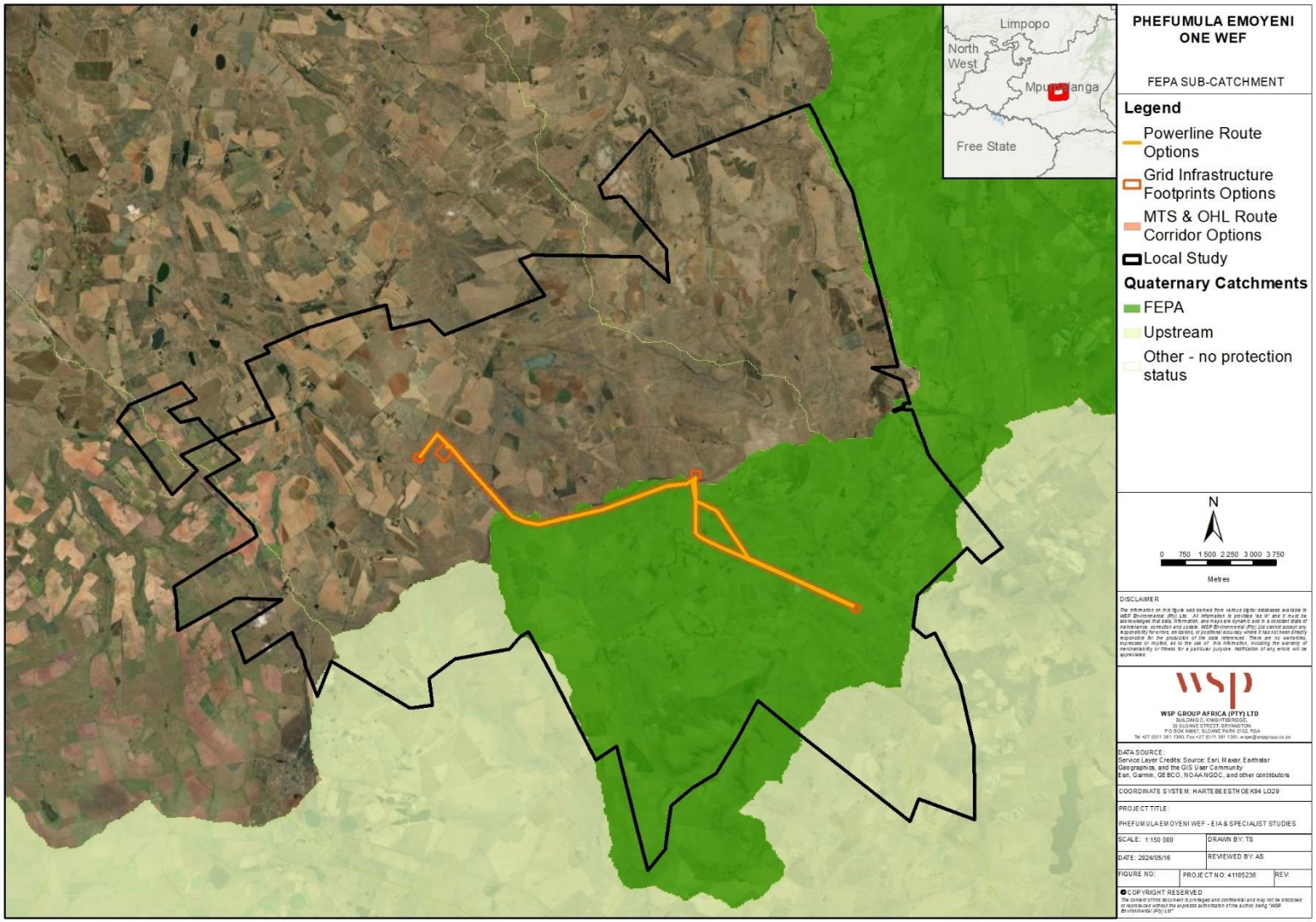

Figure 6: Study area and grid connection assessment corridor/footprints in relation to Freshwater Ecosystem Priority Areas.

Figure 7: Study area in relation to Strategic Water Source Areas

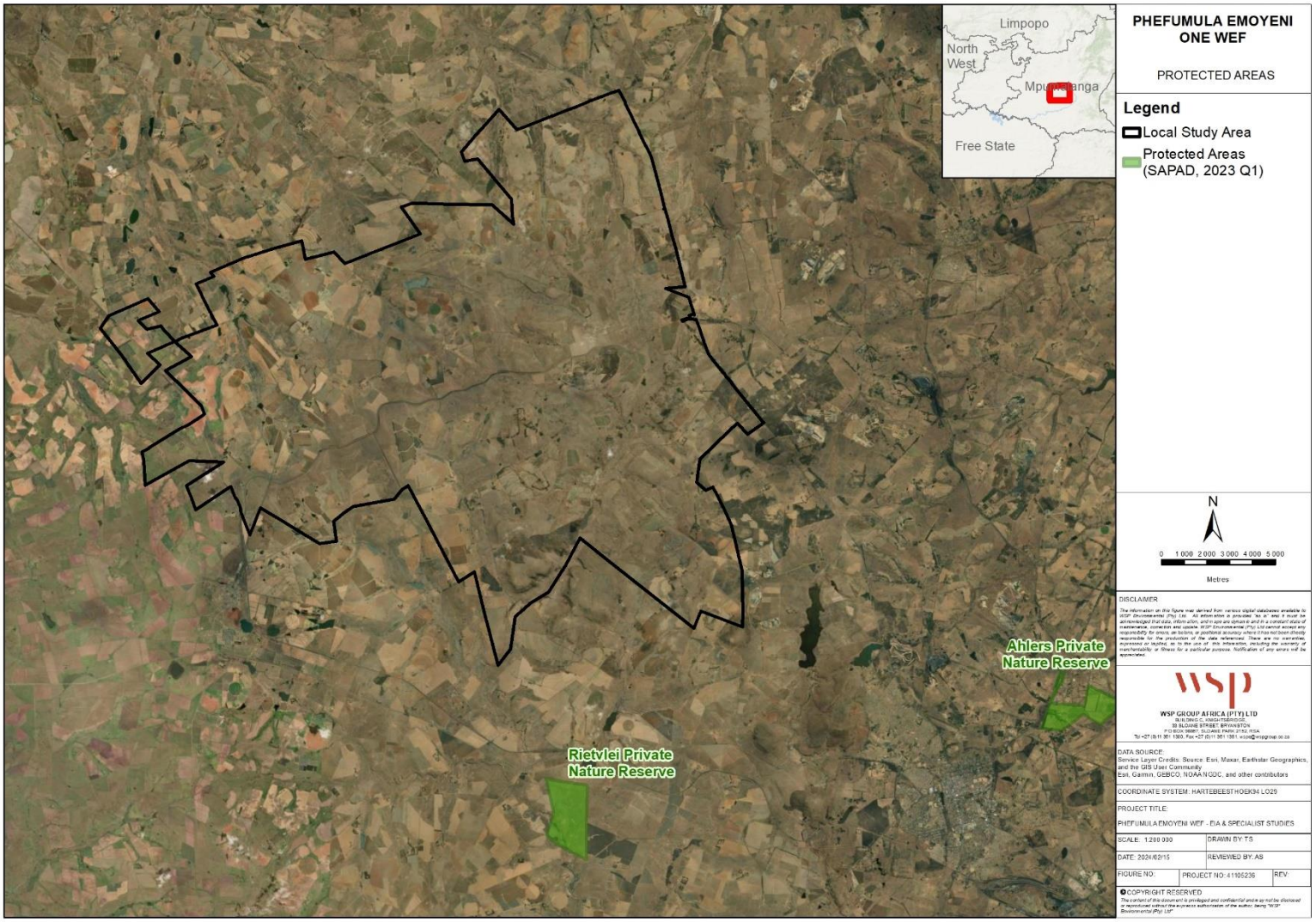

Figure 8: Study area in relation to local protected areas.

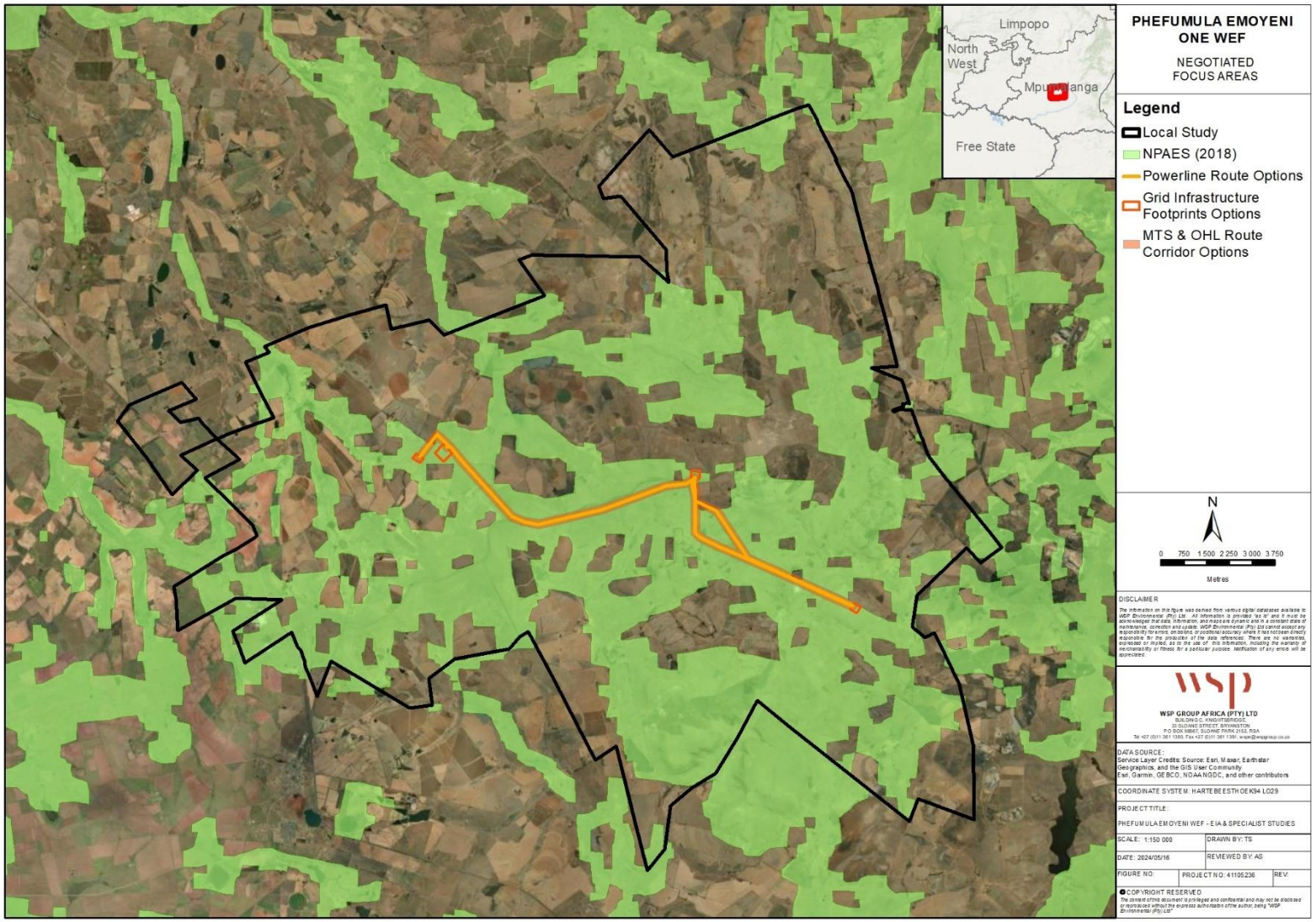

Figure 9: Study area and grid connection assessment corridor/footprints in relation to the delineation of the National Protected Area Expansion Strategy (2018)

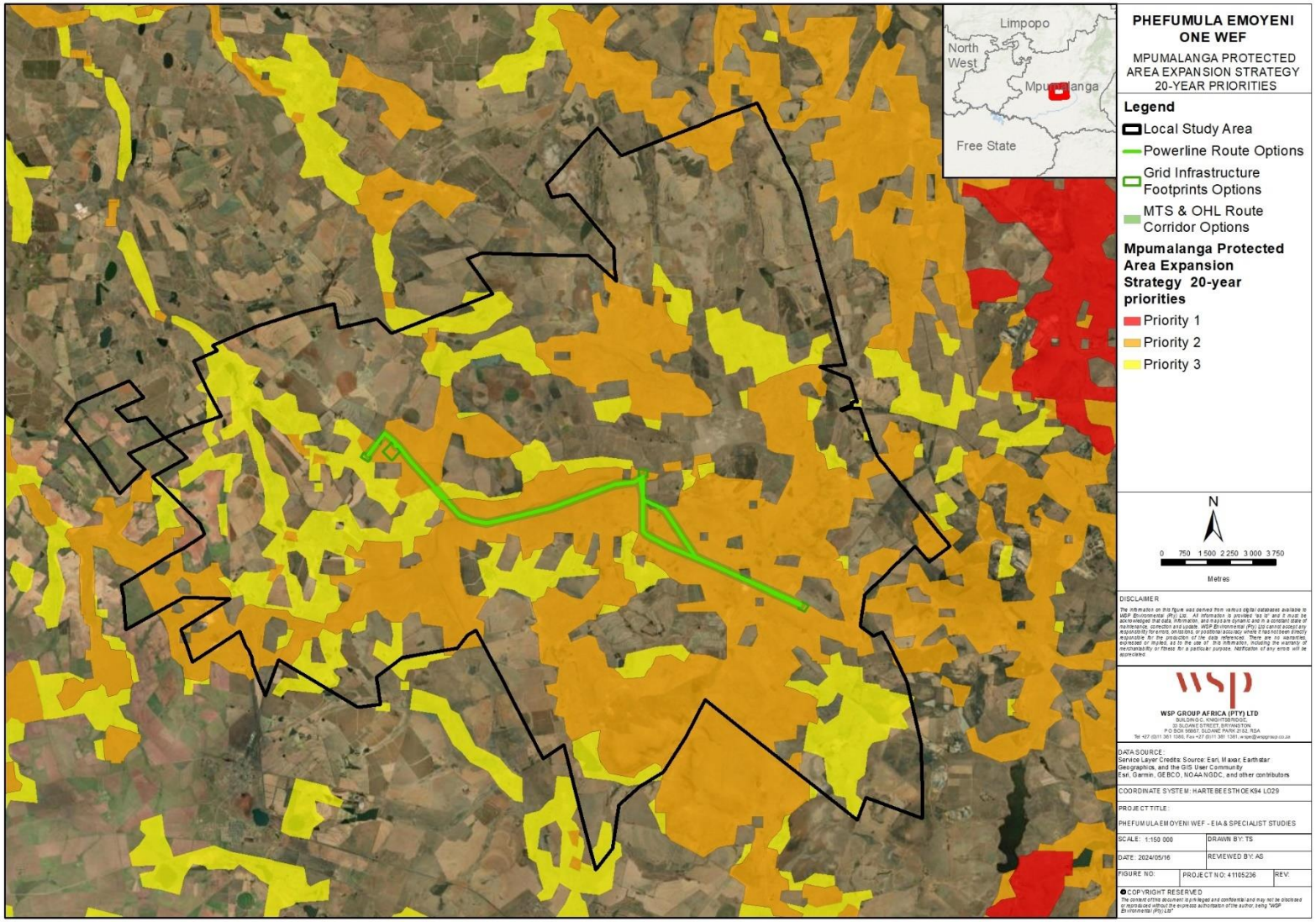

Figure 10: Study area and grid connection assessment corridor/footprints in relation to the delineation of the Mpumalanga Protected Area Expansion Strategy – 20 Year Plan

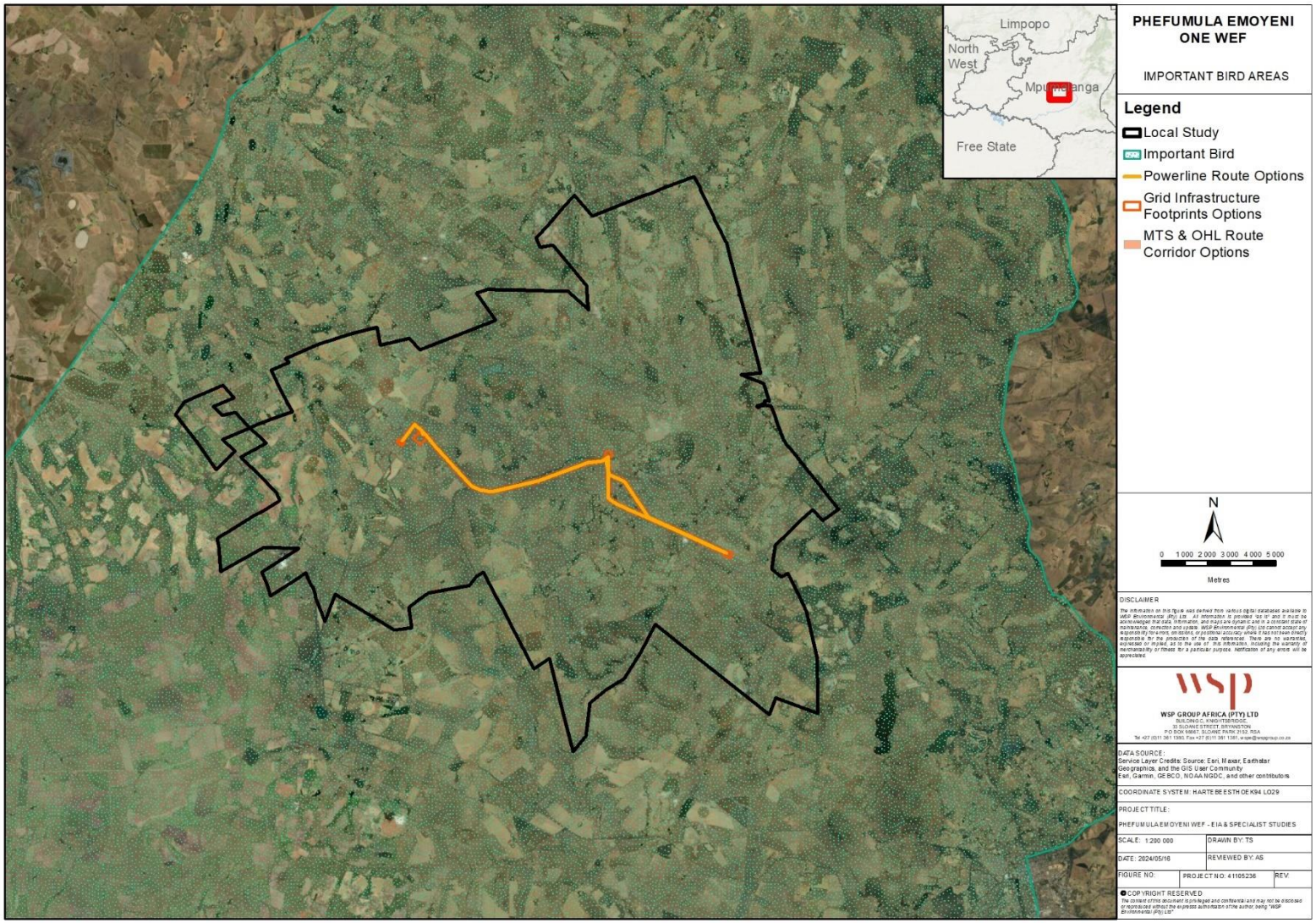

Figure 11: The study area is encompassed within the Amersfoort-Bethal-Carolina District Important Bird Area.

5.3. Terrestrial Vegetation and Flora

5.3.1. Vegetation Types and Threat Status

The study area is located in the Eastern Highveld Grassland and Soweto Highveld Grassland vegetation types. The proposed OHL assessment corridor primarily impacts Soweto Highveld Grassland, with only a small area of Eastern Highveld Grassland at the western end of the corridor impacted – shown in Figure 12.

Eastern Highveld Grasslands are found on slightly- to moderately undulating plains, low hills and wetland depressions (Mucina & Rutherford, 2011). Grasses are typical Highveld species from the genera *Aristida, Digitaria, Eragrostis* and *Tristachya*. Indigenous woody species are mainly restricted to rocky areas and include *Celtis africana, Protea caffra, Protea welwitschii, Diospyros lycioides, Searsia magalismontana* and *Senegalia caffra* (Mucina & Rutherford, 2011).

Soweto Highveld Grasslands are characterised by short to medium-high density tufted grassland occurring on gently to moderately undulating plains (Mucina & Rutherford, 2011). Grasslands are typically dominated by *Themeda triandra* along with several other co-dominant species. These grasslands are interrupted by small wetlands and rocky ridges and outcrops (Mucina & Rutherford, 2011).

According to the NEMBA Threatened Ecosystems (2021), both vegetation types are threatened; Eastern Highveld Grassland is listed as Endangered and Soweto Highveld Grassland is listed as Vulnerable. Figure 13 shows the study area in relation to the delineation of national threatened ecosystems.

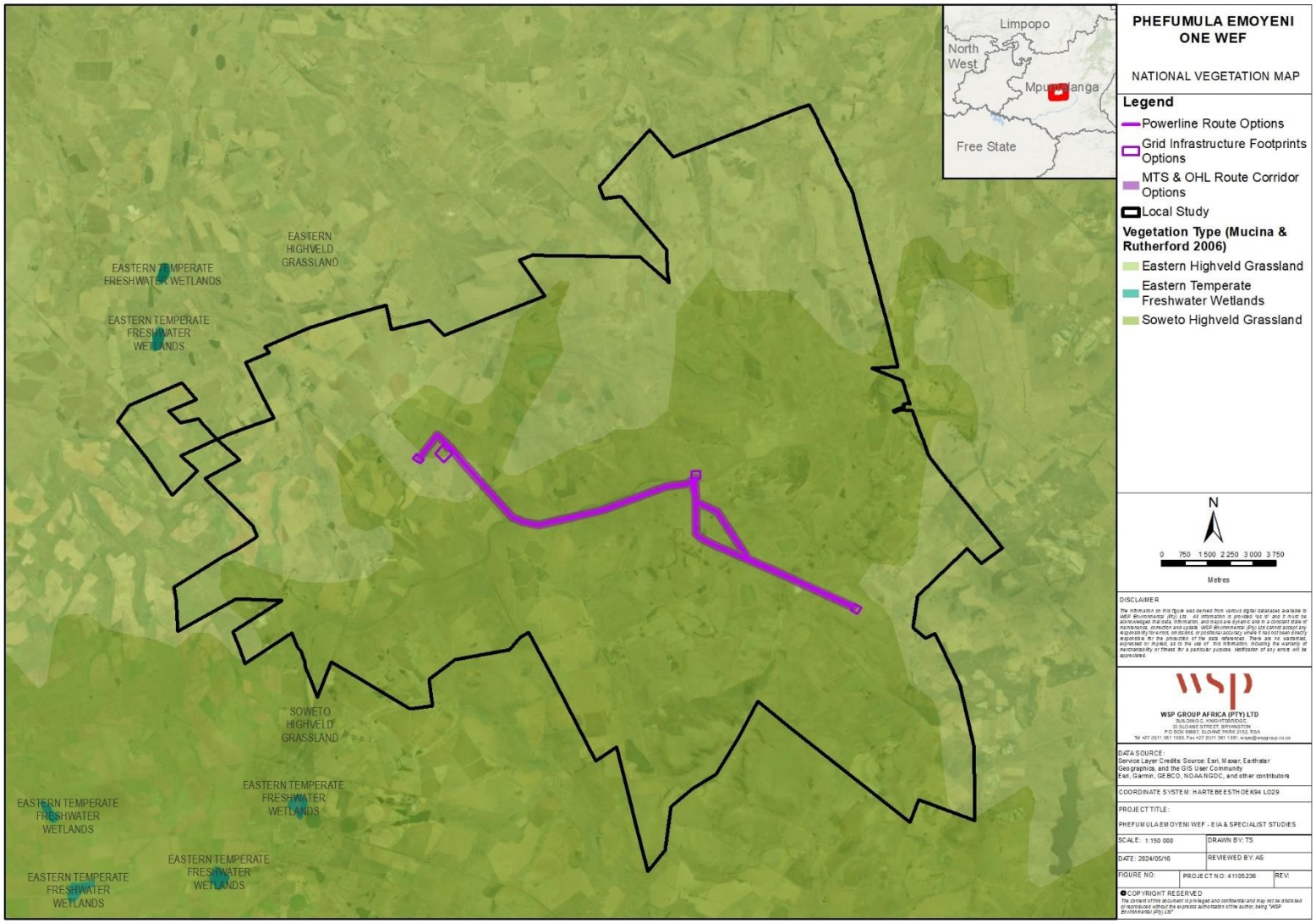

Figure 12: Regional vegetation types associated with the study area and grid connection assessment corridor/footprints.

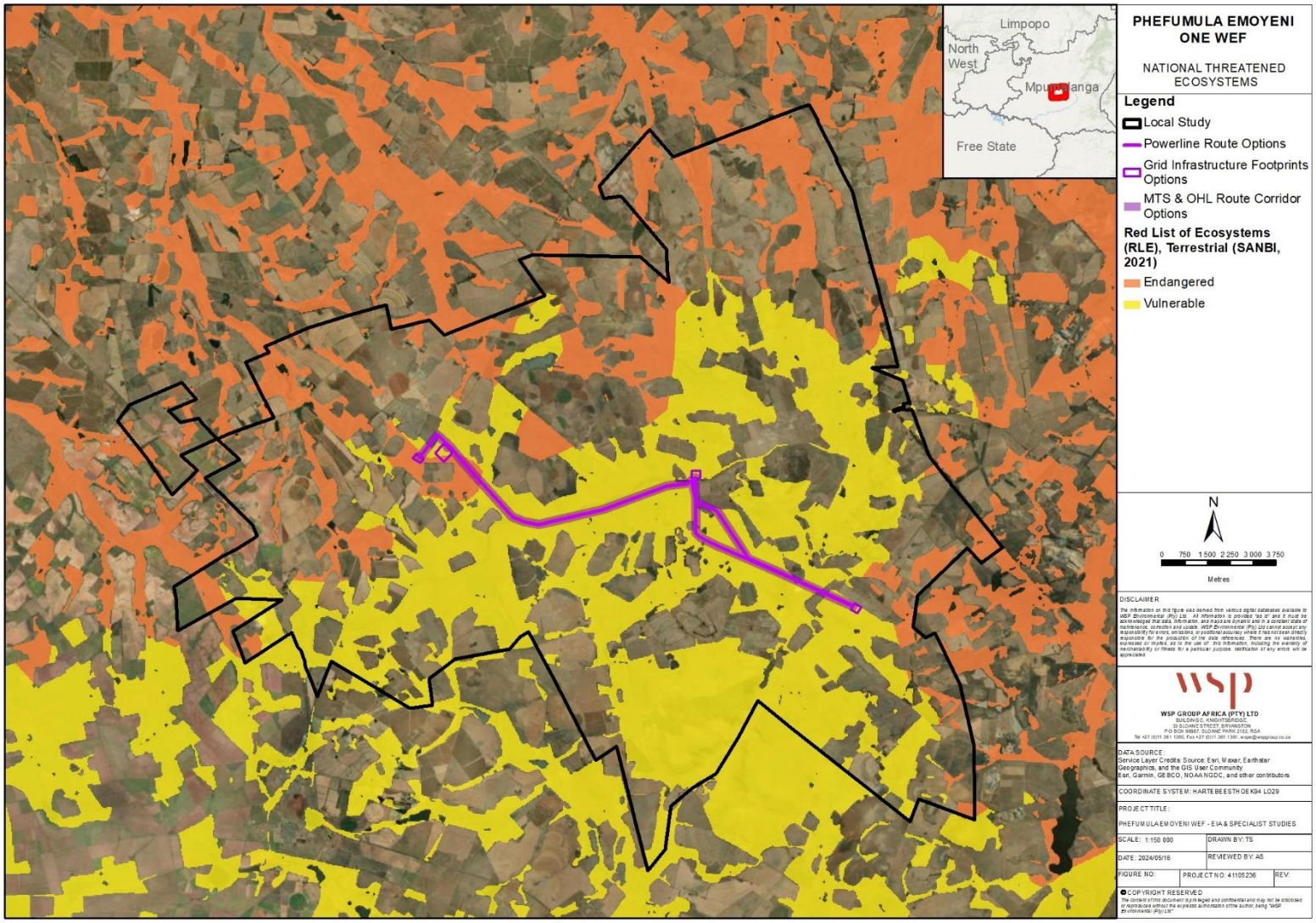

Figure 13: Study area and grid connection assessment corridor/footprints in relation to delineations of the National Red List of terrestrial ecosystems.

5.3.2. Existing Land Cover, Impacts and Drivers of Change

Existing impacts and key drivers of change that were observed in the study area during the field survey, and that are likely to influence ecosystem dynamics and functioning and the distribution of fauna and flora species in the study area are discussed below. Maps showing the major land cover types as per existing spatial data, are presented in Figure 14 and Figure 15.

- Farming is the dominant land use within the study area, and well as across the surrounding landscape. Irrigated and dry-land cultivation, coupled with livestock production (mostly cattle, but also sheep) are the primary farming activities and these, over the long term, have caused varying degrees of spatial habitat modification and disturbance;
- Mining operations are present to the south-east and north of the study area. Mined areas are either completely transformed with typically no natural habitat remaining or comprise habitat that is highly disturbed;
- Various forms of linear infrastructure are present in the study area and broader landscape, including major national roads (N11 and N17), several gravel district roads, farms roads and informal vehicle tracks, a defunct railway line, and numerous farm fences. To varying degrees, and in conjunction with transformative land uses activities, linear infrastructure has caused habitat fragmentation across the study area, although it is noted the large intact habitat patches remain present;
- Alien invasive species are present in the study area. Many localised alien tree stands are present, and typically comprise *Acacia mearnsii, Acacia dealbata, Eucalyptus camaldulensis* and *Populus x canescens*. It was also noted that the edges of many cultivated fields as well as other disturbed sites are encroached by various herbaceous AIS (e.g., *Verbena bonariensis*); and
- Other anthropogenic activities and infrastructure in the study area that have resulted in habitat loss and disturbance include *inter alia*, farm residences and various agriculture structures (barns).

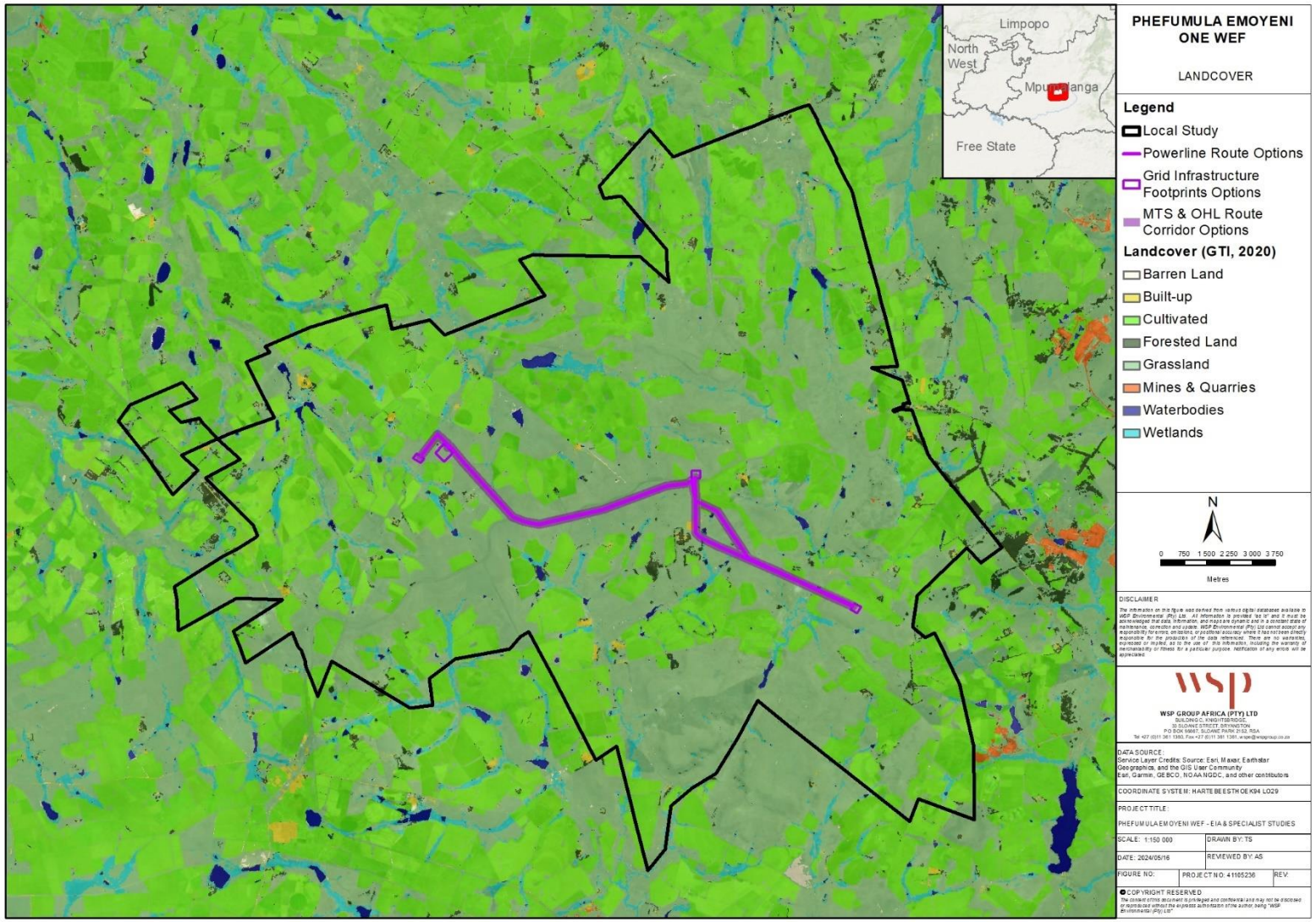

Figure 14: Landcover associated with the study area and surrounding landscape.

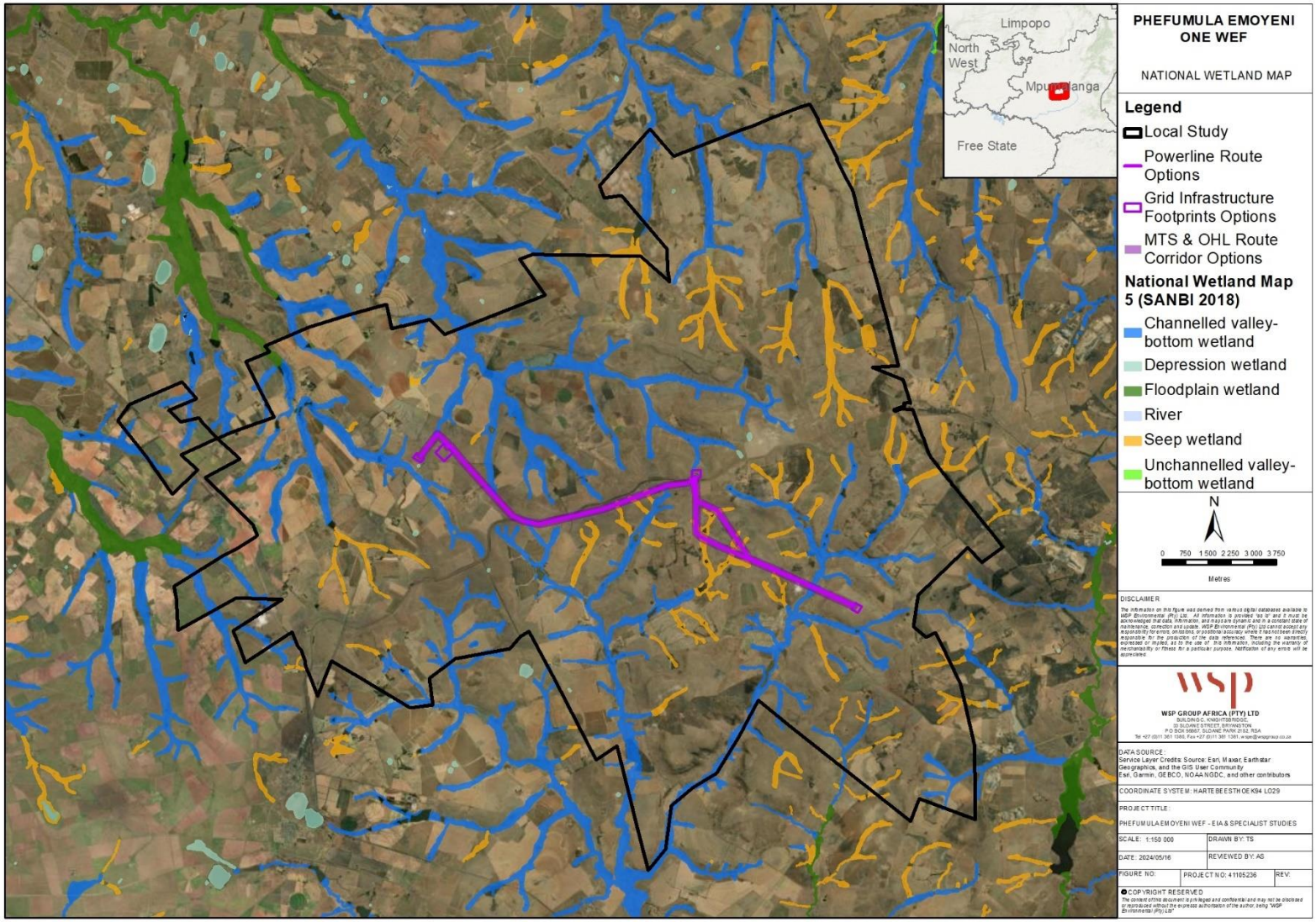

Figure 15: Wetland in the study area, as per SANBI (2018)

5.3.3. Habitat Units

Seven habitat units were identified in the study area during the field survey. These include four units regarded as natural habitat, and two units regarded as modified habitats:

Natural Habitats

- Mixed Dry Grassland;
- Rocky Shrubland;
- Moist Grassland;
- Old Lands;

Modified Habitats

- Cultivated Fields; and
- Alien Tree Plantations.

These habitat units are briefly described with accompanying photographs below, with a habitat unit map for the grid connection assessment corridor/footprints shown in Figure 22.

5.3.3.1. Mixed Dry Grassland

Mixed Dry Grassland is a variable habitat unit that characterises the large intact grasslands of the study area. Based on contemporary and former farming activities, disturbance levels in areas of Dry Mixed Grassland vary.

As per Edwards (1983) structural classification system, the vegetation structure of this unit is defined as a low closed grassland (Figure 16). Compositionally, areas of Mixed Dry Grassland are characterised by a diverse flora assemblage, that is typically grass dominated and forb rich, and with woody species generally occurring as scattered individuals.

Predicated on past livestock grazing levels and wildfire patterns, the grass species composition of these grasslands varies. Areas that have likely experienced high-levels of past grazing and/or too frequent wildfires tend to be dominated by early-seral grass species, such as *Eragrostis plana* and *Eragrostis chloromelas,* whereas in areas that have been less intensely grazed or burnt, climax grass species such as *Themeda triandra* and other species including *inter alia*; *Cymbopogon pospischilii, Eragrostis racemosa, Harpochloa falx, Setaria* species and *Tristachya leucothrix* are common.

Common herbs/forbs recorded in the Mixed Dry Grassland unit include *inter alia*; *Berkheya pinnatifida* subsp. *ingrata, Berkheya radula, Berkheya setifera, Haplocarpha scaposa, Hilliardiella aristata* various *Helichrysum* and *Hypoxis* species and *Nidorella podocephala.* Woody species occur at low abundances in areas of Mixed Dry Grassland and typically include scattered *Diospyros lycioides* and *Seriphium plumosum* shrubs. Higher abundances of *Seriphium plumosum* were noted at certain locations and are likely a result of historic localised overgrazing. In terms of declared alien invasive species *Verbena bonariensis* and *Verbena rigida*.

Sensitivity Aspects

Mixed Dry Grasslands characterises large intact portions of the study area, and they are important in maintaining the landscape-scale ecological processes that support terrestrial biodiversity. Several

protected flora species were recorded in this unit, and it is likely that several additional flora species of conservation concern (SCC) are present. These grasslands are also vital fauna habitat, and will support many of the fauna SCC known from the region.

Figure 16: Mixed Dry Grassland in the study area

5.3.3.2. Rocky Shrubland

This habitat unit occurs along rocky hillside slopes/ridges in the study area, but is not present within the proposed Electrical Grid Infrastructure assessment corridor/footprints. Unlike adjacent areas of open dry and moist grassland, this unit is characterised by an abundance of indigenous woody vegetation, coupled with the presence of large protruding rocks (Figure 17).

In line with Edwards (1983) structural classification, this habitat unit comprises low- to short sparse shrubland, with woody vegetation occurring as small trees and shrubs (typically < 3m in height) growing in either dense but spatially discrete aggregations around protruding rocks, or as scattered individual small trees and shrubs, within the broader grassland matrix.

Compositionally, *Diospyros lycioides* is the most abundant woody species. Other common larger woody taxa recorded in this unit include *Asparagus laricinus*, *Euclea crispa, Gymnosporia buxifolia, Kiggelaria africana, Rabdosiella calycina, Searsia dentata, Searsia discolor* and *Searsia pyroides* var. *gracilis.*

The herbaceous layer shares many of the same flora species as adjacent areas of Mixed Dry Grassland, as well as several additional taxa. Commonly recorded grasses include *Cymbopogon pospischilii, Eragrostis chloromelas, Eragrostis plana, Eragrostis pseudosclerantha, Hyparrhenia dregeana, Melinis nerviglumis, Themeda triandra* and *Tristachya leucothrix.* Various forbs, geophytes and small shrublets are also common in the herbaceous layer including *inter alia; Berkheya radula, Haemanthus humilis, Hilliardiella aristata, Haplocarpha scaposa, Helichrysum rugulosum, Phylica paniculata, Ledebouria ovatifolia* and *Leonotis dysophylla.* Ferns recorded in this unit include *Blechnum cf. australe, Cheilanthes hirta* var. *hirta, Pellaea calomelanos* var. *calomelanos* and *Selaginella dregei*.

Sensitivity Aspects

Due to the combination of indigenous woody vegetation and protruding rocks, Rocky Shrubland habitat is unusual within the context of the general open grassland matrix of the study area. Patches

of Rocky Shrubland habitat therefore increase landscape-scale habitat heterogeneity, and provide important niche habitat for a variety of flora and fauna species that show an affinity for hilly and well-wooded rocky areas. Included amongst these, are species of conservation concern.

Figure 17: Rocky Shrubland.

5.3.3.3.Moist Grassland

Moist Grassland habitat characterises wetland and riparian features across the study area. Vegetation structure ranges from low to tall closed grassland (*sensu*. Edwards 1983), and although not widespread or abundant in most areas of Moist Grassland, alien woody vegetation is present and well-established in certain locations (Figure 18).

Common flora species recorded include a range of grasses and sedges such as*, inter alia*; *Agrostis lachnantha, Andropogon appendiculatus, Arundinella nepalensis, Cyperus congesta, Cyperus denudatus, Cyperus fastigiatus, Cyperus marginatus, Cynodon dactylon, Eleocharis limosa, Eragrostis gummiflua, Eragrostis heteromera, Eragrostis plana, Imperata cylindrica, Juncus dregeanus, Kyllinga erecta, Leersia hexandra* and *Paspalum dilatatum.* The tall reed *Phragmites australis,* the bulrush *Typha capensis* and *Schoenoplectus brachyceras* are also present in certain areas.

Common forbs recorded in this habitat unit include *Berkheya pinnatifida* subsp. *ingrata, Berkheya radula, Berkheya setifera, Centella asiatica, Conium chaerophylloides, Helichrysum aureonitens, Helichrysum nudifolium* var. *pilosellum*, *Lobelia flaccida, Monopsis decipiens, Nidorella podocephala* and *Scabiosa columbaria.*

Alien woody taxa recorded in this habitat unit include *Eucalyptus sp., Quercus ruber, Populus x canescens, Pyracantha angustifolia* and *Salix babylonica*.

Sensitivity Aspects

Areas of Moist Grassland habitat are crucial in maintaining the hydrological functioning, ecological processes, and terrestrial biodiversity of the landscape. Several protected flora species were recorded in this habitat unit, and it is likely that several additional flora SCC are present. These habitats constitute vital landscape-scale movement and dispersal corridors, and in conjunction with adjacent dry grasslands, are important in maintaining local fauna population, including that of several SCC.

Figure 18: Area of typical Moist Grassland in the study area.

5.3.3.4. Old Lands

As the name suggests, this habitat unit characterises former cultivated fields that have regenerated to a secondary grassland state via natural plant succession.

Vegetation structure is low closed grassland (*sensu*. Edwards, 1983). Compositionally, Old Lands are floristically depauperate. Dominant grass species recorded include *Hyparrhenia dregeana, Hyparrhenia hirta, Eragrostis chloromelas, Eragrostis curvula* and *Eragrostis plana* (see Figure 19**Error! Reference source not found.**).

Forbs recorded in these areas typically include a mixture of indigenous and alien ruderal and weedy species such as *Bidens pilosa, Conyza bonariensis, Pseudognaphalium luteo-album, Senecio consanguineus, Rumex acetosella, Selago densiflora, Tagetes minuta, Verbena rigida* and *Wahlenbergia undulata.* The only woody species recorded in this habitat unit was *Seriphium plumosum.*

Sensitivity Aspects

Despite being previously disturbed, old lands can retain some of the functional attributes of natural grassland. This notwithstanding, no flora and fauna species of conservation were recorded in this habitat unit, and it is considered unlikely that any species will be present.

Figure 19: Old Lands

5.3.3.5. Cultivated Fields

Large portions of the study area are characterised by Cultivated Fields, which is considered a modified habitat type. This habitat unit includes pivot-irrigated and dry-land crop fields – which are typically under maize production (Figure 20), as well as fields that are actively managed as grass pastures. Unlike areas of natural grassland, grass pastures are often fertilised and regularly mown and baled to provide reserve forage for livestock during the dry season.

Sensitivity Aspects

Cultivated Fields are typically denuded of indigenous vegetation and/or are subject to regular anthropogenic disturbances. When not dominated by a monoculture of crop species, these areas are typically colonised by alien weed species. No flora SCC were recorded in this habitat unit and none are considered likely to be present due to the high level of disturbance. Although certain fauna species may move through and/or occasionally forage in these areas, considering the degree of ongoing disturbance and modification, they are not considered important fauna habitat.

Figure 20: Cultivated Field.

5.3.3.6. Alien Tree Plantations

This habitat unit occurs in localised stands in the study area. Stands range from narrow wind-rows and more-defined plantations to informal thickets. Structurally and compositionally, alien tree plantations are incongruous with the natural habitat units in the study area.

Vegetation structure is defined as short- to tall closed woodland characterised by closely-spaced aggregations of alien trees. Dominant alien tree species include alien *Eucalyptus, Acacia* (wattle) and *Populus* (e.g., *Populus x canescens*) species (Figure 21). Little indigenous vegetation is present in dense, well-established alien tree stands, with herbaceous flora typically supressed or in most cases, largely absent.

Sensitivity Aspects

Alien Tree Plantations is a modified habitat type, that is characterised by an almost complete dominance of essentially one or two non-indigenous tree species. No flora SCC were observed in these areas, and the probability of such taxa being present is low. From a fauna perspective, Alien Tree Plantations may be used as refuge habitats by fauna that are sensitive to hunting and other forms of anthropogenic disturbance. They can also form important roosting/nesting habitat for raptors.

Figure 21: Alien Tree Plantation.

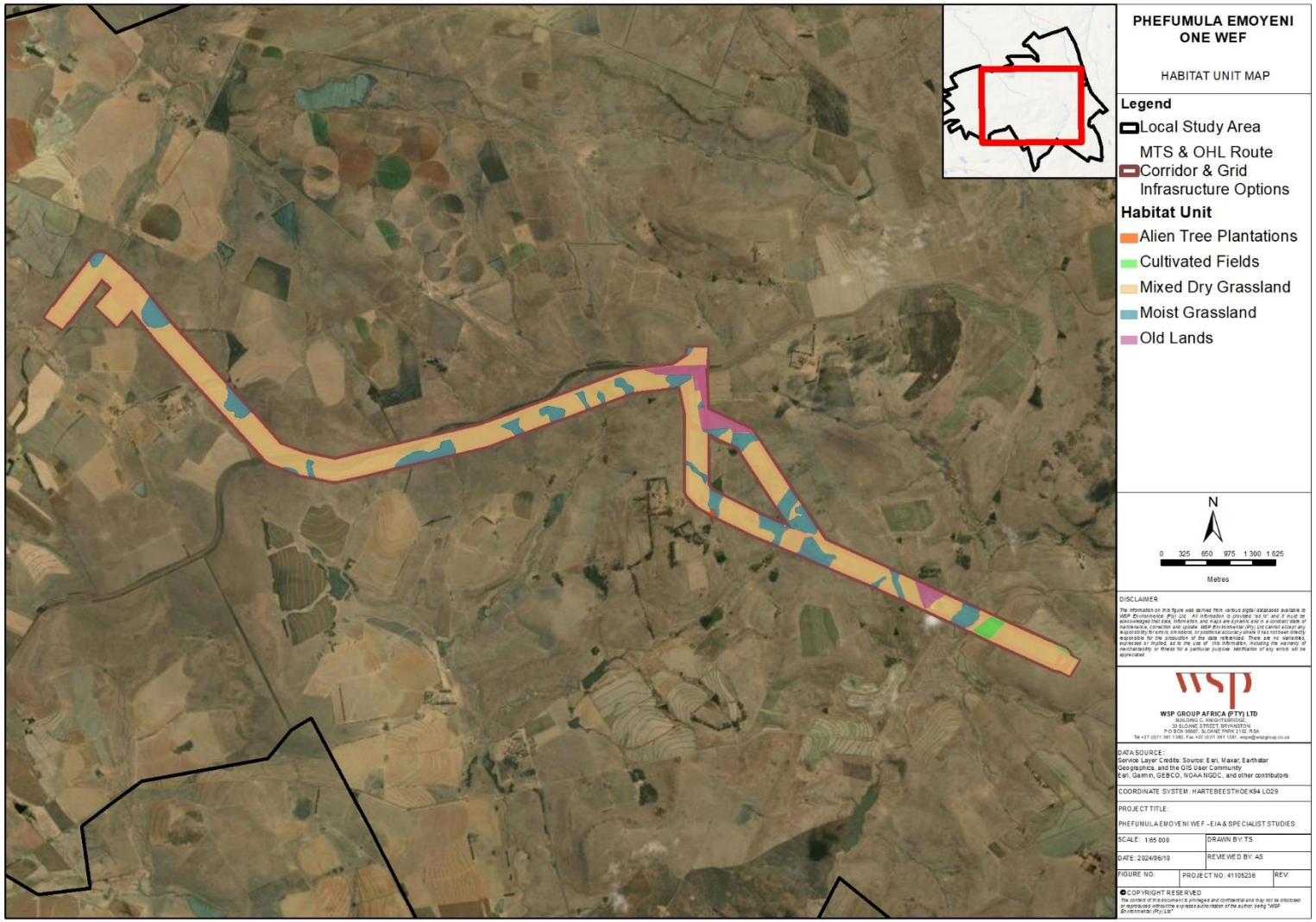

Figure 22: Habitat unit map for the grid connection assessment corridor/footprints.

5.3.4. Flora Species of Conservation Concern

No flora species listed as threatened or Near Threatened on the national Red List were recorded in the study area during the field survey. However, *Kniphofia ensifolia* subsp*. ensifolia,* which is listed as Near Threatened on the Mpumalanga Red List was recorded in the study area.

Based on reviewed literature and data sources, 10 flora species that occur, or potentially occur in the study area, are listed as threatened or near threatened on the national and/or provincial Red Lists. These are listed in Table 6 along with their conservation statuses, habitat preferences, and a probability of occurrence (based on field observations or habitat suitability assessments).

Several flora species that are listed as protected at a provincial level according to Mpumalanga Nature Conservation Act (Act No. 10 of 1998) were recorded in the study area during the field survey, including *Aloe ecklonis, Boophone disticha, Crinum bulbispermum, Gladiolus crassifolius, Gladiolus longicollis* subsp. *platypetalus, Gladiolus sericeovillosus* subsp. *calvatus* and *Haemanthus humilis.* It is possible that protected flora will occur within the development footprints of the proposed Project, and that these may be impacted by construction activities.

Table 6: Regionally or provincially threatened and Near Threatened flora species that occur or potentially occurring in the study area

Family	Scientific Name[#]	National Red List Status	Mpumalanga Red List Status	Mpumalanga Protected Status	Habitat Preferences	Probability of Occurrence
Aizoaceae	*Khadia carolinensis*	Vulnerable	Vulnerable	-	Range-restricted species, occurring in Highveld grasslands between 1700m. AOO is estimated at 28.34 km2 (SANBI, 2020). Favours on well-drained sandy loam soils amongst rock outcrops, or along the edges of sandstone sheets (Lötter *et al*., 2007a)	Probable – suitable habitat present.
Amaryllidaceae	*Boophone disticha*	Least Concern	Least Concern	Protected	Widespread species favouring dry grassland and rocky areas (Williams, et al., 2016a).	Recorded
Apocynaceae	*Aspidoglossum xanthosphaerum*	Vulnerable	Vulnerable	-	Favours marshy habitats in montane grasslands around 1800 m. Only known from four locations, within an EOO of < 500 km2 (Nickolas & Victor, 2006), and an AOO estimated at 15.90 km2 (SANBI, 2020). Recorded at Breyten to the west of the town of Ermelo.	Possible - suitable habitat present.
Apocynaceae	*Miraglossum davyi*	Vulnerable	Vulnerable	-	Found on sloping grasslands in heavy black loam soils at high altitudes. Known from only five locations, with an EOO of <15 000km2 (Lötter et al., 2005) and a AOO estimated at 10.78 km2 (SANBI, 2020).	Possible - suitable habitat present.
Apocynaceae	*Pachycarpus suaveolens*	Vulnerable	Vulnerable	-	Favours short, annually burnt grassland between 1400-2000 m. Known from eight locations with an EOO of 19 900 km2 (Lötter et al., 2007b).	Probable – suitable habitat present.
Hyacinthaceae	*Eucomis autumnalis*	Least Concern	Declining	Protected	Favours damp open places (Williams, *et al.,* 2016b).	Probable – suitable present.
Orchidaceae	*Eulophia cooperi*	Least Concern	Rare	Protected	Widespread species. Found on rocky quartzite ridges between 1000 and 1800 m.	Probable – suitable habitat present.

Family	Scientific Name[#]	National Red List Status	Mpumalanga Red List Status	Mpumalanga Protected Status	Habitat Preferences	Probability of Occurrence
Asphodelaceae	*Kniphofia ensifolia* subsp. *ensifolia*	Least Concern	Near Threatened	Protected	Generally occurs on heavy clay soils, along streams in grassland habitats.	Recorded
-	Sensitive species 1252	Vulnerable	Vulnerable	Protected	Moist bushveld habitats, including wooded mountain kloofs. AOO estimated at 73.01 km^2 (SANBI, 2020).	Unlikely/ Possible – limited suitable habitat present.
-	Sensitive species 41	Vulnerable	Vulnerable	Protected	Widespread but rare species, with a EEO of <19 940 km^2 and a AOO of <2000 km^2. Favours high altitude wetlands that remain damp throughout the year.	Probable – suitable habitat present.
-	Sensitive species 691	Vulnerable	Near Threatened	-	EOO is between 455 and 11 158 km^2, and thought to occur at less than 10 locations, with an AOO estimated at 3.06 km^2 (SANBI, 2020). Prefers moist areas in undulating grassland.	Probable – suitable habitat present.
[#]The names of specific taxa that are regarded as being susceptible to overexploitation have been redacted and are not presented in this report. These species are referred to by their assigned 'sensitive species number', as per the species assessment guidelines (SANBI, 2020).						
Source: List based on data from MPTA, BODATSA and Environmental Screening Report Output.						

5.4. Fauna Communities

5.4.1. Mammals

During the field survey, 19 mammal species were documented for the study area (Table 7). The recorded mammals range in size from small rodents to medium-sized antelope, and apart from the Blesbok (*Damaliscus pygargus phillipsi*), which is an actively-managed[1] taxon, all are free-roaming[2] species.

Four of the recorded mammal species are listed on the national mammal Red List (Child *et al.*, 2016), namely Mountain Reedbuck (*Redunca fulvorufula fulvorufula*) - Endangered, Serval (*Leptailurus serval*) – Near Threatened, Cape Clawless Otter (*Aonyx capensis*) - Near Threatened, and Swamp Musk Shrew (*Crocidura mariquensis*) - Near Threatened. A number of the recorded taxa are also listed as either nationally and/or provincially protected (listed in Appendix C).

Three mammal species were highlighted by the web-based screening tool as potentially sensitive features for the study area, namely the Spotted-necked Otter (*Hydrictis maculicollis*) - Vulnerable, Maquassie Musk Shrew (*Crocidura maquassiensis*) – Vulnerable, and Oribi (*Ourebia ourebi ourebi*) - Endangered. These taxa were not observed during the field survey. However, habitat suitability assessments indicate that it is 'probable' that the Spotted-necked Otter is present in the study area, while the probability of occurrence of the Maquassie Musk Shrew and Oribi in the study area are considered 'unlikely', and 'unlikely/possible', respectively.

Reviewed literature and datasets also indicate that an additional 24 species of conservation concern potentially occur in the study area. These are also listed in Appendix C.

Table 7: Mammals documented for the study area during the field survey

Family	Scientific Name	Common Name
Bovidae	*Damaliscus pygargus phillipsi*	Blesbok
Bovidae	*Redunca arundinum*	Southern Reedbuck
Bovidae	*Redunca fulvorufula fulvorufula*	Mountain Reedbuck
Bovidae	*Raphicerus campestris*	Steenbok
Canidae	*Canis mesomelas*	Black-backed Jackal
Erinaceidae	*Atelerix frontalis*	South African Hedgehog
Felidae	*Leptailurus serval*	Serval
Felidae	*Caracal caracal*	Caracal
Herpestidae	*Atilax paludinosus*	Water Mongoose
Herpestidae	*Cynictis penicillata*	Yellow Mongoose
Herpestidae	*Herpestes sanguineus*	Slender Mongoose
Herpestidae	*Suricata suricatta*	Suricate
Hystricidae	*Hystrix africaeaustralis*	Cape Porcupine
Leporidae	*Lepus saxatilis*	Scrub Hare
Mustelidae	*Aonyx capensis*	Cape Clawless Otter
Mustelidae	*Mellivora capensis*	Honey Badger

[1] Actively bred and managed populations.

[2] Mammals that are part of self-sustaining, natural populations and are able move freely across the landscape.

Family	Scientific Name	Common Name
Soricidae	*Crocidura mariquensis*[#]	Swamp Musk Shrew
Suidae	*Potamochoerus larvatus*	Bushpig
Viverridae	*Genetta genetta*	Small-spotted Genet
[#] Specimen identified by the Small Mammal Department at Ditsong Museum of Natural History.		

5.4.2. Birds

Reviewed literature indicates that about 22 bird SCC are known to occur in the region in which the study area is located. These include 20 species listed as threatened/Near Threatened on the regional Red List (Taylor, *et al*., 2015), ten species listed on the NEMBA ToPS list (2007), and 22 species are listed as either threatened or protected at a provincial level.

During the 2024 field survey, six bird SCC were recorded in the study area as opportunistic observations, namely the Blue Crane (*Anthropoides paradiseus*) – Near Threatened, Lesser Flamingo (*Phoeniconaias minor*) - Near Threatened, Greater Flamingo (*Phoenicoperus roseus*) - Near Threatened, Southern Bald Ibis (*Geronticus calvus*)- Vulnerable, Yellow-billed Stork (*Mycteria ibis*) – Endangered, and Blue Korhaan (*Eupodotis caerulescens*) - Near Threatened (MP).

For a screening list of all bird SCC that potentially occur in the study area refer to Appendix C. For more detailed assessment of birds, refer to the bird specialist scoping study for the proposed Project.

5.4.3. Herpetofauna

Herpetofauna observed in the study area during the field survey include the Common River Frog (*Amieta delalandii*), Water Monitor (*Varanus niloticus*) and Rinkhals (*Hemachatus haemachatus*). Anecdotal evidence from a local farmer indicate that other common encountered species include the Mole Snake (*Pseudaspis cana*) and Red-lipped Snake (*Crotaphopeltis hotamboeia*). These are all common and widespread species.

Based on distribution records, six reptile species of conservation concern potentially occur in the study area. These are all listed on the Mpumalanga Red List. None of these species are listed as threatened/Near Threatened on the regional Red List.

One amphibian of conservation concern, namely the Giant Bullfrog (*Pyxicephlaus adspersus*) potentially occurs in the study area. This is also not listed as threatened on the regional Red List. It is however, listed as Protected on the NEMBA ToPS list (2007) and according to the Mpumalanga Nature Conservation Act (Act No. 10 of 1998). For a list of fauna SCC that potentially occur in the study area refer to Appendix C. It is possible that herpetofauna SCC, including the Giant Bullfrog, occur in the study area.

5.4.4. Invertebrates

Three invertebrate species of conservation concern potentially occur in the study area, namely the Potchefstroom Blue (*Lepidochrysops procera*) – Rare, Roodepoort Copper (*Aloeides dentatis maseruna*) – Rare (MP) and the Marsh Sylph (*Metisella meninx*) – Near Threatened. These SCC were

not recorded in the study area during the field survey, but it is possible that they are present and may be impacted by the proposed Project.

6. Site Ecological Importance

The site ecological importance (SEI) of identified habitat units in the study area were assessed using the SANBI (2020) protocol, and are presented in Table 8 and shown in Figure 23.

It must be noted that with respects to the identification of sensitive habitats/sites, several regional factors were also considered important. At a regional level, both vegetation types that characterise the region, namely Eastern Highveld Grassland (EN) and Soweto Highveld Grassland (VU) are threatened. The proposed Project will mostly impact areas of Soweto Highveld Grassland. Moreover, significant portions of the study area, including most of the proposed Project site, are delineated under the MBSP as CBA Irreplaceable and CBA Optimal. Several motivating criteria are germane to these CBAs including *inter alia*, the presence/potential presence of SCC, intact grassland patches, macro-corridor and habitat linkages.

Table 8: Site Ecological Importance

Habitat Unit	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Mixed Dry Grassland	HIGH: Confirmed or highly likely occurrence of CR, EN, VU species (=Mountain Reedbuck, EN). Small area of natural habitat of EN ecosystem type or large area of VU ecosystem type (=Eastern Highveld Grassland, EN & Soweto Highveld Grassland, VU).	HIGH: Very large (>100 ha) intact area for any conservation status of ecosystem type. High habitat connectivity with potentially functional ecological corridors AND a regularly used road network between intact habitat patches. BUT Minor current negative ecological impacts (overgrazing, AIS), with limited signs of major past disturbance and good rehabilitation potential.	HIGH	MEDIUM: Habitat that can recover slowly to restore >75% of the original species composition and functionality	HIGH
Rocky Shrubland (Not present in the proposed grid connection assessment corridor/footprints)	HIGH: Confirmed or highly likely occurrence of CR, EN, VU species. Small area of natural habitat of EN ecosystem (=Eastern Highveld Grassland, EN & Soweto Highveld Grassland, VU).	HIGH: Large (<100 ha) intact area for any conservation status of ecosystem type. High habitat connectivity with potentially functional ecological corridors AND a regularly used road network between intact habitat patches. BUT Minor current negative ecological impacts	HIGH	MEDIUM: Habitat that can recover slowly to restore >75% of the original species composition and functionality	HIGH

Habitat Unit	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
		(overgrazing, AIS), with limited signs of major past disturbance and good rehabilitation potential.			
Moist Grassland	HIGH: Confirmed or highly likely occurrence of CR, EN, VU species (=Southern Bald Ibis, VU and Yellow-billed Stork, EN). Small area of natural habitat of EN ecosystem (=Eastern Highveld Grassland, EN & Soweto Highveld Grassland, VU).	HIGH: Very large (>100 ha) intact area for any conservation status of ecosystem type. High habitat connectivity with potentially functional ecological corridors AND a regularly used road network between intact habitat patches. BUT Minor current negative ecological impacts (overgrazing, AIS), with limited signs of major past disturbance and good rehabilitation potential.	HIGH	MEDIUM: Habitat that can recover slowly to restore >75% of the original species composition and functionality	HIGH
Old Lands	LOW: No confirmed or highly likely populations of SCC or range-restricted species.	LOW/MEDIUM: Mostly minor current negative ecological impacts with some major impacts (i.e., former cultivation) Moderate rehabilitation potential.	LOW	HIGH: Habitat that can recover relatively quickly to restore >75% of the original species composition and functionality	VERY LOW

Habitat Unit	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Cultivated Fields	VERY LOW: No confirmed or highly likely populations of SCC or range-restricted species. No natural habitat remaining.	VERY LOW: Several major current negative ecological impacts.	VERY LOW	VERY HIGH: Habitat that can recover rapidly to restore >75% of the original species composition and functionality.	VERY LOW
Alien Tree Plantations	VERY LOW: No confirmed or highly likely populations of SCC or range-restricted species. No natural habitat remaining.	VERY LOW: Several major current negative ecological impacts.	VERY LOW	VERY HIGH: Habitat that can recover rapidly to restore >75% of the original species composition and functionality.	VERY LOW

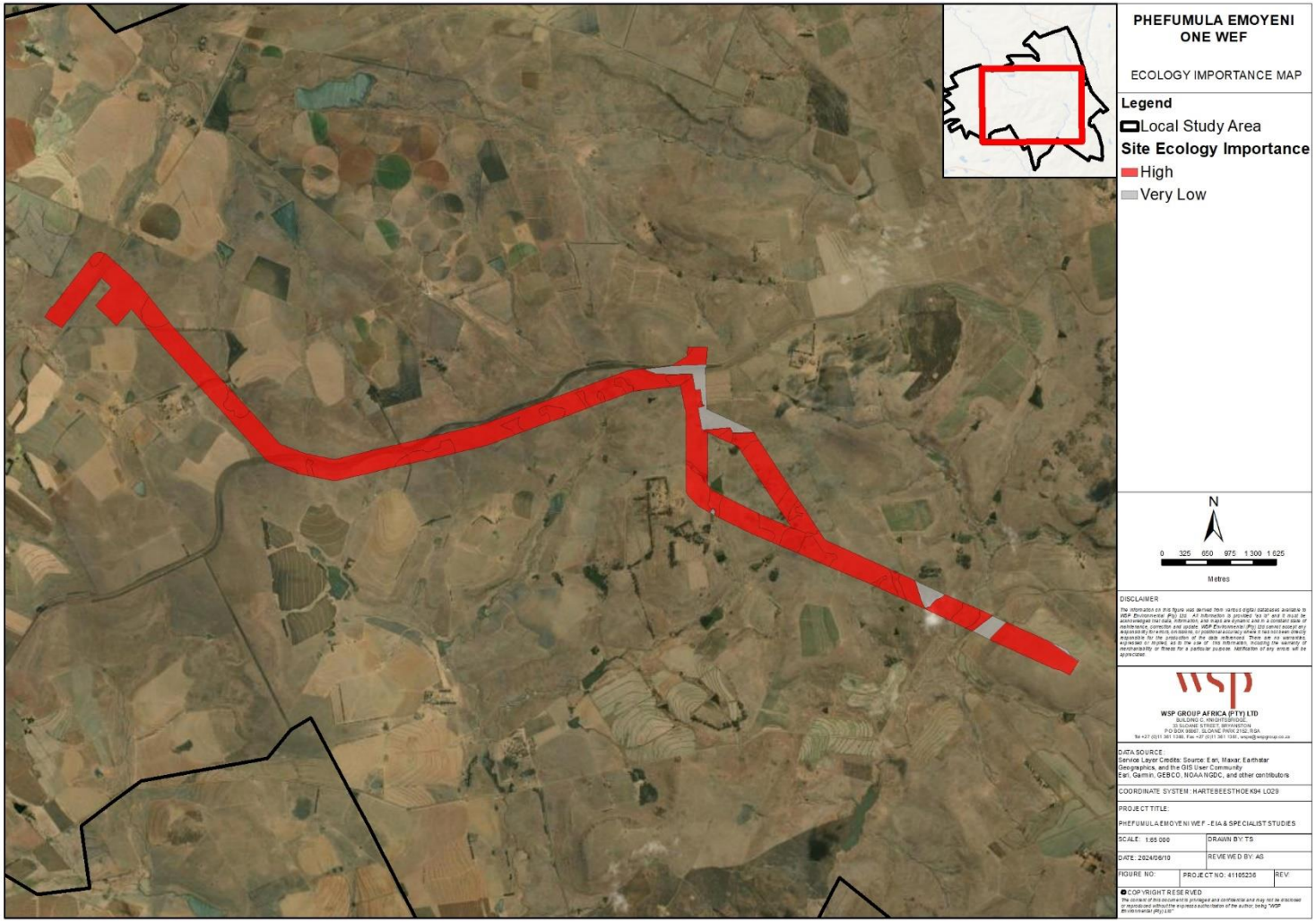

Figure 23: Site Ecological Important of identified habitat units, as assessed using the SANBI (2020) methodology.

7. Site Sensitivity Verification Outcome

The findings of the site sensitivity verification exercise, based on reviewed literature and field data collected in the study area during the field survey, together with the anticipated reporting requirements as stipulated by the various protocols, are summarised in Table 9.

Table 9: Site sensitivity verification results.

Theme	Screening Tool Sensitivity	Predicted Site-based Sensitivity	Motivation	Scoped Report Requirements
Terrestrial biodiversity	Very High	High in areas of areas of Mixed Dry Grassland, Rocky Shrubland and Moist Grassland, and Very High in these habitats designated as CBA Irreplaceable and CBA Optimal. Very Low in Old Lands, Cultivated Fields and Alien Tree Plantations.	Large patches of dry and moist grassland are designated as CBA's under the MBSP (2022). These areas care important and functional flora and fauna habitat, and thus contribute to provincial conservation targets. They also, *inter alia*, comprise Soweto Highveld Grassland and small areas of Eastern Highveld Grassland, which are both listed as threatened ecosystems. Old Lands comprise a secondary grassland community that has regenerated following disturbance. Cultivated Fields and Alien Tree Plantations are completely modified and/or dominated by alien species (often declared AIS). These habitats cannot contribute to provincial conservation targets, which is the intention of CBAs.	Terrestrial Biodiversity Specialist Assessment
Plant species	Medium	Medium in areas of Mixed Dry Grassland, Rocky Shrubland and Moist Grassland.	No national Red List flora species were recorded. But *Kniphofia ensifolia* subsp. *ensifolia* (NT in MP) and several protected taxa were observed on-site during the field survey, and habitat suitability assessments suggest that it is possible that other flora SCC are present in areas of Mixed	Terrestrial Plant Species Specialist Assessment Report

Theme	Screening Tool Sensitivity	Predicted Site-based Sensitivity	Motivation	Scoped Report Requirements
			Dry Grassland, Rocky Shrubland and Moist Grassland.	
Animal species	High	High in areas of Mixed Dry grassland, Rocky Shrubland and Moist Grassland.	Several fauna SCC were observed in the study area, including Serval (NT), Mountain Reedbuck (EN), Cape Clawless Otter (NT), Swamp Musk Shrew (NT) and several birds. Habitat suitability assessments also suggest that it is possible that several other fauna SCC are present.	Animal Species Specialist Assessment Report

8. High Level Screening of Impacts

The construction, operation and decommissioning of proposed Project infrastructure and facilities are anticipated to result in the following key impacts on terrestrial biodiversity, flora and fauna (excl. birds) receptors:

1. Direct loss and disturbance of natural habitat;
2. Establishment and spread of alien and invasive species;
3. Direct loss of flora SCC;
4. Fragmentation of fauna habitats;
5. Soil erosion and sedimentation of drainage features;
6. Injury, mortality and disturbance of fauna SCC; and
7. Accidental wildfires from Project infrastructure.

The outcomes of the screening of the potential impacts are summarised in Table 10 and described in detail in the following sections:

8.1. Construction Phase

8.1.1. Direct loss and disturbance of natural habitat

Habitat loss and disturbance refers to the direct removal or disturbance of natural habitat that results from vegetation clearing and earth works. The development of the proposed Project infrastructure will require vegetation clearing and earth works within the planned development footprints, which will result in the direct loss of habitat. The loss and disturbance of natural habitat patches that are designated threatened (Eastern Highveld Grassland – Endangered and Soweto Eastern Highveld Grassland - Vulnerable) and specifically those delineated as CBA, is an impact of concern with respects to terrestrial biodiversity.

Without mitigation, the consequence of the potential impact could be severe, and the probability definite, amounting to an impact of high significance.

8.1.2. Establishment and spread of alien and invasive species.

Disturbances caused by vegetation clearing and earth works during construction will facilitate the establishment and spread of alien invasive vegetation. Alien plant infestations can spread exponentially, suppressing or replacing indigenous vegetation. This may result in the impairment of ecosystem functioning and a loss of biodiversity.

Before mitigation, the consequence of the potential impact is considered moderately severe, while the possibility of the impact occurring is highly probable. Potential impact significance is rated medium.

8.1.3. Direct loss of flora SCC

One Mpumalanga Near Threatened species and several provincially protected flora taxa have been recorded in the study area during the field survey. It is possible that individual SCC will be present within the planned construction footprints and cleared during construction.

Without mitigation, the consequence of the potential impact could be very severe, and the probability highly probable, amounting to an impact of high significance.

8.1.4. Fragmentation of fauna habitats.

Habitat fragmentation occurs when habitat loss or the erection of barriers results in the partitioning of natural habitat into smaller, discontinuous and often isolated habitat patches. This can reduce habitat connectivity and negatively affect various landscape-scale ecological processes, such as fauna migration, movement and dispersal.

Without mitigation, the consequence of the potential impact could be severe, and the likelihood is probable, amounting to an impact of medium significance.

8.1.5. Soil erosion and sedimentation of drainage features

Construction activities, such as the removal of vegetation and earth works, are likely to increase the potential for soil erosion, which can spread beyond the development footprints and can cause broader-scale habitat degradation. Increased erosion is also likely to increase sediment loads entering downstream drainage features, which may impact the integrity of aquatic ecosystems. This could negatively affect species such as the Spotted-necked Otter (Vulnerable), which depends on large, open water bodies.

Before mitigation, the consequence of the potential impact is considered moderately severe, while the possibility of the impact occurring is probable. Potential impact significance is rated low.

8.1.6. Injury, mortality and disturbance of fauna SCC.

Large and mobile fauna will move off to avoid disturbances caused by construction activities. However, smaller and less mobile species may be trapped, injured and killed during vegetation clearing and earth works. Susceptible fauna includes *inter alia*, burrowing mammals (e.g., rodents), reptiles and amphibians. Other common potential causes of fauna death, injury and disturbance during the construction phase may include vehicle collisions, hunting and snaring by construction workers, trapping of fauna in excavations and trenches, and excessive dust and noise from construction machinery may cause sensory disturbances.

Without mitigation, the consequence of the potential impact could be very severe, and the likelihood highly probable, amounting to an impact of high significance.

8.2. Operation Phase

8.2.1. Injury, mortality and disturbance of fauna SCC.

Increased maintenance vehicle traffic in the study area during the operation phase may pose a risk of injury and mortality of fauna SCC. The consequence of the potential impact on fauna during the operational phase is expected to be very severe, and its likelihood is rated improbable, resulting in an impact of low significance prior to mitigation.

8.2.2. Establishment and spread of alien and invasive species.

Alien species colonisation will continue to be an impact of concern during the operation phase. Before mitigation, potential impact significance is rated Low.

8.2.3. Accidental wildfires from Project infrastructure

There is potential for accidental wildfires to be initiated from the arching/shorting of proposed electrical infrastructure, and to spread into adjacent natural habitat. This is particularly a risk during

the dry season, when vegetation is very dry. Unplanned wildfires can have several negative impacts on terrestrial biodiversity.

Before mitigation, the consequence of the potential impact is considered severe, while the possibility of the impact occurring is probable. Potential impact significance is rated medium.

8.3. Decommissioning Phase

8.3.1. Establishment and spread of alien and invasive species.

The dismantling and removal of proposed Project infrastructure is likely to cause disturbances to vegetation and soils that may facilitate alien invasive species establishment. Without active control, there is potential for alien invasive species to spread into adjacent undisturbed natural habitats.

Before mitigation, the consequence of the potential impact is considered moderately severe, while the possibility of the impact occurring is highly probable. Potential impact significance is rated medium.

8.3.2. Soil erosion and sedimentation of drainage features

The dismantling and removal of proposed Project infrastructure is also likely to lead to potential incidences of soil erosion. High levels of soil erosion could cause increased sedimentation of downstream drainage features.

Before mitigation, the consequence of the potential impact is considered moderately severe, while the possibility of the impact occurring is probable. Potential impact significance is rated low.

Table 10: Terrestrial Biodiversity Impact Summary

Activity	Potential Impact	Affected Receptors	Phase	Probability	Consequence	Significance without mitigation
Vegetation clearing and earthworks in development footprints	Direct loss and disturbance of natural habitat	Sensitive natural habitat	Construction	4	3	High
	Establishment and spread of alien and invasive species.	Sensitive natural habitat	Construction Operational	3	2	Medium
	Direct loss of flora SCC	Flora SCC	Construction	3	4	High
	Fragmentation of fauna habitats.	All fauna, including SCC	Construction	2	3	Medium
	Soil erosion and sedimentation of drainage features.	Sensitive natural habitat	Construction	2	2	Low
	Injury, mortality and disturbance of fauna SCC.	Fauna SCC (but also includes all fauna taxa)	Construction Operational	3	4	High
Increased vehicular traffic	Injury, mortality and disturbance of fauna SCC.	Injury, mortality and disturbance of fauna SCC.	Construction Operational	2	4	Medium
Arching/shorting of proposed electrical infrastructure.	Accidental wildfires from Project infrastructure.	Sensitive natural habitat, and flora and fauna species	Operational	2	3	Medium
Decommissioning and removal of Project infrastructure	Establishment and spread of alien and invasive species.	Sensitive natural habitat	Decommissioning	3	2	Medium
	Soil erosion and sedimentation of drainage features.	Sensitive natural habitat	Decommissioning	2	2	Low

9. Mitigation Measure

Mitigation measures that are designed to avoid and minimise the severity and consequence of the potential impacts on terrestrial biodiversity receptors in the study area are summarised below:

9.1. Identification of Areas to be Avoided

- Confirmed sites containing flora SCC that are listed on the national Red List as Vulnerable, Endangered or Critically Endangered should be avoided with a recommended buffer of 200 m;
- Areas of undisturbed natural Mixed Dry Grassland and Moist Grassland habitat that are designated as CBA should be avoided, as far as possible; and
- A loss/disturbance buffer zone of at least 100 m (or that indicated in the wetland specialist report) should be maintained between the maximum extent of construction works and the outer boundary of wetlands and riparian zones (Moist Grassland).

9.2. Minimisation

- All temporary construction footprints, including equipment laydown areas, portable toilets, should only be located in areas of modified habitat (e.g., Cultivated Fields, Old Lands);
- A wet/growing season micro-siting walkdown of proposed Project development footprints should be conducted to identify sensitive biodiversity features that should be avoided, and inform micro-siting recommendations. Where feasible, permanent proposed Project infrastructure should always be located on land that is already modified/disturbed;
- Temporary construction access roads/tracks should be aligned with existing district and farm roads and tracks wherever possible;
- Vegetation clearing should be restricted to the minimum required Project footprints only, with no clearing permitted outside of these areas;
- The footprints to be cleared should be clearly demarcated prior to construction to prevent unnecessary clearing outside of these areas;
- No heavy vehicles should travel beyond the marked works zones;
- Install erosion prevention measures at sites where erosion is likely. Measures should include:
    - Establishing low berms on approach and departure slopes to river/wetland crossings;
    - Sediment traps and barriers along the lower edge of exposed soil surfaces;
    - Use of geo-textiles, hay bales or brush-packing on exposed soil surfaces to reduce surface water flow, retain soils and soil moisture, and encourage natural revegetation;
- The wet/growing season micro-siting walkdown of proposed Project footprints should identify and assess the number of potentially impacted flora SCC and other sensitive biodiversity features. Based on the findings:
    - Wherever possible, infrastructure footprints should be re-aligned/micro-sited to avoid SCC or other sensitive biodiversity features;
    - Permits should be obtained from the relevant authority to rescue and relocate impacted protected plants;

- Develop and implement an Alien Invasive Species Control and Eradication Plan for the proposed Project;
- Develop a rehabilitation protocol to guide the stabilisation and revegetation of all area disturbed by construction activities;
- Minimise the risk of accidental wildfires by:
    - Regularly trimming tall woody vegetation that is in close proximity to proposed OHL;
    - Regularly inspecting and replacing damaged/faulty electrical infrastructure;
    - Installing systems to detect faults to infrastructure electrical infrastructure;
    - Engage with the local farmers to develop a co-ordinated grassland burning programme;
- Implement measures to protect all fauna, including specifically SCC. These could include:
    - Prohibit off-road driving;
    - Enforcing on-site speed limits for all construction and maintenance vehicles;
    - Strictly prohibiting hunting and snaring of fauna by on-site workers; and
    - Retaining an Environmental Control Officer (ECO) on-site during construction to manage any fauna-human interactions.

10. Monitoring Requirements

- Annual on-site AIS monitoring should be conducted during construction, operations and decommissioning. Monitoring should be used to inform the need and scope of follow-up AIS control; and
- Annual rehabilitation monitoring should be conducted of all disturbed and rehabilitated areas. Monitoring should be used to inform the need and scope of additional rehabilitation interventions.

11. Plan of Study for EIA Stage for Terrestrial Biodiversity, Plant and Animal Species

The findings of the flora and fauna field surveys will be used to fully develop baseline terrestrial biodiversity, flora and fauna descriptions for the study area and proposed Project site. These data will be used in conjunction with the proposed Project infrastructure layout and activities to inform a full impact assessment of proposed Project activities and the identification of appropriate mitigation measures. These data will be presented within the respective specialist assessment reports, i.e., Terrestrial Biodiversity Specialist Assessment, Animal Species Specialist Assessment and Plant Species Specialist Assessment.

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This report has been compiled by Andrew Zinn (Hawkhead Consulting).

Andrew Zinn (*Pr.Sci.Nat*.)

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Appendix A: Curriculum Vitae of Andrew Zinn

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Curriculum Vitae of Andrew Zinn (Pr.Sci.Nat.)

Details

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South Africa
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Profile

I am an ecologist with an M.Sc. Degree in Resource Conservation Biology and 15 years of experience working in biodiversity consulting and ecological research. I am registered with the South African Council of Natural Scientific Professions as a Professional Natural Scientist. I currently work as an independent consulting ecologist, with Hawkhead Consulting. During my career I have worked on projects in remote areas in several African countries including South Africa, Botswana, Democratic Republic of the Congo, Ethiopia, Ghana, Mozambique, Tanzania and Zambia. I have also previously worked in the United Kingdom and the United Arab Emirates.

Education and Qualifications

- University of the Witwatersrand, M.Sc. Resource Conservation Biology (2013).
- University of KwaZulu-Natal, BSc. Hons. Ecology and Conservation Biology (2005).
- University of KwaZulu-Natal, BSc. Zoology and Grassland Science (2004).
- Bryanston High School, Johannesburg. Matric Exemption. (2000).

Affiliations

- Member of the South African Wildlife Management Association
- Member of the South African Council of Natural Scientific Professions – Professional Natural Scientist (400687/15).

Work Experience

1. **Independent Ecologist**

Hawkhead Consulting, South Africa
September 2020 – Present

Consulting ecologist focusing on terrestrial ecology. I specialise in conducting baseline flora and fauna surveys, ecological impact assessments, and developing mitigation and management programmes for projects and operations in various industry sectors. Core services and responsibilities include, amongst others:

- Biodiversity study design and implementation;
- Biodiversity baseline and impact assessment reporting;
- Mitigation measure design and application;
- Vegetation surveys and vegetation community mapping;
- Fauna surveys for mammals, birds, reptiles and amphibians;
- Development of biodiversity management plans;
- Development of rehabilitation and revegetation plans; and
- Alien invasive species control and eradication plans.

2. Ecologist
Golder Associates Africa, South Africa
June 2011 – September 2020
Ecologist responsible for the management and implementation of baseline biodiversity studies and ecological impact assessments for development projects in the mining, power generation, transport, land development and industrial development sectors throughout sub-Saharan Africa. Role responsibilities included project management, technical review, biodiversity study design and implementation, flora and fauna surveys, biodiversity baseline and impact assessment reporting, development of biodiversity management plans, rehabilitation plans and alien invasive species control and eradication plans. These studies were conducted to satisfy national environmental regulations and/or international financing requirements, including the International Finance Corporation's (IFC) Performance Standard 6 (PS6)

3. Independent Ecologist
Subcontracted to KPMG, United Arab Emirates
March – April 2011
Subcontracted to KPMG as a subject matter expert (ecology) on the internal audit of Sir Bani Yas Island's Conservation Department (United Arab Emirates). The audit focused on evaluating the efficacy of the island's various conservation practices, including game management, feed provisioning, carnivore breeding and monitoring, veterinary care and vegetation maintenance.

4. Environmental Consultant
WSP Environment and Energy, South Africa
August 2008 – March 2011
Environmental consultant, responsible for a range of environmental projects and services including managing environmental authorisation processes (BAs and EIAs), facilitating stakeholder engagement processes,
conducting compliance audits, developing environmental management programmes and conducting specialist ecological studies.

5. Research Technician
Yale University, Kruger National Park, South Africa
October 2007 – May 2008
Research technician on the Savanna Convergence Experiment (SCE). The SCE project was a long-term cross-continental study that investigated the role of mega-herbivores in fire-grazing interactions and their influence on vegetation dynamics. Responsible for collecting and analysing vegetation composition and productivity data, as well as herbivore distribution data.

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Appendix B: Rating criteria for Conservation Importance, Functional Integrity and Receptor Resilience and the scoring matrices, as per (SANBI, 2020).

The ecological sensitivity of habitats in the study area was determined using the protocol for evaluating site ecological importance (SEI) as published in SANBI's Species Assessment Guideline (SANBI, 2020). SEI is considered to be a function of the biodiversity importance (BI) of a receptor and its resilience to impacts (receptor resilience, RR), as per:

$$SEI = BI + RR.$$

Biodiversity importance is a function of conservation importance (CI) and the functional integrity (FI) of the receptor, as per:

$$BI = CI + FI$$

- **Conservation Importance** is defined as "the importance of a site for supporting biodiversity features of conservation concern present, e.g., populations of IUCN threatened and Near Threatened species (CR, EN, VU and NT), Rare species, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystems types, through predominantly natural processes" (SANBI, 2020).
- **Functional Integrity** is defined as "A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts" (SANBI, 2020).
- **Receptor Resilience** is defined as "the intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention" (SANBI, 2020).

Table 1: Conservation Importance (CI) criteria.

Conservation Importance (CI)	Fulfilling Criteria
Very High	• Confirmed or highly likely occurrence of CR, EN, VU or Extremely Rare or Critically Rare species that have a global EOO of < 10km^2; • Any area of natural habitat of a CR ecosystem type or large area (>0.1 % of the total ecosystem type extent) of natural habitat of an EN ecosystem type; and • Globally significant populations of congregatory species (>10% of global population).
High	• Confirmed of highly likely occurrence of CR, EN, VU species that have a global EOO of > 10km^2, IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining; • Small area (>0.01% but <0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (>0.1%) of natural habitat of VU ecosystem type; • Presence of Rare species; • Globally significant populations of congregatory species (>1% but < 10% of global population).
Medium	• Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals; • Any area of natural habitat of threatened ecosystem type with status of VU; • Presence of range-restricted species; and • >50% of receptor contains natural habitat to support SCC.
Low	• No confirmed or highly likely populations of SCC; • No confirmed or highly likely populations of range-restricted species; and • <50% of receptor contains natural habitat with limited potential to support SCC.
Very Low	• No confirmed and highly unlikely populations of SCC; • No confirmed and highly unlikely populations of range-restricted species; and • No natural habitat remaining.

Table 2: Functional Integrity (FI) criteria.

Functional Integrity (FI)	Fulfilling Criteria
Very High	• Very large (>100 ha) intact area for any conservation status of ecosystem type or >5a ha for CR ecosystem type; • High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches; • No or minimal current negative ecological impacts with no signs of major disturbance (e.g., ploughing)
High	• Large (>5 ha but < 100 ha) intact area for any conservation status ecosystem types; • Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches; and • Only minor current negative ecological impacts (e.g., few livestock utilising area) with no signs of major past disturbance (e.g., ploughing) and good rehabilitation potential.
Medium	• Medium (>5ha but< 20 ha) semi-intact area for any conservation status ecosystem type or >20 ha for VU ecosystem type; • Only narrow corridors of good connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches; • Mostly minor current negative ecological impacts with some major impacts (e.g., established population of alien invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential.
Low	• Small (> 1 ha but <5ha) area; • Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential; and • Several minor and major current negative ecological impacts.
Very Low	• Very small (<1 ha) area; • No habitat connectivity except for flying species or flora with wind-dispersed seeds; • Several major current negative ecological impacts.

BI = CI + FI

Biodiversity Importance (BI) Rating Matrix

Biodiversity Importance (BI)		**Conservation Importance**				
		Very High	**High**	**Medium**	**Low**	**Very Low**
Functional Integrity	**Very High**	Very High	Very High	High	Medium	Low
	High	Very High	High	Medium	Medium	Low
	Medium	High	Medium	Medium	Low	Very Low
	Low	Medium	Medium	Low	Low	Very Low
	Very Low	Medium	Low	Very Low	Very Low	Very Low

Table 3: Receptor Resilience criteria (RR)

Resilience	Fulfilling Criteria
Very High	Habitat that can recover rapidly (˜less than 5 years) to restore >75% of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of remaining at a site even when a disturbance or impacts occurring, or species that have a very high likelihood of returning to a site once the disturbance or impact has been removed.
High	Habitat that can recover relatively quickly (˜ 5-10 years) to restore >75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impacts occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed.
Medium	Habitat that can recover slowly (˜ more than 10 years) to restore >75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impacts occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.
Low	Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ˜less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impacts occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed.
Very Low	Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed.

SEI = BI + RR

Site Ecological Importance (SEI) Rating Matrix

Site Ecological Importance		Biodiversity Importance				
		Very High	**High**	**Medium**	**Low**	**Very Low**
Receptor Resilience	**Very Low**	Very High	Very High	High	Medium	Low
	Low	Very High	Very High	High	Medium	Very Low
	Medium	Very High	High	Medium	Low	Very Low
	High	High	Medium	Low	Very Low	Very Low
	Very High	Medium	Low	Very Low	Very Low	Very Low

Table 4: Guidelines for interpreting SEI in the context of the proposed development activities.

Site Ecological Importance	Interpretation in relation to proposed development activities
Very High	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e., last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit amount of habitat impacted; limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Very Low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

Appendix C: List of Fauna SCC recorded and potentially occurring in the study area based on field observations and reviewed literature and datasets.

Mammals

Species recorded in the study area based on observations or anecdotal evidence during the field survey are in **bold** text.

Family	Scientific Name	Common Name	National Red List Status (2016)	NEMBA ToPS List (2007)	Mpumalanga Status
Bathyergidae	*Cryptomys hottentotus*	Common Mole-rat	Data Deficient	-	Data Deficient
Bovidae	*Connochaetes gnou*	Black Wildebeest	Least Concern	Protected	-
Bovidae	*Hippotragus niger*	Sable	Vulnerable	-	Vulnerable
Bovidae	*Ourebia ourebi ourebi*	Oribi	Endangered	Endangered	Endangered / Protected
Bovidae	*Pelea capreolus*	Grey Rhebok	Near Threatened	-	Protected
Bovidae	*Raphicerus campestris*	Steenbok	Least Concern	-	Protected
Bovidae	***Redunca arundinum***	**Southern Reedbuck**	**Least Concern**	**Protected**	**Protected**
Bovidae	***Redunca fulvorufula fulvorufula***	**Mountain Reedbuck**	**Endangered**	**-**	**Protected**
Canidae	*Vulpes chama*	Cape Fox	Least Concern	Protected	-
Chrysochloridae	*Amblysomus robustus*	Robust Golden Mole	Vulnerable	Endangered	Vulnerable
Chrysochloridae	*Amblysomus septentrionalis*	Highveld Golden Mole	Near Threatened	-	Near Threatened
Chrysochloridae	*Chrysospalax villosus*	Rough-haired Golden Mole	Vulnerable	Critically Endangered	-
Erinaceidae	***Atelerix frontalis***	**South African Hedgehog**	**Near Threatened**	**Protected**	**Near Threatened / Protected**
Felidae	*Felis nigripes*	Black-footed Cat	Vulnerable	Protected	Near Threatened
Felidae	***Leptailurus serval***	**Serval**	**Near Threatened**	**Protected**	**Near Threatened**
Felidae	*Panthera pardus*	Leopard	Vulnerable	Vulnerable	Near Threatened
Hyaenidae	*Parahyaena brunnea*	Brown Hyaena	Near Threatened	Protected	Near Threatened / Protected
Hyaenidae	*Proteles cristata*	Aardwolf	Least Concern	-	Protected
Muridae	*Dasymys incomtus*	African Marsh Rat	Near Threatened	-	Near Threatened
Muridae	*Otomys auratus*	Vlei Rat (Grassland type)	Near Threatened	-	-
Mustelidae	*Poecilogale albinucha*	African Striped Weasel	Near Threatened	-	-
Mustelidae	***Aonyx capensis***	**Cape Clawless Otter**	**Near Threatened**	**Protected**	**Protected**

Family	Scientific Name	Common Name	National Red List Status (2016)	NEMBA ToPS List (2007)	Mpumalanga Status
Mustelidae	*Hydrictis maculicollis*	Spotted-necked Otter	Vulnerable	Protected	Near Threatened / Protected
Mustelidae	***Mellivora capensis***	**Honey Badger**	**Least Concern**	**Protected**	**Near Threatened / Protected**
Orycteropodidae	*Orycteropus afer*	Aardvark	Least Concern	-	Protected
Soricidae	*Crocidura maquassiensis*	Maquassie Musk Shrew	Vulnerable	-	Vulnerable
Soricidae	***Crocidura mariquensis***	**Swamp Musk Shrew**	**Near Threatened**	**-**	**Near Threatened**
Source: Stuart and Stuart (2007), MammalMAP (2023) and MPTA					

Birds

Species recorded in the study area based on incidental observations during the field survey are in **bold** text (Note: no detailed bird surveys were conducted as part of the field survey for this study. For additional information on bird SCC in the study area refer to the bird specialist scoping study for the proposed Project).

Family	Scientific Name	Common Name	Regional Red List (2015)	NEMBA ToPS List (2007)	Mpumalanga Status
Accipitridae	*Circus maurus*	Black Harrier	Endangered	-	Endangered
Accipitridae	*Circus ranivorus*	African Marsh Harrier	Endangered	Protected	Endangered
Accipitridae	*Gyps coprotheres*	Cape Vulture	Endangered	Endangered	Endangered
Accipitridae	*Polemaetus bellicosus*	Martial Eagle	Endangered	Vulnerable	Endangered
Charadriidae	*Vanellus melanopterus*	Black-winged Lapwing	-	-	Near Threatened
Falconidae	*Falco biarmicus*	Lanner Falcon	Vulnerable	-	Vulnerable
Gruidae	*Grus carunculata*	Wattled Crane	Critically Endangered	Critically Endangered	Critically Endangered
Gruidae	***Grus paradisea***	**Blue Crane**	**Near Threatened**	**Endangered**	**Vulnerable**
Laridae	*Hydroprogne caspia*	Caspian Tern	Vulnerable	-	Endangered
Otididae	***Eupodotis caerulescens***	**Blue Korhaan**	**-**	**Vulnerable**	**Near Threatened**
Otididae	*Eupodotis senegalensis*	White-bellied Bustard	Vulnerable	-	Vulnerable
Otididae	*Neotis denhami*	Denham's Bustard	Vulnerable	Protected	Vulnerable
Phoenicopteridae	***Phoeniconaias minor***	**Lesser Flamingo**	**Near Threatened**	**-**	**Near Threatened**
Phoenicopteridae	***Phoenicopterus roseus***	**Greater Flamingo**	**Near Threatened**	**-**	**Near Threatened**

Family	Scientific Name	Common Name	Regional Red List (2015)	NEMBA ToPS List (2007)	Mpumalanga Status
Sagittariidae	*Sagittarius serpentarius*	Secretarybird	Vulnerable	-	Vulnerable
Threskiornithidae	***Geronticus calvus***	**Southern Bald Ibis**	**Vulnerable**	**Vulnerable**	**Vulnerable**
Tytonidae	*Tyto capensis*	African Grass Owl	Vulnerable	Vulnerable	Vulnerable
Gruidae	*Balearica regulorum*	Grey Crowned Crane	Endangered	Endangered	Endangered
Anaidae	*Oxyura maccoa*	Maccoa Duck	Near Threatened	-	Near Threatened
Falconidae	*Falco vespertinus*	Red-footed Falcon	Near Threatened	-	Near Threatened
Alaudidae	*Spizocorys fringillaris*	Botha's Lark	Endangered	-	Endangered
Ciconiidae	***Mycteria ibis***	**Yellow-billed Stork**	**Endangered**	**-**	**Endangered**
Source: SABAP (2023) and MPTA					

Herpetofauna

Family	Scientific Name	Common Name	National Red List Status	NEMBA ToPS List (2007)	Mpumalanga Status
Reptiles					
Colubridae	*Dasypeltis inornata*	Southern Brown Egg-eater	Least Concern	-	Near Threatened
Cordylidae	*Chamaesaura aenea*	Coppery Grass Lizard	Least Concern	-	Near Threatened
Lamprophiidae	*Amplorhinus multimaculatus*	Many-spotted Snake	Least Concern	-	Near Threatened
Lamprophiidae	*Homoroselaps dorsalis*	Striped Harlequin Snake	Least Concern	-	Near Threatened
Lamprophiidae	*Homoroselaps lacteus*	Spotted Harlequin Snake	Least Concern	-	Near Threatened
Scincidae	*Acontias breviceps*	Short-headed Legless Skink	Least Concern	-	Vulnerable
Amphibians					
Pyxicephalidae	*Pyxicephalus adspersus*	Giant Bullfrog	Least Concern	Protected	Protected
Source: Du Preez & Carruthers (2009) and Bates et al., (2014).					

Invertebrates

Family	Scientific Name	Common Name	National Red List Status	NEMBA ToPS List (2007)	Mpumalanga Status
Lycaenidae	*Aloeides dentatis maseruna*	Roodepoort Copper	Least Concern	-	Rare

Family	Scientific Name	Common Name	National Red List Status	NEMBA ToPS List (2007)	Mpumalanga Status
Hesperiidae	*Metisella meninx*	Marsh Sylph	Near Threatened	-	Near Threatened
Lycaenidae	*Lepidochrysops procera*	Potchefstroom Blue	Rare	-	-
Source: MPTA and Environmental Screening Report Output.					

Appendix D: Compliance with Relevant Protocols.

Terrestrial Biodiversity

Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity	Relevant Section in Report
The assessment must provide a baseline description of the site which includes, as a minimum, the following aspects:	
2.3.1. a description of the ecological drivers or processes of the system and how the proposed development will impact these	Will be presented in the Terrestrial Biodiversity Specialist Assessment Report.
2.3.2. ecological functioning and ecological processes (e.g., fire, migration, pollination, etc.) that operate within the preferred site;	Will be presented in the Terrestrial Biodiversity Specialist Assessment Report.
2.3.3. the ecological corridors that the proposed development would impede including migration and movement of flora and fauna;	Will be presented in the Terrestrial Biodiversity Specialist Assessment Report.
2.3.4. the description of any significant terrestrial landscape features (including rare or important flora- faunal associations, presence of strategic water source areas (SWSAs) or freshwater ecosystem priority area (FEPA) sub catchments;	Section 5
2.3.5. a description of terrestrial biodiversity and ecosystems on the preferred site, including: a) main vegetation types; b) threatened ecosystems, including listed ecosystems as well as locally important habitat types identified; c) ecological connectivity, habitat fragmentation, ecological processes and fine scale habitats; and d) species, distribution, important habitats (e.g., feeding grounds, nesting sites, etc.) and movement patterns identified.	Addressed in Section 5.1, Section 5.2 and Section 5.3 Will be fully presented in the Terrestrial Biodiversity Specialist Assessment Report
2.3.6. the assessment must identify any alternative development footprints within the preferred site which would be of a “low" sensitivity as identified by the screening tool and verified through the site sensitivity verification; and	Partly addressed in Section 5 of the report. Will be fully presented in the Terrestrial Biodiversity Specialist Assessment Report
2.3.7. the assessment must be based on the results of a site inspection undertaken on the preferred site and must identify: 2.3.7.1. terrestrial critical biodiversity areas (CBAs), including: a) the reasons why an area has been identified as a CBA; b) an indication of whether or not the proposed development is consistent with maintaining the CBA in a natural or near natural state or in achieving the goal of rehabilitation; c) the impact on species composition and structure of vegetation with an indication of the extent of clearing activities in proportion to the remaining extent of the ecosystem type(s);	Partly addressed in Section 5.2 Will be fully presented in the Terrestrial Biodiversity Specialist Assessment Report

Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity	Relevant Section in Report
d) the impact on ecosystem threat status; e) the impact on explicit subtypes in the vegetation; f) the impact on overall species and ecosystem diversity of the site; and g) the impact on any changes to threat status of populations of species of conservation concern in the CBA	
2.3.7.2. terrestrial ecological support areas (ESAs), including: a) the impact on the ecological processes that operate within or across the site; b) the extent the proposed development will impact on the functionality of the ESA; and c) loss of ecological connectivity (on site, and in relation to the broader landscape) due to the degradation and severing of ecological corridors or introducing barriers that impede migration and movement of flora and fauna	Section 5.2
2.3.7.3. protected areas as defined by the National Environmental Management: Protected Areas Act, 2004 including – a) an opinion on whether the proposed development aligns with the objectives or purpose of the protected area and the zoning as per the protected area management plan;	Section 5.2
2.3.7.4. priority areas for protected area expansion, including- a) the way in which in which the proposed development will compromise or contribute to the expansion of the protected area network;	Section 5.2
2.3.7.5. SWSAs including: a) the impact(s) on the terrestrial habitat of a SWSA; and b) the impacts of the proposed development on the SWSA water quality and quantity (e.g., describing potential increased runoff leading to increased sediment load in water courses);	Section 5.2
2.3.7.6. FEPA sub-catchments, including a) the impacts of the proposed development on habitat condition and species in the FEPA sub catchment;	Section 5.2
2.3.7.7. indigenous forests, including: a) impact on the ecological integrity of the forest; and b) percentage of natural or near natural indigenous forest area lost and a statement on the implications in relation to the remaining areas.	Section 5.2
3.1. The Terrestrial Biodiversity Specialist Assessment Report must contain, as a minimum, the following information:	
3.1.1. contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Page 7 & Appendix A
3.1.2. a signed statement of independence by the specialist;	Page 7
3.1.3. a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment	Section 3 and Section 4

Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity	Relevant Section in Report
3.1.4. a description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;	Section 3
3.1.5. a description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations;	Section 4
3.1.6 a location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Section 6, Section 7, Section 8 and Section 9
3.1.7. additional environmental impacts expected from the proposed development;	Section 8
3.1.8. any direct, indirect and cumulative impacts of the proposed development;	Section 8
3.1.9. the degree to which impacts and risks can be mitigated;	Partly addressed in Section 8 and Section 9
3.1.10. the degree to which the impacts and risks can be reversed;	Partly addressed in Section 8 and Section 9
3.1.11. the degree to which the impacts and risks can cause loss of irreplaceable resources;	Partly addressed in Section 8 and Section 9
3.1.12. proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Partly addressed in Section 9
3.1.13. a motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified as having a "low" terrestrial biodiversity sensitivity and that were not considered appropriate;	N/A
3.1.14. a substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, if it should receive approval or not; and	N/A
3.1.15. any conditions to which this statement is subjected.	N/A
3.2. The findings of the Terrestrial Biodiversity Specialist Assessment must be incorporated into the Basic Assessment Report or the Environmental Impact Assessment Report including the mitigation and monitoring measures as identified, which must be incorporated into the EMPr, where relevant.	NA
3.2.1. A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	NA

Animal Species

Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species	Relevant Section in Report
The assessment must be undertaken in accordance with the Species Environmental Assessment Guideline7; and must;	
2.2.1 identify the SCC which were found, observed or are likely to occur within the study area;	Section 5.4 and Appendix C
2.2.2 provide evidence (photographs or sound recordings) of each SCC found or observed within the study area, which must be disseminated by the specialist to a recognized online database facility, immediately after the site inspection has been performed (prior to preparing the report contemplated in paragraph 3);	Will be presented in the Animal Species Specialist Assessment Report
2.2.3 identify the distribution, location, viability and provide a detailed description of population size of the SCC, identified within the study area;	Will be presented in the Animal Species Specialist Assessment Report
2.2.4 identify the nature and the extent of the potential impact of the proposed development on the population of the SCC located within the study area;	Will be presented in the Animal Species Specialist Assessment Report
2.2.5 determine the importance of the conservation of the population of the SCC identified within the study area, based on information available in national and international databases, including the IUCN Red List of Threatened Species, South African Red List of Species, and/or other relevant databases;	Will be presented in the Animal Species Specialist Assessment Report
2.2.6 determine the potential impact of the proposed development on the habitat of the SCC located within the study area;	Section 7.0 Will be presented in the Animal Species Specialist Assessment Report
2.2.7 include a review of relevant literature on the population size of the SCC, the conservation interventions as well as any national or provincial species management plans for the SCC. This review must provide information on the need to conserve the SCC and indicate whether the development is compliant with the applicable species management plans and if not, include a motivation for the deviation;	Will be presented in the Animal Species Specialist Assessment Report
2.2.8 identify any dynamic ecological processes occurring within the broader landscape that might be disrupted by the development and result in negative impact on the identified SCC, for example, fires in fire-prone systems;	Will be presented in the Animal Species Specialist Assessment Report
2.2.9 identify any potential impact of ecological connectivity in relation to the broader landscape, resulting in impacts on the identified SCC and its long-term viability;	Will be presented in the Animal Species Specialist Assessment Report
2.2.10 determine buffer distances as per the Species Environmental Assessment Guidelines used for the population of each SCC;	N/A
2.2.11 discuss the presence or likelihood of additional SCC including threatened species not identified by the screening tool, Data Deficient or Near Threatened Species, as well as any undescribed species10; or	Section 5.4 and Appendix C

Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species	Relevant Section in Report
roosting and breeding or foraging areas used by migratory species where these species show significant congregations, occurring in the vicinity	
2.2.12 identify any alternative development footprints within the preferred site which would be of “low” or “medium” sensitivity as identified by the screening tool and verified through the site sensitivity verification	Section 8
3.1 This report must include as a minimum the following information:	
3.1.1 contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the assessment including a curriculum vitae;	Page 7 & Appendix A
3.1.2 a signed statement of independence by the specialist;	Page 7
3.1.3 a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 3 and Section 4
3.1.4 a description of the methodology used to undertake the site sensitivity verification, impact assessment and site inspection, including equipment and modelling used where relevant;	Discussed in Section 3. Will be fully presented in the Animal Species Specialist Assessment Report
3.1.5 a description of the mean density of observations/number of sample sites per unit area and the site inspection observations;	Will be presented in the Animal Species Specialist Assessment Report
3.1.6 a description of the assumptions made and any uncertainties or gaps in knowledge or data;	Section 4
3.1.7 details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported;	Discussed in Section 5.4 and Appendix C. Will be fully presented in the Animal Species Specialist Assessment Report
3.1.8 the online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the study area;	Will be presented in the Animal Species Specialist Assessment Report
3.1.9 the location of areas not suitable for development and to be avoided during construction where relevant;	Section 6, Section 7, Section 8 and Section 9
3.1.10 a discussion on the cumulative impacts;	Will be fully presented in the Animal Species Specialist Assessment Report
3.1.11 impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Section 8 & Section 9. Will be fully presented in the Animal Species Specialist Assessment Report

Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species	Relevant Section in Report
3.1.12 a reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not of the development and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant;	N/A
3.1.13 a motivation must be provided if there were any development footprints identified as per paragraph 2.2.12 above that were identified as having “low” or “medium” terrestrial animal species sensitivity and were not considered appropriate;	N/A
3.2 A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	EAP to incorporate

Plant Species

Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Plant Species	Relevant Section in Report
The assessment must be undertaken in accordance with the Species Environmental Assessment Guideline7; and must;	
2.2.1 identify the SCC which were found, observed or are likely to occur within the study area;	Section 5.3
2.2.2 provide evidence (photographs or sound recordings) of each SCC found or observed within the study area, which must be disseminated by the specialist to a recognized online database facility, immediately after the site inspection has been performed (prior to preparing the report contemplated in paragraph 3);	Will be presented in the Plant Species Specialist Assessment Report
2.2.3 identify the distribution, location, viability and provide a detailed description of population size of the SCC, identified within the study area;	Will be presented in the Plant Species Specialist Assessment Report
2.2.4 identify the nature and the extent of the potential impact of the proposed development on the population of the SCC located within the study area;	Will be presented in the Plant Species Specialist Assessment Report
2.2.5 determine the importance of the conservation of the population of the SCC identified within the study area, based on information available in national and international databases, including the IUCN Red List of Threatened Species, South African Red List of Species, and/or other relevant databases;	Will be presented in the Plant Species Specialist Assessment Report.
2.2.6 determine the potential impact of the proposed development on the habitat of the SCC located within the study area;	Section 7.0 Will be presented in the Plant Species Specialist Assessment Report
2.2.7 include a review of relevant literature on the population size of the SCC, the conservation interventions as well as any national or provincial species management plans for the SCC. This review must provide information on the need to conserve the SCC and indicate whether the development is compliant with the applicable species management plans and if not, include a motivation for the deviation;	Will be presented in the Plant Species Specialist Assessment Report.
2.2.8 identify any dynamic ecological processes occurring within the broader landscape that might be disrupted by the development and result in negative impact on the identified SCC, for example, fires in fire-prone systems;	Will be presented in the Plant Species Specialist Assessment Report.
2.2.9 identify any potential impact of ecological connectivity in relation to the broader landscape, resulting in impacts on the identified SCC and its long-term viability;	Will be presented in the Plant Species Specialist Assessment Report.
2.2.10 determine buffer distances as per the Species Environmental Assessment Guidelines used for the population of each SCC;	N/A
2.2.11 discuss the presence or likelihood of additional SCC including threatened species not identified by the screening tool, Data Deficient or Near Threatened Species, as well as any undescribed species; or roosting	Section 5.3

Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Plant Species	Relevant Section in Report
and breeding or foraging areas used by migratory species where these species show significant congregations, occurring in the vicinity	
2.2.12 identify any alternative development footprints within the preferred site which would be of "low" or "medium" sensitivity as identified by the screening tool and verified through the site sensitivity verification	Section 8
3.1 This report must include as a minimum the following information:	
3.1.1 contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the assessment including a curriculum vitae;	Page 7 & Appendix A
3.1.2 a signed statement of independence by the specialist;	Page 7
3.1.3 a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 3 and Section 4
3.1.4 a description of the methodology used to undertake the site sensitivity verification, impact assessment and site inspection, including equipment and modelling used where relevant;	Discussed in Section 3. Will be fully presented in the Animal Species Specialist Assessment Report
3.1.5 a description of the mean density of observations/number of sample sites per unit area and the site inspection observations;	Will be presented in the Plant Species Specialist Assessment Report
3.1.6 a description of the assumptions made and any uncertainties or gaps in knowledge or data;	Section 4
3.1.7 details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported;	Discussed in Section 5.3. Will be presented in the Plant Species Specialist Assessment Report
3.1.8 the online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the study area;	N/A Will be presented in the Plant Species Specialist Assessment Report
3.1.9 the location of areas not suitable for development and to be avoided during construction where relevant;	Section 6, Section 7, Section 8 and Section 9
3.1.10 a discussion on the cumulative impacts;	Will be presented in the Plant Species Specialist Assessment Report
3.1.11 impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Section 8 & Section 9
3.1.12 a reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not of the development and if the development should receive approval or not, related to the specific	N/A

Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Plant Species	Relevant Section in Report
theme being considered, and any conditions to which the opinion is subjected if relevant;	
3.1.13 a motivation must be provided if there were any development footprints identified as per paragraph 2.2.12 above that were identified as having “low” or “medium” terrestrial animal species sensitivity and were not considered appropriate;	N/A
3.2 A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	EAP to incorporate

TERRESTRIAL BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT

Hawkhead Consulting was appointed to conduct a Terrestrial Biodiversity (incl. Plant Species and Animal Species) Specialist Assessment as part of the Scoping and Environmental Impact Assessment (EIA) (S&EIA) process for the proposed Phefumula Emoyeni One Up to 400 kV Electrical Grid Infrastructure Project. This proposed Project will facilitate energy transmission from the proposed Phefumula Emoyeni One Wind Energy Facility (WEF) Project.

This report serves as the Terrestrial Biodiversity Site Sensitivity Verification Report for the proposed Project, and includes information for the Plant Species and Animal Species Themes.

This Terrestrial Biodiversity site sensitivity verification report relates to the Screening Tool Report completed for the site in September 2023. A site visit was conducted by the specialist on 22-26 January 2024 to inform the specialist reports required for the proposed project and confirm the site sensitivity.

The table below provides information regarding the outcome of the Screening tool in terms of the Terrestrial Biodiversity, Animal Species and Plant Species theme sensitivities associated with the proposed project and the specialist sensitivity verification.

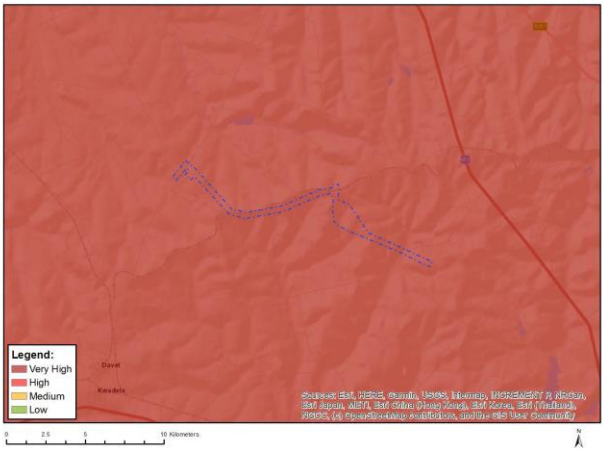
Table 1 Terrestrial Biodiversity, Animal Species and Plant Species theme sensitivities for the Phefumula Emoyeni Electrical Grid Infrastructure Project

ENVIRONMENTAL THEME	DFFE SCREENING TOOL SENSITVITY	APPLICABLE PROTOCOL	SPECIALIST SENSITVITY VERIFICATION
Terrestrial Biodiversity	Very High	Protocol for the specialist assessment and minimum report content requirements for environmental impacts on Terrestrial Biodiversity = Terrestrial Biodiversity Specialist Assessment Report	Very High in Mixed Dry Grassland, Rocky Shrubland and Moist Grassland designated as CBA Irreplaceable and CBA Optimal. High in other areas of areas of Mixed Dry Grassland, Rocky Shrubland and Moist Grassland, and Very Low in Old Lands, Cultivated Fields and Alien Tree Plantations.
Plant Species	Medium	Protocol for the specialist assessment and minimum report content requirements for environmental impacts on Plant Species = Plant Species Specialist Assessment Report	Medium in areas of Mixed Dry Grassland, Rocky Shrubland and Moist Grassland.

ENVIRONMENTAL THEME	DFFE SCREENING TOOL SENSITVITY	APPLICABLE PROTOCOL	SPECIALIST SENSITVITY VERIFICATION
Animal Species	High	Protocol for the specialist assessment and minimum report content requirements for environmental impacts on Animal Species = Animal Species Specialist Assessment Report	High in areas of Mixed Dry Grassland, Rocky Shrubland and Moist Grassland

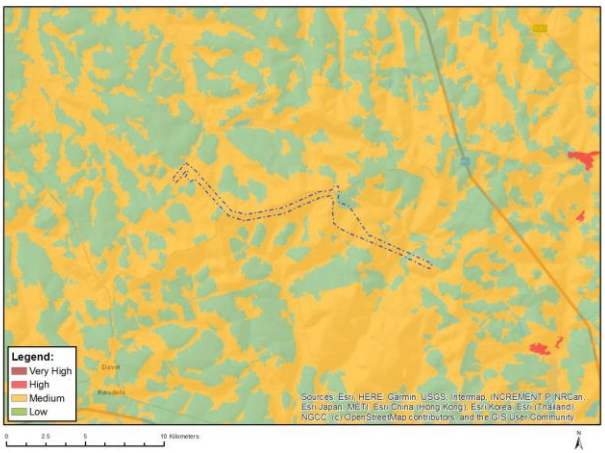
The Terrestrial Biodiversity Theme for the entire study area is rated 'Very High' sensitivity due to the presence of the following features:

- Critical Biodiversity Area (CBA) 1;
- CBA 2;
- Ecological Support Areas (ESA): Landscape corridor;
- Freshwater Ecosystem priority Area (FEPA) Sub-catchment;
- National Protected Area Expansion Strategy (NPAES);
- Endangered – Eastern Highveld Grassland; and
- Vulnerable – Soweto Highveld Grassland.



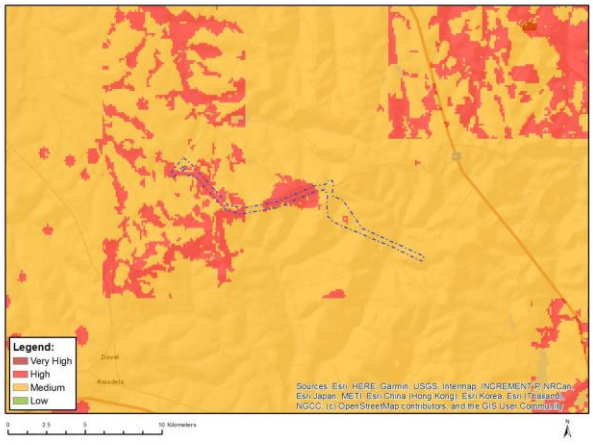
The Plant Species Theme is rated 'Medium' sensitivity due to the potential presence of the following features:

- Sensitive species 1252
- *Khadia carolinensis*;
- *Aspidoglossum xanthosphaerum*;
- *Miraglossum davyi*;
- Sensitive species 41;
- Sensitive species 691; and
- *Pachycarpus suaveolens*.



The Animal Species Theme is rated 'High Sensitivity' due to the potential presence of the following features:

- Southern Bald Ibis (*Geronticus calvus*);
- Martial Eagle (*Polemaetus bellicosus*);
- Secretarybird (*Sagittarius serpentarius*);
- Caspian Tern (*Hydroprogne caspia*);
- African Grass Owl (*Tyto capensis*);
- White-bellied Bustard (*Eupodotis senegalensis*);
- Maquassie Musk Shrew (*Crocidura maquassiensis*);
- Spotted-necked Otter (*Hydrictis maculicollis*);
- Oribi (*Ourebia ourebi ourebi*); and
- Potchefstroom Blue (*Lepidochrysops procera*).



A field programme, comprising flora and fauna surveys, was conducted for the larger Phefumula Emoyeni study area in which the proposed Project's grid connection infrastructure will be located. The results of the field surveys indicated that the study area, including most of the assessment corridor/footprints, comprises large tracts of natural habitat, with localised patches of modified habitat (e.g., Cultivated Fields, Alien Tree Plantations).

The Mpumalanga Biodiversity Sector Plan (MBSP) (2022) maps most patches of natural habitat in the proposed Project's assessment corridor/footprints as Critical Biodiversity Areas (CBA) Irreplaceable and CBA Optimal. These areas comprise mostly Soweto Highveld Grassland, which is listed as Vulnerable, and small patches of Eastern Highveld Grassland, which is listed as Endangered. In conjunction with adjacent natural habitat, natural habitat within the proposed Project's assessment corridor/footprints supports a rich fauna and flora community, and plays an important role in various regional- and landscape-scale ecological processes. Pursuant to these findings, the National Web Based Screening Tool's rating of 'Very High' sensitivity for the Terrestrial Biodiversity theme is confirmed, and a

Terrestrial Biodiversity Specialist Assessment Report will be compiled for the proposed Project, as per the applicable protocol.

Several fauna species of conservation concern were observed on-site, including *inter alia* the following mammals: Mountain Reedbuck (*Redunca fulvorufula fulvorufula*) – Endangered, Cape Clawless Otter (*Aonyx capensis*) – Near Threatened and Serval (*Leptailurus serval*) - Near Threatened, and it is likely that several other SCC, including some of those highlighted by National Web Based Screening Tool, may be present on-site. The 'High' sensitivity for the Animal Species theme is therefore confirmed, and an Animal Species Specialist Assessment Report will be compiled for the proposed Project, as per the applicable protocol.

No national Red List species were recorded during the field survey. But *Kniphofia ensifolia* subsp. *ensifolia* (Near Threatened, MP) and several flora species that are listed as protected in Mpumalanga Province were recorded in the study area. It is possible that other SCC, including some of those highlighted by National Web Based Screening Tool, may be present on-site. The 'Medium' sensitivity rating for the Plant Species theme is therefore confirmed, and a Plant Species Specialist Assessment Report will be compiled for the proposed Project, as per the applicable protocol.

This site sensitivity verification was undertaken by *Andrew Zinn* from *Hawkhead Consulting*

Andrew Zinn