Appendix G.12

PLANT SPECIES ASSESSMENT

Confidential

PLANT SPECIES SPECIALIST ASSESSMENT FOR THE PROPOSED ABO UVEMVANE WIND ENERGY FACILITY 1

WSP Group Africa Pty (Ltd)

August 2026

Submitted to:
WSP Africa Pty (Ltd)
Building 1, Maxwell Office Park
Waterfall City, Midrand
Gauteng
South Africa

HAWKHEAD CONSULTING

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Contents

PLANT SPECIES SPECIALIST ASSESSMENT FOR THE PROPOSED ABO UVEMVANE WIND ENERGY FACILITY 1 1
WSP Group Africa Pty (Ltd) 1
List of Figures 4
List of Tables 5
Acronyms and Abbreviations 6
Details of the Expertise of the Specialist 8
Declaration of Independence by Specialist 8
1. Introduction 9
1.1. Scope and Purposes of this Report 9
1.2. Project Description 9
1.3. Defining the Project's Area of Influence 13
1.4. Results of the Environmental Screening Tool 15
2. Relevant Legislation and Guidelines 16
3. Study Methodology 19
3.1. Desktop Data Collation and Literature Review 19
3.1.1. Regional Ecosystems and Vegetation Types 19
3.1.2. Vegetation and Flora Species Richness 19
3.2. Field Programme 19
3.3. Delineation and Mapping of Habitat Units 20
3.4. Assessment of Flora Species of Conservation Concern 20
3.4.1. Flora Species of Conservation Concern 20
3.4.2. Habitat Suitability Assessments for Species of Conservation Concern 20
3.5. Nationally and Provincially Protected Species 21
3.6. Alien Invasive Species 21
3.7. Flora Species of Medicinal Value 21
3.8. Assessment of Site Ecological Importance 21
4. Assumptions, Uncertainties and Gaps in Knowledge 22
5. Regional Description of Baseline Vegetation 24
5.1. Grassland Biome 24
5.2. Savanna Biome 24
5.3. Regional Vegetation Types 25
5.3.1. Soweto Highveld Grassland 25
5.3.2. Tsakane Clay Grassland 25

5.3.3. Andesite Mountain Bushveld 25
5.3.4. Gold Reef Mountain Bushveld 26
5.4. Nationally Threatened Ecosystems 26
6. Landscape Context and Existing Impacts on Flora 30
7. Vegetation and Flora Assessment 30
7.1. Habitat Units 30
7.1.1. Mountain Bushveld 32
7.1.2. Rocky Shrubland and Grassland 33
7.1.3. Watercourses (Rivers and Wetlands) 34
7.1.4. Natural Dry Grassland 35
7.1.5. Secondary Grassland 36
7.1.6. Alien Tree Stands 37
7.1.7. Cultivated Fields 38
7.2. Floristics Analysis 39
7.2.1. Flora Species of Conservation Concern 39
7.2.2. Nationally and Provincially Protected Species 39
7.2.3. Declared Alien Invasive Species 45
7.2.4. Flora of Medicinal Value 46
8. Key Ecological Attributes and Processes 47
8.1. Habitat Corridors, Resources and Refugia 47
8.2. Dynamic Ecological Processes and Drivers of Change 48
8.2.1. Alien Invasive Species Colonisation 48
8.2.2. Wildfire – Grassland Burning 48
8.2.3. Herbivory – Wildlife and Livestock Grazing and Trampling 49
9. General Sensitivity and Analysis of Site Ecological Importance 49
10. Impact Assessment 54
10.1. Impact Assessment Methodology 54
10.2. Impact Mitigation 55
10.3. Assessment of Impacts on Terrestrial Flora 56
10.3.1. Construction Phase 56
10.3.2. Operational Phase 61
10.3.3. Decommissioning Phase 61
10.3.4. Cumulative Impacts 63

10.3.4.1. *Cumulative loss of flora SCC due to natural habitat loss, disturbance and fragmentation.* 63
11. Assessment of the No Go Alternative 63
12. Mitigation Measures 65
13. Monitoring Measures 74
14. Biodiversity Management/Action Plan 77
15. Reasoned Opinion and Environmental Impact Statement 77
15.1. Summary of Main Findings 77
15.2. Conditions to be Included in the Environmental Authorisation 78
15.3. Specialist Opinion 78
16. References 79
Appendix A: Curriculum Vitae – Andrew Zinn 82
Appendix B: Methodology Supplement 86
Appendix C: Flora Species List Recorded during the Field Programme 93
Appendix D: Compliance with Plant Species Protocol. 105

List of Figures

Figure 1: Map showing the regional location and extent of the Project's Area of Influence defined for the impact assessment phase. 14
Figure 2: Screening report sensitivity for Plant Species 15
Figure 3: PAOI in relation to the SANBI (2018) vegetation types. 28
Figure 4: PAOI in relation to delineations of the National Red List of Terrestrial Ecosystems. 29
Figure 5: Habitat unit map of the PAOI. 31
Figure 6: Typical Mountain Bushveld 33
Figure 7: Typical Mountain Bushveld 33
Figure 8: Typical area of Rocky Shrubland and Grassland. 34
Figure 9: Area of Rocky Shrubland and Grassland dominated by Protea caffra trees. 34
Figure 10: The Suikerbosrand River, flanked by both woody and herbaceous flora species. 35
Figure 11: Valley-bottom wetland, with an artificial farm dam. 35
Figure 12: Mountain valley, characterised by closed-canopy woodland dominated by Olea europaea. 35
Figure 13: Drainage line encroached by Leucosidea sericea thickets. 35
Figure 14: Typical example of Natural Dry Grassland in the PAOI. 36
Figure 15: Forb dominated area of Natural Dry Grassland. 36
Figure 16: Eragrostis dominated Secondary Grassland. 37
Figure 17: Hyparrhenia hirta dominated Secondary Grassland. 37
Figure 18: Small stand/windrow of Eucalyptus camaldulensis trees. 38
Figure 19: Stand of Populus x canescens trees encroaching in a wetland in the PAOI. 38
Figure 20: Recently ploughed cultivated field. 38

Figure 21: Boophone disticha 45
Figure 22: Protea caffra 45
Figure 23: Aloe verecunda 45
Figure 24: Crinum graminicola 45
Figure 25: Site Ecological Importance of the PAOI. 53
Figure 26: Mitigation Sequence/Hierarchy 56
Figure 27: Habitat units and the proposed infrastructure layout 59
Figure 28: Map showing other renewable energy projects in the broader region surrounding the PAOI. 64

List of Tables

Table 1: Summary of the proposed Project. 10
Table 2: Affected properties. 13
Table 3: Relevant environmental and biodiversity legislation and guidelines. 16
Table 4: Guidelines for interpreting SEI in the context of the proposed development activities 22
Table 5: National Red List flora species that potentially occur in the PAOI 40
Table 6: Provincially Protected flora species observed or potentially occurring in the PAOI. 43
Table 7: NEMBA Declared alien invasive species recorded in the PAOI. 45
Table 8: Flora species recorded in the PAOI that have recognised medicinal value. 46
Table 9: Site Ecological Importance of habitat unit in the PAOI 50
Table 10: Impact Assessment Criteria and Scoring System 54
Table 11: Approximate extent of possible loss/disturbance of habitat units. 58
Table 12: Impact assessment scoring for flora species 62
Table 13: Recommended mitigation measures. 66
Table 14: Recommended additional monitoring measures 75

Acronyms and Abbreviations

Abbreviation	Explanation
AIS	Alien Invasive Species
AOO	Area of Occupancy
BESS	Battery Energy Storage System
BI	Biodiversity Importance
CA	Conservation Areas
CBA	Critical Biodiversity Areas
CI	Conservation Importance
C-Plan	Conservation Plan
CR	Critically Endangered
DFFE	Department of Fisheries, Forestry and the Environment
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
EN	Endangered
EOO	Extent of Occurrence
ESA	Ecological Support Area
FEPA	Freshwater Ecosystem Protection Area
FI	Functional Integrity
GDARD	Gauteng Department of Agricultural and Rural Development
Ha	Hectare
IBA	Important Bird Areas
KBA	Key Biodiversity Areas
MBSP	Mpumalanga Biodiversity Sector Plan
MTPA	Mpumalanga Tourism and Parks Agency
NEMA	National Environmental Management Act
NEMBA	National Environmental Management Biodiversity Act
NEMPA	National Environmental Management Protected Areas Act
NFEPA	National Freshwater Ecosystem Priority Areas

Abbreviation	Explanation
NPAES	National Protected Area Expansion Strategy
NT	Near Threatened
O&M	Operation and Maintenance
PA	Protected Areas
PAOI	Project's Area of Influence
QDS	Quarter Degree Square
REEA	Renewable Energy Environmental Authorisation
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
VU	Vulnerable
WEF	Wind Energy Facility

Details of the Expertise of the Specialist

	Specialist Information
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Qualifications	M.Sc. Resource Conservation Biology B.Sc. Hons. Ecology and Conservation Biology B.Sc. Zoology and Grassland Science
Affiliations	Member of the South African Council of Natural Scientific Professions Member of the South African Wildlife Management Association Member of the South African Association of Botanists
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. Andrew has 17 years 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.
Refer to Appendix A for a full Curriculum Vitae of Andrew Zinn.	

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 ABO Uvemvane Wind Energy Facility 1;
- 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 ABO Uvemvane Wind Energy Facility 1 (Pty) Ltd, to conduct the Plant Species Specialist Assessment for the proposed ABO Uvemvane Wind Energy Facility (WEF) 1 Project (hereafter referred to as the 'Project'), near Heidelberg in Gauteng Province and Balfour in Mpumalanga Province, South Africa.

1.1. Scope and Purposes of this Report

This specialist study focused on terrestrial plant species (flora), and was compiled in line with the 'Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in Terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, When Applying for Environmental Authorisation', and specifically the:

- Protocol for the Specialist Assessment and Minimum Content Requirements for Environmental Impacts on Plant Species.

The primary scope of work included:

- Collating and reviewing information and data on terrestrial vegetation and flora species that occur or potentially occur on-site and in the surrounding landscape;
- Conducting a field programme to collect data on vegetation communities and flora species present on-site, and identify any botanical sensitivities;
- Assessing the suitability of the Proposed project and the nature and extent of potential impacts on terrestrial vegetation and flora that may result from proposed Project activities; and
- Recommending mitigation and management measures for inclusion in the proposed Project's Environmental Management Programme (EMP) and/or Biodiversity Management Plan (BMP).

In line with the above scope, the purpose of this report is to; 1) present a baseline description of terrestrial flora species occurring on-site, highlighting the presence/potential presence of species of conservation concern; 2) present the findings of an impact assessment for the proposed Project; 3) recommend applicable biodiversity mitigation and management measures; and 4) provide an impact statement on the appropriateness of the proposed Project with respects to terrestrial plant species conservation.

This report should be read in conjunction with the other specialist ecology reports for the proposed Project, including *inter alia*, the Terrestrial Biodiversity Specialist Assessment report and Animal Species Specialist Assessment report.

1.2. Project Description

ABO Uvemvane Wind Energy Facility 1 (Pty) Ltd proposes the development of ABO Uvemvane Wind Energy Facility 1 (WEF 1), a commercial wind energy generation facility comprising up to 20 turbines and with a total generation capacity of up to 170 MWac in capacity, as well as associated infrastructure – refer to Table 1 for a summary of the proposed Project description.

The proposed WEF would be located approximately 9 km west of the town of Balfour in the Mpumalanga Province in the Dipaleseng Local Municipality, within the Gert Sibande District

Municipality, and approximately 14km south-east of the town Heidelberg in the Gauteng Province in the Lesedi & Midvaal Local Municipalities within the Sedibeng District Municipality.

Table 1: Summary of the proposed Project.

Infrastructure	WEF 1
MWac	Up to 170
Development Footprint	Approx. 67.2 ha
Access Points	Five existing access points
Internal Road Lengths	Up to 31 km
Electrical Infrastructure Hub (with collector substation, substation, and BESS infrastructure)	Three locations to be assessed as options, only one will be constructed (up to 7 ha)
Temporary Laydown Areas	Four, totalling up to 15 ha.

It is anticipated that the proposed WEF would have a total (permanent) development footprint of up to 67.2 ha, which is approximately 1.12% of the total site (i.e., affected properties) area. The affected properties are indicated in Table 2.

A development area (i.e., the full extent of the affected properties as well as beyond, where appropriate) has been identified for the proposed development. Within this identified development area, a development footprint has been defined in a manner which has considered the environmental sensitivities present on the affected properties and intentionally remains outside of highly sensitive areas. All affected properties in their entirety have been considered in this S&EIA process (which includes the independent specialists' assessment undertaken hereunder) and assessed in terms of the suitability from an environmental and social perspective. The location of the proposed Project and the siting of the Project infrastructure within the assessed study area has been informed by the recommendations of the specialists following their field assessments, where relevant.

It is important to note at the outset that the exact specifications of the proposed Project components will be determined during the detailed engineering design phase prior to construction (subsequent to the issuing of an EA, should such an authorisation be granted), but that the information provided below is seen as the maximum development scenario for the proposed development.

The proposed facility would comprise the following (to be located within the proposed development footprint):

- Up to 20 turbines with the following maximum specifications:
    - Maximum hub height 180 m;
    - Maximum blade length 100 m;
    - Maximum rotor diameter 200 m;
    - Maximum capacity per turbine 10 MW;
    - A transformer at the base of each turbine;
    - Concrete turbine foundations up to 1 ha each;
    - Turbine, crane, and blade hardstands (included in the abovementioned 1 ha);

- Primary/main access roads as well as internal road reticulation (note that existing roads/disturbed areas would be used as far as possible, and for the proposed roads, a corridor of up to 12 m wide may be temporarily impacted upon during construction and be rehabilitated to up to 10 m wide after construction), inclusive of stormwater infrastructure where relevant;
- 4 Temporary laydown areas/ construction compounds (includes concrete batching), totalling up to 15 ha, would be fenced with access control; and/or
- Battery Energy Storage System (BESS) to be located within the electrical infrastructure hub described under "associated infrastructure" below.

Associated infrastructure would include the following (to be located within the proposed development footprint):

- Associated internal electrical reticulation/ cabling (i.e., low- and medium voltage powerlines), underground as far as is feasible, and to run within the proposed road footprint/route as far as possible;
- A 33kV overhead/underground line to connect the northern and southern portions of the facility;
- On-site electrical infrastructure hub up to 7 ha in extent (note there are 3 locations to be assessed as options, however only 1 will be constructed) consisting of:
    - On-site substation and associated infrastructure,
    - Additional step-up/ transformation/ collector/switchyard infrastructure;
    - Auxiliary buildings (including, but not limited to, Operation and Maintenance (O&M) building/s, admin building/s, workshop/s, gatehouse/s, security building/s, control centre/s, office/s, visitor centre/s, warehouse/s, etc.);
    - May include the installation of a communications tower and lighting mast on site with a maximum height of 32 m and 25m respectively; and/or
    - BESS.

Five access points are proposed, four of these are off existing unnamed farm roads (originating from the D1220 and P243/1), and one is off Lagerspoort Road and from Heidelberg - Balfour Road (R23). Access roads would be developed both to the site and within the site (i.e., between Project components).

The operations of the proposed facility would require some servicing, noting that the operational electrical requirements would be nominal and would be supplied by the facility on site. Water would be required for sanitation use by operational staff (drinking and washing hands, food, etc) as well as for cleaning of equipment, and scheduled internal cleaning of building, and dust control on internal roads (where needed). Water would ideally be sourced from the local municipality, in terms of a Service Level Agreement established between the Municipality and the Proponent. If this is not possible, then further options, such as sourcing water from a private services provider, will be investigated. Where required, a storage tank (i.e., Jo-Jo tank) of up to approximately 10,000L may be used on site for temporary water storage. Sanitation requirements would be minimal, given that there would not be many operational staff. Sanitation for auxiliary buildings would be connected to the existing municipal sewage system. If the Municipality does not approve, or have capacity for, such a connection, sewage would be stored in the conservancy tank and collected either by a honey-

sucker truck or by a service provider (Contractor) for treatment at a licensed disposal site. Alternatively, a standalone system would be used (i.e., porta-loos) which would be regularly serviced by an independent contractor. Note that it is not intended to make use of soakaways or on-site treatment solutions. Refuse/solid waste produced would also be nominal (approximately two wheelie bins per week) and would ideally be removed by the Municipality, however, if this is not possible, the Operator would employ private contractors to remove the refuse and dispose of it appropriately.

The construction phase would also require water and sanitation, with these aspects being the primary responsibility of the Contractor. However, it would be preferable for water to be sourced from the local Municipality (where available), with alternative arrangements (for example, bringing water in with trucks) being made where necessary. Solid waste would also be produced and would be managed in accordance with the requirements in the Environmental Management Programme (EMPr).

Stormwater drainage systems may be constructed on site to ensure that stormwater run-off from site is appropriately managed. Water from these systems is not likely to contain any chemicals or hazardous substances and would be released into the surrounding environment based on the natural drainage contours.

Temporary water pipelines may be installed on site during construction for water supply to inter alia the concrete batching plant and the O&M building complex for domestic use and sanitation. Possible groundwater abstraction on site for purposes of the batching plant could be considered, if required, considering any necessary and relevant legal requirements. There would be no other specific stormwater and/or landscaping initiatives undertaken as part of the proposed WEF, other than any interventions prescribed by the relevant specialist/s through the S&EIA process.

Blade patterning may be implemented as a recommended avian mitigation, in accordance with the Blade Patterning Guidelines (SAWEA & BirdLife South Africa, 2024).

The connection for the project within could occur at these via a new loop-in-loop-out connection or via a direct connection to one of the two nearby substations. Note that the EGI component of the WEFs will be subject to separate environmental impact assessments.

Alternatives:

The proposed development as described above has been assessed with the following alternatives:

1. 33kV overhead/underground line to connect northern and southern parts of the facility:
    - A 100 m assessment corridor should be assessed; the actual servitude width would only be 22m;
    - The line is approximately 8km long and a conservative average span length of approximately 100 m can be assumed for assessment purposes, although actual spans may be longer (depending on final engineering design and terrain);
    - Two route alternatives to assess;
2. BESS Technology: With regard to the proposed BESS, the technology thereof is dynamic and so the specific type/technology to be developed would be selected based on market demands and technology availability at the time of construction. Therefore, both Lithium-ion

and redox-flow are assessed as technology alternatives, with Lithium-ion being the current preferred technology; and

3. The No-go alternative has also been assessed, noting that the property does hold existing development rights (i.e., Agriculture) and so, not developing the proposed development does not necessarily mean that there would be no changes or impacts on the site.

Table 2: Affected properties.

Affected Property	SG Code
The Remaining Extent of Portion 2 of the Farm Lagerspoort Number 406	T0IR00000000040600002
Portion 17 (a Portion of Portion 3) of the Farm Lagerspoort Nr 406	T0IR00000000040600017
Remaining Extent of Portion 4 of the Farm De Hoek 411	T0IR00000000041100004
Portion 45 of the Farm Lagerspoort 406	T0IR00000000040600045
Portion 7 of the Farm Lagerspoort Number 406	T0IR00000000040600007
Portion 19 of the Farm De Hoek No 411	T0IR00000000041100019
Remaining Extent of Portion 2 of the Farm Modderfontein 410	T0IR00000000041000002
The Farm Orion No 413	T0IR00000000041300000
Remaining Extent of Portion 5 of the Farm Lagerspoort 406	T0IR00000000040600005
Portion 7 of the Farm Driefontein 405	T0IR00000000040500007
Remaining Extent of Portion 9 of the Farm Malanskraal No 407	T0IR00000000040700009
Remaining Extent of Portion 2 of the Farm Malanskraal 407	T0IR00000000040700002
Portion 12 (a Portion of Portion 2) of the Farm Malanskraal 407	T0IR00000000040700012
Remaining Extent of Portion 2 of the Farm Driefontein 405	T0IR00000000040500002
Remaining Extent of the Farm Driefontein 405	T0IR00000000040500000
Remainder of Portion 6 (Kingsmead) of the Farm Malanskraal 407	T0IR00000000040700006
Portion 17 (a Portion of Portion 8) of the Farm Malanskraal No 407	T0IR00000000040700017
Farm Bothas Spruit Nr. 404	T0IR00000000040400000
Portion 16 (a Portion of Portion 4) of the Farm Malanskraal No 407	T0IR00000000040700016
Remaining Extent of Portion 13 (a Portion of Portion 2) of the Farm Malanskraal 407	T0IR00000000040700013
Remainder of Portion 18 (a Portion of Portion 3) of the Farm Malanskraal 407	T0IR00000000040700018
Portion 1 of the Farm Weltevreden Nr. 449	T0IR00000000044900001

1.3. Defining the Project's Area of Influence

A Project's Area of Influence (PAOI) is defined according to important ecosystem processes and functions that may be impacted by the proposed Project's infrastructure and activities (SANBI, 2026).

The PAOI delineated for this specialist study consists of the various farms and farm portions identified by the Project Proponent as the technically suitable footprint for the WEF development (**Error! Reference source not found.**). This is the area within which direct and indirect impacts on the biodiversity receptors addressed in this report may arise. It should be noted that during the initial baseline studies a larger study area covering various neighbouring properties was defined and assessed.

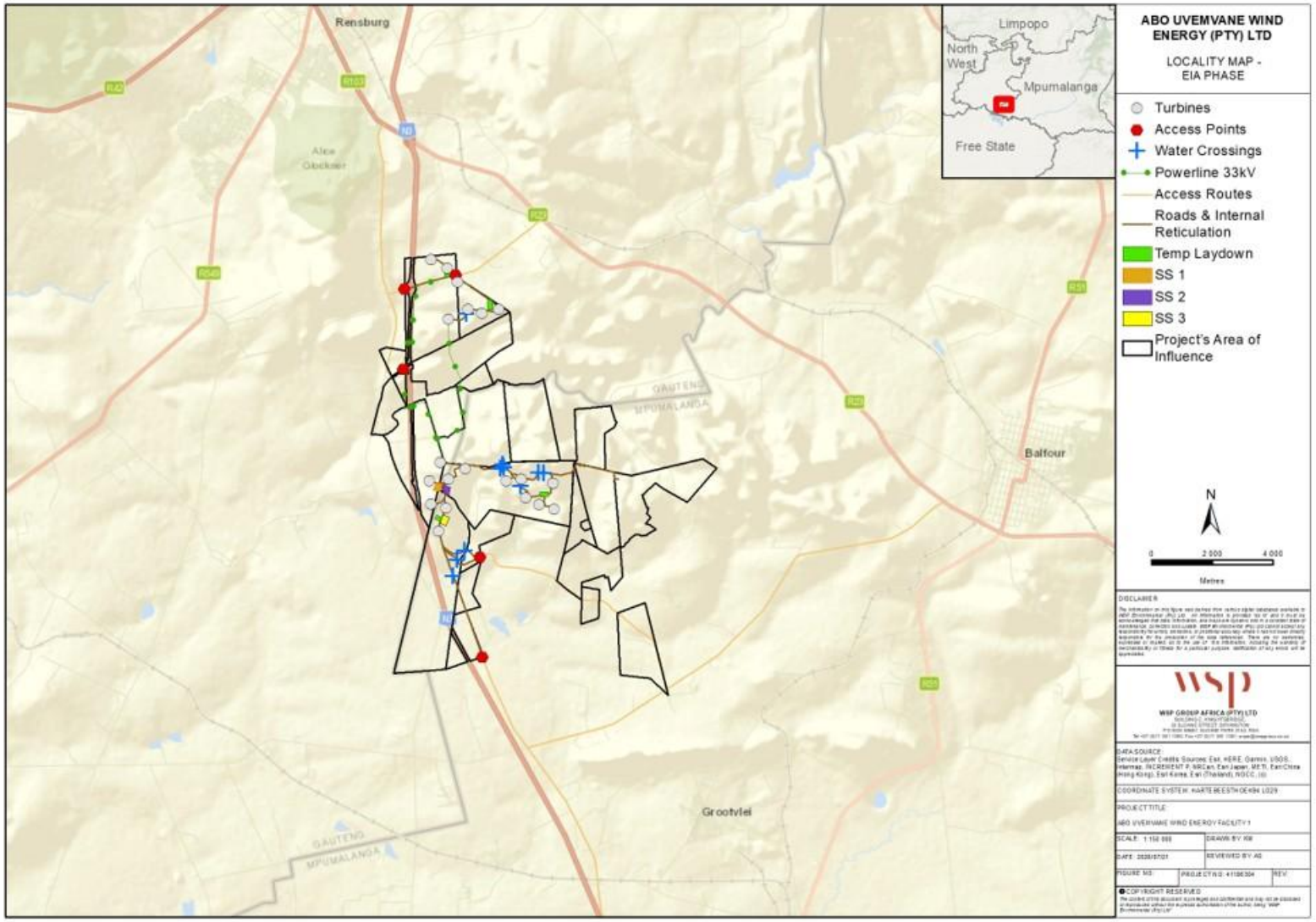

Figure 1: Map showing the regional location and extent of the Project's Area of Influence defined for the impact assessment phase.

1.4. Results of the Environmental Screening Tool

According to the Department of Forestry, Fisheries and the Environment (DFFE) National Web Based Screening Tool, the Plant Species Theme for the proposed Project was rated 'Medium' sensitivity on account of the presence/potential presence of several threatened flora species. These species are listed below and discussed in more detail in Section 7.2.1 of this report.

- *Khadia beswickii*;
- Sensitive species 1252;
- *Delosperma macellum*;
- *Cineraria longipes*;
- Sensitive species 691;
- *Brachycorythis conica* subsp. *transvaalensis*;
- Sensitive species 1248; and
- *Prunus africana*.

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, 2026).

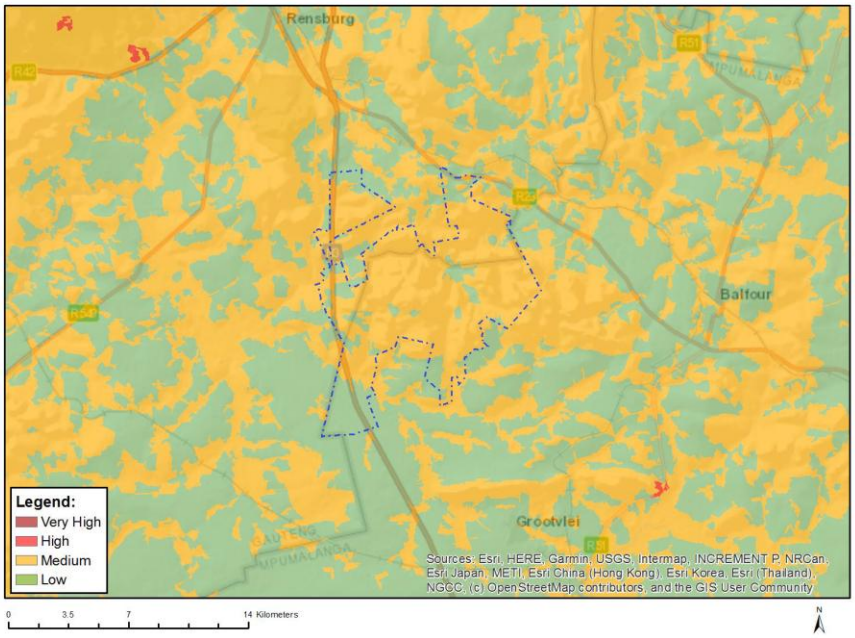

Figure 2: Screening report sensitivity for Plant Species

2. Relevant Legislation and Guidelines

National and provincial legislation, and associated guidelines and policies that are relevant to the environment and biodiversity, and which were used to guide the Plant Species Specialist Assessment are listed in Table 3.

Table 3: Relevant environmental and biodiversity legislation and guidelines.

Applicable Legislation and Guideline	Relevance to the Proposed Project
National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA)	Section 24 of the NEMA, headed "Environmental Authorisations" sets out the provisions which are to give effect to the general objectives of Integrated Environmental Management, and laid down in Chapter 5 of the NEMA. In terms of section 24(1), the potential impact on the environment of listed activities must be considered, investigated, assessed and reported on to the competent authority charged by the NEMA with granting of the relevant environmental authorisation. In terms of section 24F(1) of the NEMA no person may commence an activity listed or specified in terms of section 24(2)(a) or (b) unless the competent authority has granted an environmental authorisation for the activity. Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the NEMA (1998), when applying for environmental authorisation, the following is relevant to this study: • Protocol for the specialist assessment and report content requirements for environmental impacts on terrestrial biodiversity.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA)	The NEMBA is administered by the Department of Forestry, Fisheries and the Environment (DFFE) and provides the framework under the NEMA for the: • Management and conservation of South Africa's biodiversity; • The protection of species and ecosystems that warrant protection; • The fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; and • The establishment and functions of a South African National Biodiversity Institute (SANBI). Amongst other components, the NEMBA includes: • Lists of Critically Endangered, Endangered, Vulnerable and Protected Species (February 2007), with associated amendments (December 2007) (ToPS), published under Section 56(10) of NEMBA; • Threatened or Protected Species Regulations (February 2007);

Applicable Legislation and Guideline	Relevance to the Proposed Project
	• National list of threatened terrestrial ecosystems for South Africa (2022 revision), published under Section 51(1)(a) of NEMBA; and • National Biodiversity Offset Guideline (2023), which provides guidance on the need to develop biodiversity offsets. The purpose of ToPS lists and regulations are to regulate the permit system concerning restricted activities involving specimens of listed threatened or protected species. The primary purpose of listing threatened ecosystems is to reduce the rate of ecosystem and species extinction by identifying 'witness' sites' of exceptionally high conservation value and enabling and facilitating proactive management of these ecosystems. Chapter 5 of NEMBA also provides a list of regulations and guidance concerning alien invasive species, including: • A guideline for Monitoring, Control and Eradication Plans (September 2015); • 2020 Alien and Invasive Species Regulations (September 2020); and • Alien and Invasive Species Lists (March 2021).
National Environmental Management: Protected Areas Act (2003) (NEMPA)	• The NEMPA provides the framework under the NEMA for the protection and conservation of South Africa's biodiversity through the establishment of a system of protected areas that represent the country's diverse ecosystems, landscapes, and seascapes; and • The NEMPA sets out mechanisms and processes for declaring and managing protected areas, including protected environments, with an emphasis on intergovernmental cooperation and public involvement.
Mpumalanga Nature Conservation Act (Act No. 10 of 1998)	Amongst other provisions, the Mpumalanga Nature Conservation Act (Act No. 10 of 1998) provides lists of specially protected and protected flora and fauna. Of particular relevance to this specialist study are species of game/wild animals and flora that are listed under: • Schedule 11 and 12: Protected and Specialist Protected Plants.
Nature Conservation Ordinance 12 of 1983, as amended by Gauteng General Law Amendment Act 4 of 2005.	Amongst other provisions, the Nature Conservation Ordinance provides lists of specially protected and protected flora and fauna. Of particular relevance are Schedule 2, 2A, 4, 7, 11 and 12 concerning Protected and Specially Protected fauna and flora.
Other Relevant national and Provincial Policies, Plans and Guidelines	Other relevant policies, plans and guidelines that were considered during this study include: • Species Environmental Assessment Guideline, Version 3.1 (2022) and Version 4.1. (2026); • National Protected Area Expansion Strategy (2018);

Applicable Legislation and Guideline	Relevance to the Proposed Project
	• Best practice Guidelines for Implementing the Mitigation Hierarchy in South Africa – Draft February 2023. (EWT, 2023); • Mpumalanga Protected Areas Expansion Strategy – 20 Year Plan; • Mpumalanga Biodiversity Sector Plan (2024); • Gauteng Conservation Plan (Version 4) (2024); • The Ridges Guideline (2019) for Gauteng Province; • The Red List Plant Guideline (2018) for Gauteng Province; and • Gauteng Department of Agriculture and Rural Development Requirements for Biodiversity Assessments Version 3.

3. Study Methodology

The study methodology comprised a desktop literature review and an on-site field programme, both undertaken in accordance with the Species Environmental Assessment Guidelines, Version 3.1 (SANBI, 2022), with subsequent reporting updated where necessary to align with Version 4.1 (SANBI, 2026). The specific tasks associated with the desktop literature review and field programme are outlined below:

3.1. Desktop Data Collation and Literature Review

The aim of the desktop literature review component was to collate and review data and information pertaining to flora species that may occur in the PAOI and surrounding landscape, based on historic distribution ranges or recent records. Information and data that were reviewed were obtained from a variety of online and literature sources, as discussed below:

3.1.1. Regional Ecosystems and Vegetation Types

Regional vegetation mapping and descriptions relevant to the PAOI and the surrounding landscape were obtained from SANBI (2018) and Mucina and Rutherford (2011).

3.1.2. Vegetation and Flora Species Richness

- A list of flora species that have previously been recorded in the broader region, and that potentially occur in the PAOI, was obtained from the SANBI's online Botanical Database of Southern Africa (BODATSA);
- Lists of flora species of conservation concern previously recorded on farms in the PAOI or in the 2628CB Quarter Degree Square (QDS) were sourced from the Mpumalanga Parks and Tourism Agency (MPTA) (courtesy of M. Lötter) and the Gauteng Department of Agriculture and Rural Development (GDARD) (courtesy of S. Veldsman);
- The iNaturalist database was consulted to identify any flora species of conservation concern previously observed in close proximity to the PAOI; and
- Flora species of conservation concern highlighted by the DFFE National Web Based Screening Tool were also assessed.

3.2. Field Programme

With respects to vegetation and flora sampling, the field programme comprised one wet/growing season field survey, which was conducted from the 20th-24th January 2025. In line with SANBI (2026), this period falls within the peak growing and flowering period for the Grassland and Savanna Biomes and is an optimal time to assess flora species composition and to detect the majority of flora species of conservation concern potentially present. The flora sampling methodologies used during the field survey were based on those recommended in SANBI (2022), and included the following:

- Vegetation was sampled using timed-meander searches. This is a semi-quantitative method that optimises surveying for species of conservation concern (Goff, *et al*., 1982); Timed-meander searches were conducted at representative sites in patches of natural- and semi-natural habitat in the PAOI. Thirty-two meander search transects were surveyed across the PAOI;
- Field data collected during the flora surveys included general habitat character, vegetation structure, flora species composition and estimates of cover abundance/dominance using the

Braun-Blanquet scale (Kent & Cocker, 1992). Notes were also made on evidence of disturbance and the presence of declared alien invasive species;
- Flora nomenclature is based on species names presented on SANBI's Red List of South African Plants website (redlist.sanbi.org); and
- Vegetation structural classification was based on Edwards (1983).

3.3. Delineation and Mapping of Habitat Units

Mapping of the main habitat units in the PAOI was based on a desktop analysis of composite satellite/aerial imagery, coupled with field data and observations obtained during the field programme.

3.4. Assessment of Flora Species of Conservation Concern

3.4.1. Flora Species of Conservation Concern

In line with the internationally endorsed IUCN Red List Categories and Criteria, the Red List of South African Plants recognises three categories of threatened species, namely Critically Endangered (CR), Endangered (EN) and Vulnerable (VU). Four other categories of conservation concern are also recognised as having high protection priority: Near Threatened (NT), Data Deficient – Insufficient Information (DDD), and two non-IUCN categories, Critically Rare and Rare.

Flora species assigned to any of these conservation categories are considered species of conservation concern (SCC) (SANBI, 2010). The conservation status of flora species presented in this report is based on the Red List of South African Plants (Version 2024), published by SANBI (redlist.sanbi.org).

3.4.2. Habitat Suitability Assessments for Species of Conservation Concern

Habitat suitability assessments were conducted for SCC that have historically been recorded in the region to determine a 'probability of occurrence' in the PAOI. The following parameters were used in the assessments:

- Habitat requirements: Most threatened species have very specific habitat requirements. The presence of these habitats in the PAOI was evaluated;
- Habitat status: The status or ecological condition of available habitat was assessed. Often a high level of habitat degradation will negate the potential presence of sensitive species; and
- Habitat linkage: Dispersal between natural areas is an important population-level processes. Habitat connectivity within the PAOI and to surrounding natural habitat and corridors was evaluated to determine the likely persistence of SCC.

Probability of occurrence is presented in the following categories:

- Confirmed (Recorded): Any SCC observed/documented in or close to the PAOI;
- Probable (High): the species is likely to occur in the PAOI due to suitable habitat and resources being present;
- Possible (Medium): The species may occur in the PAOI due to potential habitat and/or resources; and

- Unlikely (Low): the species will not likely occur in the PAOI due to lack of suitable habitat and resources, or significant differences in its Area of Occupancy (AOO) compared to its Extent of Occurrence (EOO).

3.5. Nationally and Provincially Protected Species

Due to their specific conservation management requirements, flora species listed as Specially Protected, Protected, or threatened under national and provincial conservation legislation are also highlighted in this report. Relevant legislation in this regard included:

- National Environmental Management: Biodiversity Act (Act No. 10 of 2004) - Threatened or Protected Species List (Notice 389 of 2013) (NEMBA ToPS List, 2007);
- Mpumalanga Nature Conservation Act (Act No. 10 of 1998); and
- Gauteng Nature Conservation Ordinance 12 of 1983, as amended by Gauteng General Law Amendment Act 4 of 2005.

3.6. Alien Invasive Species

Owing to their potential to spread, outcompete and exclude indigenous vegetation, special emphasis was placed on declared alien invasive flora species occurring in the PAOI. These were categorised according to the National Environmental Management: Biodiversity Act (NEMBA) (Act No. 10 of 2004) - 2021 listing of declared alien and invasive species.

3.7. Flora Species of Medicinal Value

Many common and widespread flora species have medical or cultural utility to humans, and as such have value to local communities. Flora of medicinal value recorded in the PAOI were therefore identified and their purported uses described based on Van Wyk, *et al*., (2009).

3.8. Assessment of Site Ecological Importance

The ecological importance (sensitivity) of habitat units was determined using the protocol for evaluating site ecological importance (SEI) as published in SANBI's Species Assessment Guideline (SANBI, 2026). 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 ecosystem types, through predominantly natural processes" (SANBI, 2026).
- **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, 2026).

- **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, 2026).

For tables detailing the rating criteria for Conservation Importance, Functional Integrity and Receptor Resilience and the scoring matrices, refer to Appendix B. Table 4 presents a guideline for interpreting the SEI (SANBI, 2026).

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.
Source: SANBI (2026).	

4. Assumptions, Uncertainties and Gaps in Knowledge

The following assumptions, uncertainties and gaps in knowledge are highlighted for the Plant Species Specialist Assessment:

- It is assumed that the flora species data (e.g., species lists and distribution records) obtained from online databases are accurate and up to date. However, it is acknowledged that these resources may contain limitations or discrepancies due to outdated information or misidentifications;
- The field survey was conducted over a five-day period in January 2025. The timing of the field survey coincided with mid wet-season, which is the peak growing and flowering period for grassland and savanna flora in summer-rainfall regions. This period is recognised as the optimal window for detecting the majority of flora SCC. Although certain SCC flower during the late dry/winter season, most winter-flowering species retain certain identifiable morphological characteristics that remain detectable during the mid-summer period. Sufficient rain had fallen prior to the field survey and vegetation was actively growing. Conditions at this time were therefore optimal to assess vegetation condition, flora species

composition and identify potential SCC presence. Seasonality is therefore not considered a limiting factor; and

- Notwithstanding the above, it is possible that certain herbaceous taxa (e.g., annuals and geophytes) that are most readily visible or distinguishable at other periods during the yearly cycle, may not have been detected during the field survey.

5. Regional Description of Baseline Vegetation

The PAOI contains elements of both the Grassland and Savanna Biomes, and according to SANBI's regional mapping of South Africa's vegetation types (2018) (shown in Figure 3), is represented by four vegetation types, namely Soweto Highveld Grassland (Gm 8), Tsakane Clay Grassland (Gm 9), Andesite Mountain Bushveld (SVcb 11), and Gold Reef Mountain Bushveld (SVcb 9).

The general characteristics of the Grassland and Savanna Biomes, and the relevant regional vegetation types are discussed in more detail below:

5.1. Grassland Biome

The PAOI is located in the Grassland Biome, which covers approximately 28% of South Africa and is the dominant biome of the central plateau and inland areas of the eastern subcontinent (SANBI, 2013). Grasslands are typically situated in moist, summer rainfall regions that experience between 400 mm and 2000 mm of rainfall per year. Vegetation consists of a dominant field-layer comprising grasses and herbaceous perennials, with little-to-no woody plants present.

South Africa's grassland ecosystems are parsed into five groups, with the PAOI located in the Mesic Highveld Grasslands group (SANBI, 2013). Mesic Highveld Grasslands occur at mid-altitudes and experience warm, wet summers (MAP 700-1200 mm) and cold winters. They are typically highly productive sourveld grasslands that are dominated by long-lived perennial grasses (SANBI, 2013).

Fire is common in Mesic Highveld Grasslands and maintains these ecosystems in a relatively treeless form (SANBI, 2013). Apart from their importance as rich stores of biodiversity, grasslands are critically important water production landscapes, constituting about half of South Africa's Strategic Water Source Areas (SANBI, 2013).

5.2. Savanna Biome

The savanna biome is the largest biome in South Africa, covering approximately 35% of the country's land surface (Scholes and Walker, 1993). Savannas are characterised by a dominant grass layer, over-topped by a discontinuous, yet distinct woody plant component. Primary determinants of savanna composition, structure and functioning are; fire, a distinct seasonal climate, substrate type, and browsing and grazing by large herbivores (Scholes and Walker, 1993).

Compositionally, Africa's savannas are distinguished as either fine-leafed savannas or broad-leafed savannas. The distribution of these forms is based primarily on soil fertility (Scholes and Walker, 1993); fine-leafed savannas occur on nutrient rich soils and are dominated by microphyllous woody species of the Fabaceae family (most commonly indigenous Acacia's). These savannas have a productive and diverse herbaceous layer that is dominated by grasses and can support large populations of mammalian herbivores (Scholes and Walker, 1993). Conversely, broad-leafed savannas usually occur on nutrient poor soils and are dominated by macrophyllous woody species from the Combretaceae family (common genera: *Combretum* & *Terminalia*). Compared to fine-leafed savannas, broad-leafed savannas are less productive and support a lower herbivore biomass (Scholes and Walker, 1993).

5.3. Regional Vegetation Types

5.3.1. Soweto Highveld Grassland

Soweto Highveld Grassland extends in a broad band between Johannesburg and Ermelo in the north, and Perdekop and the Vaal River in the south (Mucina & Rutherford, 2011). Vegetation is 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).

In Mucina and Rutherford's (2011) regional vegetation type descriptions, important plant taxa are those species that have a high abundance, a frequent occurrence (not being particularly abundant), or are prominent in the landscape within a particular vegetation type. They recognise the following species as important taxa in Soweto Highveld Grassland vegetation type, amongst others:

Graminoids: *Themeda triandra, Andropogon appendiculatus, Brachiaria serrata, Cymbopogon pospischilii, Cynodon dactylon, Elionurus muticus, Eragrostis capensis, Eragrostis chloromelas, Eragrostis curvula, Eragrostis plana, Heteropogon contortus, Hyparrhenia hirta, Setaria sphacelata, Aristida junciformis, Aristida congesta, Aristida bipartita* and *Paspalum dilatatum*.

Herbs: *Hermannia depressa, Euryops gilfillanii, Geigeria aspera, Graderia subintegra, Haplocarpha scaposa, Helichrysum rugulosum, Helichrysum nudifolium, Lippia scaberrima, Senecio coronatus, Vernonia oligocephala* and *Wahlenbergia undulata.*

5.3.2. Tsakane Clay Grassland

Tsakane Clay Grassland occurs in pockets along a narrow band from Soweto to Springs, towards Vereeniging and between Balfour and Standerton, in Gauteng and Mpumalanga Provinces (Mucina and Rutherford, 2011). The landscape is characterised by flat to slightly undulating grassy plains and low hills. Vegetation includes short dense grasslands, dominated by several highveld grass species and several forb species (Mucina and Rutherford, 2011).

Mucina & Rutherford (2011) list the following flora species as being important or characteristic taxa in Tsakane Clay Grassland:

Grasses: *Brachiaria serrata, Cynodon dactylon, Cynodon hirsutus, Digitaria ternata, Elionurus muticus, Eragrostis chloromelas, Eragrostis plana, Eragrostis racemosa, Heteropogon contorts, Hyparrhenia hirta, Seteria sphacelata, Themeda triandra, Andropogon schirensis, Cymbopogon caesius, Melinis nerviglumis* and *Seteria nigrirostris*.

Herbs: *Acanthospermum australe, Eriosema salignum, Euryops transvaalensis, Gerbera viridifolia, Helichrysum nudifolium, Helichrysum rugulosum, Hermannia depressa, Nidorella hottentotica, Senecio coronatus, Senecio inornatus, Hypoxis rigidula, Striga asiatica, Tephrosia capensis* and *Chaetacanthus setiger*.

5.3.3. Andesite Mountain Bushveld

Andesite Mountain Bushveld is found across several separate occurrences in Gauteng, North-West, Mpumalanga and Free State Provinces. This vegetation type is characterised by medium-tall thorny

bushveld, with a well-developed grass layer on hillslopes and the valleys of undulating landscapes (Mucina and Rutherford, 2011).

Mucina & Rutherford (2011) list the following flora species as being important or characteristic taxa in Andesite Mountain Bushveld:

Trees and Tall Shrubs: *Dombeya rotundifolia, Celtis africana, Combretum molle, Diospyros lycioides* subsp. *lycioides, Gymnosporia polyacantha, Euclea crispa, Protea caffra, Searsia pyroides* var. *pyroides, Searsia rigida, Senegalia caffra, Vachellia karroo, Zanthoxylum capense* and *Ziziphus mucronata*.

Grasses: *Hyparrhenia hirta, Setaria sphacelata, Themeda triandra, Digitaria eriantha, Elionurus muticus, Eragrostis racemosa, Eragrostis superba, Panicum maximum, Cymbopogon pospischilii, Digitaria eriantha* and *Eragrostis curvula*.

Herbs: *Commelina africana, Vernonia natalensis, Vernonia oligocephala* and *Aloe greatheadii* var. *davyana*.

5.3.4. Gold Reef Mountain Bushveld

Gold Reef Mountain Bushveld occurs along rocky west-east trending ridge and hill systems in the North-West, Gauteng, Free State and Mpumalanga Provinces (Mucina and Rutherford, 2011). Vegetation comprises a mixture of trees and grasses, with dense woody vegetation dominated by *Senegalia caffra* associated with south-facing slopes (Mucina and Rutherford, 2011).

Mucina & Rutherford (2011) list the following flora species as being important or characteristic taxa in Gold Reef Mountain Bushveld:

Trees and Tall Shrubs: *Dombeya rotundifolia, Celtis africana, Combretum molle, Englerophytum magalismontanum, Ochna pretoriensis, Gymnosporia buxifolia, Mystroxylon aethiopicum, Protea caffra, Searsia leptodictya, Vangueria infausta, Vangueria parvifolia, Canthium gilfillanii, Ehretia rigida, Grewia occidentalis, Senegalia caffra* and *Ziziphus mucronata*.

Low Shrubs: *Athrixia elata, Pearsonia cajanifolia, Searsia magalismontana* subsp. *magalismontana, Searsia rigida* var. *rigida* and *Ancylobothrys capensis.*

Grasses: *Loudetia simplex, Panicum natalense, Trachypogon spicatus, Alloteropsis semialata, Bewsia biflora, Digitaria tricholaenoides, Diheteropogon amplectens, Tristachya biseriata* and *Tristachya leucothrix.*

Herbs: *Helichrysum nudifolium, Helichrysum rugulosum, Pentanisia angustifolia, Senecio venosus, Xerophyte retinervis, Cheilanthes hirta, Hypoxis hemerocallidea* and *Pellaea calomelanos.*

5.4. Nationally Threatened Ecosystems

According to the NEMBA Revised National List of Threatened Ecosystems (2022), Andesite Mountain Bushveld and Gold Reef Mountain Bushveld are not threatened. Soweto Highveld Grassland however, is listed as Vulnerable, while Tsakane Clay Grassland is listed as Endangered. Both of these vegetation types have experienced large-scale habitat loss and modification due to cultivation, urbanisation, mining, dam building and road infrastructure. Considering the conservation status of Soweto Highveld Grassland and Tsakane Clay Grassland, any potential losses associated with the

proposed Project are a concern. The remaining extent of Soweto Highveld Grassland and Tsakane Clay Grassland, as mapped by SANBI are shown in Figure 4. The proposed Project layout has been intentionally configured to avoid placing infrastructure within natural habitat areas classified as Soweto Highveld Grassland and Tsakane Clay Grassland. While the layout successfully avoids all Tsakane Clay Grassland, small portions of Soweto Highveld Grassland will still be affected in the north of the PAOI.

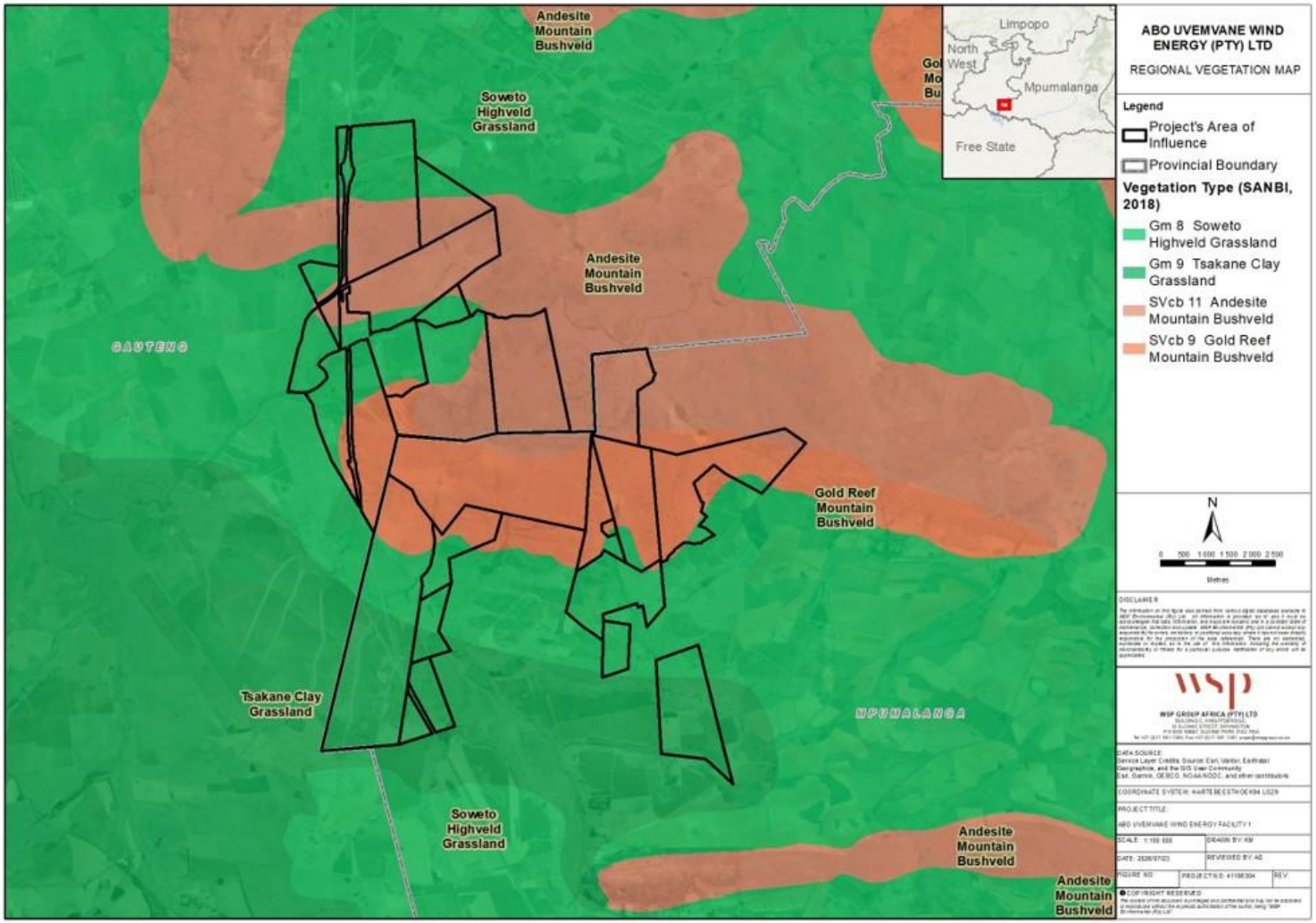

Figure 3: PAOI in relation to the SANBI (2018) vegetation types.

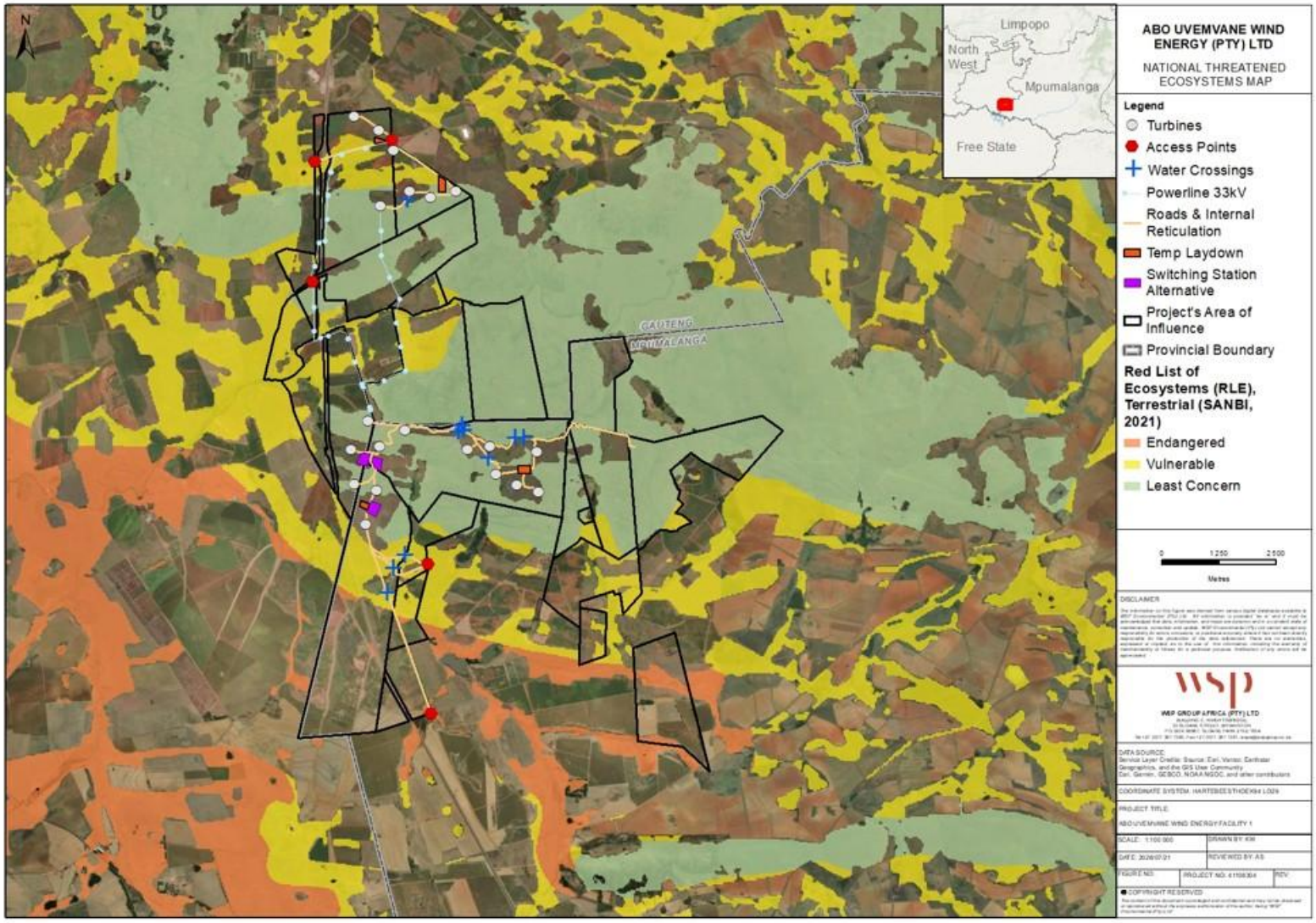

Figure 4: PAOI in relation to delineations of the National Red List of Terrestrial Ecosystems.

6. Landscape Context and Existing Impacts on Flora

The following notes summarise the general landscape context and exiting/current impacts observed in the PAOI during the field programme:

- The PAOI is large and encompasses a series of rocky ridges and hills, bisected by the Suikerbosrand River and numerous small water courses and streams;
- Most of the land in the centre of the PAOI remains natural and under wildlife or livestock management, with isolated cultivated fields also present. Cultivated fields are more prevalent along the flat and open periphery of the PAOI;
- Stands of alien invasive trees including *Acacia dealbata, Acacia mearnsii*, *Eucalyptus camaldulensis* and *Populus x canescens* are present in the PAOI, but are not currently abundant or widespread;
- Game/livestock fences typically delineate farm boundaries and numerous internal fences further partition farms into smaller game or grazing camps. The PAOI is also fragmentated by many farm roads/tracks, as well as larger district and national roads, such as the N3 Highway, which bisects the PAOI along its western boundary; and
- Agricultural land uses (i.e., crop production and livestock farming) dominate most of the land surrounding the PAOI, and accordingly large areas are modified by cultivated fields.

7. Vegetation and Flora Assessment

7.1. Habitat Units

Seven habitat units were identified in the PAOI during the field programme. These include four natural habitats and three modified habitats:

Natural Habitats

- Mountain Bushveld;
- Rocky Shrubland and Grassland;
- Watercourses (Rivers and Wetlands);
- Natural Dry Grassland;

Modified Habitats

- Secondary Grassland;
- Alien Tree Stands; and
- Cultivated Fields.

These habitat units are described, with accompanying photographs, in Section 7.1.1 through to Section 7.1.7. **Error! Reference source not found.Error! Reference source not found.**A habitat unit map for the PAOI is shown in Figure 5.

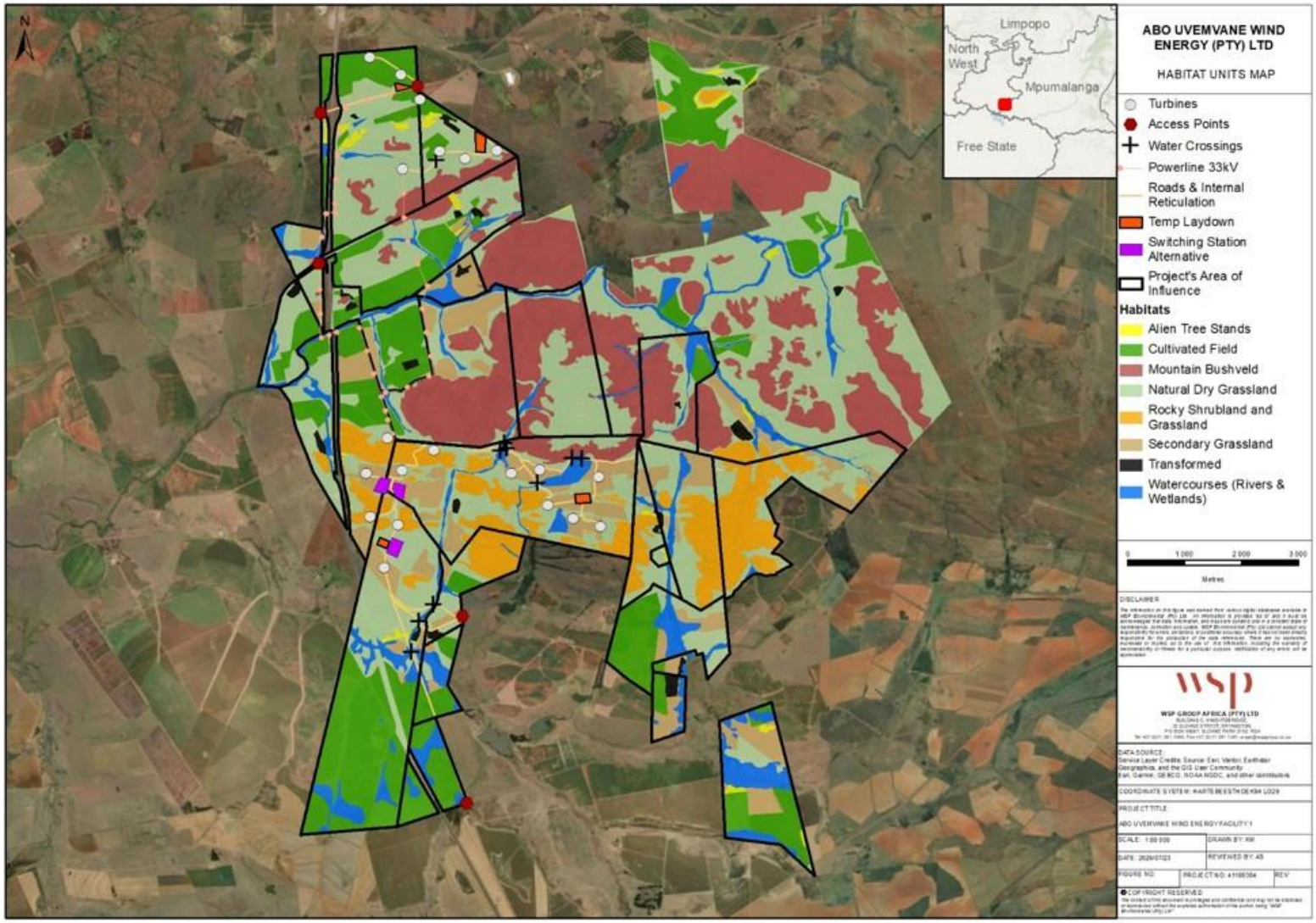

Figure 5: Habitat unit map of the PAOI.

7.1.1. Mountain Bushveld

Mountain Bushveld is a variable habitat unit, that dominates the taller rocky hills and mountains in the north of the PAOI. Vegetation structure ranges from low open bushveld to low- and short closed bushveld depending on slope position, as per Edwards (1983) structural classification, and this generally grades into the Natural Dry Grassland habitat unit.

The woody component is dominated by broad-leafed species. The herbaceous layer is moderately- to well-developed, except in very rocky sites, and in most areas is grass dominated, although forbs are common to locally abundant (Figure 6 and Figure 7).

Dominant woody species generally include *Diospyros lycioides, Searsia leptodictya* and *Searsia pyroides,* with several other taxa also common or diagnostic, such as *Aloe marlothii, Cussonia paniculata, Dombeya rotundifolia, Euclea crispa, Gymnosporia buxifolia, Lippia javanica, Rhoicissus tridentata, Vangueria parvifolia* and *Ziziphus mucronata.*

Species commonly recorded in the herbaceous layer of areas of Mountain Bushveld include grasses, such as *Brachiaria serrata, Eragrostis chloromelas, Eragrostis curvula, Hyparrhenia hirta, Melinis nerviglumis, Setaria sphacelata, Themeda triandra* and *Tristachya leucothrix,* and various forbs including *inter alia*; *Acalypha angustata, Berkheya setifera, Commelina africana* var. *barberae, Hilliardiella oligocephala, Hypoxis acuminata, Ipomoea ommaneyi, Pentanisia angustifolia* and *Pseudopegolettia tenella.* For a list of flora species recorded in this habitat unit during the field survey refer to Appendix C.

Sensitivity Aspects

- The Mountain Bushveld that characterises the rocky hills and mountains in the PAOI is a natural habitat unit;
- These areas provide important habitat for a variety of flora and fauna, and at both local- and regional scales they increase habitat heterogeneity and play a vital role as landscape corridors and refugia;
- No flora SCC were recorded in this habitat unit; however, habitat suitability assessments suggest that several flora SCC may be present; and
- Areas of Mountain Bushveld in the PAOI are therefore considered to have floristic importance and sensitivity.

Figure 6: Typical Mountain Bushveld

Figure 7: Typical Mountain Bushveld

7.1.2. Rocky Shrubland and Grassland

Rocky Shrubland and Grassland characterises the low, but very rocky hills and ridges in the southern portion of the PAOI. Vegetation structure is variable and ranges from low closed grassland to low- to high open shrubland (*sensu*. Edwards, 1983). Woody vegetation is dominated by broad-leafed species and the herbaceous layer is poor- to moderately developed and generally grass dominated (Figure 8 and Figure 9).

Dominant woody species include *Protea caffra, Searsia magalismontana* and *Vangueria parvifolia.* Other common woody taxa include *Ancylobothrys capensis, Brachylaena rotundata, Clutia pulchella, Cussonia paniculata*, *Englerophytum magalismontanum, Lopholaena coriifolia* and *Mundulea sericea.*

Common graminoids species recorded include *Cyperus rupestris*, *Eragrostis chloromelas, Eragrostis curvula, Eragrostis trichophora, Melinis nerviglumis, Loudetia simplex, Microchloa caffra* and *Tristachya leucothrix,* while common forbs include *inter alia*; *Cleome maculata, Commelina africana* var. *barberae, Helichrysum lepidissimum, Hilliardiella aristata, Hypoxis acuminata, Indigofera melanadenia, Phymaspermum athanasioides* and *Tritonia nelsonii.* For a list of flora species recorded in this habitat unit during the field survey refer to Appendix C.

Sensitivity Aspects

Rocky Shrubland and Grassland shares many of the same sensitivity features as Mountain Bushveld:

- Rocky Shrubland and Grassland in the PAOI is a natural habitat unit;
- These areas provide important habitat for a variety of flora and fauna, and at both local- and regional scales, they increase habitat heterogeneity and play a vital role as landscape corridors and refugia;
- No flora SCC were recorded in this habitat unit; however, habitat suitability assessments suggest that several flora SCC may be present; and
- Areas of Rocky Shrubland and Grasslands in the PAOI are therefore considered to have floristic importance and sensitivity.

Figure 8: Typical area of Rocky Shrubland and Grassland.

Figure 9: Area of Rocky Shrubland and Grassland dominated by Protea caffra trees.

7.1.3. Watercourses (Rivers and Wetlands)

This is a variable habitat unit that is associated with the drainage features in the PAOI, including large watercourses, such as the Suikerbosrand River, as well as smaller drainage lines and wetland systems.

Vegetation structure along larger rivers and streams ranges from low- to short open bushveld, with certain areas characterised by low- to short closed bushveld (Figure 10). In more typical wetland areas, vegetation structure is typically characterised by low- to tall closed grassland (Figure 11) (*sensu*. Edwards, 1983).

Common woody species generally recorded along rivers and streams include a mixture of *Celtis africana*, *Diospyros lycioides, Leucosidea sericea, Salix mucronata, Searsia leptodictya, Searsia pyroides* and the alien trees *Gleditsia triacanthos, Salix babylonica* and *Sesbania punicea.* Some notable variations include dense, closed-canopy stands of *Olea europaea* that characterise certain mountain valley streams, and thickets dominated by *Leucosidea sericea* that characterise overgrazed river and drainage line portions.

Common flora species recorded include grasses and sedges such as *Andropogon appendiculatus, Digitaria eriantha, Cyperus congesta, Eleocharis limosa, Eragrostis curvula, Eragrostis gummiflua, Eragrostis plana, Kyllinga erecta, Panicum maximum, Panicum schinzii, Paspalum distichum, Paspalum dilatatum*, Scirpoides burkei, Setaria sphacelata* and *Themeda triandra.* The tall reed *Phragmites australis,* as well as the bulrush *Typha capensis* are also present in certain areas. Common forbs recorded in this habitat unit include inter alia; *Berkheya bipinnatifida, Berkheya radula, Berkheya speciosa, Bidens pilosa*, Centella asiatica, Cleome maculata, Commelina africana, Chironia palustris, Monopsis decipiens* and *Senecio inornatus* (*denotes alien species). For a list of flora species recorded in this habitat unit during the field survey refer to Appendix C.

Sensitivity Aspects

- Watercourse habitats play a crucial role in maintaining terrestrial biodiversity, ecological processes and the hydrological functioning (e.g., filtration and flood attenuation) of the landscape.
- These habitats significantly increase landscape-scale habitat connectivity and thus provide important ecological corridors.

- No flora SCC were recorded in this habitat unit; however, habitat suitability assessments suggest that several flora SCC may be present;
- Watercourse habitats in the PAOI are therefore considered to have floristic importance and sensitivity.

Figure 10: The Suikerbosrand River, flanked by both woody and herbaceous flora species.

Figure 11: Valley-bottom wetland, with an artificial farm dam.

Figure 12: Mountain valley, characterised by closed-canopy woodland dominated by Olea europaea.

Figure 13: Drainage line encroached by Leucosidea sericea thickets.

7.1.4. Natural Dry Grassland

Natural Dry Grasslands occur throughout the PAOI, where they typically grade into areas of Mountain Bushveld or Rocky Shrubland and Grassland. Structurally, vegetation comprises low closed grassland, as per Edwards (1983).

Generally, this habitat unit is species rich and considered a primary vegetation community. Compositionally, vegetation is dominated by grasses, although forbs and some woody species are present and can be locally abundant (Figure 14 and Figure 15).

Common grass species recorded in areas of natural grassland include *Brachiaria serrata, Cymbopogon caesius, Cymbopogon pospischilii, Eragrostis chloromelas, Eragrostis curvula, Harpochloa falx, Hyparrhenia hirta, Melinis nerviglumis, Setaria sphacelata, Themeda triandra* and *Tristachya leucothrix.* In overgrazed or trampled areas of this habitat unit, the species composition is similar to areas of Secondary Grassland and characterised by a prevalence of *Eragrostis* species.

Commonly recorded forbs include *Acalypha angustata, Berkheya setifera, Cleome maculata, Cyanotis speciosa, Hermannia depressa, Hilliardiella aristata, Hilliardiella oligocephala, Hypoxis acuminata, Ipomoea ommaneyi, Ledebouria luteola, Senecio inornatus, Senecio oxyriifolius* and *Scabiosa columbaria.*

Woody species generally occur as scattered individual- or small aggregations of medium-sized trees and shrubs. Common species include *Cussonia paniculata, Diospyros lycioides, Euclea crispa, Leucosidea sericea, Osteospermum moniliferum, Protea caffra* and *Seriphium plumosum.* The dwarf shrubs *Elephantorrhiza elephantina, Searsia discolor* and *Ziziphus zeyheriana* were also frequently recorded. For a list of flora species recorded in this habitat unit during the field survey refer to Appendix C.

Sensitivity Aspects

- Natural Dry Grassland in the PAOI is a natural habitat unit;
- These areas provide important habitat for a variety of flora and fauna, and also act as important ecological corridors, increasing local habitat connectivity and facilitating various ecological processes such as, *inter alia*, flora and fauna movement and dispersal;
- No flora SCC were recorded in this habitat unit; however, habitat suitability assessments suggest that several flora SCC may be present; and
- Natural Grasslands in the PAOI are therefore considered to have floristic importance and sensitivity.

Figure 14: Typical example of Natural Dry Grassland in the PAOI.

Figure 15: Forb dominated area of Natural Dry Grassland.

7.1.5. Secondary Grassland

Secondary Grasslands characterise former cultivated fields ('old lands') that have been left fallow, and over several years, have regenerated into a recovering (secondary) grassland community.

In line with Edwards (1983), vegetation structure is low closed grassland. Compositionally, Secondary Grasslands exhibit lower diversity compared to areas of Natural Dry Grassland, and are typically dominated by a small number of grass species – mostly *Eragrostis* species, such as *Eragrostis chloromelas, Eragrostis curvula* and *Eragrostis trichophora* (shown in Figure 16). The tall, robust thatching grasses *Hyparrhenia hirta* also prevalent in certain areas of Secondary Grassland (Figure 17).

Other recorded grasses include *Cynodon dactylon, Digitaria eriantha, Eragrostis gummiflua, Eragrostis racemosa, Melinis nerviglumis, Pogonarthria squarrosa, Setaria sphacelata, Themeda triandra* and *Tristachya leucothrix.*

Few forbs are present in areas of this habitat unit, and include, *inter alia*; *Cleome monophylla, Commelina africana, Cyanotis speciosa, Gomphrena celosioides*, Helichrysum callicomum, Helichrysum nudifolium* var. *nudifolium, Hilliardiella oligocephala, Ipomoea ommaneyi* and *Solanum elaeagnifolium*.*

Woody species occurs as scattered individual small shrubs, and typically include *Diospyros lycioides*, *Elephantorrhiza elephantina, Searsia rigida* and *Seriphium plumosum.* For a list of flora species recorded in this habitat unit during the field survey refer to Appendix C.

Sensitivity Aspects

- Secondary Grassland is a modified habitat unit;
- These areas have been stable for a long period, and as a result retain some of the functional attributes of natural grasslands;
- No flora SCC were recorded in this habitat unit. Considering their disturbed nature, it is considered unlikely that any flora SCC are present; and
- Accordingly, these Secondary Grasslands in the PAOI have low floristic importance or sensitivity.

Figure 16: Eragrostis dominated Secondary Grassland.

Figure 17: Hyparrhenia hirta dominated Secondary Grassland.

7.1.6. Alien Tree Stands

Alien tree stands are present in the PAOI. These generally occur as small, localised single-species stands. Structurally, they are defined as closed woodland, as per Edwards (1983). Dominant tree species dominating these stands in the PAOI include *Acacia mearnsii*, *Eucalyptus* species and *Populus x canescens* (Figure 18 and Figure 19). Little to no indigenous vegetation is present in well-established alien tree stands.

Sensitivity Aspects

- Alien tree stands are considered modified habitat;
- No flora SCC were recorded in this habitat unit, and none are likely to be present; and
- Accordingly, Alien Tree Stands have no floristic importance or sensitivity.

Figure 18: Small stand/windrow of Eucalyptus camaldulensis trees.

Figure 19: Stand of Populus x canescens trees encroaching in a wetland in the PAOI.

7.1.7. Cultivated Fields

Several cultivated fields, including both pivot-irrigated and dry-land crop fields, are present across the PAOI. Most occur on the flatter edges of the PAOI, although there are a small number of fields in low-lying areas within the interior of the PAOI.

This habitat unit includes both actively/currently used cultivated fields that are regularly disturbed and denuded of indigenous vegetation (Figure 20), and well as fallow fields that have not been ploughed/cultivated in the recent past, but still remain either unvegetated or dominated by a combination of alien and indigenous ruderal plants and weeds.

Sensitivity Aspects

- Cultivated fields are considered a modified habitat Unit;
- They have been, or are currently, subject to regular and intense anthropogenic disturbance. When not dominated by a monoculture of crop species, these areas are typically colonised by several alien weeds, including some declared AIS;
- No flora SCC were recorded in this habitat unit and none are considered likely to be present; and
- Accordingly, Cultivated Fields have no floristic importance or sensitivity.

Figure 20: Recently ploughed cultivated field.

7.2. Floristics Analysis

7.2.1. Flora Species of Conservation Concern

Based on reviewed literature and data sources, up to 14 flora species that potentially occur in the PAOI are listed as SCC on the Red List of South Africa Plants. These taxa are listed in Table 5, along with the conservation statuses, habitat preferences and a probability of occurrence, based on the findings of habitat suitability assessments. Twelve of the 14 taxa are summer flowering species.

No flora SCC were recorded in the PAOI during the field programme. However, considering the size and availability and diversity of natural habitat in the PAOI, habitat suitability assessments indicate that it is possible that SCC may be present across the broader PAOI.

Several taxa highlighted by the DFFE Screening Tool as potentially sensitive features for the PAOI for example favour open, undulating grassland habitats, often associated with exposed rocky outcrops. These include *Khadia beswickii, Delosperma macellum*, Sensitive Species 691, and *Brachycorythis conica* subsp. *transvaalensis*. Other taxa, such as Sensitive Species 1252 and Sensitive Species 1248, are more closely associated with wooded or bushland habitats. Both open grassland and more closed wooded habitats are present in the PAOI, and it is therefore possible/probable that some of these flora SCC may occur in undisturbed portions of natural habitat in the broader PAOI. Conversely, *Prunus africana* is typically associated with more well-developed forest habitat, which is not present in the PAOI. It is therefore considered unlikely that this species is present. Table 5 provides species-specific accounts for these taxa, as well as other SCC that potentially occur in the PAOI based on reviewed literature and datasets.

It is noted that most proposed Project infrastructure has been strategically located in areas that have already been disturbed by human activities, including historic and current cultivation, while most of proposed access road have been aligned with existing farm roads and vehicle tracks. It is therefore considered unlikely that flora SCC are present within these proposed development footprints.

7.2.2. Nationally and Provincially Protected Species

Several flora species recorded in the PAOI during the field programme are listed as Protected on the Mpumalanga Nature Conservation Act (Act No. 10 of 1998) and/or Gauteng's Nature Conservation Ordinance 12 of 1983 (as amended).

These are listed in Table 6, along with other provincially Protected flora species that potentially occur in the PAOI based on reviewed literature and datasets. No flora species listed on the NEMBA ToPS List (2007) are likely to occur in the PAOI. Figure 21 to Figure 24 show images of select Protected flora species taken in the PAOI during the field programme.

Table 5: National Red List flora species that potentially occur in the PAOI.

Family	Scientific Name[#]	National Red List Status	Flowering Time	Habitat Preferences	Probability of Occurrence in the PAOI
Aizoaceae	*Delosperma leendertziae*	Near Threatened	August-March	Has an EOO of 8658 km^2 and an AOO of 4-13 km^2. Known from 10 locations, where it favours steep south-facing quartzite slopes in mountain grassland (Victor and Pfab, 2005c). iNaturalist records indicate that this species has been recorded at Suikerbosrand Nature Reserve.	Possible – suitable habitat present in the PAOI.
Aizoaceae	*Delosperma macellum*	Endangered	November-April	Known from only two locations, with a total population estimated at 68 mature individuals (Victor and Pfab, 2005b). The occupied area of this species is 101 km^2 (SANBI, 2026). Occurs in open areas, near trees and favours loose gravel habitats (Victor and Pfab, 2005b).	Possible – suitable habitat present in the PAOI.
Aizoaceae	*Khadia beswickii*	Vulnerable	July-April	Species has an EOO of only 475 km^2 and an AOO of 3-7 km^2 (Victor and Pfab, 2005a). SANBI (2026) indicate the occupied area of this species is 1439.33 km^2. It is known from only ten locations, mostly across Gauteng Province, but also scattered sites in Mpumalanga. iNaturalist records indicate that this species has been recorded at two sites close to the POAI in 2023; approximately 6.6 km north-east and 2 km north-west of the PAOI. Favours open shallow soils, over rocks in grassland (Victor and Pfab, 2005a).	Probable – suitable habitat present in the PAOI, but unlikely to be present in disturbed areas.
Aizoaceae	*Lithops lesliei* subsp. *lesliei*	Vulnerable	March-June	Rocky habitats in arid grassland (Mtshali, *et al*., 2023). The occupied area of this species according to SANBI (2026) is 2620.67 km^2. iNaturalist records indicate that this species has been recorded in 2015 at sites approximately 5 km and 6.5 km to the north and west of the PAOI, respectively.	Probable – suitable habitat present in the PAOI, but unlikely to be present in disturbed areas.
Asteraceae	*Cineraria longipes*	Vulnerable	March-May	Known from six subpopulations, with an AOO estimated at 5-14 km^2 (Pfab and Victor, 2005a). The occupied area of this species is 138.62 km^2 by SANBI (2026). Occurs on south-facing slopes of basalt hills, where it favours grassland habitats, where it grows amongst rocks and seepage lines (Pfab and Victor, 2005a). iNaturalist records indicate that	Possible – suitable habitat present in the PAOI.

Family	Scientific Name[#]	National Red List Status	Flowering Time	Habitat Preferences	Probability of Occurrence in the PAOI
				this species has been recorded at Suikerbosrand Nature Reserve.	
Brassicaceae	*Cleome conrathii*	Near Threatened	March-May December-January	Occurs in grassland or deciduous woodland, where it favours stony quartzite slopes, with red sandy soils (Pfab, *et al*., 2005)	Probable – suitable habitat present in the PAOI, but unlikely to be present in disturbed areas.
Crassulaceae	*Adromischus umbraticola* subsp. *umbraticola*	Near Threatened	September-January	Species has an EOO of 14 600 km^2 and is known from 14 locations. Grows in rock crevices on south-facing slope ridges. (Helme and Raimondo, 2006). iNaturalist records indicate that this species has been recorded at a site to the north-west of the PAOI.	Probable – suitable habitat present and previously recorded in close proximity to the PAOI.
Orchidaceae	*Brachycorythis conica subsp. transvaalensis*	Critically Endangered	January-March	Three small subpopulations of this species remain in Mpumalanga, all with populations of <10 individual plants (Van Staden *et al*., 2015). One other subpopulation is known in Gauteng and numbers about 117 plants (Van Staden *et al*., 2015). This species has an occupied area estimated at 1194.27 km^2 (SANBI, 2026). Favours short open grassland and wooded grassland, on sandy gravel overlying dolomite and occasionally quartzite. Occurs at an altitude of between 1000-1705 m (Van Staden *et al*., 2015).	Possible – suitable habitat present in the PAOI.
Orchidaceae	*Eulophia coddii*	Vulnerable	December	A range-restricted species, with an EOO of 7000-9000 km^2 Pfab and Victor, 2005b). The occupied area of this species is 110.89 km^2 (SANBI, 2026). Known from five locations, with an estimated population size of 240-1000 individuals (Pfab and Victor, 2005b). Occurs in bushveld and grassland, where it prefers sandstone-derived soils on steep slopes (Pfab and Victor, 2005b). iNaturalist records indicate that this species has been recorded in and around Suikerbosrand Nature Reserve in 2019-2022.	Probable – suitable habitat present in the PAOI, but unlikely to be present in disturbed areas.

Family	Scientific Name[#]	National Red List Status	Flowering Time	Habitat Preferences	Probability of Occurrence in the PAOI
Orchidaceae	*Habenaria barbertoni*	Near Threatened	February to March	Favours rocky hillsides in *Acacia* savanna, at altitudes between 1000 -1500 m (Victor, *et al*., 2005). iNaturalist records indicate that this species has been recorded at a site to the north of the PAOI.	Unlikely – no suitable habitat in the PAOI.
Rosaceae	*Prunus africana*	Vulnerable	December - June	Forest species, favouring *inter alia*, inland mistbelt and Afromontane forests up to 2100 m. Population estimated at 10 000 mature trees (Williams *et al*., 2008). The occupied area of this species is 1116.73 km^2 according to SANBI (2026).	Unlikely – limited to no suitable habitat.
-	Sensitive species 1248	Vulnerable	September - April	Found in open woodland and steep rocky hills in shady situations at low- and medium altitudes. No EOO for this species is listed. The occupied area of this species is estimated at 9013.20 km^2 (SANBI, 2026).	Possible – suitable habitat present.
-	Sensitive species 1252	Vulnerable	October - January	Moist bushveld habitats, including wooded mountain kloofs. The occupied area of this species is 4592.18 km^2 (SANBI, 2026).	Possible – suitable habitat present.
-	Sensitive species 691	Vulnerable	February - March	EOO is between 455 and 11 158 km^2, and thought to occur at less than 10 locations. The occupied area of this species is estimated at 6903.43 km^2 (SANBI, 2026). Prefers moist areas in undulating grassland. iNaturalist records indicate that this species has been recorded at a site to the north-west of the PAOI.	Possible – suitable habitat present.

Table 6: Provincially Protected flora species observed or potentially occurring in the PAOI.

Family	Species Name	Gauteng Protected Status (1983)	Mpumalanga Protected Status(1998)	Field Programme Record
Agapanthaceae	*Agapanthus campanulatus*	Protected	-	
Amaryllidaceae	*Boophone disticha*	-	Protected	Confirmed
Amaryllidaceae	*Crinum bulbispermum*	Protected	Protected	Confirmed
Amaryllidaceae	*Crinum graminicola*	Protected	Protected	Confirmed
Amaryllidaceae	*Haemanthus humilis*	Protected	Protected	
Amaryllidaceae	*Haemanthus montanus*	Protected	Protected	
Amaryllidaceae	*Nerine krigei*	Protected	-	
Amaryllidaceae	*Scadoxus multiflorus*	Protected	Protected	
Anacampserotaceae	*Anacampseros subnuda*	-	-	
Apocynaceae	*Ceropegia rendallii*	Protected	Protected	
Apocynaceae	*Stapelia leendertziae*	Protected	-	
Araceae	*Zantedeschia albomaculata* subsp. *albomaculata*	Protected	Protected	
Aquifoliaceae	*Ilex mitis var. mitis*	-	-	
Araliaceae	*Cussonia paniculata*	Protected	-	Confirmed
Asphodelaceae	*Aloe bergeriana*	Protected	Protected	
Asphodelaceae	*Aloe davyana*	-	Protected	Confirmed
Asphodelaceae	*Aloe marlothii*	-	Protected	Confirmed
Asphodelaceae	*Aloe subspicata*	Protected	Protected	
Asphodelaceae	*Aloe transvaalensis*	Protected	Protected	
Asphodelaceae	*Aloe verecunda*	Protected	Protected	Confirmed
Asphodelaceae	*Kniphofia porphyrantha*	Protected	Protected	
Hypoxidaceae	*Hypoxis hemerocallidea*	-	Protected	Confirmed
Iridaceae	*Babiana bainesii*	Protected	-	
Iridaceae	*Gladiolus crassifolius*	Protected	Protected	
Iridaceae	*Gladiolus elliotii*	Protected	Protected	
Iridaceae	*Gladiolus longicollis* subsp. *platypetalus*	Protected	Protected	
Iridaceae	*Gladiolus papilio*	Protected	Protected	
Iridaceae	*Gladiolus permeabilis* subsp. *edulis*	Protected	Protected	
Iridaceae	*Gladiolus sericeovillosus* subsp. *calvatus*	Protected	Protected	
Iridaceae	*Gladiolus sericeovillosus* subsp. *sericeovillosus*	Protected	Protected	
Iridaceae	*Gladiolus dalenii*	Protected	Protected	Confirmed
Iridaceae	*Gladiolus permeabilis subsp. edulis*	Protected	Protected	Confirmed
Orchidaceae	*Bonatea antennifera*	Protected	Protected	
Orchidaceae	*Brownleea parviflora*	Protected	Protected	
Orchidaceae	*Disa aconitoides* subsp. *aconitoides*	Protected	Protected	
Orchidaceae	*Eulophia hians* var. *nutans*	Protected	Protected	
Orchidaceae	*Eulophia ovalis* var. *bainesii*	Protected	Protected	
Orchidaceae	*Eulophia tuberculata*	Protected	Protected	
Orchidaceae	*Habenaria falcicornis* subsp. *caffra*	Protected	Protected	
Orchidaceae	*Habenaria filicornis*	Protected	Protected	
Orchidaceae	*Habenaria galpinii*	Protected	Protected	

Family	Species Name	Gauteng Protected Status (1983)	Mpumalanga Protected Status(1998)	Field Programme Record
Orchidaceae	*Habenaria pseudociliosa*	Protected	Protected	
Orchidaceae	*Orthochilus leontoglossus*	Protected	Protected	
Orchidaceae	*Orthochilus welwitschii*	Protected	Protected	
Orchidaceae	*Pterygodium dracomontanum*	Protected	Protected	
Orchidaceae	*Satyrium parviflorum*	Protected	Protected	
Proteaceae	*Protea caffra*	Protected	Protected	Confirmed
Proteaceae	*Protea roupelliae* subsp. *roupelliae*	Protected	Protected	
Source: List based on data from BODATSA and field observations.				

Figure 21: Boophone disticha

Figure 22: Protea caffra

Figure 23: Aloe verecunda

Figure 24: Crinum graminicola

7.2.3. Declared Alien Invasive Species

Based on the findings of the field survey, 17 NEMBA declared alien invasive plant species were recorded in the PAOI. These are listed in Table 7, along with their growth form and NEMBA Category.

Table 7: NEMBA Declared alien invasive species recorded in the PAOI.

Scientific Name	Common Name	Growth Form	NEMBA Category
Acacia dealbata	Silver Wattle	Tree	2
Acacia mearnsii	Black Wattle	Tree	2
Cereus jamacaru	Queen of the Night	Succulent Tree	1b
Cirsium vulgare	Spear Thistle	Herbaceous forb	1b
Cuscuta campestris	Common Dodder	Parasite	1b
Datura stramonium	Large Thorn Apple	Herbaceous forb	1b
Eucalyptus camaldulensis	Gum	Tree	2
Gleditsia triacanthos	Honey Locust	Tree	1b
Melia azedarach	Syringa	Tree	1b

Scientific Name	Common Name	Growth Form	NEMBA Category
Opuntia ficus-indica	Sweet Prickly Pear	Succulent Tree	1b
Pennisetum clandestinum	Kikuyu	Graminoid	1b
Populus x canescens	Gray Polar	Tree	2
Pyracantha angustifolia	Yellow Firethorn	Tree	1b
Sesbania punicea	Red Sesbania	Tree	1b
Solanum elaeagnifolium	Potato Creeper	Herbaceous forb	1b
Verbena bonariensis	Wild Verbena	Herbaceous forb	1b
Xanthium spinosum	Spiny Cocklebur	Herbaceous forb	1b
Xanthium strumarium	Large Cocklebur	Herbaceous forb	1b

7.2.4. Flora of Medicinal Value

Twenty-nine flora species recorded in the PAOI have recognised medicinal value. These are listed in Table 8, accompanied by a description of their purported use, as per Van Wyk *et al*., (2009).

Table 8: Flora species recorded in the PAOI that have recognised medicinal value.

Scientific Name	Medicinal Use*
Afroaster serrulatus	Used to treat headaches.
Artemisia afra	Treats several ailments, such as coughs, colds, fever and influenza.
Asparagus species	Used in the treatment of tuberculosis, kidney ailments and rheumatism.
Athrixia elata	Used as a remedy for coughs and as a purgative.
Boophone disticha	Bulbs scales are used to treat boils and septic wounds, as well as alleviate pains.
Centella asiatica	Used to treat a variety of infirmities including leprosy, wounds, cancer, fever and syphilis.
Crinum bulbispermum	Treats colds and scrofula.
Datura stramonium	Relieves asthma and acts to reduce pain. Weak infusions are used as an aphrodisiac.
Dombeya rotundifolia	Used to treat ulcers, diarrhoea, haemorrhoids and other stomach afflictions.
Elephantorrhiza elephantina	Used to treat diarrhoea, haemorrhoids, dysentery, perforated ulcers and as an emetic. .
Gomphocarpus fruticosus	Ground leaves are used as snuff, and to treat headaches, tuberculosis and as an emetic.
Helichrysum species	Treats a variety of afflictions, including coughs, colds, fever, headaches and infections.
Heteromorpha arborescens	Various plant parts are used as a remedy for tuberculosis, abdominal pains, colic, headaches, fever, asthma and coughs.
Hilliardiella species	Infusions taken to treat stomach ailments, rheumatism, dysentery and diabetes.
Hypoxis species	Infusions of the corm are used to treat dizziness, bladder disorders and insanity.
Lippia javanica	Used to treat coughs, colds, influenza, measles, stomach problems and headaches.
Mentha longifolia	Treats various respiratory ailments including coughs, colds and asthma.

Scientific Name	Medicinal Use*
Olea europaea	Used as a hypotensive to lower blood pressure and enhance renal function.
Pelargonium luridum	Taken orally to treat diarrhoea and dysentery.
Pellaea calomelanos	Used to treat boils and abscesses and for internal parasites
Pentanisia angustifolia	Decoctions are used to treat burns, swellings, sore joints and rheumatism.
Protea caffra	Bark is used to treat bleeding stomach ulcers and diarrhoea.
Rhoicissus tridentata	Roots and tubers used to treat stomach ailments, kidney and bladder issues, and dysmenorrhoea.
Salix mucronata	Willow tips are used to treat rheumatism and fever.
Scabiosa columbaria	Used to treat colic and heartburn.
Typha capensis	Decoctions used to treat venereal disease, as well as diarrhoea, dysentery and enhance male libido.
Vachellia karroo	Barks and leaves used to treat diarrhoea and dysentery. Gum, barks and leaves also used to treat colds and oral thrush.
Zanthoxylum capense	Treats flatulent colic, stomach ache and fever.
Ziziphus mucronata	Bark and leaves are used as an expectorant in coughs and chest ailments, while roots extracts are used to treat diarrhoea and dysentery.
*Medicinal use, as per Van Wyk, *et al*. (2009).	

8. Key Ecological Attributes and Processes

8.1. Habitat Corridors, Resources and Refugia

The PAOI is characterised by its combination of extensive tracts of natural habitat occurring on a topographically diverse landscape. Most of the PAOI is dominated by a series of rocky hills and ridges, which are interspersed by grassy plains and river valleys (e.g. Suikerbosrand River). Modified habitats, such as cultivated fields, and old lands, are present, but mostly occur on the edges of the PAOI, or on the flat portions of its interior.

Prominent linear infrastructure in the PAOI includes numerous game fences, internal farm roads and tracks, and larger district and even national roads (i.e., N3 highway). Despite the presence of modified habitat patches and linear infrastructure, overall habitat connectivity within the PAOI, and to the adjacent landscape, remains relatively high.

Rocky outcrops and ridges, such as those in the PAOI, are recognised for their high biodiversity importance, and for their role as landscape corridors, refugia and as critical hydrological features (read Pfab, 2001). The combination and interaction of several factors including altitude, aspect, slope, geology, soils, light and hydrological patterns create highly diverse and unique micro-habitats that significantly increase local- and landscape-scale habitat heterogeneity. This in turn, promotes a high degree of both flora and fauna diversity (Pfab, 2001).

Outside the boundary of the PAOI, the landscape is generally flatter and increasingly dominated by modified habitats, primarily cultivated fields. Natural habitats in this broader region tend to exist as smaller, fragmented patches, frequently linked to drainage systems.

On a larger regional scale, the PAOI is not located within, or in close proximity to, a Key Biodiversity Area nor are areas of the POAI mapped as part of Mpumalanga's Intact Grasslands. It is noted though that the rocky ridges and hills within the PAOI are part of a discontinuous chain of mountains extending southeast and northwest. This chain includes Alice Glöckner Provincial Nature Reserve (approximately 3.2 km) and Suikerbosrand Nature Reserve approximately 13 km to the northwest. The natural ridge habitat within the PAOI therefore likely plays an important functional role in landscape-scale ecological processes. These include source-sink metapopulations dynamics, such as providing habitat refugia, and facilitating dispersal through corridors or stepping stones. Portions of natural habitat within and adjacent to the PAOI have also been identified as being important for climate change adaptation, with focal areas as well as critical link, core and supporting corridors present.

8.2. Dynamic Ecological Processes and Drivers of Change

The following notes summarise the key ecological processes and drivers of change that are present in the landscape and their possible influence on the character of terrestrial vegetation and flora in the PAOI.

8.2.1. Alien Invasive Species Colonisation

Although present, alien invasive species are not overly abundant in the PAOI. This notwithstanding, stands of large woody taxa such as *Acacia dealbata, Acacia mearnsii*, *Eucalyptus camaldulensis* and *Populus x canescens* were noted. Species like *Acacia dealbata, Acacia mearnsii*, and *Populus x canescens* are particularly aggressive invaders and if not actively controlled, will continue to spread into adjacent natural habitat, where they will shade-out and competitively exclude many indigenous woody and herbaceous species. This can have several deleterious impacts on the integrity and function of these habitats, such as *inter alia*:

- A loss of natural habitat and floristic diversity, with the resulting habitat patches unable to support diverse fauna communities;
- A reduction in grass productivity for grazing herbivores, and
- Increased exposed soil surfaces and incidences of erosion.

The spread of alien invasive vegetation is therefore considered a significant driver of change in the PAOI and surrounding landscape, and one capable of negatively impacting terrestrial biodiversity. The proposed Project may create temporary and localised sites where alien invasive species could establish and this will need to be managed.

8.2.2. Wildfire – Grassland Burning

Fire is a natural, albeit often human initiated, disturbance agent in both grasslands and savannas, which are considered fire-prone and fire-dependent landscapes. Fire is essential to the maintenance of biodiversity patterns and ecological processes (SANBI, 2013).

Wildfires have several key ecological effects, including:

- Removal of moribund vegetation and increasing plant productivity and palatability, which improves grazing for wild herbivores, and stimulates germination / flowering of fire-adapted flora species (e.g., certain orchid species);
- Controls the encroachment of both alien and indigenous woody plant species and weeds; and

- Increases overall habitat heterogeneity by creating a structural mosaic of tall- and short grassland, and closed- and open wooded areas.

Notwithstanding the positive ecological benefits of fire, wildfires that are too frequent, or too intense, can have negative consequences for terrestrial biodiversity. These include the killing of fauna species (typically slow-moving taxa, or taxa trapped by fences) and fire-sensitive flora species, and the homogenisation of on-site habitat, which can limit the availability of key adaptive resources and reduce biodiversity.

Fire is considered an important driver of change in the PAOI. It is anticipated that the proposed Project could affect fire patterns in the PAOI through increased habitat fragmentation and or an increase in fires from shorting/faulty electrical infrastructure.

8.2.3. Herbivory – Wildlife and Livestock Grazing and Trampling

Both wildlife (game) and livestock faming are common in the PAOI and surrounding landscape. High levels of grazing (overgrazing) and trampling by herbivores is a common cause of dryland degradation (Scholes, 2009). Overgrazing occurs when herbivores (both wildlife and domestic) are kept at excessive stocking rates and/or are able to concentrate their grazing to a limited foraging area, without suitable rest periods.

A common degradation syndrome that is linked to overgrazing, at least in part, is a change in plant species composition. In both grassland and savanna habitats, this typically manifests as a reduction in palatable grass species and a reduction in grassland productivity (Scholes, 2009). In savannas, overgrazing can also lead to bush encroachment, i.e., an increase in woody species and a reduction in grasses. These phenomena can, in turn, negatively affect local fauna communities. Excessive trampling can also cause soil erosion and gully formation, which can reduce the integrity of terrestrial habitats, as well as aquatic habitats (rivers and streams) through increased sedimentation. Grazing and trampling are considered potentially important drivers of change in the PAOI. It is anticipated that the proposed Project will not impact wildlife and livestock grazing intensity and frequency across the PAOI.

9. General Sensitivity and Analysis of Site Ecological Importance

The DFFE National Web Based Screening Tool rated the Plant Species Theme for the PAOI as ‘Medium’ sensitivity, based on the possible presence of several flora SCC (listed in Section 1.4). The findings of this specialist study confirm this sensitivity rating, with habitat suitability assessments indicating that several flora SCC, including those highlighted by the screening tool, may occur in the PAOI (refer to Table 5).

The site-specific ecological importance (SEI) of identified habitat units in the PAOI were assessed for flora using the SANBI (2026) protocol (refer to Section 3.8 and Appendix B for the methodology). The results of the assessment for flora are presented in Table 9. Figure 25 shows a map of the SEI ratings for habitat units in the PAOI.

Table 9: Site Ecological Importance of habitat unit in the PAOI

Habitat Unit	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Mountain Bushveld	HIGH: Confirmed or highly likely occurrence of CR, EN, VU species.	HIGH: Large intact area for any conservation status ecosystem types. Good habitat connectivity with potentially functional ecological corridors. Only minor current negative ecological impacts with limited signs of major past disturbance and good rehabilitation potential.	HIGH	MEDIUM: Habitat that can recover slowly (˜ more than 10 years) to restore >75% of the original species composition and functionality of the receptor functionality	HIGH
Rocky Shrubland and Grassland	HIGH: Confirmed or highly likely occurrence of CR, EN, VU species.	HIGH: Large intact area for any conservation status ecosystem types. Good habitat connectivity with potentially functional ecological corridors. Only minor current negative ecological impacts with limited signs of major past disturbance and good rehabilitation potential.	HIGH	MEDIUM: Habitat that can recover slowly (˜ more than 10 years) to restore >75% of the original species composition and functionality of the receptor functionality	HIGH
Watercourses (Rivers and Wetlands)	HIGH: Confirmed or highly likely occurrence of CR, EN, VU species. Small area of natural habitat of EN or VU ecosystem type (=Soweto Highveld Grassland, VU & Tsakane Clay, EN).	HIGH: Large intact area for any conservation status ecosystem types. Good habitat connectivity with potentially functional ecological corridors.	HIGH	MEDIUM: Habitat that can recover slowly (˜ more than 10 years) to restore >75% of the original species composition and functionality of the receptor functionality	HIGH

Habitat Unit	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
		Only minor current negative ecological impacts with limited signs of major past disturbance and good rehabilitation potential.			
Natural Dry Grassland	HIGH: Confirmed or highly likely occurrence of CR, EN, VU species. Small area of natural habitat of EN or VU ecosystem type (=Soweto Highveld Grassland, VU & Tsakane Clay, EN).	HIGH: Large intact area for any conservation status ecosystem types. Good habitat connectivity with potentially functional ecological corridors. Only minor current negative ecological impacts with limited signs of major past disturbance and good rehabilitation potential.	HIGH	MEDIUM: Habitat that can recover slowly (˜ more than 10 years) to restore >75% of the original species composition and functionality of the receptor functionality	HIGH
Secondary Grassland	LOW: No confirmed populations of SCC. < 50% of receptor contains natural habitat.	LOW: Good habitat connectivity, with potentially functional ecological corridors and a regularly used road network. BUT, Several major past and current impacts (=ploughing).	LOW	MEDIUM: Habitat that can recover slowly to restore >75% of the original species composition and functionality.	LOW

Habitat Unit	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
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
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

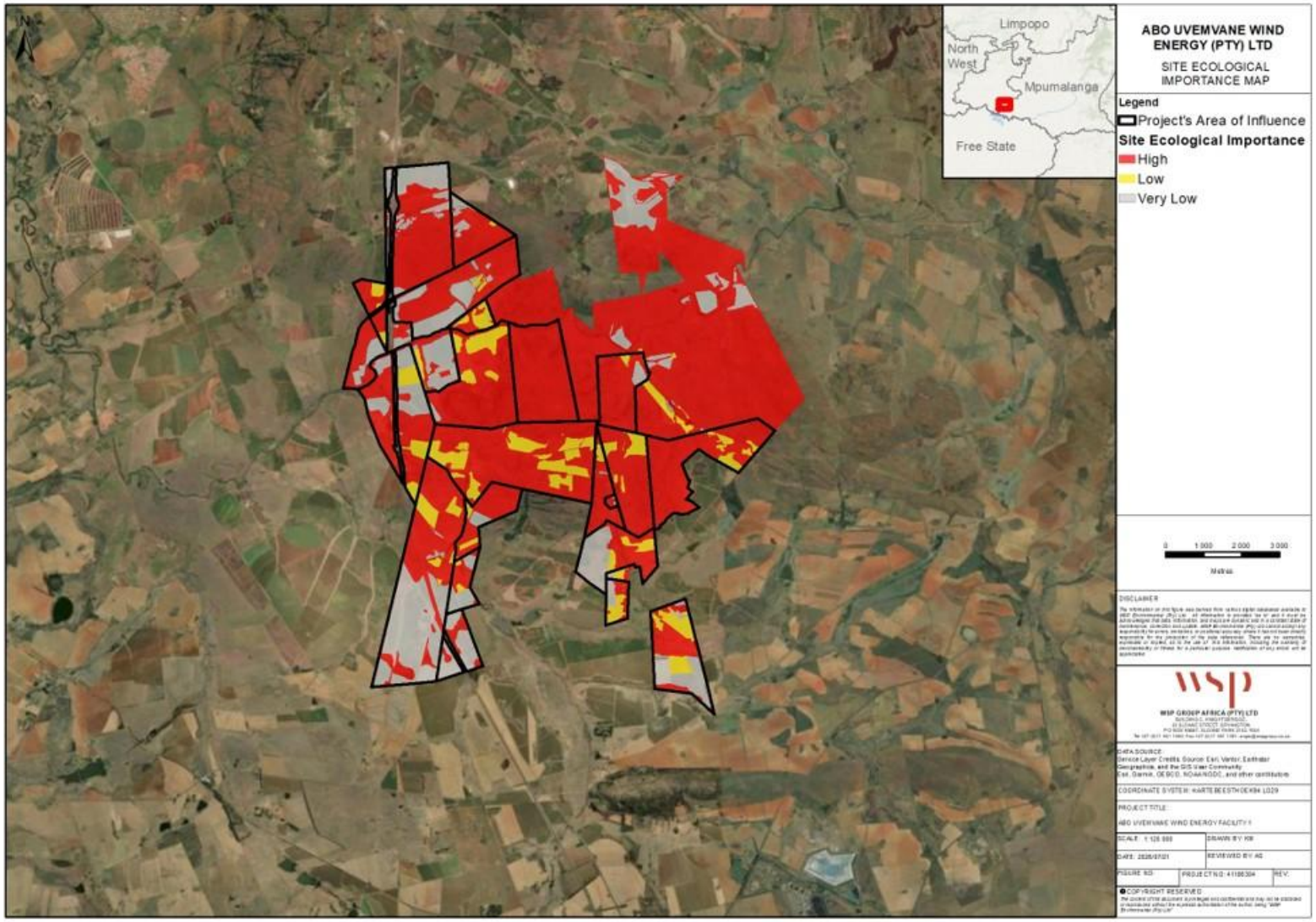

Figure 25: Site Ecological Importance of the PAOI.

10. Impact Assessment

10.1. Impact Assessment Methodology

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct[1], indirect[2], secondary[3] as well as cumulative[4] impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e., residual impact). The significance of environmental aspects is determined and ranked by considering the criteria[5] presented in Table 10.

Table 10: Impact Assessment Criteria and Scoring System

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action

[1] Impacts that arise directly from activities that form an integral part of the Project.
[2] Impacts that arise indirectly from activities not explicitly forming part of the Project.
[3] Secondary or induced impacts caused by a change in the Project environment.
[4] Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects
[5] The definitions given are for guidance only, and not all the definitions will apply to all the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
IMPACT SIGNIFICANCE RATING					
Total Score	**4 to 15**	**16 to 30**	**31 to 60**	**61 to 80**	**81 to 100**
Environmental Significance Rating (Negative (-))	**Very low**	**Low**	**Moderate**	**High**	**Very High**
Environmental Significance Rating (Positive (+))	**Very low**	**Low**	**Moderate**	**High**	**Very High**

10.2. Impact Mitigation

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during Project implementation to verify that actual impacts are the same as those predicted in this report.

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then

considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

The mitigation sequence/hierarchy is shown in Figure 26 below.

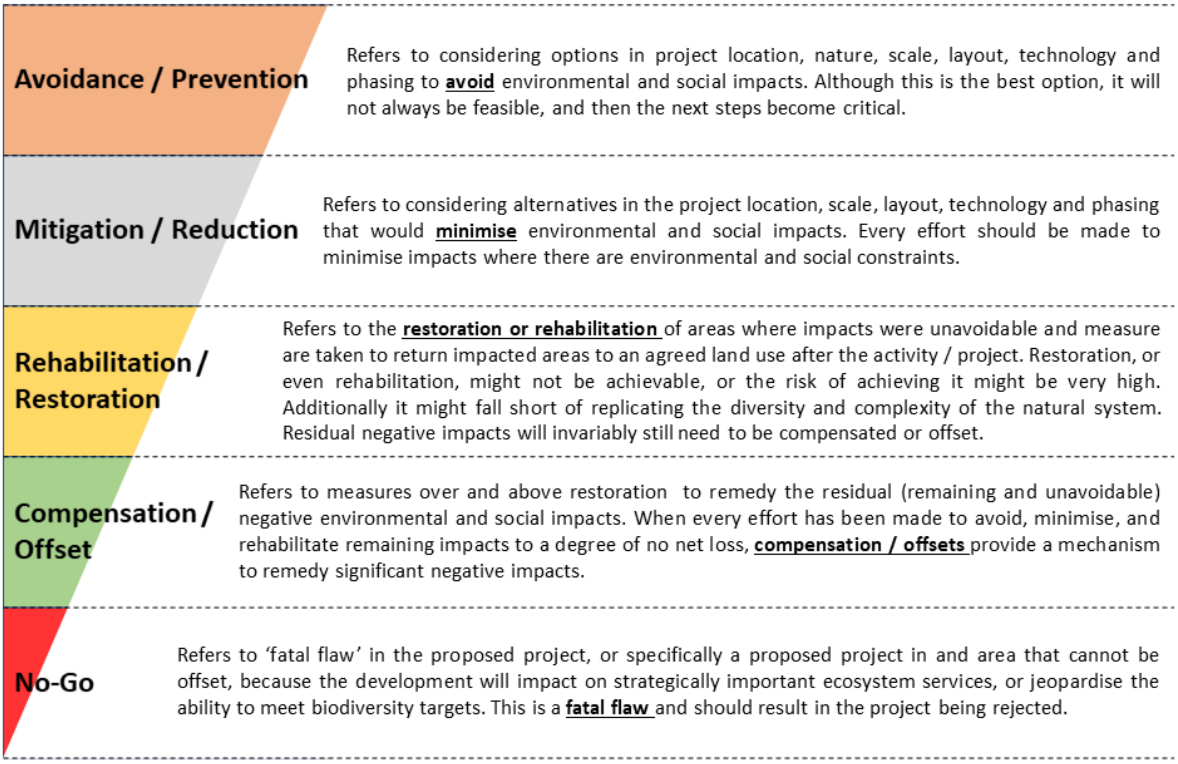

Figure 26: Mitigation Sequence/Hierarchy

A discussion on assessed impacts for each phase (i.e., Construction Operational and Decommissioning) of the proposed Project is provided in the sections below, along with an analysis of anticipated cumulative impact in Section 10.3.4. A summary table presented in Table 12.

Although there is overlap, the below section should be read alongside the corresponding sections in the Animal Species- and Terrestrial Biodiversity Specialist Assessment reports.

10.3. Assessment of Impacts on Terrestrial Flora

10.3.1. Construction Phase

10.3.1.1. Direct loss and disturbance of natural habitat

Habitat loss refers to the removal or complete degradation of natural habitat. In terrestrial ecosystems, this primarily occurs through vegetation clearing and bulk earth works during construction. Habitat disturbance refers to the modification of habitat to the extent that it loses important functionality. These impacts can negatively impact ecosystem functioning and integrity, and the viability of local fauna and flora populations, including that of SCC.

In line with the application of the mitigation hierarchy, the infrastructure layout has undergone a series of revisions to reduce potential negative impacts on biodiversity, amongst other environmental and social sensitivities.

From a biodiversity perspective, a key focus of the mitigation strategy has been the spatial avoidance of sensitive habitats, particularly CBAs and threatened vegetation types[6]. Accordingly, most proposed Project infrastructure has been located in patches of modified habitat, such as Secondary Grassland (olds lands) and Cultivated Fields, or to within natural habitat that is not classified as CBAs or a threatened ecosystem. The proposed access road network has also been aligned, wherever feasible, with existing district roads and farm tracks to limit the extent of new disturbance and fragmentation. Nonetheless, it is noted that natural habitat loss and disturbance will still occur as a result of construction activities, such as vegetation clearing and earth works.

Based on the current infrastructure layout, it is anticipated that up to 40.90 ha of natural habitat may be impacted by construction activities - Table 11 presents the approximate extent of habitat loss for each habitat unit, while Figure 27 shows the proposed Project layout in relation to the habitat unit map.

Regarding the proposed Project's alternative substation and powerline options/alternatives:

- From a terrestrial biodiversity perspective, of the three proposed site options Substation Site 2 is preferred. This proposed site is situated entirely within a patch of Secondary Grassland (old lands) that is designated as 'Heavily Modified' by the MBSP (2024). The development of this site would therefore result in the lowest impact on natural habitat. Substation Site 3 is the next most preferred option, as it is located within grassland classified as 'Moderately Modified' by the MBSP (2024). Substation Site 1 intersects a small patch of Natural Dry Grassland mapped as 'Other Natural Areas' by the MBSP (2024), and is therefore the least preferred location for this facility; and
- Regarding the two proposed 33 kV powerline routes, the preferred option is longer (± 8.3 km compared to ± 5.6 km for the alternative), but for most of its alignment it follows major existing linear infrastructure, specifically the N3 highway and a district gravel road, where habitat is already transformed and fragmented. In contrast, the alternative route traverses less fragmented habitat. Given the substantial disturbance zone associated with the N3, co-locating new linear infrastructure along this corridor will reduce additional impacts on terrestrial biodiversity

Natural habitat loss and disturbance from the proposed Project is of very high magnitude prior to mitigation. Duration of impact will be permanent, and habitat within and potentially adjacent to the development footprints (local) will be impacted. Probability is rated definite. This results in an impact of "high" significance.

In combination with avoidance measures, a suite of additional mitigation measures, centred on minimisation and rehabilitation measures have also been recommended. These include, *inter alia*, the infield micro-siting of infrastructure to localized sites of disturbances, the restriction of disturbance footprints to the minimum area required for construction, and the active rehabilitation

[6] Refer to the Terrestrial Biodiversity Specialist Report for discussion on CBAs and threatened ecosystems.

of disturbed areas footprints, followed by the active control or erosion and eradication of alien invasive plant establishment.

Through the application of the mitigation hierarchy and integration of measures at each step of the hierarchy, the post-mitigation impact magnitude can be reduced to high, while the impact's spatial extent can be reduced to the site only. Duration can be reduced to the life of the proposed Project (i.e. long-term), and probability to low. This results in an after-mitigation impact of "Low" significance.

Table 11: Approximate extent of possible loss/disturbance of habitat units.

Habitat Unit	Approx. Extent of Loss & Disturbance (ha)		
	Project Infrastructure (excl. powerlines)	33kV Powerline Route[7]	
		Preferred	Alternative
Mountain Bushveld	0.01	0.01	0.08
Rocky Shrubland and Grassland	3.81	0.00	0.00
Natural Dry Grassland	35.39	0.38	0.29
Watercourse (rivers and wetlands)	1.25	0.05	0.03
Secondary Grassland	31.50	0.09	0.06
Alien Tree Stands	1.78	0.2	0.00
Cultivated Fields	8.36	0.24	0.10

[7] Powerline loss/disturbance calculations based on an inter-pylon span of 100m and an approximate pylon construction/disturbance footprint of 10mx10m.

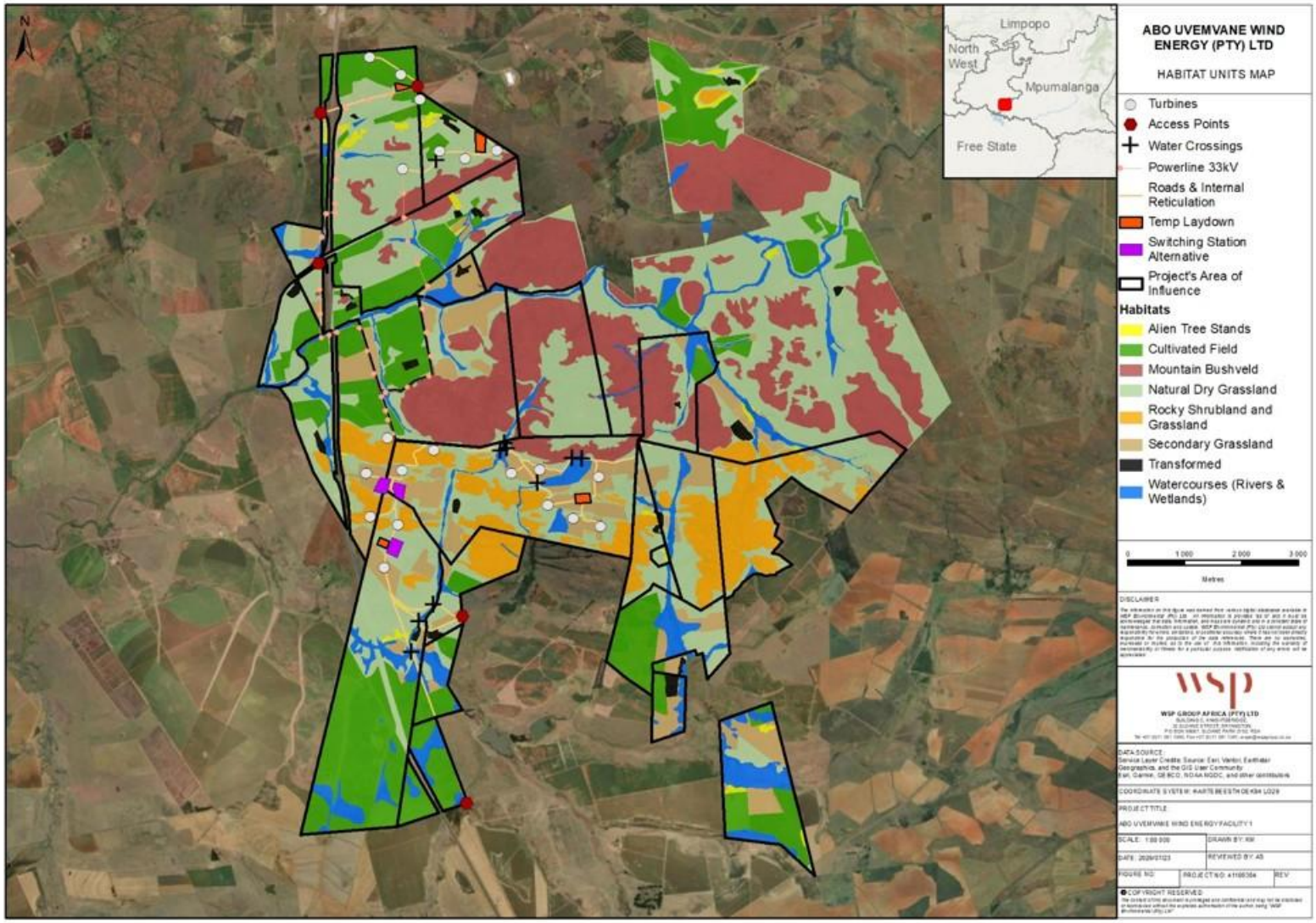

Figure 27: Habitat units and the proposed infrastructure layout.

10.3.1.2. Fragmentation reducing natural habitat connectivity and integrity

Habitat fragmentation is caused when vegetation clearing and/or the development of infrastructure (e.g., roads and fences) result in the partitioning of habitat into smaller, discontinuous patches. This leads to altered habitat configuration that typically manifests as an increase in patch number and isolation, yet a decrease in overall patch size. These alterations change the ecological properties of remaining patches (edge effects) and can affect various ecological processes (e.g. fire patterns) and metapopulation dynamics, such as flora pollination and propagule dispersal. This can, in turn, affect flora species richness and population stability.

The proposed access and internal road network has mostly been aligned with existing district roads and farm tracks. However, existing road upgrades coupled with the cutting of the proposed new access roads is likely to cause some habitat fragmentation, and this may reduce habitat connectivity, which may have negative ecological impacts.

Prior to mitigation, this impact has a high magnitude, permanently affecting natural habitat within and potentially adjacent to the development footprint (local). It is also considered to have a high probability, resulting in an impact of "Medium" significance.

Several mitigation measures can be implemented to reduced habitat fragmentation - these have been discussed under Section 10.3.1.1. With these measures, impact magnitude can be reduced to medium. Duration can be reduced to the long-term, and probability to low, but spatial scale will remain local. This results in a residual impact of "Low" significance.

10.3.1.3. Loss of flora species of conservation concern

No flora SCC were recorded in the PAOI during the field programme. However, habitat suitability assessments indicate that several SCC may be present on-site and therefore potentially directly lost/damaged during construction phase vegetation clearing and earth works.

Before mitigation, the loss of flora SCC has a very high magnitude. Duration is immediate and it has a high probability of occurrence. The spatial extent of the impact is at the local scale. Prior to mitigation, this impact is rated of "medium" significance. This impact can be effectively mitigated through the successful of mitigation measures, including *inter alia*:

- Conducting additional targeted wet/summer and dry/winter walkdown surveys of the proposed infrastructure footprints to identify SCC;
- Re-siting proposed infrastructure outside a 200 m buffer around the any confirmed SCC locations, as prescribed by SANBI (2026); and
- Rescuing and relocating provincially protected flora species occurring within proposed infrastructure footprints to adjacent areas of suitable habitat.

With the application of mitigation, this impact can be reduced to a medium magnitude, while duration will remain of immediate. Spatial extent will be reduced to the site only, but probability will be reduced to low. After mitigation, this impact is rated to be of "Low" significance.

10.3.1.4. Establishment and spread of alien invasive species

Seventeen NEMBA listed AIS have been recorded during the field programme. Habitat disturbances caused by vegetation clearing and earth works during construction can facilitate the establishment and spread of these AIS. Alien plant infestations can spread exponentially, suppressing or replacing

indigenous vegetation. This may impact ecological integrity and functioning and terrestrial biodiversity, which may impact flora SCC.

Before mitigation, impact magnitude is high, while the duration is long term, and the impact has a high probability of occurrence. The spatial extent of AIS spread is local. Prior to mitigation, the establishment and spread of AIS is rated an impact of "medium" significance.

This impact is relatively easy to mitigate though the implementation of an AIS control programme during the construction phase. This impact can be reduced to a low magnitude, with a short-term duration. Spatial extent will be reduced to the site only and the probability of the impact occurring as predicted would be reduced to low. After mitigation, this impact is rated to be of "Low" significance.

10.3.2. Operational Phase

10.3.2.1. Establishment and spread of alien invasive species

The potential establishment and spread of AIS will continue to be an impact of concern during the operational phase.

Before mitigation, impact magnitude is high, while duration is long-term and the impact has a medium probability of occurring as predicted. The spatial extent of alien invasive species spread is local. Prior to mitigation, the establishment and spread of alien invasive species is rated an impact of "medium" significance.

With the continued implementation of an active alien species control programme during the operational phase this impact can be reduced to a low magnitude, with a short-term duration. Spatial extent will be reduced to the site only and probability at low. After mitigation, this impact is rated to be of "Low" significance.

10.3.3. Decommissioning Phase

10.3.3.1. Establishment and spread of alien invasive species

As Project infrastructure is dismantled and removed from site during the decommissioning phase, the associated disturbances are likely to facilitate additional alien invasive species colonisation and spread from disturbed sites.

Before mitigation, impact magnitude is high, while duration is long-term and the impact has a high probability of occurring as predicted. The spatial extent of alien invasive species spread is local. Prior to mitigation, the establishment and spread of alien invasive species is rated an impact of "medium" significance.

With the continued implementation of an active alien species control programme during decommissioning and for a defined period thereafter, this impact can be reduced to a low magnitude, with a short-term duration. Spatial extent will be reduced to the site only and the probability of the impact occurring would be low. After mitigation, this impact is rated to be of "Low" significance

Table 12: Impact assessment scoring for flora species

CONSTRUCTION																			
Impact number	**Receptor**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
Impact 1:	Flora habitat	Direct loss and disturbance of natural habitat	Construction	Negative	Low	5	2	3	5	5	**75**	**N3**	4	1	3	4	2	**24**	**N1**
					Significance	**N3 - High**							**N1 - Low**						
Impact 2:	Flora habitat	Fragmentation reducing natural habitat connectivity and integrity	Construction	Negative	Low	4	2	3	5	4	**56**	**N2**	3	2	3	4	2	**24**	**N1**
					Significance	**N2 - Medium**							**N1 - Low**						
Impact 3:	Flora SCC	Loss of flora of conservation concern	Construction	Negative	High	5	2	5	1	4	**52**	**N2**	3	1	5	1	2	**20**	**N1**
					Significance	**N2 - Medium**							**N1 - Low**						
Impact 4:	Flora habitat	Establishment and spread of alien invasive species	Construction	Negative	High	4	2	3	4	4	**52**	**N2**	2	1	3	2	2	**16**	**N1**
						N2 - Medium							**N1 - Low**						
OPERATIONAL																			
Impact number	**Receptor**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**		**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	
Impact 1:	Flora habitat	Establishment and spread of alien invasive species	Operational	Negative	High	4	2	3	4	3	**39**	**N2**	2	1	3	2	2	**16**	**N1**
					Significance	**N2 - Medium**							**N1 - Low**						
DECOMMISSIONING																			
Impact number	**Receptor**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**		**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	
Impact 1:	Flora habitat	Establishment and spread of alien invasive species	Decommissioning	Negative	High	4	2	3	4	4	**52**	**N2**	2	1	3	2	2	**16**	**N1**
					Significance	**N2 - Medium**							**N1 - Low**						
CUMULATIVE																			
Impact number	**Receptor**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**		**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	
Impact 1:	Flora habitat & SCC	Cumulative loss of flora SCC due to natural habitat loss, disturbance and fragmentation	Construction	Negative	Moderate	5	3	5	5	4	**72**	**N3**	2	3	5	4	2	**28**	**N1**
					Significance	**N3 - High**							**N1 - Low**						

10.3.4. Cumulative Impacts

According to the Renewable Energy Environmental Authorisation (REEA) Q4 2024 database and data received from MTPA, several approved renewable energy development projects are located across the broader region surrounding the PAOI (Figure 28). Within a 50 km radius of the PAOI, these include *inter alia*, Suikerbos PV 1 and Suikerbos PV 2, Suikerbos PV 3, Suikerbos PV 4, Waterall Solar Park, Lethabo Power Station Solar PV Facility. It is also noted that additional infrastructure elements associated with this proposed Project, such as the required grid connection (which will form part of a separate authorisation process), will also take place in the surrounding landscape and will have negative ecological impacts. It is within the context of these various projects that cumulative impacts associated with this proposed Project were assessed below:

10.3.4.1. *Cumulative loss of flora SCC due to natural habitat loss, disturbance and fragmentation.*

The cumulative effects of the various renewable energy projects listed above are a concern with respects to flora SCC. Not only is it possible for individual threatened plants to be killed during vegetation clearing for these various projects, but it is also possible that the associated habitat loss, disturbance and fragmentation may compromise the integrity of the broader habitat matrix and negatively affect the key ecological process that sustain viable SCC populations, including pollinator movement, seed dispersal and the maintenance of suitable microhabitats.

Prior to any form of mitigation, the cumulative impact on flora SCC from habitat loss, disturbance and fragmentation is rated 'high'. The proposed Project's contribution to cumulative impacts can be minimised by strictly implementing the required mitigation measures and addressing any significant residual impacts via additional conservation actions. The cumulative impacts on terrestrial flora SCC can therefore be reduced to 'Low' significance.

11. Assessment of the No Go Alternative

Should the proposed Project not proceed, it is anticipated that existing agricultural and game farming activities will persist across the PAOI. Consequently, it is probable that the ecological condition of on-site natural habitats will remain unchanged from the current status quo. It is, however, noted that the on-site properties hold existing agricultural development rights, and it is therefore possible that portions of the land may be converted for agricultural use (e.g., cultivation) in the future.

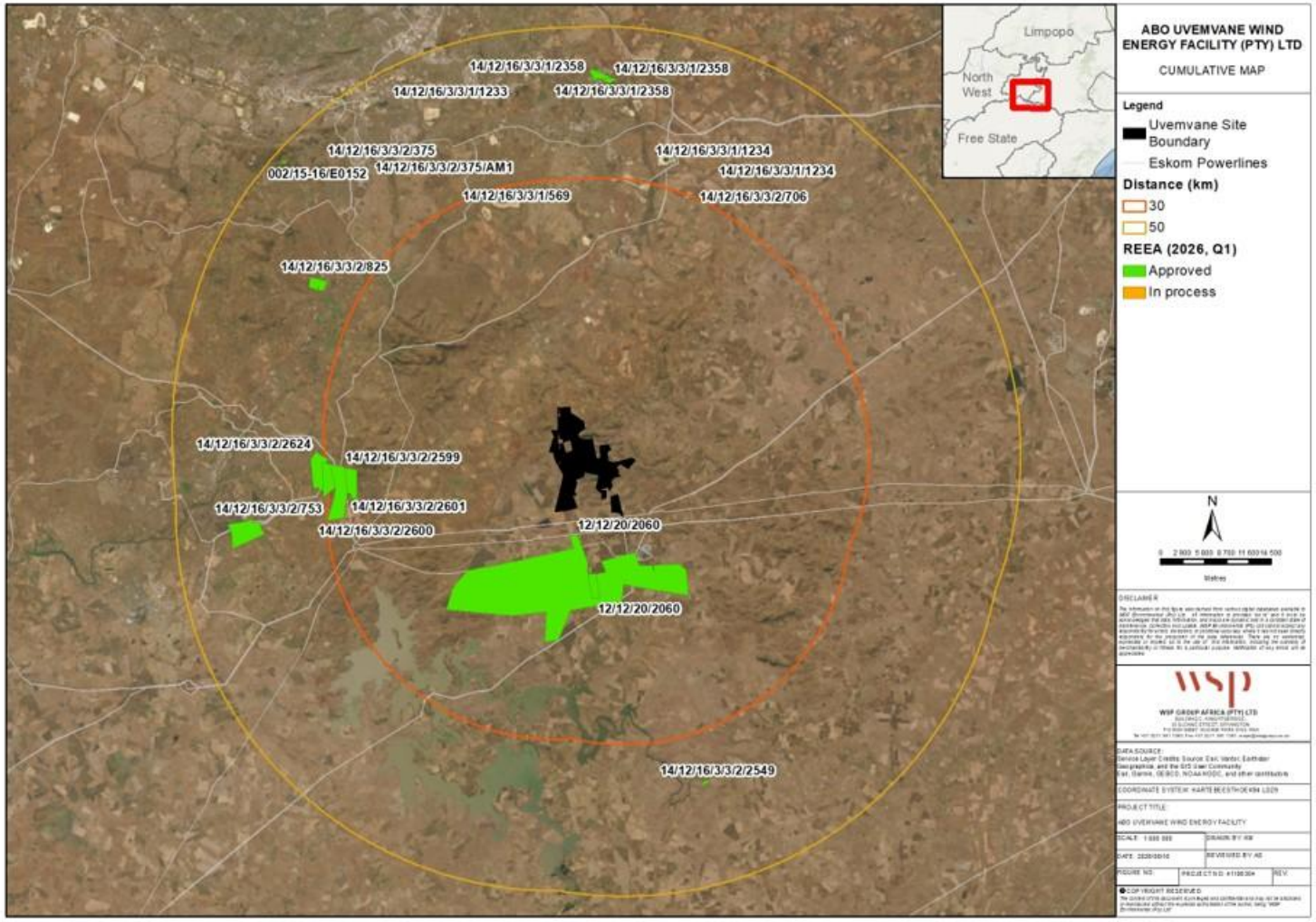

Figure 28: Map showing other renewable energy projects in the broader region surrounding the PAOI.

12. Mitigation Measures

The following section presents the proposed impact management actions to avoid, minimise and/or manage the potential impacts/risks which were assessed in the preceding section.

As with the assessment of potential impacts/risks, the impact management actions have been arranged according to the following main Project phases:

- Pre-Construction and Construction;
- Operational; and
- Decommissioning

For each impact management action, the following information is provided:

- Category: The category within which the potential impact/risk occurs;
- Potential impact/risk: Identified potential impact/risk resulting from the pre-construction, construction, operation, and decommissioning of the proposed Project;
- Description: Description of the possible impact management action;
- Prescribed standards or practices: Prescribed environmental standards or practices with which the impact management action must comply. Note that only key standards or practices have been listed;
- Mitigation type: The type of mitigation measure. This includes the following:
    - Avoidance;
    - Minimisation;
    - Rehabilitation or restoration;
    - Offsetting;
- Time period: The time period when the impact management actions must be implemented; and
- Responsible persons: The persons who will be responsible for the implementation of the impact management actions.

Table 13**Error! Reference source not found.** presents a summary of the proposed impact mitigation actions during the construction, operational, and decommissioning phases of the proposed Project.

Table 13: Recommended mitigation measures.

Ref No.	Category	Potential impact/risk	Description	Prescribed standards or practices	Mitigation type	Time period	Responsible person
1. Pre-Construction and Construction Phase							

1.1	Terrestrial Flora	Direct loss and disturbance of flora habitat	<u>Avoidance</u>
			• As far as possible proposed permanent Project infrastructure should be located in areas of modified habitat (i.e., Cultivated Fields and Secondary Grassland);
			  ○ It is recommended that Substation Site 2 is selected as the preferred site. This site is entirely located within Secondary Grassland (old lands).
			• All temporary construction footprints, (e.g., construction camps, laydown areas), should <u>only</u> be located in areas of modified habitat:
			  ○ It is recommended that Temporary Laydown Area 2 should be relocated to a nearby cultivated field or confined entirely within the Secondary Grassland patch that
				N/A	Avoidance, Minimisation and Rehabilitation	During Pre-Construction and Construction Phase	Project Manager

Ref No.	Category	Potential impact/risk	Description	Prescribed standards or practices	Mitigation type	Time period	Responsible person
			comprises the northern portion of its current footprint; • A pre-construction walkdown of the approved development footprints should be conducted during both the wet/summer season and dry/winter season to identify sensitive biodiversity and inform the micro-siting of Project infrastructure to already disturbed sites and other relevant management measures. <u>Minimisation</u> • All vegetation clearing for the Project should be restricted to the proposed Project footprints only, with no clearing permitted outside of these footprints; • The footprints to be cleared of vegetation should be clearly demarcated, prior to construction, to prevent unnecessary clearing outside of these areas; • No heavy vehicles should travel beyond the marked/demarked work zones;				

Ref No.	Category	Potential impact/risk	Description	Prescribed standards or practices	Mitigation type	Time period	Responsible person
			• Removed topsoil should be stockpiled and used to rehabilitate all disturbed areas. <u>Rehabilitation</u> A rehabilitation/ landscaping protocol should be developed and implemented to stabilise and revegetate all non-operational sites that have been disturbed by construction activities. The protocol should include: • The correct stockpiling of topsoil that was cleared from development footprints during site preparation; • The correct contouring of the post-construction landform to limit potential erosion; • Compacted soils should be ripped and loosened to facilitate vegetation establishment; • Topsoil removed during construction should be applied to all non-operational sites that were disturbed during construction and require revegetation; and				

Ref No.	Category	Potential impact/risk	Description	Prescribed standards or practices	Mitigation type	Time period	Responsible person
			• Active revegetation should be conducted using grass species that are indigenous, locally-occurring and perennial.				
1.2	Flora	Fragmentation reducing natural habitat connectivity and integrity	<u>Avoidance and Minimisation</u> See mitigation measures for *Direct loss and disturbance of natural habitat*, and • All proposed access roads and powerlines should be aligned, as far as possible, with existing linear infrastructure (roads/tracks), and wherever possible micro-sited to already disturbed sites. <u>Rehabilitation</u> See rehabilitation measures for *Direct loss and disturbance of natural habitat.*	N/A	Avoidance, Minimisation and Rehabilitation	During Pre-Construction and Construction Phase	Project Manager
1.3	Flora SCC	Loss of Flora SCC	<u>Avoidance and Minimisation</u> • Additional targeted walkdown surveys of the proposed development footprints	SANBI (2026) Guidelines	Avoidance & Minimisation	During Construction Phase	Project Manager

Ref No.	Category	Potential impact/risk	Description	Prescribed standards or practices	Mitigation type	Time period	Responsible person

			should be conducted during the pre-construction planning phase in both the wet/summer season and the dry/winter season to confirm the presence/absence of any potentially impacted flora SCC and protected flora species;
			• Data from the walkdown surveys should then be used to inform:
			  ○ Additional micro-siting requirements for proposed Project infrastructure, including avoiding a 200 m buffer around Red List species locations, as prescribed by SANBI (2026); and.
			  ○ The need for, and scope of, an Flora SCC Management Plan. If a plan is required, it should be developed during the pre-construction planning phase and include:
			  ▪ Species-specific management and monitoring actions for any flora SCC recorded on-site; and				

Ref No.	Category	Potential impact/risk	Description	Prescribed standards or practices	Mitigation type	Time period	Responsible person
			▪ Procedure for rescuing and relocating provincial Protected flora species occurring within infrastructure footprints.				
1.4	Terrestrial Flora	Establish and spread of alien invasive species	An AIS control and eradication plan must be developed for the Project that focuses on controlling and eradicating AIS occurring at sites disturbed by proposed Project activities. It is recommended that the plan should be developed with input and guidance from an invertebrate specialist regarding the management of threatened butterfly species. Operationally, the plan should include: • Identification of AIS management units • Prioritisation of sites and species requiring control; • Targets and indicators of success; • Scheduling of AIS control; • Species-specific control methods, using a combined approach of both chemical and mechanical control methods; and	Guidelines for Monitoring, Control and Eradication of AIS (DEA, 2015)	Minimisation	During Construction Phase	Project Manager

Ref No.	Category	Potential impact/risk	Description	Prescribed standards or practices	Mitigation type	Time period	Responsible person
			• Provision for follow-up treatments, as informed by regular AIS monitoring.				
2. Operational Phase							
2.1	Terrestrial Biodiversity	Establish and spread of alien invasive species	• Active alien invasive species control should continue throughout the operational phase, as per the approved AIS control and eradication programme.	Guidelines for Monitoring, Control and Eradication of AIS (DEA, 2015)	Minimisation	During Operational Phase	Facility Manager
3. Decommissioning Phase							
3.1	Terrestrial Biodiversity	Establish and spread of alien invasive species	• Active alien invasive species control should continue during the decommissioning phase and annual follow up control should be carried out for a five- year period following decommissioning.	Guidelines for Monitoring, Control and Eradication of AIS (DEA, 2015)	Minimisation	Annually during decommissioning and annually for a five-year period after decommissioning	Facility Manager
3.2	Terrestrial Biodiversity	General habitat restoration	• To limit the potential for AIS encroachment, soil erosion and dust generation, all Project footprints and sites that were disturbed during decommissioning, should be actively	N/A	Rehabilitation	During the Decommissioning Phase	Facility Manager

Ref No.	Category	Potential impact/risk	Description	Prescribed standards or practices	Mitigation type	Time period	Responsible person
			rehabilitated using local-occurring perennial indigenous flora species.				

13. Monitoring Measures

The following section presents the proposed monitoring actions for monitoring and reporting on the implementation of the impact mitigation actions presented in the preceding Section **Error! Reference source not found.**.

The content of this section is largely based on the monitoring requirements outlined in Appendix 4 of the EIA Regulations, 2014.

For each monitoring action, the following information is provided:

- Category: The category within which the potential impact and/or risk occurs
- Potential impact/risk: Identified potential impact/risk resulting from the pre-construction, construction, operation, and closure of the proposed Project
- Method for monitoring : The method for monitoring the implementation of the recommended mitigation measures
- Time period: The time period over which the monitoring actions must be implemented
- Frequency of monitoring: The frequency of monitoring the implementation of the recommended mitigation measures
- Mechanism for monitoring compliance: The mechanism for monitoring compliance with the impact management actions
- Responsible persons: The persons who will be responsible for the implementation of the monitoring actions

As with the impact management actions, the proposed monitoring actions have been arranged according to the following project phases:

- Construction and Operational; and
- Decommissioning.

Table 14 presents a summary of the proposed monitoring actions during the construction, operational and decommissioning phases.

Table 14: Recommended additional monitoring measures

Ref. No.	Category	Method for monitoring	Time period	Frequency of monitoring	Mechanism for monitoring compliance	Responsible person
1. Construction and Operational Phases						

1.1	Alien invasive species	• Annual on-site alien invasive species monitoring should be conducted. Monitoring should focus on:
		  ○ All sites disturbed during the construction phase;
		  ○ Wetland areas adjacent to construction sites; and
		• Monitoring should assess species type and density, and these data should inform the scope of ongoing alien invasive species control.
			Wet/growing season	Annual	Annual Monitoring Report	Project Manager

2. Decommissioning Phase						
2.1	Alien invasive species	• Alien invasive species monitoring should be conducted on an annual basis during decommissioning and annually for a five-year period following decommissioning. Monitoring should focus on: ○ All sites disturbed during decommissioning;	Wet/growing season	Annually during decommissioning and for a five-year period after decommissioning	Annual Monitoring Report	Facility Manager

Ref. No.	Category	Method for monitoring	Time period	Frequency of monitoring	Mechanism for monitoring compliance	Responsible person
		○ Watercourses adjacent to development sites; and • Monitoring should assess species type and density, and these data should inform the scope of ongoing alien invasive species control.				

14. Biodiversity Management/Action Plan

It is recommended that during the pre-construction planning phase all terrestrial biodiversity mitigation and monitoring measures, including those outlined in the Terrestrial Biodiversity, Plant Species, and Animal Species Specialist Assessment Reports, as well as all management measures recommended in other ecological specialist studies, should be consolidated into a single, integrated Biodiversity Management/Action Plan (BMP/BAP) for the proposed Project.

A single, consolidated BMP/BAP will provide an integrated and practical framework that encompasses, aligns and guides all aspects of biodiversity management throughout the various life-cycle phases of the Project.

15. Reasoned Opinion and Environmental Impact Statement

15.1. Summary of Main Findings

The PAOI is characterised by extensive tracts of diverse natural habitat, dominated by rocky hills and ridges and interspersed with grassy plains and river valleys. These factors create myriad micro-habitats that could potentially support flora SCC.

Flora field surveys were conducted during peak growing and flowering period, which is the optimal time to assess flora species composition and to detect the majority of flora species of conservation concern potentially present in the POAI. Although no flora SCC were recorded in the PAOI during the field programme, habitat suitability assessments suggest that flora SCC, including some of those highlighted by the DFFE screening tool, may be present in areas of undisturbed natural habitat across the broader PAOI. The DFFE screening tool rated the Plant Species Theme for the Project site as 'Medium' sensitivity and the findings of this specialist study confirm this sensitivity rating.

Based of field data and the application of the mitigation hierarchy to avoid and minimise potential negative impacts on sensitive biodiversity features, most proposed Project infrastructure has been strategically located within areas that have been disturbed by past human activities, including historic and current cultivation, while the proposed access road network has largely been aligned with existing district gravel roads and farm tracks.

This notwithstanding, it is possible that vegetation clearing and earth works associated with the proposed Project may negatively impact any flora SCC occurring in development footprint through the destruction of individual plants and through the associated disruption of key ecological processes (e.g. pollination) caused by habitat loss and disturbances. Potential negative impacts on flora SCC were therefore assessed for the proposed Project for both pre- and post-mitigation scenarios.

Several mitigation/management measures have been recommended to reduce potential negative impacts on flora SCC. Included amongst these is the prioritisation of development footprints to disturbed sites, confinement of the disturbance footprints to the minimum areas required for construction purposes, and completion of additional targeted walkdown surveys of the final approved development footprints during both the wet/summer and dry/winter seasons to verify the presence/absence of flora SCC and to inform micro-siting recommendations and any species-specific management and monitoring requirements. The successful implementation of all the recommended

mitigation measures presented in this report can effectively manage the identified impacts on flora SCC.

It is also recommended that all relevant mitigation and management measures for the proposed Project should be incorporated into an integrated Biodiversity Management/Action Plan.

15.2. Conditions to be Included in the Environmental Authorisation

No additional conditions are recommended for inclusion in the proposed Project's environmental authorisation.

15.3. Specialist Opinion

In accordance with the outcomes of the impact assessment, and taking cognisance of the baseline conditions presented herein, as well as the impact management measures, the proposed Project, is not deemed to present significant negative ecological issues or impacts on flora SCC, and there are no identified constraints that would prevent the proposed Project from being authorised.

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

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Appendix A: Curriculum Vitae – Andrew Zinn

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

Details

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South Africa
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Nationality: South African

Profile

I am an ecologist with an M.Sc. Degree in Resource Conservation Biology and 17 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 Council of Natural Scientific Professions – Professional Natural Scientist (400687/15).
- Member of the South African Wildlife Management Association.
- Member of the South African Association of Botanists.

Work Experience

1. **Independent Senior Ecologist**

Hawkhead Consulting, South Africa
September 2020 – Present
Senior 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.

Publications

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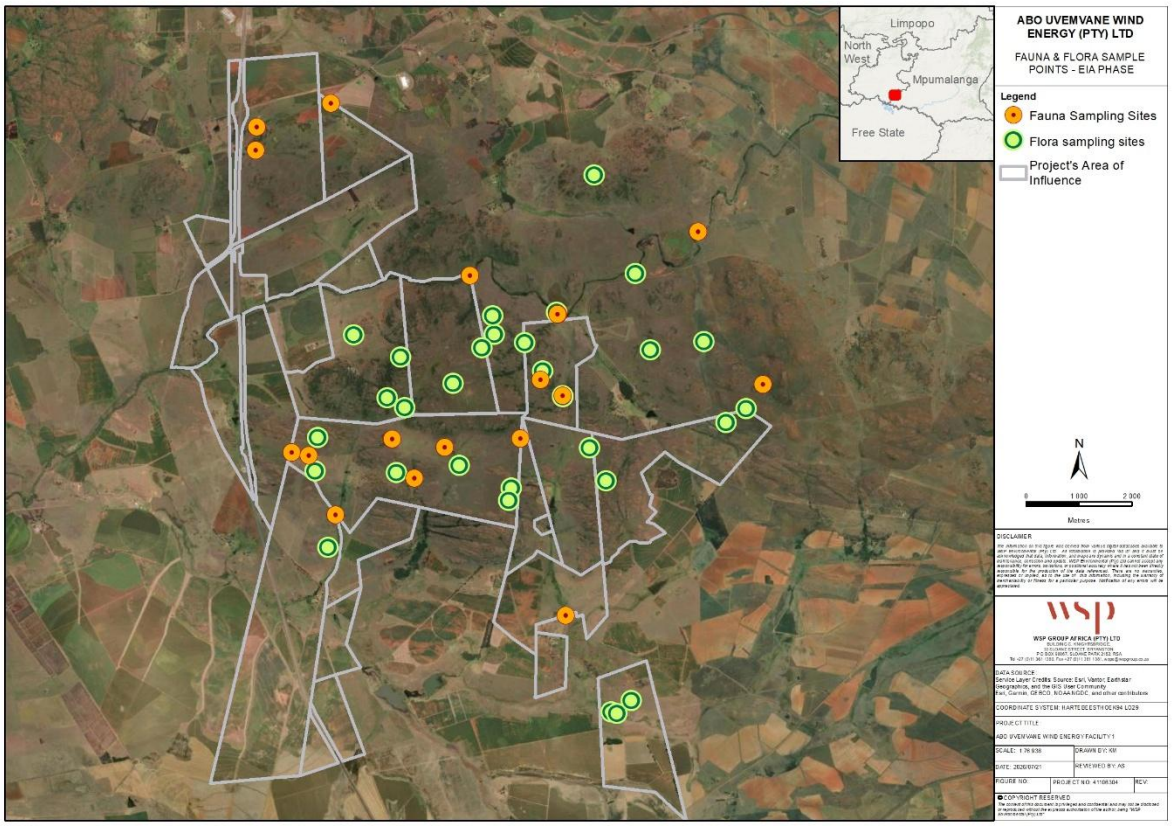
Appendix B: Methodology Supplement

Appendix B 1: Location of field programme sampling points



Appendix B - Figure 1: Location of flora and fauna sampling points.

Appendix B 2: Rating criteria for Conservation Importance, Functional Integrity and Receptor Resilience and the scoring matrices, as per (SANBI, 2026).

The ecological sensitivity of habitats in the PAOI was determined using the protocol for evaluating site ecological importance (SEI) as published in SANBI's Species Assessment Guideline (SANBI, 2026). 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, 2026).
- **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, 2026).
- **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, 2026).

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: Flora Species List Recorded during the Field Programme

Family	Species Name	Growth Form	Origin	Conservation Status			Habitat Units					
				National Red List Status	Gauteng Province Status	Mpumalanga Province Status	Mountain Bushveld	Rocky Shrubland and Grassland	Watercourses (Rivers & Wetlands)	Natural Dry Grassland	Secondary Grassland	Other (Alien Tree Stands)
Acanthaceae	*Crabbea acaulis*	Herb	Indigenous	LC	-	-						
Agavaceae	*Chlorophytum cooperi*	Herb	Indigenous	LC	-	-				x	x	
Aizoaceae	*Delosperma cooperi*	Succulent	Indigenous	LC	-	-		x				
Amaranthaceae	*Achyranthes aspera**	Herb	Alien	NE	-	-	x			x		
Amaranthaceae	*Gomphrena celosioides**	Herb	Alien	NE	-	-					x	
Amaryllidaceae	*Boophone disticha*	Geophytic Herb	Indigenous	LC	-	Protected	x	x		x		
Amaryllidaceae	*Crinum bulbispermum*	Geophytic Herb	Indigenous	LC	Protected	Protected / Declining			x			
Amaryllidaceae	*Crinum graminicola*	Geophytic Herb	Indigenous	LC	Protected	Protected				x		
Anacardiaceae	*Schinus molle**	Tree	Alien	NE	-	-	x					
Anacardiaceae	*Searsia discolor*	Tree	Indigenous	LC	-	-	x			x		
Anacardiaceae	*Searsia leptodictya*	Tree	Indigenous	LC	-	-	x			x		
Anacardiaceae	*Searsia magalismontana* subsp. *magalismontana*	Shrub	Indigenous	LC	-	-		x		x		
Anacardiaceae	*Searsia pallens*	Tree	Indigenous	LC	-	-	x					
Anacardiaceae	*Searsia pyroides*	Tree	Indigenous	LC	-	-	x			x	x	
Anacardiaceae	*Searsia rigida*	Tree	Indigenous	LC	-	-	x			x		
Apiaceae	*Centella asiatica*	Herb	Indigenous	LC	-	-			x			
Apiaceae	*Heteromorpha arborescens*	Tree	Indigenous	LC	-	-	x			x		
Apocynaceae	*Ancylobothrys capensis*	Shrub	Indigenous	LC	-	-	x	x				
Apocynaceae	*Asclepias albens*	Herb	Indigenous	LC	-	-				x		
Apocynaceae	*Gomphocarpus fruticosus*	Herb	Indigenous	LC	-	-	x		x			
Apocynaceae	*Xysmalobium undulatum*	Herb	Indigenous	LC	-	-			x			
Araliaceae	*Cussonia paniculata*	Tree	Indigenous	LC	Protected	-	x	x		x		
Asparagaceae	*Asparagus angusticladus*	Shrub	Indigenous	LC	-	-	x			x		
Asparagaceae	*Asparagus cooperi*	Shrub	Indigenous	LC	-	-	x					

Family	Species Name	Growth Form	Origin	Conservation Status			Habitat Units					
				National Red List Status	Gauteng Province Status	Mpumalanga Province Status	Mountain Bushveld	Rocky Shrubland and Grassland	Watercourses (Rivers & Wetlands)	Natural Dry Grassland	Secondary Grassland	Other (Alien Tree Stands)
Asphodelaceae	*Aloe davyana*	Succulent	Indigenous	LC	-	Protected	x			x		
Asphodelaceae	*Aloe marlothii*	Tree Succulent	Indigenous	LC	-	Protected	x	x		x		
Asphodelaceae	*Aloe verecunda*	Succulent	Indigenous	LC	Protected	Protected		x				
Asteraceae	*Afroaster serrulatus*	Herb	Indigenous	LC	-	-	x			x		
Asteraceae	*Artemisia afra*	Shrub	Indigenous	LC	-	-	x			x		
Asteraceae	*Athrixia elata*	Shrub	Indigenous	LC	-	-	x			x	x	
Asteraceae	*Berkheya bipinnatifida*	Herb	Indigenous	LC	-	-		x	x			
Asteraceae	*Berkheya radula*	Herb	Indigenous	LC	-	-			x			
Asteraceae	*Berkheya seminivea*	Herb	Indigenous	LC	-	-	x	x				
Asteraceae	*Berkheya setifera*	Herb	Indigenous	LC	-	-	x			x		
Asteraceae	*Berkheya speciosa*	Herb	Indigenous	LC	-	-			x			
Asteraceae	*Bidens bipinnata**	Herb	Alien	NE	-	-	x			x	x	
Asteraceae	*Bidens pilosa**	Herb	Alien	NE	-	-	x		x			
Asteraceae	*Brachylaena rotundata*	Tree	Indigenous	LC	-	-		x				
Asteraceae	*Cirsium vulgare**	Herb	Alien (NEMBA Category 1b)	NE	-	-			x	x	x	
Asteraceae	*Conyza bonariensis**	Herb	Alien	NE	-	-					x	
Asteraceae	*Conyza canadensis**	Herb	Alien	NE	-	-					x	
Asteraceae	*Cosmos bipinnatus**	Herb	Alien	NE	-	-	x					
Asteraceae	*Felicia filifolia*	Shrub	Indigenous	LC	-	-	x					
Asteraceae	*Galinsoga parviflora**	Herb	Alien	NE	-	-	x					
Asteraceae	*Garuleum woodii*	Herb	Indigenous	LC	-	-	x					
Asteraceae	*Gerbera* cf. *piloselloides*	Herb	Indigenous	LC	-	-	x					
Asteraceae	*Haplocarpha lyrata*	Herb	Indigenous	LC	-	-			x			
Asteraceae	*Helichrysum callicomum*	Herb	Indigenous	LC	-	-					x	
Asteraceae	*Helichrysum lepidissimum*	Herb	Indigenous	LC	-	-		x				
Asteraceae	*Helichrysum nudifolium* var. *nudifolium*	Herb	Indigenous	LC	-	-	x			x	x	

Family	Species Name	Growth Form	Origin	Conservation Status			Habitat Units					
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Asteraceae	*Helichrysum nudifolium* var. *pilosellum*	Herb	Indigenous	LC	-	-	x			x		
Asteraceae	*Helichrysum rugulosum*	Herb	Indigenous	LC	-	-				x	x	
Asteraceae	*Hilliardiella aristata*	Herb	Indigenous	LC	-	-		x		x		
Asteraceae	*Hilliardiella hirsuta*	Herb	Indigenous	LC	-	-	x					
Asteraceae	*Hilliardiella oligocephala*	Herb	Indigenous	LC	-	-	x			x	x	
Asteraceae	*Hypochaeris radicata**	Herb	Alien	NE	-	-					x	
Asteraceae	*Lopholaena coriifolia*	Shrub	Indigenous	LC	-	-		x		x		
Asteraceae	*Nidorella anomala*	Herb	Indigenous	LC	-	-	x			x	x	
Asteraceae	*Nidorella podocephala*	Herb	Indigenous	LC	-	-			x	x	x	
Asteraceae	*Osteospermum moniliferum*	Shrub	Indigenous	LC	-	-				x		
Asteraceae	*Phymaspermum athanasioides*	Shrub	Indigenous	LC	-	-		x				
Asteraceae	*Schkuhria pinnata**	Herb	Alien	NE	-	-			x			
Asteraceae	*Senecio coronatus*	Herb	Indigenous	LC	-	-			x	x		
Asteraceae	*Senecio erubescens*	Herb	Indigenous	LC	-	-	x	x	x			
Asteraceae	*Senecio inornatus*	Herb	Indigenous	LC	-	-	x		x	x		
Asteraceae	*Senecio oxyriifolius*	Herb	Indigenous	LC	-	-		x		x		
Asteraceae	*Senecio venosus*	Herb	Indigenous	LC	-	-				x		
Asteraceae	*Seriphium plumosum*	Shrub	Indigenous	LC	-	-	x		x	x	x	
Asteraceae	*Sonchus wilmsii*	Herb	Indigenous	LC	-	-	x					
Asteraceae	*Tagetes minuta**	Herb	Alien	NE	-	-	x		x			
Asteraceae	*Xanthium spinosum**	Herb	Alien (NEMBA Category 1b)	NE	-	-					x	x
Asteraceae	*Xanthium strumarium**	Herb	Alien (NEMBA Category 1b)	NE	-	-	x					
Asteraceae	*Zinnia peruviana**	Herb	Alien	NE	-	-	x					
Astercaeae	*Pseudopegolettia tenella*	Herb	Indigenous	LC	-	-	x	x	x	x		
Boraginaceae	*Ehretia rigida*	Tree	Indigenous	LC	-	-	x					
Brassicaceae	*Cleome maculata*	Herb	Indigenous	LC	-	-	x	x	x		x	

Family	Species Name	Growth Form	Origin	Conservation Status			Habitat Units					
				National Red List Status	Gauteng Province Status	Mpumalanga Province Status	Mountain Bushveld	Rocky Shrubland and Grassland	Watercourses (Rivers & Wetlands)	Natural Dry Grassland	Secondary Grassland	Other (Alien Tree Stands)
Brassicaceae	*Cleome monophylla*	Herb	Indigenous	LC	-	-			x		x	
Cactaceae	*Cereus jamacaru**	Tree	Alien (NEMBA Category 1b)	NE	-	-				x		
Cactaceae	*Opuntia ficus-indica**	Tree	Alien (NEMBA Category 1b	NE	-	-	x	x		x		
Campanulaceae	*Wahlenbergia undulata*	Herb	Indigenous	LC	-	-					x	
Caryophyllaceae	*Dianthus mooiensis*	Herb	Indigenous	LC	-	-		x		x		
Celastraceae	*Gymnosporia buxifolia*	Tree	Indigenous	LC	-	-	x	x		x		
Celastraceae	*Gymnosporia polyacanthus* subsp. *vaccinifolia*	Tree	Indigenous	LC	-	-	x	x				
Celastraceae	*Mystroxylon aethiopicum*	Tree	Indigenous	LC	-	-	x					
Commelinaceae	*Commelina africana* var. *barberae*	Herb	Indigenous	LC	-	-	x	x	x	x	x	
Commelinaceae	*Commelina benguelensis*	Herb	Indigenous	LC	-	-	x	x				
Commelinaceae	*Cyanotis speciosa*	Herb	Indigenous	LC	-	-	x	x	x	x	x	
Convolvulaceae	*Cuscuta campestris**	Herb	Alien (NEMBA Category 1b)	NE	-	-	x					
Convolvulaceae	*Ipomoea crassipes*	Herb	Indigenous	LC	-	-	x			x	x	
Convolvulaceae	*Ipomoea bathycolpos*	Herb	Indigenous	LC	-	-				x		
Convolvulaceae	*Ipomoea ommaneyi*	Herb	Indigenous	LC	-	-	x			x	x	
Convolvulaceae	*Ipomoea transvaalensis*	Herb	Indigenous	LC	-	-				x		
Crassulaceae	*Kalanchoe thyrsiflora*	Succulent	Indigenous	LC	-	-	x					
Cyperaceae	*Bulbostylis burchellii*	Graminoid	Indigenous	LC	-	-					x	
Cyperaceae	*Cyperus congesta*	Graminoid	Indigenous	LC	-	-		x	x			
Cyperaceae	*Cyperus esculentus*	Graminoid	Indigenous	LC	-	-			x		x	
Cyperaceae	*Cyperus obtusiflorus*	Graminoid	Indigenous	LC	-	-				x		
Cyperaceae	*Cyperus rupestris*	Graminoid	Indigenous	LC	-	-		x				
Cyperaceae	*Eleocharis limosa*	Graminoid	Indigenous	LC	-	-	x					
Cyperaceae	*Fuirena* species	Graminoid	Indigenous	LC	-	-			x			
Cyperaceae	*Kyllinga erecta*	Graminoid	Indigenous	LC	-	-			x	x	x	

Family	Species Name	Growth Form	Origin	Conservation Status			Habitat Units					
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Cyperaceae	*Schoenoplectus muriculatus*	Graminoid	Indigenous	LC	-	-			x			
Cyperaceae	*Scirpoides burkei*	Graminoid	Indigenous	LC	-	-			x	x		
Dennstaedtiaceae	*Pteridium aquilinum*	Fern	Indigenous	LC	-	-				x		
Dipsacaceae	*Cephalaria zeyheriana*	Herb	Indigenous	LC	-	-			x	x		
Dipsacaceae	*Scabiosa columbaria*	Herb	Indigenous	LC	-	-	x			x	x	
Ebenaceae	*Diospyros lycioides*	Tree	Indigenous	LC	-	-	x		x	x	x	
Ebenaceae	*Diospyros whyteana*	Tree	Indigenous	LC	-	-	x					
Ebenaceae	*Euclea crispa*	Tree	Indigenous	LC	-	-	x		x	x		
Euphorbiaceae	*Acalypha angustata*	Herb	Indigenous	LC	-	-	x			x		
Euphorbiaceae	*Clutia pulchella*	Shrub	Indigenous	LC	-	-	x	x				
Fabaceae	*Acacia dealbata**	Tree	Alien (NEMBA Category 2)	NE	-	-						x
Fabaceae	*Acacia mearnsii**	Tree	Alien (NEMBA Category 2)	NE	-	-	x					x
Fabaceae	*Calprunia* sp.	Tree	Indigenous	LC	-	-	x					
Fabaceae	*Chamaecrista comosa*	Herb	Indigenous	LC	-	-	x			x		
Fabaceae	*Chamaecrista mimosoides*	Herb	Indigenous	LC	-	-	x				x	
Fabaceae	*Elephantorrhiza elephantina*	Dwarf Tree	Indigenous	LC	-	-	x	x		x	x	
Fabaceae	*Erythrina zeyheri*	Dwarf Shrub	Indigenous	LC	-	-	x					
Fabaceae	*Gleditsia triacanthos**	Tree	Alien (NEMBA Category 1b)	NE	-	-			x			
Fabaceae	*Indigofera hedyantha*	Herb	Indigenous	LC	-	-	x			x		
Fabaceae	*Indigofera melanadenia*	Herb	Indigenous	LC	-	-		x				
Fabaceae	*Indigofera oxytropis*	Herb	Indigenous	LC	-	-						
Fabaceae	*Mundulea sericea*	Tree	Indigenous	LC	-	-	x	x		x		
Fabaceae	*Otholobium polystictum*	Shrub	Indigenous	LC	-	-	x			x		
Fabaceae	*Pearsonia cajanifolia* subsp. *cajanifolia*	Shrub	Indigenous	LC	-	-				x		
Fabaceae	*Rhynchosia monophylla*	Herb	Indigenous	LC	-	-		x				

Family	Species Name	Growth Form	Origin	Conservation Status			Habitat Units					
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Fabaceae	*Sesbania punicea**	Shrub	Alien (NEMBA Category 1b)	NE	-	-			x			
Fabaceae	*Tephrosia capensis*	Herb	Indigenous	LC	-	-	x			x		
Fabaceae	*Vachellia karoo*	Tree	Indigenous	LC	-	-	x					
Fabaceae	*Zornia linearis*	Herb	Indigenous	LC	-	-				x		
Gentianaceae	*Chironia palustris*	Herb	Indigenous	LC	-	-			x			
Geraniaceae	*Pelargonium luridum*	Herb	Indigenous	LC	-	-	x			x		
Hyacinthaceae	*Ledebouria luteola*	Herb	Indigenous	LC	-	-	x			x	x	
Hypoxidaceae	*Hypoxis acuminata*	Geophytic Herb	Indigenous	LC	-	-	x	x	x	x	x	
Hypoxidaceae	*Hypoxis galpinii*	Geophytic Herb	Indigenous	LC	-	-						
Hypoxidaceae	*Hypoxis hemerocallidea*	Geophytic Herb	Indigenous	LC	-	-	x			x		
Hypoxidaceae	*Hypoxis iridifolia*	Geophytic Herb	Indigenous	LC	-	-	x			x		
Hypoxidaceae	*Hypoxis rigidula*	Geophytic Herb	Indigenous	LC	-	-	x					
Iridaceae	*Gladiolus dalenii*	Herb	Indigenous	LC	Protected	Protected	x					
Iridaceae	*Gladiolus* sp. (no flowers)	Herb	Indigenous	LC	Protected	Protected		x				
Iridaceae	*Gladiolus permeabilis* subsp. *edulis*	Herb	Indigenous	LC	Protected	Protected				x		
Iridaceae	*Tritonia nelsonii*	Herb	Indigenous	LC	-	-		x				
Iridaceae	*Watsonia* sp. (no flowers)	Herb	Indigenous	-	-	-				x		
Lamiaceae	*Ajuga ophrydis*	Herb	Indigenous	LC	-	-	x		x		x	
Lamiaceae	*Hemizygia canescens*	Herb	Indigenous	LC	-	-	x	x				
Lamiaceae	*Leonotis microphylla*	Herb	Indigenous	LC	-	-		x		x		
Lamiaceae	*Mentha longifolia*	Herb	Indigenous	LC	-	-	x		x			

Family	Species Name	Growth Form	Origin	Conservation Status			Habitat Units					
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Lamiaceae	*Plectranthus madagascariensis*	Herb	Indigenous	LC	-	-	x					
Lamiaceae	*Salvia runcinata*	Herb	Indigenous	LC	-	-				x		
Lamiaceae	*Syncolostemon pretoriae*	Herb	Indigenous	LC	-	-		x				
Lamiaceae	*Teucrium trifidum*	Herb	Indigenous	LC	-	-						
Lobeliaceae	*Monopsis decipiens*	Herb	Indigenous	LC	-	-			x			
Lythraceae	*Nesaea sagittifolia*	Herb	Indigenous	LC	-	-						
Malvaceae	*Dombeya rotundifolia*	Tree	Indigenous	LC	-	-	x			x		
Malvaceae	*Grewia occidentalis*	Tree	Indigenous	LC	-	-	x					
Malvaceae	*Hibiscus aethiopicus*	Herb	Indigenous	LC	-	-				x		
Malvaceae	*Hibiscus trionum**	Herb	Alien	NE	-	-			x			
Malvaceae	*Sida dregei*	Herb	Indigenous	LC	-	-	x			x		
Malvaceae	*Waltheria indica*	Herb	Indigenous	LC	-	-			x			
Meliaceae	*Melia azedarach**	Tree	Alien (NEMBA Category 1b)	NE	-	-					x	
Myrsinaceae	*Myrsine africana*	Shrub	Indigenous	LC	-	-	x	x		x		
Myrtaceae	*Eucalyptus camaldulensis**	Tree	Alien (NEMBA Category 2)	NE	-	-						x
Myrtaceae	*Eucalyptus sp.**	Tree	Alien	NE	-	-						x
Oleaceae	*Olea europaea*	Tree	Indigenous	LC	-	-	x					
Onagraceae	*Oenothera roseus**	Herb	Alien	NE	-	-	x		x		x	
Oxalidaceae	*Oxalis corniculata**	Herb	Alien	NE	-	-				x		
Oxalidaceae	*Oxalis obliquifolia*	Herb	Indigenous	LC	-	-	x			x	x	
Pittosporaceae	*Pittosporum viridiflorum*	Tree	Indigenous	LC	-	-		x				
Plantaginaceae	*Plantago lanceolata*	Herb	Indigenous	LC	-	-		x	x			
Poaceae	*Alloteropsis semialata*	Graminoid	Indigenous	LC	-	-						
Poaceae	*Andropogon appendiculatus*	Graminoid	Indigenous	LC	-	-			x			
Poaceae	*Andropogon chinensis*	Graminoid	Indigenous	LC	-	-				x		
Poaceae	*Aristida bipartita*	Graminoid	Indigenous	LC	-	-			x			
Poaceae	*Aristida junciformis*	Graminoid	Indigenous	LC	-	-			x			

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Poaceae	*Aristida* cf. *diffusa*	Graminoid	Indigenous	LC	-	-			x			
Poaceae	*Aristida* sp.	Graminoid	Indigenous	LC	-	-		x			x	
Poaceae	*Brachiaria serrata*	Graminoid	Indigenous	LC	-	-	x			x	x	
Poaceae	*Bromus catharticus**	Graminoid	Alien	NE	-	-			x			
Poaceae	*Chloris gayana*	Graminoid	Indigenous	LC	-	-	x			x		
Poaceae	*Cymbopogon caesius*	Graminoid	Indigenous	LC	-	-	x	x				
Poaceae	*Cymbopogon pospischilii*	Graminoid	Indigenous	LC	-	-	x		x	x		
Poaceae	*Cynodon dactylon*	Graminoid	Indigenous	LC	-	-	x		x	x	x	
Poaceae	*Digitaria eriantha*	Graminoid	Indigenous	LC	-	-			x		x	
Poaceae	*Digitaria monodactyla*	Graminoid	Indigenous	LC	-	-		x				
Poaceae	*Digitaria tricholaenoides*	Graminoid	Indigenous	LC	-	-		x	x	x		
Poaceae	*Elionurus muticus*	Graminoid	Indigenous	LC	-	-				x		
Poaceae	*Eragrostis capensis*	Graminoid	Indigenous	LC	-	-				x		
Poaceae	*Eragrostis chloromelas*	Graminoid	Indigenous	LC	-	-	x	x	x	x	x	
Poaceae	*Eragrostis curvula*	Graminoid	Indigenous	LC	-	-	x	x	x	x	x	
Poaceae	*Eragrostis gummiflua*	Graminoid	Indigenous	LC	-	-			x	x	x	
Poaceae	*Eragrostis lehmanniana*	Graminoid	Indigenous	LC	-	-				x	x	
Poaceae	*Eragrostis plana*	Graminoid	Indigenous	LC	-	-			x	x	x	
Poaceae	*Eragrostis racemosa*	Graminoid	Indigenous	LC	-	-				x	x	
Poaceae	*Eragrostis trichophora*	Graminoid	Indigenous	LC	-	-	x	x			x	
Poaceae	*Eragrostis* sp.	Graminoid	Indigenous	LC	-	-	x					
Poaceae	*Harpochloa falx*	Graminoid	Indigenous	LC	-	-	x			x		
Poaceae	*Helictotrichon turgidulum*	Graminoid	Indigenous	LC	-	-			x			
Poaceae	*Hemarthria altissima*	Graminoid	Indigenous	LC	-	-			x			
Poaceae	*Heteropogon contortus*	Graminoid	Indigenous	LC	-	-	x					
Poaceae	*Hyparrhenia hirta*	Graminoid	Indigenous	LC	-	-	x			x	x	
Poaceae	*Hyparrhenia cf. dregeana*	Graminoid	Indigenous	LC	-	-					x	
Poaceae	*Loudetia simplex*	Graminoid	Indigenous	LC	-	-		x			x	
Poaceae	*Melinis nerviglumis*	Graminoid	Indigenous	LC	-	-	x	x		x	x	
Poaceae	*Melinis repens*	Graminoid	Indigenous	LC	-	-					x	

Family	Species Name	Growth Form	Origin	Conservation Status			Habitat Units					
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Poaceae	*Microchloa caffra*	Graminoid	Indigenous	LC	-	-		x		x	x	
Poaceae	*Panicum maximum*	Graminoid	Indigenous	LC	-	-	x		x	x	x	
Poaceae	*Panicum natalense*	Graminoid	Indigenous	LC	-	-	x	x		x		
Poaceae	*Panicum schinzii*	Graminoid	Indigenous	LC	-	-					x	
Poaceae	*Paspalum distichum*	Graminoid	Indigenous	LC	-	-			x			
Poaceae	*Paspalum dilatatum**	Graminoid	Alien	NE	-	-	x		x			
Poaceae	*Paspalum urvillei**	Graminoid	Alien	NE	-	-			x			
Poaceae	*Pennisetum clandestinum**	Graminoid	Alien (NEMBA Category 1b)	NE	-	-			x			
Poaceae	*Perotis patens*	Graminoid	Indigenous	LC	-	-					x	
Poaceae	*Phragmites australis*	Graminoid	Indigenous	LC	-	-			x			
Poaceae	*Pogonarthria squarrosa*	Graminoid	Indigenous	LC	-	-					x	
Poaceae	*Setaria incrassata*	Graminoid	Indigenous	LC	-	-			x	x		
Poaceae	*Setaria sphacelata var. sphacelata*	Graminoid	Indigenous	LC	-	-	x		x	x	x	
Poaceae	*Setaria sphacelata var. torta*	Graminoid	Indigenous	LC	-	-	x		x	x	x	
Poaceae	*Sorghum bicolor*	Graminoid	Indigenous	LC	-	-						x
Poaceae	*Sporobolus africanus*	Graminoid	Indigenous	LC	-	-	x		x			
Poaceae	*Sporobolus pectinatus*	Graminoid	Indigenous	LC	-	-	x	x				
Poaceae	*Sporobolus cf. consimilis*	Graminoid	Indigenous	LC	-	-			x			
Poaceae	*Themeda triandra*	Graminoid	Indigenous	LC	-	-	x	x	x	x	x	
Poaceae	*Trichoneura grandiglumis*	Graminoid	Indigenous	LC	-	-					x	
Poaceae	*Tristachya leucothrix*	Graminoid	Indigenous	LC	-	-	x	x	x	x	x	
Poaceae	*Urochloa panicoides*	Graminoid	Indigenous	LC	-	-	x					
Polygalaceae	*Polygala hottentotta*	Herb	Indigenous	LC	-	-					x	
Polygalaceae	*Polygala uncinata*	Herb	Indigenous	LC	-	-						
Polygonaceae	*Persicaria lapathifolia**	Herb	Alien	NE	-	-			x			
Proteaceae	*Protea caffra*	Tree	Indigenous	LC	Protected	Protected		x		x		
Pteridaceae	*Cheilanthes hirta*	Fern	Indigenous	LC	-	-	x	x		x		
Pteridaceae	*Cheilanthes eckloniana*	Fern	Indigenous	LC	-	-	x					

Family	Species Name	Growth Form	Origin	Conservation Status			Habitat Units					
				National Red List Status	Gauteng Province Status	Mpumalanga Province Status	Mountain Bushveld	Rocky Shrubland and Grassland	Watercourses (Rivers & Wetlands)	Natural Dry Grassland	Secondary Grassland	Other (Alien Tree Stands)
Pteridaceae	*Pellaea calomelanos* var. *calomelanos*	Fern	Indigenous	LC	-	-	x	x				
Rhamnaceae	*Helinis integrifolius*	Climber	Indigenous	LC	-	-	x					
Rhamnaceae	*Ziziphus mucronata*	Tree	Indigenous	LC	-	-	x			x		
Rhamnaceae	*Ziziphus zeyheriana*	Dwarf Shrub	Indigenous	LC	-	-	x			x		
Rophulariaceae	*Jamesbrittenia aurantiaca*	Herb	Indigenous	LC	-	-			x			
Rosaceae	*Leucosidea sericea*	Tree	Indigenous	LC	-	-	x		x	x		
Rosaceae	*Pyracantha angustifolia**	Tree	Alien (NEMBA Category 1b)	NE	-	-	x					
Rosaceae	*Rubus rigidus*	Shrub	Indigenous	LC	-	-				x		
Rubiaceae	*Afrocanthium mundianum*	Tree	Indigenous	LC	-	-	x	x				
Rubiaceae	*Afrocanthium gilfillanii*	Tree	Indigenous	LC	-	-	x					
Rubiaceae	*Anthospermum hispidulum*	Shrub	Indigenous	LC	-	-		x			x	
Rubiaceae	*Pentanisia angustifolia*	Herb	Indigenous	LC	-	-	x			x		
Rubiaceae	*Richardia brasiliensis**	Herb	Alien	NE	-	-			x	x	x	
Rubiaceae	*Vangueria infausta*	Tree	Indigenous	LC	-	-	x	x				
Rubiaceae	*Vangueria parvifolia*	Tree	Indigenous	LC	-	-	x	x				
Ruscaceae	*Eriospermum cooperi*	Herb	Indigenous	LC	-	-	x			x		
Rutaceae	*Zanthoxylum capense*	Tree	Indigenous	LC	-	-	x			x		
Salicaceae	*Populus x canescens*	Tree	Alien (NEMBA Category 1b)	NE	-	-						x
Salicaceae	*Salix babylonica**	Tree	Alien	NE	-	-			x			
Salicaceae	*Salix mucronata*	Tree	Indigenous	LC	-	-			x			
Salicaceae	*Scolopia zeyheri*	Tree	Indigenous	LC	-	-	x					
Santalaceae	*Osyris lanceolata*	Tree	Indigenous	LC	-	-	x					
Sapotaceae	*Englerophytum magalismontanum*	Tree	Indigenous	LC	-	-		x				
Scrophulariaceae	*Buddleja saligna*	Tree	Indigenous	LC	-	-	x				x	
Scrophulariaceae	*Buddleja salviifolia*	Tree	Indigenous	LC	-	-	x		x			
Scrophulariaceae	*Selago densiflora*	Herb	Indigenous	LC	-	-					x	

Family	Species Name	Growth Form	Origin	Conservation Status			Habitat Units					
				National Red List Status	Gauteng Province Status	Mpumalanga Province Status	Mountain Bushveld	Rocky Shrubland and Grassland	Watercourses (Rivers & Wetlands)	Natural Dry Grassland	Secondary Grassland	Other (Alien Tree Stands)
Solanaceae	*Datura stramonium**	Herb	Alien (NEMBA Category 1b)	NE	-	-					x	x
Solanaceae	*Solanum elaeagnifolium**	Herb	Alien (NEMBA Category 1b)	NE	-	-	x			x	x	
Solanaceae	*Solanum lichtensteinii*	Herb	Indigenous	LC	-	-	x					
Solanaceae	*Solanum mauritianum**	Herb	Alien (NEMBA Category 1b)	NE	-	-						x
Solanaceae	*Solanum pseudocapsicum**	Shrub	Alien (NEMBA Category 1b)	NE	-	-	x					
Solanaceae	*Solanum sisymbriifolium**	Shrub	Alien (NEMBA Category 1b)	NE	-	-			x		x	
Sterculiaceae	*Hermannia depressa*	Herb	Indigenous	LC	-	-	x			x	x	
Stilbaceae	*Nuxia congesta*	Tree	Indigenous	LC	-	-	x					
Thymelaeaceae	*Dias cotinifolia*	Tree	Indigenous	LC	-	-	x					
Thymelaeaceae	*Lasiosiphon capitatus*	Shrub	Indigenous	LC	-	-						
Typhaceae	*Typha capensis*	Graminoid	Indigenous	LC	-	-			x			
Ulmaceae	*Celtis africana*	Tree	Indigenous	LC	-	-	x		x			
Verbenaceae	*Lantana rugosa*	Shrub	Indigenous	LC	-	-	x			x		
Verbenaceae	*Lippia javanica*	Shrub	Indigenous	LC	-	-	x		x	x		
Verbenaceae	*Verbena bonariensis**	Herb	Alien (NEMBA Category 1b)	NE	-	-	x		x	x	x	
Verbenaceae	*Verbena officinalis**	Herb	Alien (NEMBA Category 1b)	NE	-	-	x		x		x	
Viscaceae	*Viscum rotundifolium*	Herb	Indigenous	LC	-	-	x					
Vitaceae	*Rhoicissus tridentata*	Shrub	Indigenous	LC	-	-	x			x		

Red List Categories
NE = Not Evaluated
LC = Least Concern

Appendix D: Compliance with Plant Species Protocol.

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 PAOI;	Section 7.2.1
2.2.2 provide evidence (photographs or sound recordings) of each SCC found or observed within the PAOI, 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);	7.2.1
2.2.3 identify the distribution, location, viability and provide a detailed description of population size of the SCC, identified within the PAOI;	Section 7.2.1
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 PAOI;	Section 10.3
2.2.5 determine the importance of the conservation of the population of the SCC identified within the PAOI, 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;	Section 7.2.1
2.2.6 determine the potential impact of the proposed development on the habitat of the SCC located within the PAOI;	Section 10.3
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;	Section 7.2.1
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;	Section 8
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;	Section 8 & Section 10.3
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 roosting and breeding or foraging areas used by migratory species where these species show significant congregations, occurring in the vicinity	Section 7.2.1
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 9
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	Page 7 & Appendix A

Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Plant Species	Relevant Section in Report
registration number of the specialist preparing the assessment including a curriculum vitae;	
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 3.2 & 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;	Section 3 & Section 10.1
3.1.5 a description of the mean density of observations/number of sample sites per unit area and the site inspection observations;	Section 3.2
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;	Section 7.2.1
3.1.8 the online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the PAOI;	iNaturalist
3.1.9 the location of areas not suitable for development and to be avoided during construction where relevant;	N/A
3.1.10 a discussion on the cumulative impacts;	Section 10.3.4
3.1.11 impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Section 12 & Section 13
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;	Section 14
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” plant 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