



Terrestrial Biodiversity Assessment

WKN Bonsmara PV (Kroonstad)

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Compiled for: **SiVest Environmental Division**

Date of report: **15/03/2023**

First Draft Report

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1 Introduction & Background

1.1 Background

SiVest Environmental Division have been appointed to undertake the necessary environmental applications for a proposed WKN Bonsmara Solar (PV) facility near Kroonstad, within the Free State province. As part of this application, a terrestrial biodiversity assessment is required.

Project : Bonsmara Solar PV Facility Layout - Topographic Locality Map

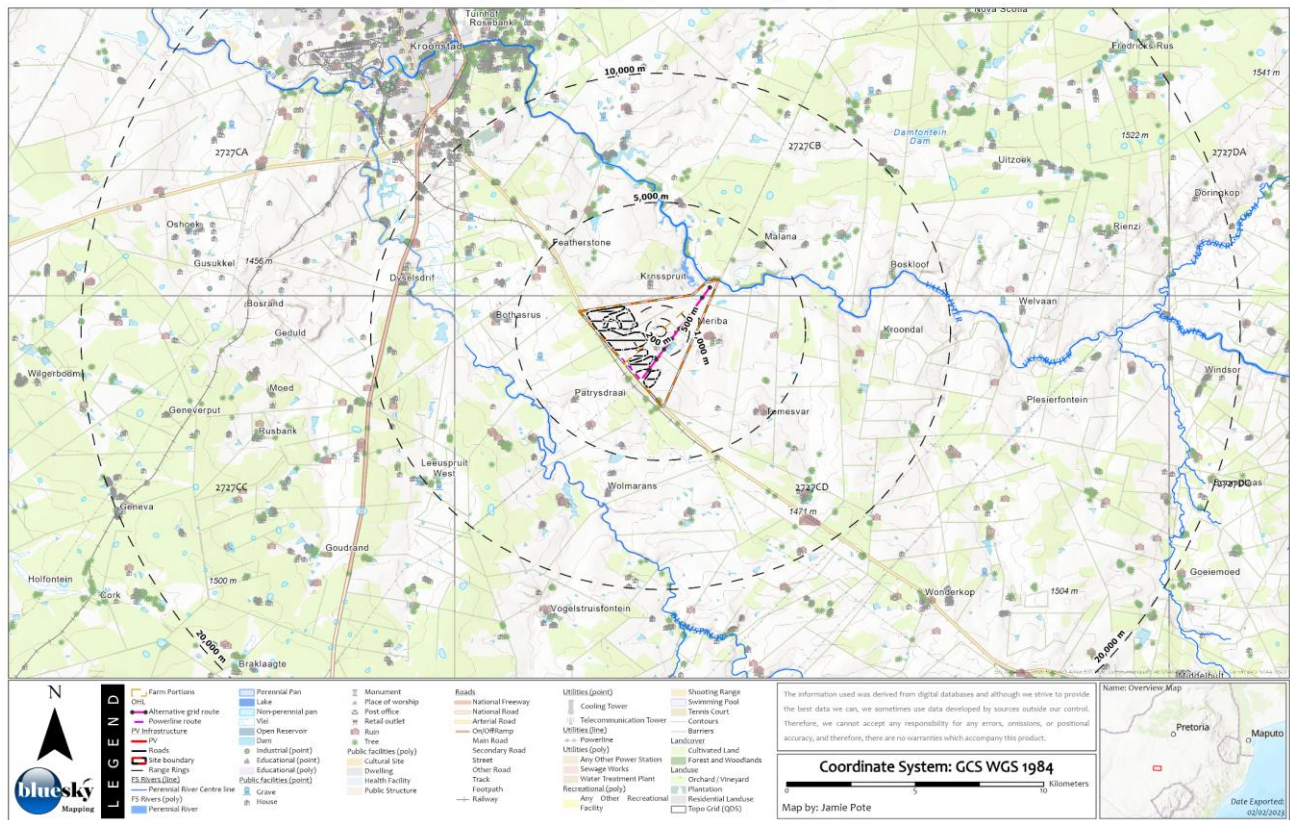


Figure 1: Locality Map.

1.2 Project Description

1.2.1 Activity Location and Description

The proposed site is situated approximately 9 km south-east of Kroonstad, along the R 76 road in the direction of Steynsrus, in the Free State province. The site is situated within a commercial farming area (Refer to Figure 1) and is comprised of two farm portions, a north-western portion, Remainder of Farm Scheveningen 636 (~575 Ha) and a south-eastern portion, Portion 1 of Farm Scheveningen 636 (~429 Ha). The sites are within a predominantly commercial stock and game farming area, generally comprising dryland grazing in the surrounding area. The proposed activity will be to construct PV energy facilities, which will most likely feed into the national grid, being accessible in proximity to the site via Portion 0 of Farm Oslaagte No 2564.

1.2.2 Aspects of the project that could potentially have Biodiversity related Impacts

The key components of the project and their respective impacts upon terrestrial biodiversity and ecological processes include the following:

COMPONENT	POTENTIAL BIODIVERSITY AND ECOLOGICAL IMPACTS
PV FACILITY	
The construction of the PV Facility will require <u>permanent</u> clearing of the site within the footprint.	The terrestrial environment will be permanently impacted where vegetation clearing is required to construct the PV footprint. Several minor perennial watercourse crossing may be required.
OHL POWERLINE (GRID CONNECTION)	
The construction of the PV Facility will require installation of OHL pylons and a two-track access road and small footprint-sub-stations.	The terrestrial environment will be temporarily impacted during construction of the OHL but will only require installation of pylons and an access track (two track). Vegetation clearing within the powerline servitude will be minimal.

1.3 Methodology and Approach

The proposed methodology and approach are outlined below:

- Conduct a comprehensive desktop study and identify potential risks relating to vegetation and flora of the site and surrounding area, for a Terrestrial Biodiversity Assessment Report. This will include the relevant Regional Planning and legislated frameworks, which will also be represented in a series of associated maps.
- Conduct a detailed site visit to assess the following:
 - Detailed field survey of vegetation, flora and habitats present.
 - Comprehensive species list, highlighting species that are of special concern, threatened, Red Data species and species requiring permits for destruction/relocation in terms of NEMBA and the Provincial Nature Conservation Ordinance No. 19 of 1974.
 - Detailed mapping of the various habitat units and assessment of habitat integrity, ecological sensitivity, levels of degradation and transformation, alien invasion and species of special concern, the outcome being a detailed sensitivity map ranked into high, medium or low classes.
- Reporting will be comprised of a preliminary summary, with identification of anticipated impacts and risks for any scoping phase report (where applicable), a draft detailed Assessment Report (for public review and comment) and a Final Assessment Report for submission. The draft and final detailed reports will include the following:
 - Indicate any assumptions made and gaps in available information. Assessment of all the vegetation types and habitat units within the relevant Regional Planning Frameworks.
 - A detailed species list highlighting the various species of special concern categories (endemic, threatened, Red Data species and other protected species requiring permits for destruction/relocation and invasive/exotic weeds).
 - Description and assessment of the habitat units and site sensitivities ranked into high, medium or low classes based on sensitivity and conservation importance. A standard methodology has been developed based on other projects in the specific area.
 - Assessment of Impacts and Mitigation Measure, as well as specific measure that may be required for alternative development plans.
 - A comprehensive EMPr for inclusion in the reports and EMP with specific management actions for construction and Operation.
 - A habitat sensitivity map will be compiled, indicating the sensitivities as described above.
 - A map indicating buffers (if required) to accommodate Regional Planning and any other requirements.

1.3.1 Site visit

A site visit was conducted on the 29th & 30th September 2022, during early to mid-spring and again on the 27 and 28 February 2023 during late summer. The site falls within a summer rainfall area and for the purposes of this report, based on favourable seasonal rainfall and on-site observations, the site visits are deemed to be adequate. The site visit and assessment were undertaken by Mr Jamie Pote, SACNASP registered ecological scientist with a BSc (Hons) degree in Botany and a BSc degree in Botany and environmental Science, with nearly 20 years' experience undertaking ecological assessments.

1.4 Purpose of Report

1.4.1 Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes

This report has been compiled to fulfil the requirement for a **Terrestrial Biodiversity Assessment** as per 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 NEMA (GNR 320), **as gazetted on 20 March 2020**. This report is undertaken as supporting information as part of a greater environmental application process and is compliant in terms of the requirements in the above regulations in terms of Terrestrial Biodiversity.

In terms of 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 NEMA, gazetted **on 30 October 2020**, relating to requirements relating specifically to the **Terrestrial Plant species theme**, this report includes these flora species requirements. The terrestrial biodiversity assessment also gives consideration of fauna, as per protocol requirements for terrestrial biodiversity reporting.

The principles that guide this process include protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources which are fundamental to sustainable development. Since the ecology of a landscape is a function of the relationships between living organisms, including humans, and their physical environment, this terrestrial biodiversity or ecological assessment report will consider not only vegetation but also flora and fauna as well as the physical environment in which they occur, which will determine the ecological processes that are affected within the site and immediate surrounds (area of influence).

Refer to Section 9.11: Appendix J: Site Sensitivity Verification Report.

1.4.2 Data sources and references

A comprehensive list of references, including data sources is provided in Section 9.1. Data sources that have been used for this report include the following:

- National (DFFE) Web Based Environmental Screening Tool (referred to as NEST in this report) – to generate the sites potential environmental sensitivity.
- National Vegetation Map 2018 (NVM, 2018), Mucina & Rutherford (2006) and National Biodiversity Assessment (NBA, 2019) – description of vegetation types, species (including endemic) and vegetation unit conservation status.
- National and Regional Legislation including Provincial Nature Conservation Ordinances and NEM:BA Threatened or Protected Species (ToPS).
- Botanical Database of Southern Africa (BODATSA) and New Plants of Southern Africa (POSA) – lists of plant species and potential species of concern found in the general area (SANBI)
- International Union for Conservation of Nature (IUCN) – Red List of Threatened Species
- Animal Demography Unit Virtual Museum (VM) – potential faunal species

- Global Biodiversity Information Facility (GBIF) – potential faunal species
- Southern African Bird Atlas Project 2 (SABAP2) – for bird species records
- National Red Books and Lists – mammals, reptiles, frogs, dragonflies & butterflies
- National Freshwater Ecosystem Priority Areas assessment (NFEPA, 2011) – important catchments
- National Protected Areas Expansion Strategy (NPAES, 2018) and South Africa Protected Area database (2020) – protected area information
- SANBI BGIS – All other biodiversity GIS datasets
- Bioregional Plans: Free State BSP
- Aerial Imagery – Google Earth, Esri, Chief Surveyor General (<http://csg.dla.gov.za>)
- Cadastral and other topographical country data – Chief Surveyor General (<http://csg.dla.gov.za>)
- Other sources include peer-reviewed journals, regional and local assessments and studies in the general location of the project and its area of influence, landscape prioritization schemes (Key Biodiversity Areas), systematic conservation planning assessments and plans (as above), and any pertinent masters and doctoral theses, among others.

A Glossary and list of Abbreviations is provided in Section 9.6 Annexure E: Abbreviations and Glossary.

1.4.3 Assumptions, Uncertainties and Gaps in Knowledge

The findings and recommendations of this report may be susceptible to the following uncertainties and limitation:

- Any botanical surveys based upon a limited sampling time-period, may not reflect the actual species composition of the site due to seasonal variations in flowering times. Additionally, the composition of fire adapted vegetation may vary depending on level of maturity or time since last burn. As far as possible, site collected data has been supplemented with desktop and database-centred distribution data.
- No assessment has been made of aquatic processes relating to any wetlands, pans and rivers/seeps and/or estuaries outside of the scope of those having an influence on the terrestrial biodiversity.

2 Policy

2.1 Company Policy

No company policy is applicable to this assessment.

2.2 Legislation Framework

In terms of NEMA EIA Regulations (07 April 2014, as amended), the following specific listing notices have bearing on this report¹:

Listing Notice 1 (GNR 327):

1. The development of facilities or infrastructure for the generation of electricity from a renewable resource where—
 - (i) the electricity output is more than 10 megawatts but less than 20 megawatts; or
 - (ii) the output is 10 megawatts or less, but the total extent of the facility covers an area in excess of 1 hectare.

¹ The listed activities itemized are only those with Biodiversity relevance to this report and is not a complete list.

Activity 1 could apply relating to facilities or infrastructure for the generation of electricity more than 10 megawatts but less than 20 megawatts from a renewable resource but is not related to terrestrial biodiversity unless additional activities are triggered, as below.

12. The development of:

(ii) infrastructure or structures with a physical footprint of 100 square metres or more.

where such development occurs—

(a) within a watercourse.

~~(b) in front of a development setback; or~~

(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse: —

Watercourses are present on site and the listed activity would be triggered if such an activity was to take place above the legislated thresholds.

19. The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles, or rock of more than 10 cubic metres from a watercourse.

Watercourses are present on site and the listed activity would be triggered if such an activity was to take place above legislated thresholds.

27. The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—

~~(i) the undertaking of a linear activity; or~~

~~(ii) maintenance purposes undertaken in accordance with a maintenance management plan.~~

Indigenous vegetation is present on site and the listed activity will be triggered, as it is likely clearing will exceed 1 Ha.

Listing Notice 2 (GNR):

15. The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for—

~~(i) the undertaking of a linear activity; or~~

~~(ii) maintenance purposes undertaken in accordance with a maintenance management plan.~~

The PV footprint will likely require the clearing of greater than 20 Ha of indigenous vegetation, hence this activity would likely be triggered, requiring a full Scoping and EIA process.

Listing Notice 3 (GNR 324):

4. The development of a road wider than 4 metres with a reserve less than 13,5 metres

b. Free State

i. Outside urban areas:

~~(aa) A protected area identified in terms of NEMPAA, excluding disturbed areas;~~

(bb) National Protected Area Expansion Strategy Focus areas;

~~(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;~~

~~(dd) Sites or areas identified in terms of an international convention;~~

- ~~(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;~~
~~(ff) Core areas in biosphere reserves; or~~
(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas; or
 ii. ~~Inside urban areas:~~
~~(aa) Areas zoned for use as public open space;~~
~~(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose; or~~
~~(cc) Areas within urban protected areas.~~

The listed activity will be triggered if access roads exceed the threshold (wider than 4 m) and occurs within designated Critical Biodiversity Areas or within 5 km of a nature reserve. The site is within an ESA and not a CBA but is within 5 km of a nature reserve, hence the activity will be triggered if road widths exceed 4 m.

12. The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.

b. Free State

- i. ~~Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;~~
 ii. ~~Within critical biodiversity areas identified in bioregional plans;~~
 iii. ~~On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or~~
 iv. **Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland.**

The listed activity would be triggered if clearing of indigenous vegetation (natural areas) exceeds 300 m² and occurs within 100 m of a watercourse or wetland or within designated Critical Biodiversity Areas. The site is within an ESA and not a CBA but may result in the clearance of greater than 300 m² of natural vegetation within 100 m of watercourses, which are present across the site, as a minimum in order to construct access roads.

14. The development of -

(ii) infrastructure or structures with a physical footprint of 10 square metres or more, where such development occurs -

(a) within a watercourse.

(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse.

b. Free State

i. Outside urban areas:

~~(aa) A protected area identified in terms of NEMPAA, excluding conservancies;~~

(bb) National Protected Area Expansion Strategy Focus areas;

~~(cc) World Heritage Sites;~~

~~(dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;~~

~~(ee) Sites or areas identified in terms of an international convention;~~

~~(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;~~

~~(gg) Core areas in biosphere reserves; or~~

~~(hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve; or~~

~~ii. Inside urban areas:~~

~~(aa) Areas zoned for use as public open space; or~~

~~(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, zoned for a conservation purpose.~~

The site is within 5 km of a nature reserve and a portion is also within a designated NPAES; hence this legislated activity will be triggered.

Implications:

- Due to the scale of the project and largely indigenous nature of the site, more than 20 Ha of indigenous vegetation will require clearing, hence triggering a Full Scoping & EIA process.
- The proposed activity may also require the clearing of more than 300 m² of indigenous vegetation and greater than 1 Ha of indigenous vegetation and/or an activity in a watercourse to construct access road crossings, hence additional listed activities are likely to be triggered.
- Additional listed activities that may pertain to the type of activity (PV) rather than directly to terrestrial biodiversity features have not been considered in depth at this Scoping stage.

Other potentially relevant legislation, which will be evaluated as required, includes the following:

- NEMA: Environmental management principles set out in NEMA, and other Specific Environmental Management Acts (SEMA's) should guide decision making throughout the project life cycle to reflect the objective of sustainable development. One of the most important and relevant principles is that disturbance of ecosystems, loss of biodiversity, pollution and degradation of environment and sites that constitute the nation's cultural heritage should be avoided, minimised or as a last option remedied. This is supported by the Biodiversity Act as it relates to loss of biodiversity.
- Liability for any environmental damage, pollution, or ecological degradation: Arising from all-related activities occurring inside or outside the area to which the permission/right/permit relates is the responsibility of the rights holder. The National Water Act and NEMA both oblige any person to take all reasonable measures to prevent pollution or degradation from occurring, continuing or reoccurring (polluter pays principle). Where a person/company fails to take such measures, a relevant authority may direct specific measures to be taken and, failing that, may carry out such measures and recover costs from the person responsible.
- Public participation: Public consultation and participation processes prior to granting licences or authorisations can be an effective way of ensuring that the range of ways in which the activities impact on the environment, social and economic conditions are addressed, and taken into account when the administrative discretion to grant or refuse the licence is made. No specific public participation is undertaken as part of this assessment; however, it will be undertaken as part of the environmental application for which this report has been compiled. As part of that process, any comments raised in that process will be addressed as required. Where applicable, local persons,

including landowners and residents, will be informally interviewed, where information pertaining to the terrestrial environment may provide value or information.

- Constitution of Republic of South Africa (1996): Section 24(a) of the Constitution states that everyone has the right ‘to an environment that is not harmful to their health or well-being’. Construction activities must comply with South African constitutional law by conducting their activities with due diligence and care for the rights of others.
- National Forests Act 84 of 1998 with Amendments: Lists Protected trees, requiring permits for removal Department of Agriculture, Forestry and Fisheries). Section (3)(a) of the National Forests Act stipulate that ‘natural forests must not be destroyed save in exceptional circumstances where, in the opinion of the Minister, a proposed new land use is preferable in terms of its economic, social or environmental benefits’.
- Provincial Nature and Environmental Conservation Ordinances: Lists Protected species, requiring permits for removal. Free State Nature Conservation Ordinance 8 of 1969 (FSNCO).
- The National Water Act (No. 36 of 1998): Requires that provision is made both in terms of water quantity and quality for ‘the reserve’, namely, to meet the ecological requirements of freshwater systems and basic human needs of downstream communities. It is essential in preparing an EMP that any impacts on water resources be they surface water or groundwater resources, and/ or impacts on water quality or flow, are carefully assessed and evaluated against both the reserve requirement and information on biodiversity priorities. This information will be required in applications for water use licenses or permits and/or in relation to waste disposal authorisations.
- Conservation of Agricultural Resources Act 43 of 1993: Lists Alien invasive species requiring removal.
- Sustainable Development Goals: Goal 15: Life on Land: Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss. The approach, assessment methodology and recommendations contained within this report are in line with this sustainable development goal.

2.3 Systematic Planning Frameworks Summary

A screening of Systematic Planning Framework for the region was undertaken (summarised in Table 1), that included the following features:

- Critically Endangered, Endangered and Vulnerable Ecosystems.
- Critical Biodiversity Areas and Ecological Support Areas.
- River, Estuarine and Wetland Freshwater Ecosystem Priority Areas (FEPAs) and buffers.
- Regional Planning Frameworks (Free State Biodiversity Plan)
- Protected Areas (and buffers) and Protected Area Expansion Strategy (PAES).
- Critical Habitat for endemic, protected and threatened species.

A summary of the key implications of the respective ecological receptors and indicators is provided in the sections below and further information is also provided in Section 9.4: Appendix D: Systematic Planning Frameworks.

Table 1: Summary of Regional Planning Biodiversity features.

FEATURE ²	DESCRIPTION	IMPLICATIONS/COMMENT
National Environmental Screening Tool (Terrestrial Biodiversity)	Very High Terrestrial Biodiversity Medium/High Animal Species	ESA 1 &2, NPAES, Erfdeel Private Nature Reserve. <i>Smaug giganteus</i> (Reptile), <i>Hydrictis maculicollis</i> (Mammal)

² Refer to Figure 8 to Figure 11 and Section 9.4: Appendix D: Systematic Planning Frameworks.

FEATURE ²	DESCRIPTION	IMPLICATIONS/COMMENT
	Low Plant Species Low/Very High Aquatic Medium/High Agriculture Very High, High & Medium	Low Sensitivity (None) SWSA, Wetlands Land Capability Moderate/High
National Vegetation Map (NVM, 2018)	Central Free State Grassland	Least Concern
Regional Planning: Free State Biodiversity Plan (2016)	ESA 1, ESA 2, Other Natural Areas (ONA) & Degraded (Cultivated and old lands)	Specific activity within a predominantly natural rural farming area and having a limited footprint area will not significantly fragment Ecological Support Area connectivity requirements if planned to maximise connectivity.
Critically Endangered and Endangered Ecosystems (NBA 2018)	None	N/A
Vulnerable Ecosystems (NBA)	None	N/A
Protected Areas (SAPAD)	Erfdeel Private Nature Reserve is situated on the north-eastern boundary of the site and entire site is within 5 km.	No protected areas nor any ecological processes associated with them are directly affected by the proposed PV project, however the site is directly adjacent to a private Nature Reserve. The proposed PV site is situated more than 2.8 km from this reserve and unlikely to have any direct or indirect impacts.
NPAES	The south-eastern corner and a portion along the northern boundary fall within NPAES Priority Focus Areas.	No NPAES or associated ecological processes are likely directly affected.
Strategic Water Source Areas (SWSA)	The majority of the site footprint falls within the Kroonstad Strategic Water Source Area.	Specific activity unlikely to have any impact to downstream water resources exceeding baseline levels.
Freshwater Ecosystem Priority Areas (FEPA's)	Situated within catchment of Valsrivier to the north (Class C: Moderately Modified).	Specific activity unlikely to have any significant impact to nearby rivers, as long as measures are implemented to minimise impacts to watercourses and runoff.
Important Bird Areas (IBA's)	Willem Pretorius Game Reserve (53 km south) and Fouriesburg-Bethlehem-Clarens 70 km to east.	Specific activity is unlikely to have any impact on any IBA's.
Key Biodiversity Areas (KBA's)	None	N/A
Marine/Coastal areas	None	N/A
RAMSAR sites	None	N/A
Within 32 m of Watercourse	Several non-perennial watercourses are present.	Watercourses will only be affected if proposed activity is undertaken in

FEATURE ²	DESCRIPTION	IMPLICATIONS/COMMENT
		proximity or where access road crossings are required.
Within 100 m of River	Site is within 100 m of the Valsrivier along the northern boundary. Actual proposed PV footprint is more than 2.8 km from this river.	Development of the site is unlikely to significantly impact any watercourse, as long as recommended buffers are retained.
Within 500 m of Wetland	Site is within 500 m of Valley floor natural wetlands associated with the Valsrivier along the northern boundary. Several dams of varying size are present on the site.	Wetlands will only be affected if proposed activity is undertaken in proximity.
Forest	No forest is present.	None
Regional Hotspots & Regions of Endemism	Outside of any endemism hotspots.	N/A.
Surrounding Land Uses	Mostly commercial agriculture. Site is generally intact within minimal transformation.	
Critical Habitat for listed endemic/ protected species	There are several red listed faunal species in the surrounding area and vegetation units that are known to have limited distributions (refer to Section 3.1).	

Implications:

- Vegetation unit currently has a Least Concern conservation status; hence natural vegetation does not have an elevated status.
- The current Conservation Planning designation for the site is mostly ESA 1 with some ESA 2 patches also present, indicating that within the site ecological processes and connectivity are considered to be important rather than irreplaceable habitat (i.e. CBA) or conservation targets. The implications of this are that direct loss of habitat is not the main risk, but rather disruptions to ecological processes.
- Watercourses are present as well as the Valsrivier on the northern boundary and respective buffers will require consideration.
- The Erfdeel Private Nature Reserve is also located on the northern boundary and a buffer would be advisable. No specific guidelines are provided for such buffers in regional planning guidelines.
- No other ecological elements or sensitive features (terrestrial) of significance are identified in the respective regional planning information sources that would be directly or indirectly affected.

2.3.1 National Environmental Screening Tool

The DEA Screening Tool indicates the following:

- Terrestrial Biodiversity is **Very High** and **Low** (Figure 2).
- Plant species sensitivity is **Low** (Figure 3).
- Animal Species sensitivity is **Medium** and **Low** (Figure 4).
- Aquatic Sensitivity is **Very High & Low** (Figure 5).
- Agricultural Sensitivity is **High, Medium, & Low** (Figure 6).
- Landscape (Solar) Sensitivity is **Very High, High, Medium, & Low** (Figure 7).

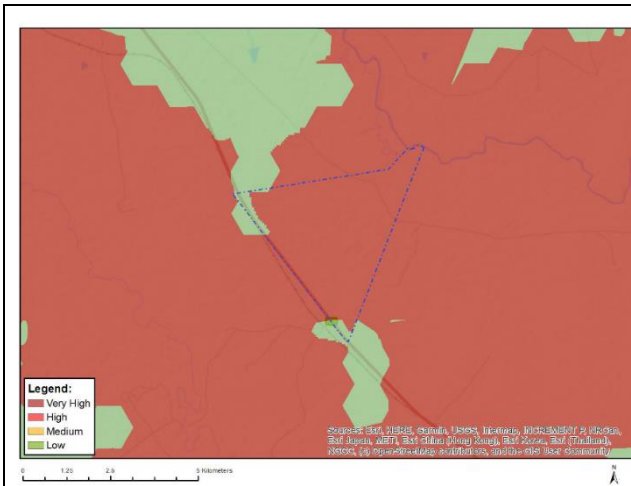


Figure 2: Terrestrial Biodiversity Sensitivity

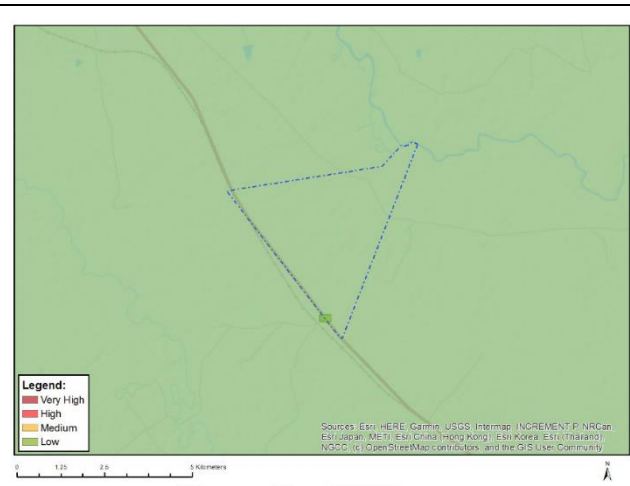


Figure 3: Plant Species Sensitivity

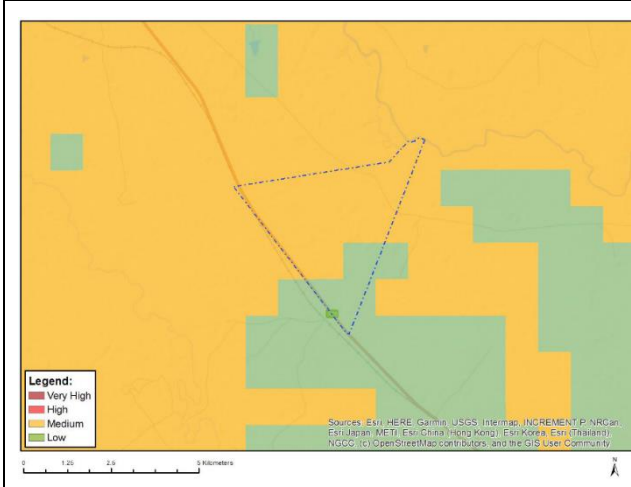


Figure 4: Animal Species Sensitivity

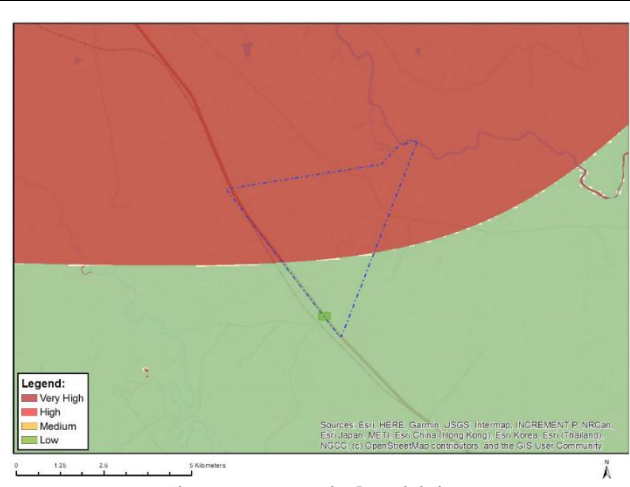


Figure 5: Aquatic Sensitivity

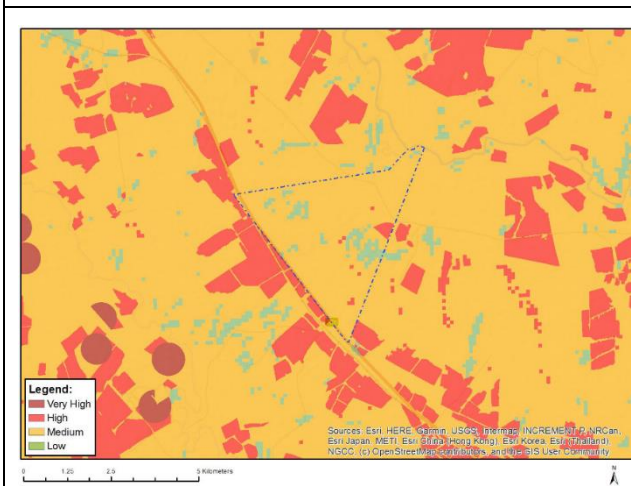


Figure 6: Agricultural Sensitivity.

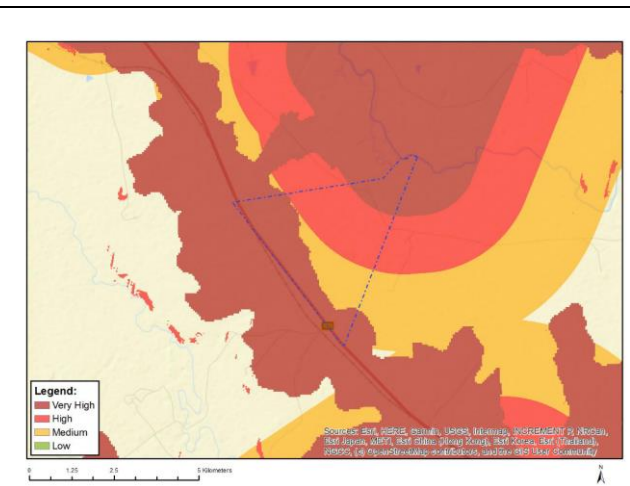


Figure 7: Landscape (Solar) Sensitivity.

SENSITIVITY	DESCRIPTION - FEATURE(S) IN PROXIMITY
TERRESTRIAL SENSITIVITY	
Very High	ESA 1 & 2; Erfdeel Private Nature reserve, PAES
High	None
Medium	None
Low	Present
PLANT SENSITIVITY	

SENSITIVITY	DESCRIPTION - FEATURE(S) IN PROXIMITY
Very High	None
High	None
Medium	None
Low	Present
ANIMAL SENSITIVITY	
Very High	None
High	None
Medium	Sensitive Species 15, <i>Hydriectis maculicollis</i> (Mammal)
Low	Present
AQUATIC SENSITIVITY	
Very High	Strategic Water Source Area & Wetlands
High	None
Medium	None
Low	Present
AGRICULTURAL SENSITIVITY	
Very High	None
High	Land capability: 09. Moderate-High; 10. Moderate-High High Annual Crop Cultivation / Planted Pastures Rotation: Land capability: 06. Low-Moderate; 07. Low-Moderate; 08. Moderate High Annual Crop Cultivation / Planted Pastures Rotation: Land capability: 01. Very low/02. Very low/03.; Low-Very low/04. Low-Very low/05. Low
Medium	Land capability: 06. Low-Moderate; 07. Low-Moderate; 08. Moderate
Low	Land capability: 01. Very low; 02. Very low; 03. Low-Very low; 04. Low-Very low; 05. Low
LANDSCAPE SENSITIVITY	
Very High	Nature Reserve, Within 1.5 km of a nature reserve, Mountain tops and high ridges
High	Slope between 1:4 and 1:10, Between 1.5 and 3 km of a nature reserve
Medium	Between 3 and 5 km of a nature reserve
Low	None

NOTE: as per point 1.5 of the Terrestrial Biodiversity Specialist Assessment and Minimum Report Content Requirements:

*'If any part of the proposed development footprint falls within an area of 'very high' sensitivity, the assessment and reporting requirements prescribed for the 'very high' sensitivity apply to the entire footprint, **excluding linear activities** for which impacts on terrestrial biodiversity are temporary and the land in the opinion of the terrestrial biodiversity specialist, based on the mitigation and remedial measures, can be returned to the current state within two years of the completion of the construction phase, in which case a compliance statement applies. Development footprint in the context of this protocol means the area on which the proposed development will take place and includes any area that will be disturbed.'*

Based on the above reporting protocol condition, the entire grid connection overhead line will fall into the above category, which implies that for a temporary linear activity, the screening tool designated high sensitivity should be reduced to a low sensitivity and only a complicated statement would be required.

The site assessment will physically screen for the presence of the listed, and other possible species or sensitivities that are not identified in the screening tool. Not all features are directly affected, but being in proximity, the risks associated with the activity will be investigated further and addressed in the report.

2.3.2 Vegetation of Southern Africa

A single vegetation unit (Table 1, Figure 8) is primarily affected by the proposed project (Mucina & Rutherford, 2006). The site is located entirely within Central Free State Grassland (currently having a Least Concern conservation status). Elements of Vaal-Vet Sandy Grassland (Endangered), Eastern Free State Sandy Grassland (Least Concern), and Winburg Grassy Shrubland (Least Concern) may be present on slopes and rocky hills or mesas, which will be assessed further during the assessment process. Highveld Alluvial Vegetation elements may be represented in alluvial or wetland areas. A general description of the vegetation units is provided Section 9.4: Appendix D: Systematic Planning Frameworks (as per Mucina & Rutherford, 2006) as a reference point for the baseline vegetation composition.

Project : Bonsmara Solar PV Facility
Layout - Vegetation and Status (National)

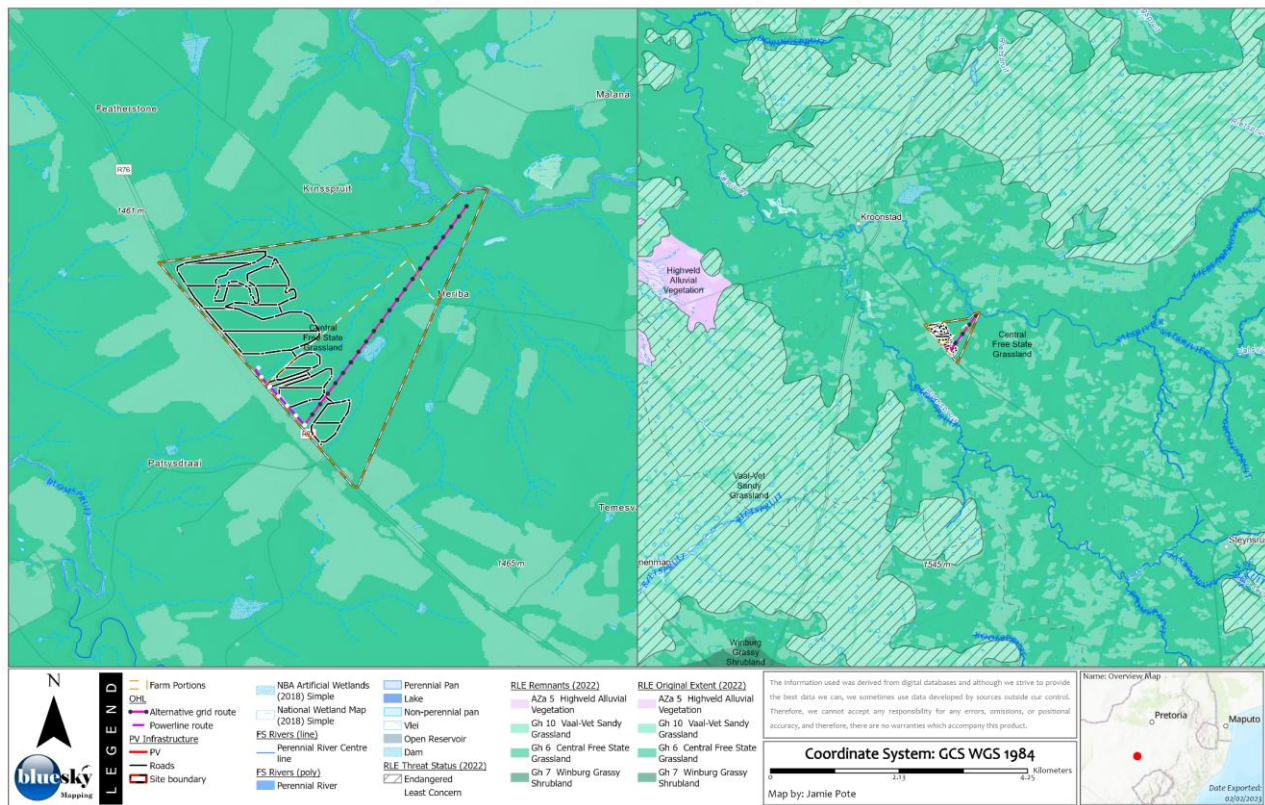


Figure 8: Vegetation of Southern Africa (National Biodiversity Assessment. 2022).

The project area is generally characterised by Central Freestate Grassland undulating plains supporting short grassland, in natural condition dominated by *Themeda triandra* while *Eragrostis curvula* and *E. chloromelas* become dominant in degraded habitats. Dwarf karoo bushes establish in severely degraded clayey bottomlands. Overgrazed and trampled low-lying areas with heavy clayey soils are prone to *Acacia karroo* encroachment. Pockets of Vaal-Vet Sandy Grassland also occur as a Plains-dominated landscape with some scattered, slightly irregular undulating plains and hills. Mainly low-tussock grasslands with an abundant karroid element. Dominance of *Themeda triandra* is an important feature of this vegetation unit. Locally low cover of *T. triandra* and the associated increase in *Elionurus muticus*,

Cymbopogon pospischilii and *Aristida congesta* is attributed to heavy grazing and/or erratic rainfall. The Highveld Alluvial Vegetation generally has flat topography supporting riparian thickets mostly dominated by *Acacia karroo*, accompanied by seasonally flooded grasslands and disturbed herblands often dominated by alien plants.

Implications:

- The site falls within Central Free State Grassland, which is currently not of conservation concern (Least Concern).
- Vaal-Vet Sandy Grassland (Endangered) is situated in the broader area and not affected.
- The vegetation assessed on site is typical of the vegetation unit, refer to Section 3.1 for specific description.
- Several South Africa and Eastern Cape endemic species are recorded from the represented vegetation units, some having localised distributions and others are widespread. Refer to Sections 3.1.8 and 9.3.

2.3.3 National Biodiversity Assessment

The NBA is the primary tool for monitoring and reporting on the state of biodiversity in South Africa and informs policies, strategic objectives, and activities for managing and conserving biodiversity more effectively. Ecosystem protection level is an indicator that tracks how well represented an ecosystem type is in the protected area network. It has been used as a headline indicator in national reporting in South Africa since 2005.

The status categorisation is based on a complex set of criteria, but for the purposes of this reporting, can be summarised as follows (NBA, 2019; IUCN RLE, 2017):

STATUS	DESCRIPTION
Least Concern	These <u>ecosystems</u> have lost only a small proportion (~more than 80 % remains) of their original natural habitat and are largely intact (although they may be degraded to varying degrees, for example by invasive alien species, overgrazing, or overharvesting from the wild).
Vulnerable	<u>Vulnerable terrestrial ecosystems</u> have lost some (~more than 60 % remains) of their original natural habitat and their functioning will be compromised if they continue to lose natural habitat.
Endangered	<u>Endangered terrestrial ecosystems</u> have lost significant amounts (~less than 40 % remains) of their original natural habitat, so their functioning is compromised.
Critically Endangered	<u>Critically Endangered terrestrial ecosystems</u> have lost significant amounts (~less than 20 % remains) of their original natural habitat, and therefore considered to have an extremely high risk of collapse.

The outcome of the most recent National Biodiversity Assessment (2018) indicate that Central Free State Grassland has a Least Concern conservation status (Table 1), which is the lowest threat status elevation. This indicates that more than 60 % of the unit remains. There is a moderate to low level of utilization of this unit with lower degradation and transformation compared to units having an elevated status. Development of a portion of the site will thus not significantly affect conservation targets for the affected vegetation unit(s).

As is evident from land-use coverages, the broader area surrounding the site is somewhat fragmented because of agriculture related land-use, including agriculture and urbanisation to the north. The specific site is relatively unmodified, although the specific state or level of degradation will be assessed further in the full assessment process. Some erosion along watercourses and surrounding drainage lines is

evident from aerial photographs supported by initial site observations, which could be indicative of historical overgrazing.

Implications:

- The vegetation unit, Central Free State Grassland, has a Least Concern status, indicating that less than 40% has been transformed and there will likely be minimal loss or disruptions to ecological functioning.
- Elements of Vaal-Vet Grassland and Winburg Grassy Shrubland could potentially be present in rocky areas and Highveld Alluvial Vegetation around watercourses and alluvial areas, which will be assessed further in the detailed assessment process.

2.3.4 Free State Biodiversity Plan

The Free State Conservation Plan (2016) designates the following CBA categories, based on national standards:

- Protected Areas
- Critical Biodiversity Area 1 & Critical Biodiversity Area 2
- Ecological Support Area 1 & Ecological Support Area 2
- Other & Degraded

While no Free State Biodiversity Plan guideline report is available, national, and other regional reporting guidelines for Critical Biodiversity Areas can be consulted. The *Western Cape Biodiversity Spatial Plan Handbook* (Pool-Stanvliet, Duffell-Canham, Pence & Smart, 2017) is generally considered to be the accepted norm and is based on national standards, and more information is provided in Appendix D: Systematic Planning Frameworks (Section 9.4) for the purposes of this report.

The following can be deduced regarding the categories:

- Critical Biodiversity Area 1: Areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure. Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate in these areas. **Not present.**
- Critical Biodiversity Area 2: Areas in a degraded or secondary condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure. Maintain in a functional, natural, or near-natural state, with no further loss of natural habitat. These areas should be rehabilitated. **Not present.**
- Ecological Support Area 1: Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PA's or CBA's and are often vital for delivering ecosystem services. Maintain in a functional, near-natural state. **Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised. Present.**
- Ecological Support Area 2: Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PA's or CBA's and are often vital for delivering ecosystem services. Restore and/or manage to minimise impact on ecological infrastructure functioning; especially soil and water-related services. **Present.**

The site falls predominantly within an ESA 1 designated area, with patches of ESA 2, Other Natural Areas, and Degraded Areas (Figure 9). Two key ESA designated corridors are delineated, the first to the north

and east of the site, following the Valsrivier and the second to the south along the Blomspruit River. The site falls across a portion of designated ESA that serves to connect these two corridors, thus the site will serve as an integral part in the connectivity of these corridors.

The purpose of ecological corridors is to provide intact pathways for long-term biological movement. They also support the natural movement of species between populations to ensure population viability. Landscape corridors are aligned with areas that have maximum amounts of remaining natural habitat. Local corridors are fine-scale corridors that contribute to connectivity.

Implications:

- Land use guidelines indicate that while ESA sites are not essential for meeting biodiversity targets, they play an important role both in delivering ecosystem services as well as supporting ecological functioning and connectivity. Some habitat loss is generally acceptable within these areas; however, ecological functioning and connectivity should not be compromised.
- This terrestrial biodiversity or ecological assessment will determine requirements in terms of maintain ecological processes with specific recommendations relating to a suitable layout that will still address connectivity requirements for an ESA designated area.

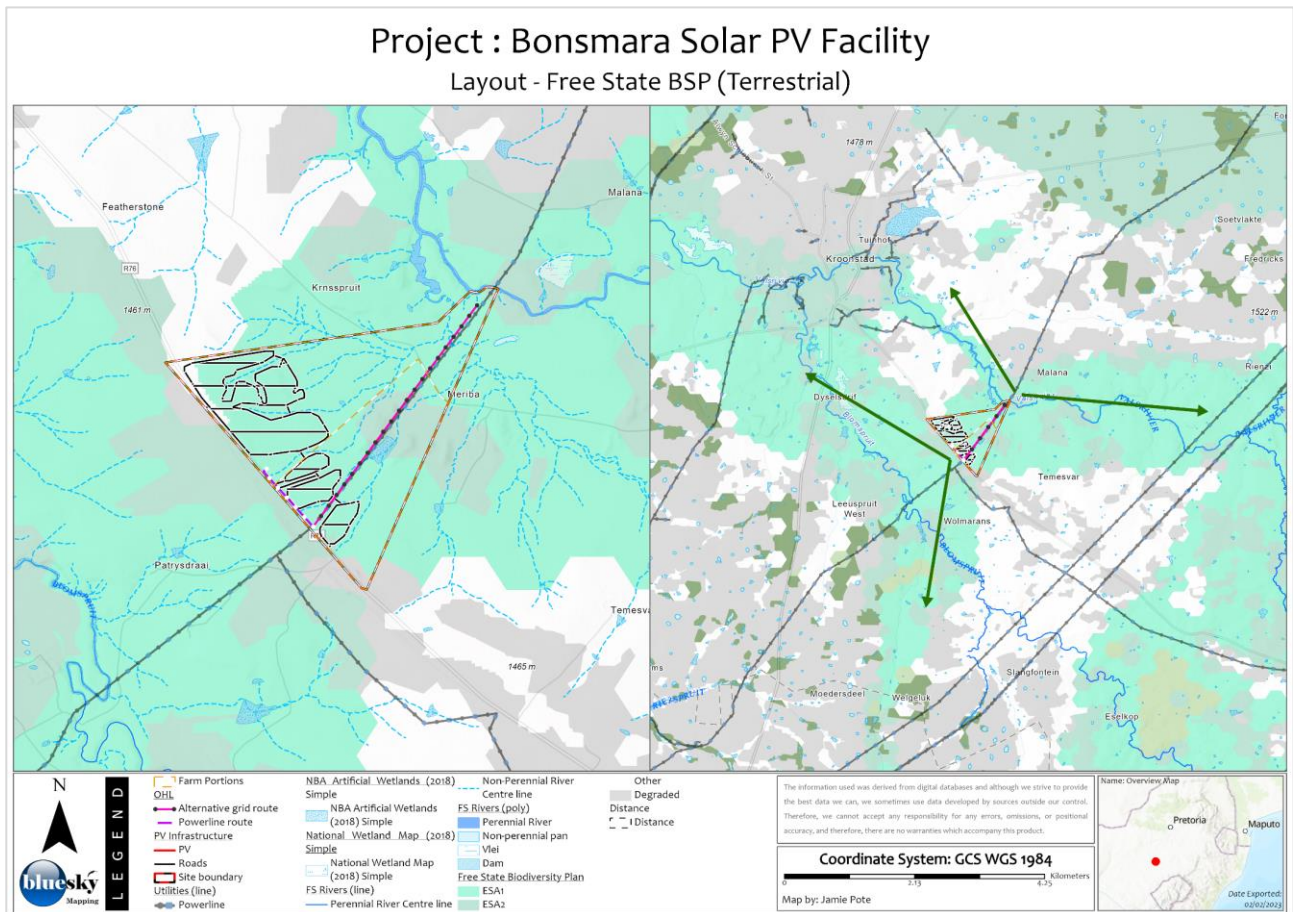


Figure 9: Free State Biodiversity Plan (2016) – Terrestrial.

2.3.5 Other Biodiversity Sector Plans

The site is outside of the planning domain of any other Biodiversity Sector Plans.

2.3.6 Regional Hotspots and Centres of Endemism

The site is not situated within any Centre of Endemism, the flora species assessment will further investigate Species of Conservation Concern that are present.

2.3.7 Key Biodiversity Areas

Important Bird Areas

Important Bird and Biodiversity Areas (IBA's) are sites of international significance for the conservation of the world's birds and other biodiversity. They also provide essential benefits to people, such as food, materials, water, climate regulation and flood attenuation, as well as opportunities for recreation and spiritual fulfilment. By conserving IBA's, we look after all the ecosystem goods and services they provide, which means in effect that we support a meaningful component of the South African economy (such as water management and agriculture). Since the late 1970s, more than 12 000 IBA's have been identified in virtually all the world's countries and territories, both on land and at sea. In 1998, 122 South African IBA's were identified and listed in Barnes (1998). This inventory was revised to 112 IBA's in 2015. IBA's have also had considerable and increasing relevance when responses have been developed to several wider environmental issues, such as habitat loss, ecosystem degradation, climate change and the sustainable use of resources. The core aims of the IBA Programme are:

- To identify, monitor and conserve the sites and habitats that support South Africa's priority bird species.
- To develop a network of partners, from grassroots to national level, who collaborate to conserve IBA's.
- To gather new data regularly and monitor IBA's to track status and trends across the network and so that up-to-date information can be passed on to decision-makers, enabling them to take appropriate conservation action.
- To confirm periodically that existing IBA's continue to meet the selection criteria and to identify other critical sites that may qualify for recognition as IBA's as new information becomes available.
- To build capacity in the IBA Programme by sourcing funding, and to acquire and develop appropriate skills in staff and volunteers so that these objectives can be implemented at a regional scale.

The extension of the IBA approach to several other wildlife groups has led to the identification of Important Plant Areas, Prime Butterfly Areas, Important Mammal Areas and Key Biodiversity Areas for Freshwater Biodiversity. South Africa is also the first mega diverse country to practically test the Key Biodiversity Areas (KBA's) standards across a full range of species groups and ecosystems but is not yet published.

The site is not within any current identified or known Important Bird Areas or Key Biodiversity Areas. IBA's and KBA's that are in the surrounding area include [Amersfoort-Bethal-Carolina District](#) situated 70 km to the south-east. The National Screening Tool does not identify any bird species that would require further assessment by avifaunal specialist.

Implications:

- Birds are not identified as sensitive receptors for the site. Refer to separate Avifaunal Assessment.

2.3.8 Protected Areas

The South Africa Protected Areas Database (SAPAD) database, a comprehensive database of various protected area categories, is updated on a quarterly basis, and provides a comprehensive source of all national and private nature reserves, world heritage sites and other formal legally protected conservation areas situated within South Africa. When projects are in legally protected and internationally recognized areas, it should be ensured that project activities are consistent with any national land use, resource use, and management criteria (including Protected Area Management Plans, National Biodiversity Strategy and Action Plans (NBSAP's), or similar documents).

Table 2: List of Protected Areas in vicinity

NAME	DISTANCE
Erfdeel Private Nature Reserve	0 km North-East
Serendipidie Private Nature Reserve	< 10 km South
Boslaagte Private Nature Reserve, Dalmanuthaa Game Reserve, Phatakalle Private Nature Reserve, Ezelkop Game Industry Nature Reserve	< 20 km
Free State Safaris Nature Reserve, De Rust Private Nature Reserve, Thabong Game Ranch, Newlands Game Ranch, Goliatskraal Private Nature Reserve, Tara Wildlife Safarism, Bosrant Private Nature Reserve, Doornkloof Private Nature Reserve, Goedehoop Nature Reserve, Nooitgedacht Private Nature Reserve, Mizpah Safaris, Silberbank Game Reserve	< 50 km

No National Parks are situated within 10 km of the site (Figure 10) and a single Private nature Reserve is situated within 5 km of the site, the Erfdeel Private Nature Reserve which abuts the north-eastern boundary of the site.

Several other Private Nature Reserves are situated within the 5 km to 50 km range from the site, as listed in Table 2. A **portion of the site, on the southern boundary overlaps with designated NPAES**. The next nearest NPAES is over 15 km to the north-west as well as several designated areas in the broader 20 – 50 km area (all designated as Freestate Highveld Grassland Focus Areas). The site is situated to the south-west of the nature reserve. No national protected areas, nor any ecological processes associated with them are likely to be affected by the proposed activity. No Marine Protected Areas or NPAES areas are directly or indirectly affected and no RAMSAR sites are affected directly or indirectly.

Implications:

- The site is located adjacent to a nature reserve and a buffer would be recommended. This will be assessed further in the detailed assessment to ascertain possible impact(s).
- The activity will unlikely have any direct, indirect, or cumulative impact on any other protected environment.
- The site does overlap with the edge of a larger designated NPAES area on the south-east corner as well as at the northern end, but is not expected to be of significance, which will likely be negligibly affected. The linkage to the south is not linked to any specific biodiversity feature that is not represented in areas that will not be developed, for example a band on the eastern corner that will link to the designated NPAES area south of the site. The northern NPAES link will not be affected, being outside the project footprint and the linear grid connection alternative would be negligible.

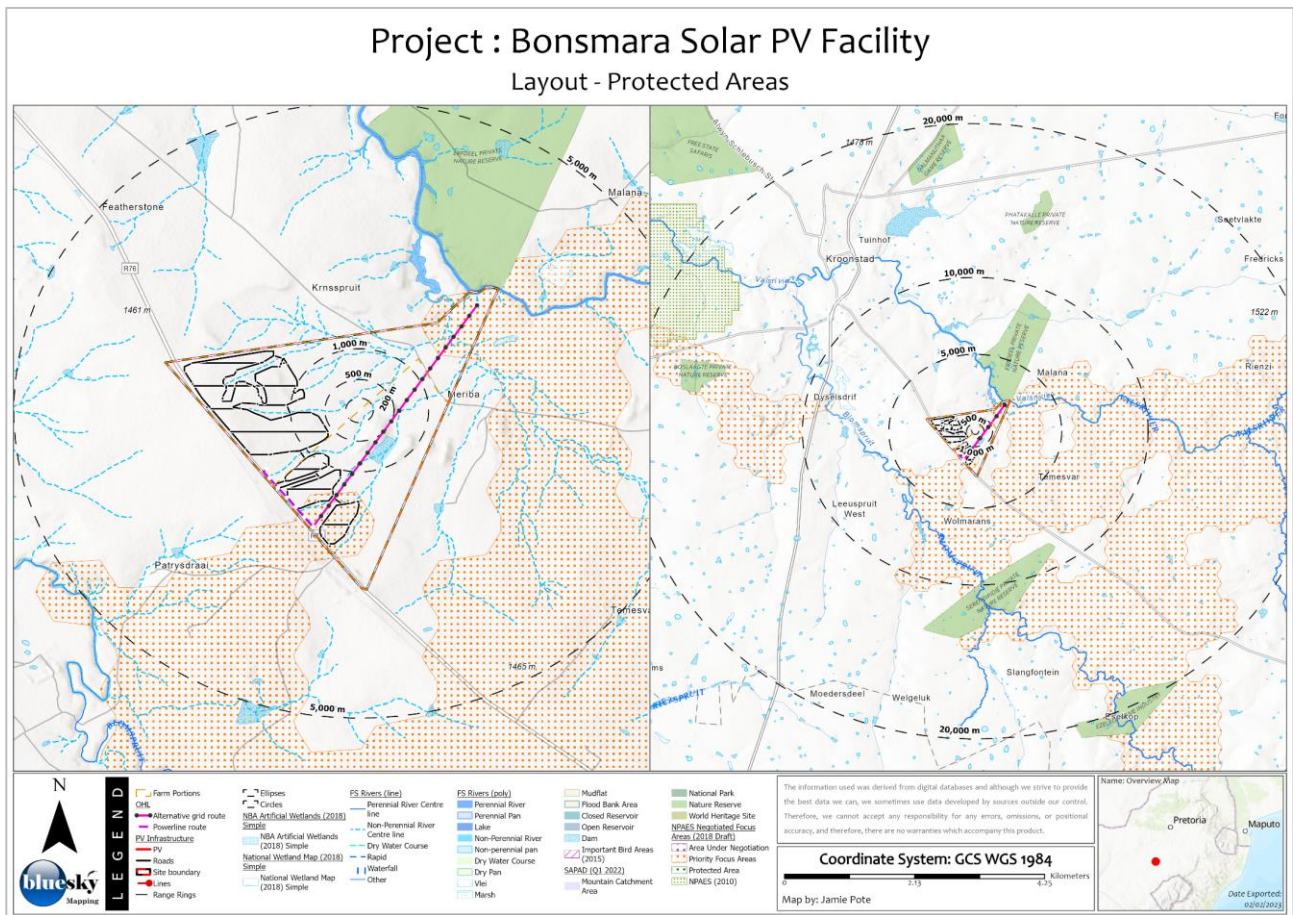


Figure 10: Protected Areas.

2.3.9 Strategic Water Source Areas

Strategic water source areas (Figure 11) are those that supply substantial downstream economies and urban centres. These water source areas are vital to the national economy. Strategic water source areas are those that supply substantial downstream economies and urban centres. These water source areas are vital to the national economy.

The majority of the site footprint is situated within the Kroonstad Strategic Water Source Area, however the specific activity (PV Facility) is unlikely to have an impact on any Strategic Water Source area, as it will not alter water flows.

Implications:

- The site falls within a designated SWSA area, being situated adjacent to the Valsrivier, which is a tributary of the Vaal River and upstream of the Bloemhof dam, which is situated near Bloemfontein to the north-west. Both are important water reservoirs for local towns and settlements.
- The proposed activity (PV facility) is unlikely to result in any significant impacts to any critical water supply to downstream economies and urban centres because of development of this site, as it will unlikely alter water flows; however, several runoff mitigation measures may be required, depending on the layout.

2.3.10 Freshwater Ecosystem Priority Areas

The National Freshwater Ecosystem Priority Areas (NFEPA) project responds to the high levels of threat prevalent in river, wetland, and estuary ecosystems of South Africa. It provides strategic spatial priorities

for conserving the country's freshwater ecosystems and supporting sustainable use of water resources. These strategic spatial priorities are known as Freshwater Ecosystem Priority Areas, or 'FEPAs'.

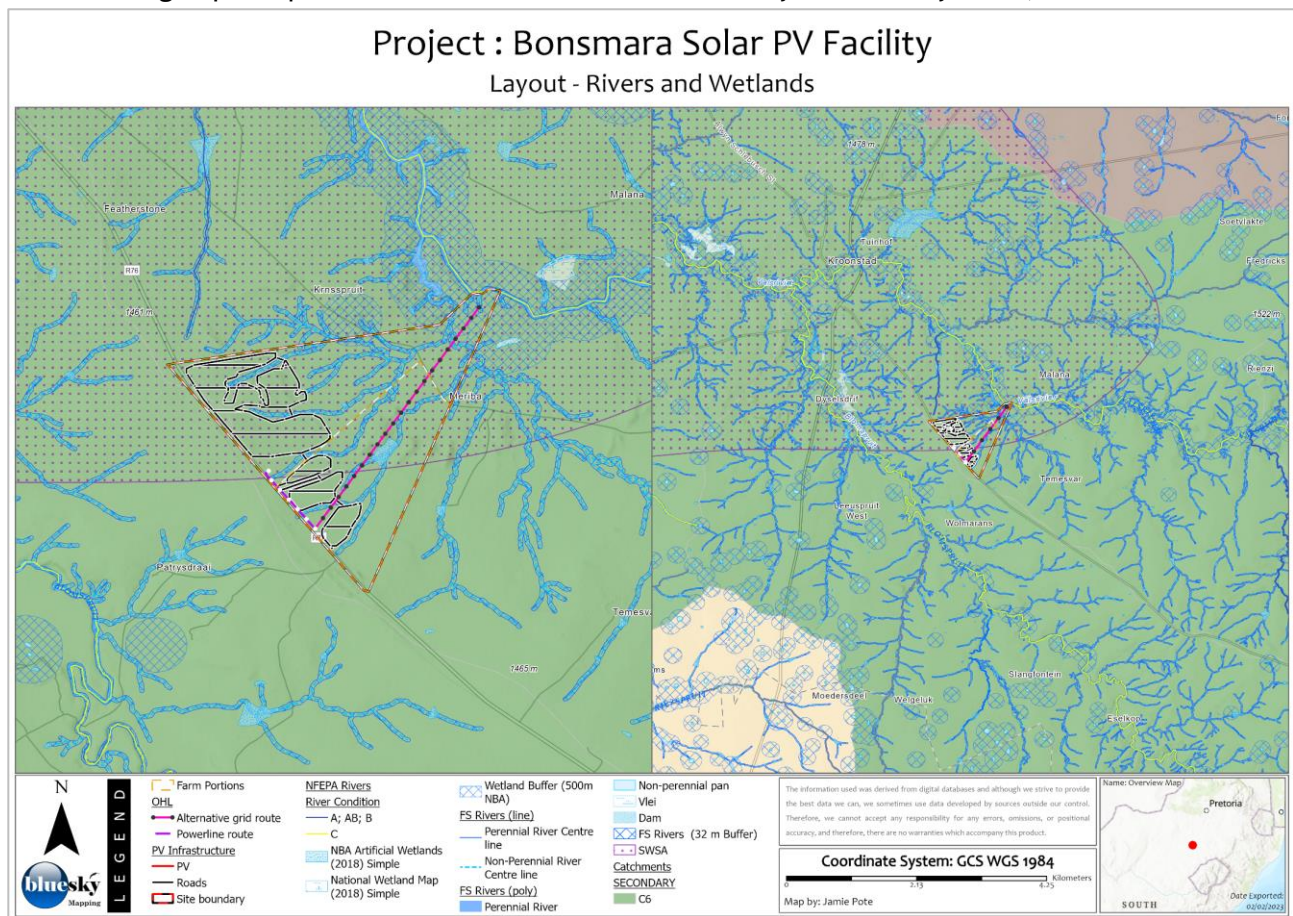


Figure 11: Rivers and Wetlands.

The site is near aquatic features or aquatic functional zones within the property boundaries. The closest perennial rivers are the Vals River (Class C: Moderately Modified) to the north-east, along the north-eastern boundary of the site as well as the Blomspruit River situated further to the south and west of the site. All drainage lines and water courses within the site drain north-east directly into the Vals River (Figure 11). The proposed activity is however unlikely to significantly affect these rivers (or wetlands & seeps) above surrounding levels of disturbance as long as they do not encroach into the remaining vegetation buffers around any watercourses as recommended, and runoff is managed appropriately.

Implications:

- The site is situated within the catchment of a perennial river (CLASS C: MODERATELY MODIFIED).
- Natural vegetation buffers around these aquatic features should not be further disturbed significantly.
- Necessary measures to be implemented to minimise pollution, manage runoff and erosion risks as well as downstream sedimentation.

3 Biodiversity Risk Identification and Assessment

3.1 Baseline Biodiversity Description

3.1.1 Site Locality

The proposed site is situated approximately 9 km south-east of Kroonstad, along the R76 road in the direction of Steynsrus in the Free State province (Refer to Figure 12). The proposed PV site is comprised of two farm portions, a north-western portion, Remainder of Farm Scheveningen 636 (~575 Ha) and a south-eastern portion, Portion 1 of Farm Scheveningen 636 (~429 Ha), and will most likely feed into the national grid, being accessible in proximity to the site via Portion o of Farm Oslaagte No 2564. Land use on Portion 1 of Farm Scheveningen 636 is game farming and the outer fence is a game fence, while Remainder of Farm Scheveningen 636 is used for cattle farming with a standard stock fence. No significant cultivated areas are present on either property.

The sites are within a predominantly commercial stock and game farming area, generally comprising dryland grazing, with associated infrastructure including buildings, dams, and other infrastructure. Indigenous vegetation is mostly near natural to natural with transformed and cultivated patches more widespread in the area surrounding the proposed site but absent within the site. The area falls within a moderate summer rainfall area.

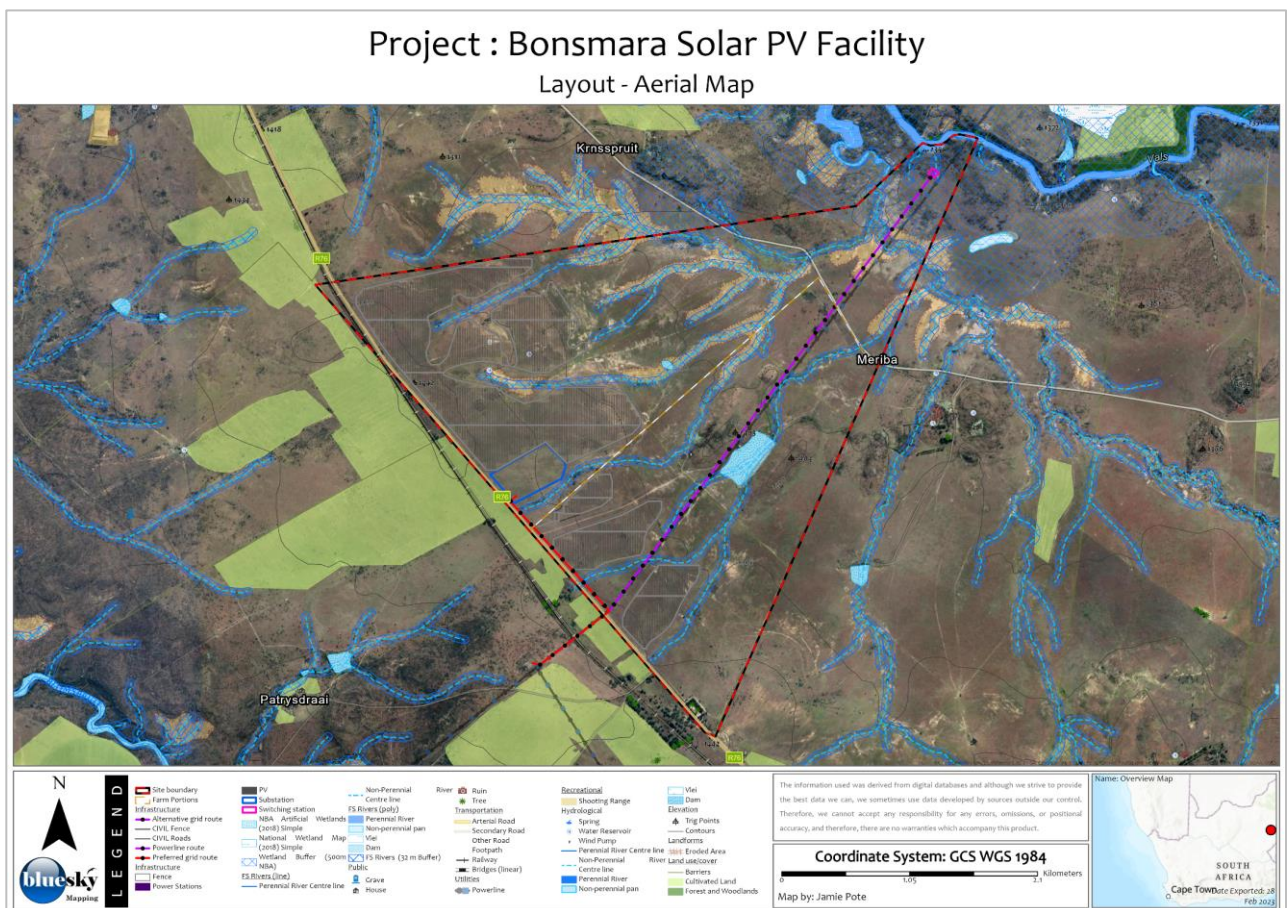


Figure 12: Aerial Photograph of the site and surrounding area.

3.1.2 Topography and Drainage

Flat to gently undulating landscape supporting a short grassland (Figure 12), where in natural condition dominated by *Themeda triandra*, while *Eragrostis curvula* and *E. chloromelas* become dominant in degraded habitats. Dwarf karoo bushes and *Acacia karroo* encroachment are indicative severely degradation, overgrazing and trampling. The site generally slopes from more elevated ground in the south, towards the Vals River along the northern boundary, in a series of steps. The undulating landscape is interspersed with rocky hills and drained by a network of usually incised watercourses draining towards the Vals River.

3.1.3 Terrestrial Landscape Features (Habitat)

Overview

While largely grass dominated and typical of the Central Free State Grassland unit, a notable herbaceous and forbs component is evident, often patchy with several geophytes also noted, although not abundant. The broader area has low to moderate levels of transformation, primarily agriculture with small watercourses and occasional rocky hills interrupting the largely continuous grassland cover. Site verification confirms that the vegetation of the site is clearly grassland dominated, with a notable herbaceous component and the occasional tree. Watercourse sources (seeps) have a more developed tree component, mostly scattered *Vachellia (Acacia) karroo*, and does have Highveld Alluvial Vegetation elements present in riverine areas surrounding the watercourses as well as surrounding the Vals River.

The site is largely natural to near natural with some areas clearly showing indicators of degradation as well as localised erosion, mostly surrounding the incised watercourses within deep sandy alluvia, having a deep sandy substrate.

Grassland vegetation is comprised primarily of grasses including *Aristida adscensionis*, *Aristida congesta*, *Cynodon dactylon*, *Eragrostis chloromelas*, *Eragrostis curvula*, *Eragrostis plana*, *Panicum coloratum*, *Setaria sphacelata*, *Themeda triandra* and *Tragus koelerioides*. Low shrubs and herbs include *Felicia muricata*, *Anthospermum rigidum*, *Helichrysum dregeanum*, *Berkheya onopordifolia*, *Chamaesyce inaequilatera*, *Conyza pinnata*, *Hermannia depressa* and *Hibiscus pusillus*. Geophytic and Succulent species include *Oxalis depressa*, *Raphionacme dyeri* and *Tripterys aghillana*. Pockets of trees, having a bushveld appearance are also present, which are partly indicative of degradation, presence of rockier habitat and/or along watercourses or possible seep areas on upper watercourses. Typical tree species include *Vachellia karroo*, *Searsia dentata*, *Diospyros lycioides* and *Searsia rigida*.

Figure 14 to Figure 21 below include photographs of the general project area and PV facility footprint.

Project : Bonsmara Solar PV Facility

Layout - Mapped Vegetation

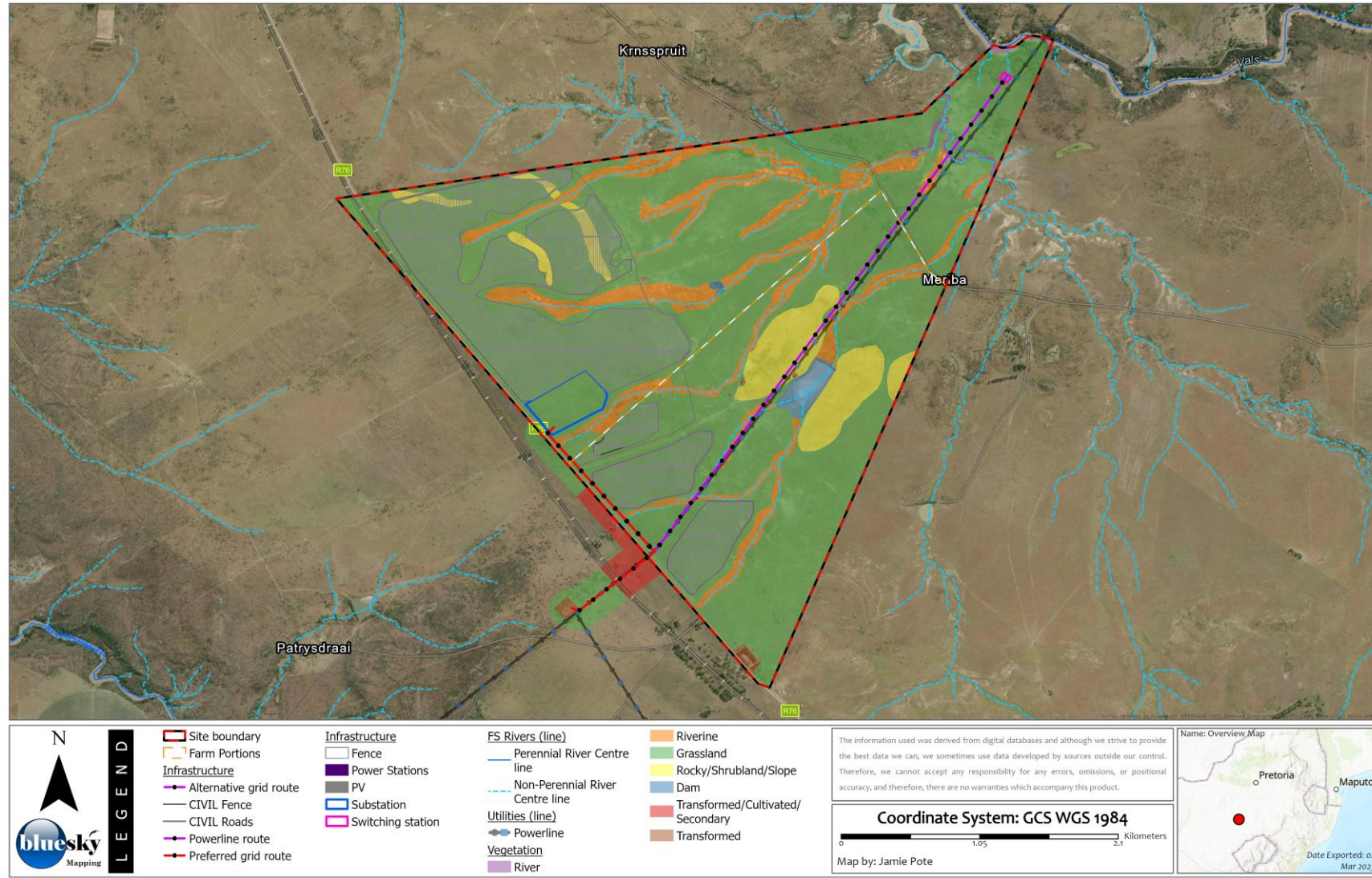


Figure 13: Mapped Vegetation.



Figure 14: Typical natural grassland (Spring).



Figure 15: Typical natural grassland with grazing evident (Spring).



Figure 16: Typical natural grassland (Summer).



Figure 17: Typical natural grassland (Summer).



Figure 18: Typical rocky habitat – small hills (Spring).



Figure 19: Typical rocky habitat – slopes (Spring).



Figure 20: Typical degraded area around dwelling with poor secondary vegetation.



Figure 21: Typical degraded grassland with overgrazing evident

3.1.4 Aquatic Habitat

Aquatic systems do not function in isolation and in terms of ecological processes, the aquatic systems are very closely linked to the terrestrial system. Perennial, non-perennial watercourses, and wetlands are present in the wider area and within the site as well as several dams (Figure 22 to Figure 25). Any aquatic habitat including surrounding riverine habitat should be excluded from further development, being an arid area, such habitat has an elevated sensitivity. These riverine corridors will also serve as the core for maintaining the ecological process or connectivity.



Figure 22: Typical non-perennial watercourse with riparian elements (Spring).



Figure 23: Typical perennial river (Vals Rivier) with riparian elements (Spring).



Figure 24: Man-made dam along watercourse.



Figure 25: Man-made dam along watercourse.

The separate aquatic assessment will assess the impacts to the aquatic systems separately, however for the purposes of this report, any crossings must limit loss of vegetation as far as possible in order to limit risks to terrestrial processes and habitat in riparian vegetation.

3.1.5 Present Ecological State

Table 3 provides a comprehensive description and assessment of biodiversity and ecological indicators for the site. In summary, the following general observations can be noted regarding the site:

- Alien invasion is very low within the site, restricted to a few patches in degraded areas and include common weedy species such as Khaki bos and Blackjack.
- Erosion and erosion risk is generally low across the site, more prominent along sandy banks of incised watercourses.
- The Grassland vegetation on site has varying levels of degradation, from transformed to near-natural and natural, with historical and ongoing grazing prevalent in natural areas.

Table 3: Summary of Key Biodiversity and Ecological Indicators.

ASPECT	DESCRIPTION
LANDSCAPE AND COMMUNITY DESCRIPTION	
Aspect, Slope, Topography	Undulating hilly landscape
Substrate	Moderate to shallow rocky soils with deeper sandy alluvial deposits in low lying areas incised by non-perennial watercourses.
Vegetation units	Grassland with scattered trees
Total Ground Cover (%)	> 90 %
Tree Height (m) – Median (alien species)	3 - 5 m
Tree Cover (%) Aerial	< 20 %
Shrub Cover (%)	> 20 %
Herbaceous Cover (%)	
Grass Cover (%)	> 80 %
Bare soil/rock (%) and disturbed	< 10 %
TERRESTRIAL LANDSCAPE FEATURES	
Forest	None
Thicket	Scattered trees can form denser thickets along watercourses
Grassland	Predominant vegetation.
Fynbos/Grassy Fynbos	No Fynbos elements are present
Riparian	Riparian vegetation is limited to aquatic habitat including the dams and along the watercourses.
Wetland	Wetland habitat is present on site, in the form of small dams and vlei-like areas in low lying areas.
Estuaries	No estuaries are present
Dunes/Coastal	No coastal/dune habitat is present
Rocky Outcrop Habitat	No notable rocky outcrop habitat is present, other than a few patches of exposed rock. These patches are not deemed significantly more sensitive compared to surrounding habitat although likely to provide refuge to certain reptiles that may not be common in the surrounding habitat. Rocky hills provide more distinct rocky habitat and have been allocated an elevated sensitivity.
Fauna Nesting Sites	Scattered trees likely to provide nesting and roosting habitat for several small bird species, including passerines, being common in grassland areas..
Fauna Feeding Grounds	The grassland, riverine and rocky habitat is likely to provide suitable habitat for a range of faunal species.

ASPECT	DESCRIPTION
Ecotones	Ecotones are not well developed other than marginal areas between woodier riverine areas and surrounding grassland.
Ecological Corridors	Riverine corridors along watercourses and rocky hills are likely important corridors within the broader grassland habitat.
Evolutionary Processes	None of significance within terrestrial environment
Transformed (housing)	Minimal, few scattered dwellings.
Transformed (other)	None of significance.
Degraded (modified)	The grassland vegetation, comprising most of the site, is likely primary vegetation. Secondary vegetation is nominal.
Secondary vegetation	
DISTURBANCES, CURRENT LAND USES AND SOURCES OF DEGRADATION	
Human disturbances	Human disturbance is low.
Habitat fragmentation	Fragmentation is moderate in the surrounding area comprising a mozaic of agricultural lands, dwellings, and intact vegetation, but low within the site.
Invasive Alien Plants	Minimal, occasional areas with dense herbaceous weed infestations, predominantly Khakibos and Blackjack.
Other degradation	Minimal`
Remaining intact habitat:	Intact habitat is extensive in the surrounding landscape and within the site.
Grazing (livestock)	Surrounding area and the site is used for livestock and wildlife grazing.
Hunting	Likely present in surrounding rural landscape
Conservation (passive)	General the area does contribute to passive conservation, having low population density and mozaic of intact vegetation with patchy transformation.
Recreational (sport)	None
Other	None
PATTERNS OF BIODIVERSITY	
Flora	Flora diversity is moderate to low with predominantly a single vegetation unit, but elevated by elements of other units in rocky and riverine areas.
Fauna	Fauna diversity is moderate.
Species of Conservation Concern	A few species are potentially found in the region and vegetation units, none of significance were recorded within the site that would be negatively affected, other than several widespread but protected species.
ECOLOGICAL PROCESSES	
Gene dispersal barriers	Roads, settlements, agriculture, moderate to low fragmentation
Gene dispersal corridors	Extensive valleys and hills and widespread grassland likely provide corridors for movement of a suite of fauna.
Aeolian (dune) processes	None
Climatic gradients	None
Rivers and Drainage Lines (Riparian Vegetation)	Vegetated drainage lines will provide ecological corridors in proximity to and within the site.
Refuges (outcrops/islands)	Rocky and other refuges are present but not prominent within the site, other than a few rocky areas and more significantly the rocky hills.
Fire	Grassland vegetation is highly susceptible to fire, which is considered an important ecological driver.
Ecotones/Tension zones	Ecotones are not well developed on the site.
Erosion	Erosion is low within the site, more pronounced in riverine areas.
ECOLOGICAL SERVICES	
Carbon storage	Grassland is considered a low carbon accumulator.
Provisioning Services	<p><u>Livestock grazing</u>: Grazing is prevalent in the area with moderate grazing capacity.</p> <p><u>Timber (Building materials)</u>: None known.</p> <p><u>Fuelwood</u>: Thorn trees likely a source of fuelwood.</p> <p><u>Food</u>: None known</p> <p><u>Fibre</u>: None known</p>

ASPECT	DESCRIPTION
	<u>Medicinal plants:</u> Various species in the surrounding area have medicinal properties and are most likely harvested informally.
Other (ornamentals)	None known
CONSERVATION IMPORTANCE	
Current Distribution (extent)	Vegetation unit has a widespread regional distribution covering an extensive area outside of the site footprint. More than 60 % is considered to be still intact.
Red Listed Species and other Species of Conservation Concern	A few species are potentially found in the region and vegetation units, none of significance were recorded within the site, other than several widespread but protected species.
Habitat for SSC	Several species of conservation concern are known from the general area, as well as the vegetation unit that is present. The site does provide habitat for several faunal species as well as several flora species, although none considered to be of significant conservation concern are confirmed to be present or likely to be present.
Relative Conservation importance	The site has a low overall significance regionally as the vegetation has a locally widespread distribution.
OTHER SENSITIVITIES	
Conservation importance	Low
Topography	Flat to undulating hills
Wetlands	No natural wetlands, several farm dams on site or in vicinity and vlei like areas in low lying alluvial areas.
Rehabilitation potential	Rehabilitation potential is generally high for grassland.
Community structure	Community structure is relatively simple in grassland, some complexity added by presence of riverine thicket corridors.

In summary, the site is located within a rural area, to the south of a densely populated urban area, having scattered dwellings and other infrastructure as well as farming activities including cultivated lands prevalent. The Grassland vegetation is generally natural to near natural with some degraded areas. The vegetation is widespread hence the status is not elevated and not presently under any threat. The site is identified as an Ecological Support Area but not a Critical Biodiversity Area, which suggests that connectivity and ecological processes are locally more important than the conservation of natural habitat. While there are several range-restricted endemic species in the surrounding area and the vegetation types, there are no known locations that will be directly affected and although unlikely that they would be present within the site, other than transient manner for faunal species (i.e., flying over or foraging) and no flagged species of conservation concern were found to be present within the footprint, during the site visit, the proposed activity, including clearing of alien vegetation and rehabilitation will have an overall benefit to ecological processes and biodiversity. The site assessment has physically screened for the presence of these, and other possible species not identified in the screening tool.

3.1.6 Flora

Several endemic and range restricted species are known from the surrounding area. None are likely to be present. Note, there is a residual very-low possibility that these species could be present, and cannot be discounted without extensive seasonal sampling, which is generally outside the scope of such an assessment, unless a specific risk is identified. Due to the localised nature of the impact, as well as the level of degradation of the site, the risk of a species suffering any significant loss is low.

3.1.7 Fauna

The habitats and microhabitats present on the project site are not unique and although highly fragmented, are widespread in the broader area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to.

Mammals

The National Environmental Screening Tool identifies *Hydrictis maculicollis* (Spotted-necked Otter) as possibly occurring in the area. Preferred habitat for Spotted Necked Otter is standing or permanent water, thus it is not likely to pose any significant risk to the PV facility which is situated away from any such habitat. No permanent standing water sources likely to contain fish are present within or in close proximity to the site and all watercourses and drainage liens have been designated no go areas. No

Avifauna and Bats

National Environmental Screening Tool identifies no bird species as possibly being in the area. Refer to separate avifaunal assessment.

Reptiles

Reptiles such as lizards, snakes and tortoises may be present. National Environmental Screening Tool identifies Sensitive Species 15, as possibly occurring in the area. No Sensitive Species 15 or evidence of the species was seen across the broader site and specifically the project footprint during the site survey (spring 2022 and summer 2023). Consultation with the landowner supports this observation and confirms that known localities are generally to the east and south of the project area.

Amphibians

National Environmental Screening Tool identifies no amphibian species of conservation concern as possibly being in the area. Amphibians are likely to be present due to the prevalence of watercourses. Site visits confirmed no species of conservation concern were identified.

Invertebrates

National Environmental Screening Tool identifies no invertebrate species of conservation concern as possibly being in the area. Site assessment not required but would be required to confirm.

3.1.8 Species of Special Concern occurring in the region

Several endemic and range restricted species are known from the general surrounding area and there is a residual likelihood that they could be present, but cannot be discounted without comprehensive seasonal sampling, which is generally outside the scope of such an assessment, unless a specific risk is identified. Due to the localised nature of the impact, with vegetation clearing only required for site development, as well as the level of degradation, the risk of a species suffering any significant population loss is low. There is always a residual risk to species for any activity.

Red Listed, Endemic and Protected Flora

No flora species are listed in terms of the National Environmental Screening Tool as being likely to occur. Several protected, endemic, range restricted or threatened species are known from the surrounding area and site screening would still be advised to determine if any are present. Due to the localised nature of the impact, and low plant species sensitivity, the risk of a species being present is low. As per Table 4, no Vulnerable, Endangered or Critically Endangered flora species were confirmed to be present nor are known to be present in the affected area and no species are flagged into the National Environmental Screening Tool, having distributions ranges that extend significantly further than the site. Site verification would be required to confirm presence or absence.

Several flora species, having protected status in terms of the Free State Nature Conservation Ordinance (Ordinance 8 of 1969) may be present (Table 4), for which permits would be required. Some of these are

confirmed to be present as well as additional species, still to be confirmed in full assessment reporting, in order to inform pre-construction permit requirements.

Table 4: Flora Species of Special Concern.

SCIENTIFIC NAME	FAMILY	STATUS ³	COMMENT/PRESENCE ⁴
<i>Crinum bulbispermum</i>	Amaryllidaceae	LC, FSNCO	AZa 5, Not recorded

Listed species (Table 4) were flagged from various database sources, including the National Environmental Screening Tool, as occurring in the region and having an elevated status. All were cross-checked for distribution overlay and were actively screened for presence/absence on site. Species that were observed are indicated accordingly.

A pre-commencement flora search and rescue procedure recommended several species requiring permits are within the affected area.

Red Listed and Protected Fauna

As per Table 5, no Endangered or Critically Endangered terrestrial fauna species are flagged for the site. The site falls within the potential distribution range of a few faunal species of conservation concern. No further avifaunal investigations have been undertaken but the single mammal and insect species that is flagged both have significantly more widespread distribution than the site. Since the project footprint is likely to be relatively contained, any disturbance or displacement associated with habitat destruction as a direct result of the activity is unlikely to pose a significant negative impact to terrestrial faunal species above background disturbance levels that are already present.

Table 5: Fauna Species of Special Concern

SCIENTIFIC NAME	COMMON NAME	STATUS ⁵	COMMENT/PRESENCE
Mammals			
<i>Hydricteis maculicollis</i>	Spotted-necked Otter	NT A3cde	The species occurs throughout most of tropical and sub-tropical sub-Saharan Africa, being restricted to areas of permanent fresh water, offering good shoreline cover and abundant prey base. Thus, while the distribution range is large, the spatial size of their occupied habitats is much smaller and faces continued loss particularly due to habitat destruction and pollution. The Spotted-necked Otter inhabits freshwater habitats where water is not silted or polluted, and rich in small to medium sized fishes. The Spotted-necked Otter also occasionally feeds on crabs, frogs, insects and birds. The Spotted-necked Otter is decreasing throughout its range, mainly as a result of the alteration or degradation of freshwater habitats and riparian vegetation. Unlikely to be present away from permanent or

³ IUCN - Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Least Concern (LC); End – Endemic; FSNCO – Free State Provincial Nature Conservation Ordinance; Ex, Exotic/Invasive/Weed; NFA – National Forest Act; ToPS – Threatened or Protected Species.

⁴ Gh 10 – Central Free State Grassland; AZa 5 - Highveld Alluvial Vegetation

⁵ IUCN: LC – Least Concern; VU – Vulnerable; EN – Endangered; CR – Critically Endangered.

SCIENTIFIC NAME	COMMON NAME	STATUS ⁵	COMMENT/PRESENCE
			semipermanent watercourses (i.e. Vals River).
Birds			
None of concern			
Reptiles			
Sensitive Species 15		Vu A2bcd +4bcd	Endemic to South Africa, where it is found Highveld grasslands of the northern Free State Province and the southwestern parts of Mpumalanga Province. It is unique among the cordylids as it an obligate burrower living in self-excavated burrows (Branch 1998, Parusnath et al. 2017). It can be considered a habitat specialist, that is highly philopatric for burrowing sites. Although it is a large lizard, it will not easily disperse across the landscape to make new burrows should its habitat be destroyed. It is diurnal and insectivorous, although plant material may also be consumed (Jacobsen 1989). Females reproduce only every second year (Van Wyk 1991), and the generation length has been estimated at 15 years (Parusnath et al. 2017). None observed during site visits, unlikely to be present. Relocation is feasible should any be found during construction.
Amphibians			
None of concern	-	-	N/A
Invertebrates			
None of concern			N/A

Further site investigations will try and confirm if the flagged species are present or not, or if suitable habitat is present and/or any other species of conservation concern are present or potentially present. The Spotted Necked Otter is least likely to be affected, as its preferred habitat (standing water and adjacent riparian vegetation) is not likely to be significantly affected by the proposed activity. Sensitive Species 15 was not found to occur.

A fauna search and rescue is recommended before commencement.

Alien Invasive Species

On 18 September 2020, the Minister of Environmental Affairs published the Alien and Invasive Species Regulations (“the Regulations”) which came into effect on the 18 October 2020 in a bid to curb the negative effects of IAPs. The Regulations call on landowners and sellers of land alike to assist the Department of Environmental Affairs to conserve our indigenous fauna and flora and to foster sustainable use of our land. Non-adherence to the Regulations by a landowner or a seller of land can result in a criminal offence punishable by a fine of up to R 5 million (R 10 million in case of a second offence) and/or a period of imprisonment of up to 10 years.

Category 1a and 1b listed invasive species must be controlled and eradicated. Category 2 plants may only be grown if a permit is obtained, and the property owner ensures that the invasive species do not spread beyond his or her property. The growing of Category 3 species is subject to various exemptions and prohibitions. Some invasive plants are categorised differently in different provinces. For example: the

Spanish Broom plant is categorised as a category 1b (harmful) invasive plant in Eastern Cape and Western Cape, but it is a category 3 (less harmful) invasive plant in the other seven provinces.

Invasive alien plants have a significant negative impact on the environment by causing direct habitat destruction, increasing the risk and intensity of wildfires, and reducing surface and sub-surface water. Landowners are under legal obligation to control alien plants occurring on their properties. Alien Invasive Plants require removal according to the Conservation of Agricultural Resources Act 43 of 1983 (CARA) and the National Environmental Management: Biodiversity Act (10 of 2004; NEMBA): Alien and Invasive Species Lists (GN R598 and GN R599 of 2014). Alien control programs are long-term management projects and a clearing plan, which includes follow up actions for rehabilitation of the cleared area, is essential. This will save time, money and significant effort. Collective management and planning with neighbours allow for more cost-effective clearing and maintenance considering aliens seeds as easily dispersed across boundaries by wind or water courses. All clearing actions should be monitored and documented to keep track of which areas are due for follow-up clearing. A general rule of thumb is to first target lightly infested areas before tackling densely invaded areas and prioritize sensitive areas such as riverbanks and wetlands. Alien grasses are among the worst invaders in lowland ecosystems adjacent to farms but are often the most difficult to detect and control.

Alien invasive species on site are not extensive and include mostly weedy annual species including Blackjacks and Khakibos. These species are likely to become problematic in disturbed areas during and after construction and a suitable management plan will be compiled as part of the assessment. A weed management programme, as part of the construction contract including an after-care period will be required, until such time as natural vegetation has become adequately re-established. A two year after-care period is recommended. A list of species is included in Table 6. Some species listed are not within the site but may be introduced during construction from the adjacent area.

Table 6: Alien (exotic) invasive and other weed species and status.

SCIENTIFIC NAME	COMMON NAME	FAMILY	STATUS ⁶	PRESENCE
<i>Cirsium vulgare</i>	Scotch Thistle	Asteraceae	CARA 1b	Present, few individuals
<i>Datura spp.</i>	Thorn Apple	Solanaceae	CARA 1b	Present, few individuals
<i>Opuntia ficus-indica</i>	Prickly Pear	Cactaceae	CARA 1b	Present, few individuals
<i>Pennisetum clandestinum</i>	Kikuyu	Poaceae	CARA 1b	Present, few individuals
<i>Solanum mauritianum</i>	Bugweed	Solanaceae	CARA 1b	Present, few individuals
<i>Solanum sisymbriifolium</i>	Wild tomato	Solanaceae	CARA 1b	Present, few individuals
<i>Tagetes minuta</i>	Khakibos	Asteraceae	Weed	Present, can form dense infestations in disturbed areas
<i>Bidens pilosa</i>	Blackjack	Asteraceae	Weed	Present, can form dense infestations in disturbed areas

Eradication protocol

The act required the removal of these species, being the responsibility of the landowner, as described in [Section 9.5.6: Alien Invasive Species](#). It is likely that the disturbed areas will be prone to alien infestation after construction is completed and follow up maintenance period will be required.

Specific eradication and management procedures must be stipulated in the EMP as to the methods to be implemented to remove and control the various alien invasive species as they tend to require species specific techniques. A management plan should be incorporated into the EMP, and a detailed action plan compiled and implemented by the ECO. All plants including any trees must either be removed from site or disposed of at a registered waste disposal facility. Alternatively, the plant material can be mulched

⁶ CARA - Conservation of Agricultural Resources Act (1993); National List of Invasive Species in Terms Sections 70(1), 71(3) and 71A (2016). Refer to Section 2.2 & Table 15 for detailed procedures and requirements.

using a woodchipper on site, however any seed-bearing material is to be disposed of at a registered landfill facility.

3.1.9 Terrestrial Vegetation Sensitivity Assessment

An overall Biodiversity Sensitivity assessment, incorporating key vegetation and ecological indicators was undertaken and includes the following key criteria:

- relative levels of *intactness* i.t.o overall loss of indigenous vegetation cover.
- presence, diversity and abundance of *species of special concern* (weighted in favour of local endemic species).
- extent of *invasion* (severity and overall ecological impact), as well as the degree to which successful rehabilitation could take place.
- overall degradation incorporating above factors.
- relative importance of the vegetation communities relative to regional conservation status – indicated as vulnerability of the area because of loss.

Intactness

Three basic classes are differentiated as follows:

- **Low:** > 75 % of original vegetation has been removed or lost; and/or no species of special concern present that are critically endangered, endangered or endemic with highly localised distribution.
- **Moderate:** 25 – 75 % of original vegetation has been removed/lost; and or presence of species of special concern but not having high conservation status or high levels of endemism or highly localised distributions.
- **High:** < 25 % of original vegetation has been removed or lost; and or presence of species with a highly endemism and or high conservation status (endangered or critically endangered).

Intactness for the site is variable but overall Moderate to High, with extensive natural and near natural vegetation.

Alien Invasion

Three classes are differentiated as follows:

- **Low:** no or few scattered individuals.
- **Moderate:** individual clumps of invasives present but cover less than 50% of original area.
- **High:** dense, impenetrable stands of invasives present, or cover > 50 % of area with substantial loss functioning. Rehabilitation will most likely require specialised techniques over an extended period (> 5 years).

Alien invasion for the site is generally low, with some common weeds such as Blackjack and Khakibos locally common in disturbed areas.

Degradation

Overall Degradation is determined from the above alien invasion and intactness scores, according to the following matrix:

INTACTNESS	INVASION		
	LOW	MODERATE	HIGH
High	Pristine	Near Pristine	Moderately Degraded
Moderate	Near Pristine	Moderately Degraded	Severely Degraded
Low	Moderately Degraded	Severely Degraded	Transformed

Degradation is high in transformed areas and Low to Moderate in natural areas, depending on extent of historical and current grazing. Overall vegetation is generally pristine to near pristine. Over winter periods the vegetation can look more degraded due to grazing pressure but recovery is good in the rainy season (summer).

Overall Sensitivity score

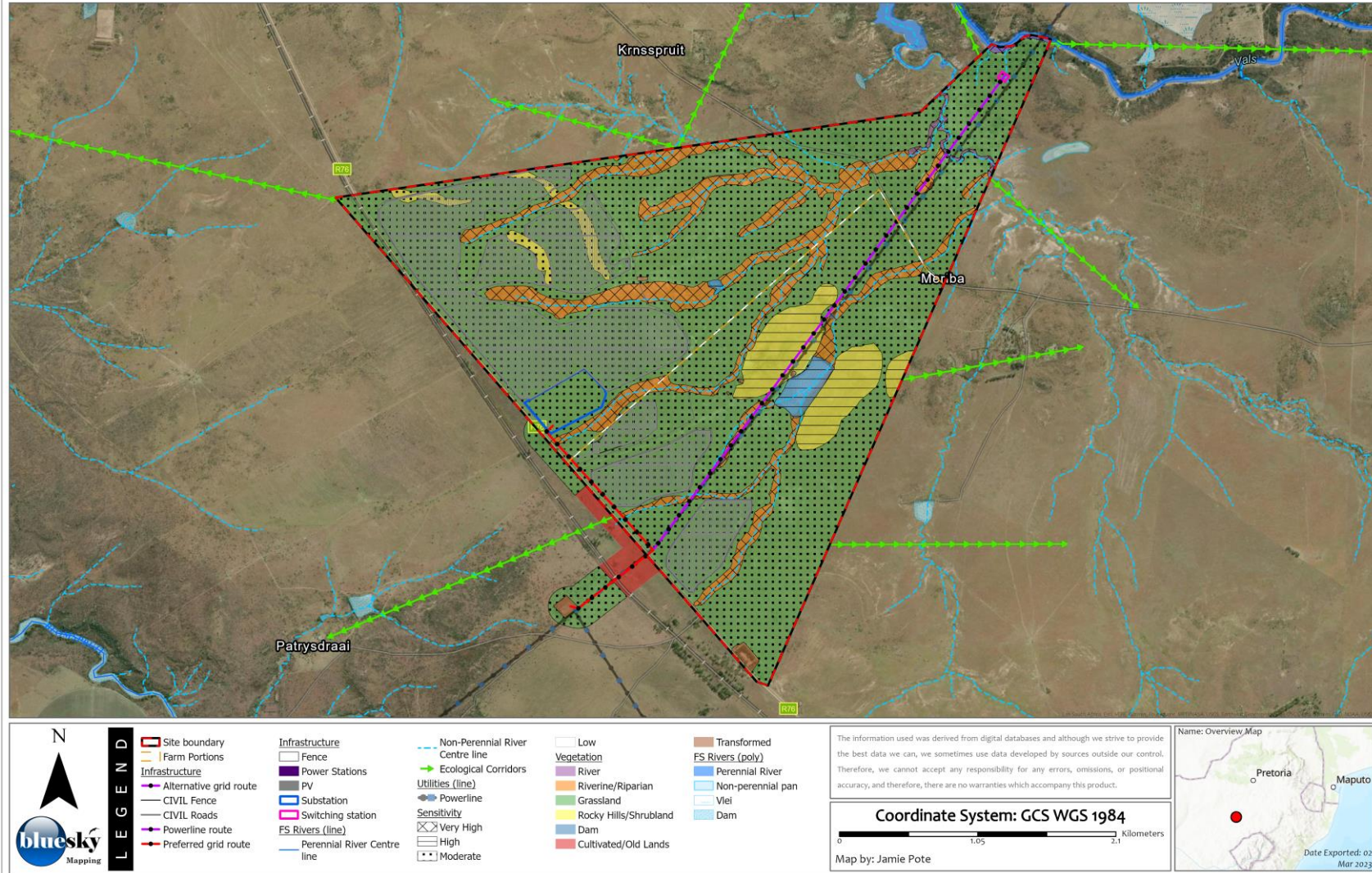
Overall Biodiversity Sensitivity of the vegetation within the site is calculated according to the following matrix which combines degradation and overall conservation status of the vegetation units of the site.

DEGRADATION	CONSERVATION STATUS			
	LEAST THREATENED	VULNERABLE	ENDANGERED	CRITICALLY ENDANGERED
Severely degraded/ Transformed	Very Low	Low	Moderate	Moderate – High
Moderately degraded	Low	Moderate	High	High
Ecologically Pristine or near Pristine	Moderate	Moderate – High	High	Very High (No-Go area)

Refer to Figure 26 For overall sensitivity map.

Project : Bonsmara Solar PV Facility

Layout - Vegetation & Sensitivity



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Figure 26: Overall Sensitivity.

The site sensitivity can be summarised as follows:

- Low sensitivity areas include all significantly disturbed vegetation, cultivated lands and other transformed land. All transformed areas including hardened surfaces, and dwelling have a low sensitivity.
- Moderate sensitivity sites include secondary vegetation identified in the vicinity of the activity. Moderate sensitivity habitat consists of all-natural grassland vegetation, having a Least Concern conservation status as well as being designated as ESA but not having an elevated CBA designation.
- High sensitivity areas include intact habitat having an elevated conservation status, providing critical habitat for species of conservation concern or overall elevated sensitivity where risks must be managed appropriately. High sensitivity habitat consists of man-made dams, rocky hills, that is less common in the surrounding landscape is present.
- Very High sensitivity terrestrial areas include habitat deemed to be critical habitat. Very high sensitivity habitat includes riverine and riparian habitat along watercourses, wetlands, and includes eroded areas adjacent to watercourses, which would be deemed sensitive to disturbance.
- No-go areas would include populations of threatened or protected species or areas providing critical ecological processes. Riverine areas would be considered no go areas, other than for strategic linear crossings including roads, powerlines and other such infrastructure.

3.1.10 Critical Habitat

The following Critical Habitat features have been identified within the site:

1. Criterion 1: Habitat for Critically Endangered (CR) and/or Endangered (EN) species
 - No Endangered or Critically Endangered Flora species were recorded. Several species known from general area were screened to confirm that most likely localities do not overlap with the site.
 - No other Endangered Mammals, Reptiles, Amphibians, or Invertebrates are known to be present on the site or will be affected (other than temporary displacement during construction).
2. Criterion 2: Habitat for Endemic or restricted-range species
 - Several range restricted flora species are potentially present in the surrounding area and vegetation types, none of which were confirmed to be present.
3. Criterion 3: Habitat for Migratory or congregatory species
 - No such terrestrial habitat will be directly or indirectly affected.
4. Criterion 4: Habitat for Highly threatened and/or unique ecosystems
 - No such terrestrial habitat will be directly or indirectly affected.
5. Criterion 5: Habitat for Key evolutionary processes
 - No such terrestrial habitat will be directly or indirectly affected.

Flagged faunal species include the Reptile *Smaug giganteus* (Giant Dragon Lizard) and mammal *Hydrictis maculicollis* (Spotted-necked Otter) both being endemic or range restricted species and having a Vulnerable and Near Threatened status respectively.

- The Spotted-necked Otter is mostly associated with riverine areas in particular standing water which would include the dam and the Vals River along the northern boundary, neither of these areas are within or near the development footprint. Otters may frequent upper watercourses occasionally for

foraging, but since these areas are excluded from the footprint, it is unlikely to have any impact, should any otters be present.

- The Sungazer (Giant Dragon Lizard) is unique, being an obligate burrower, living in self-excavated burrows (Branch 1998, Parusnath et al. 2017). It can be considered a habitat specialist, that is highly philopatric for burrowing sites. Although it is a large lizard, it will not easily disperse across the landscape to make new burrows should its habitat be destroyed. This species was not observed during the site visits, despite comprehensive sampling of the footprint and broader area and are not anticipated to be present. Discussions with the landowners, also concluded that no Sungazers had been seen on the properties, but were known from other farms in the area. In conjunction with relatively low status (Vulnerable and Near Threatened) and relative abundance of suitable habitat in the surrounding area, it is not anticipated that the proposed activity will pose a significant risk to either species resulting from potential habitat loss.

3.1.11 Other Important or Sensitive Habitat

Special Habitats include areas that are rare within a region, or which support important species, ecosystems or ecological processes. Species of Special Concern refers to red data species and important habitats include the locations where these species are known to occur. The following are generally considered to be important habitats, **none of which are present within the site.**

Feature	Desired State
Rocky Outcrops	No rocky outcrop habitat of significance is directly affected.
Wetland habitat	No wetlands are directly affected.
Priority Estuaries	No Estuaries are affected by the proposed activity.
Critical Forest Habitat	No forest is present.
Critical Fynbos Habitat	No Fynbos is present.
Critical Grassland habitat	Grassland is present, not a high diversity grassland.
Colonies or Populations of Threatened or Protected Species	No colonies or populations of threatened or protected species are present or in proximity to the activity that may be directly or indirectly affected.

3.1.12 No-Go Areas

No-go areas would include populations of threatened or protected species or areas providing critical ecological processes such as watercourses and riverine areas as well as associated recommended buffers. Will be assessed further in detailed assessment and refining of sensitivity mapping.

3.1.13 Potential Development Footprints

It is feasible that a development footprint can be identified within the site. Most suitable areas would minimise biodiversity impacts but also maintain ecological connectivity within the site and adjacent landscape.

3.2 Risks and Potential Impacts to Biodiversity

3.2.1 Summary of actions, activities, or processes that require mitigation

The main impacts likely to result from the proposed activity include the following:

1. Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.

2. Loss of flora species of special concern during pre-construction site clearing activities. Numerous species of special concern are potentially present within the affected area, which could be destroyed during site preparation.
3. Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.
4. Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.
5. Disturbances to ecological processes. Activity may result in disturbances to ecological processes.
6. Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern.
7. Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.
8. Loss of faunal SSC due to construction activities: Activities associated with bush clearing and ploughing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.

3.2.2 Potential Terrestrial Biodiversity Impacts (Direct)

A summary of potential ecological and terrestrial biodiversity risks and impacts are listed in Table 7.

Table 7: Potential Impacts to Terrestrial Biodiversity

IMPACT	Nature of Impact
Vegetation	<u>Permanent or temporary loss of indigenous vegetation</u> cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.
Flora Species	<u>Loss of flora species of special concern</u> during pre-construction site clearing activities. Several special of concern are known from surrounding areas, which could be destroyed during site preparation, none of which were confirmed to be present.
Alien Invasive Species	<u>Susceptibility of post construction disturbed areas to invasion</u> by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.
Erosion	<u>Susceptibility of some areas to erosion</u> because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.
Ecological Processes	<u>Disturbances to ecological processes:</u> Activity may result in disturbances to ecological processes.
Aquatic and Riparian processes	<u>Aquatic and Riparian processes:</u> None present/affected
Faunal Habitat	<u>Loss of Faunal Habitat:</u> Activity may result in the loss of habitat for faunal species, which could result in disturbance and displacement of faunal species.

IMPACT	Nature of Impact
Faunal Processes	Impacts to <u>faunal processes</u> because of the activity
Faunal Species	<u>Loss of faunal SSC</u> due to construction activities: Activities associated with bush clearing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.

3.2.3 Potential Terrestrial Biodiversity Impacts (Indirect)

No significant additional ancillary linear infrastructure, such as roads, conveyors, power lines, pipelines, and railways, which can impact on biodiversity and ecosystem services are expected. Stormwater runoff will be managed effectively before being discharged from the site.

3.2.4 Potential Terrestrial Biodiversity Impacts (Cumulative)

Cumulative impacts will be proportional to the extent to which similar projects are developed in the surrounding landscape. Based on available information, it would appear that the surrounding area is not overly developed and would thus accommodate the proposed development. Further investigation would be required as part of a terrestrial biodiversity or ecological assessment, including ascertaining other PV facilities in the area that are proposed or under investigation.

3.3 Assessment of Risks and Impacts to Biodiversity

3.3.1 Environmental Impact Assessment (EIA) Methodology

The Environmental Impact Assessment (EIA) Methodology assists in evaluating the overall effect of a proposed activity on the environment. Determining of the significance of an environmental impact on an environmental parameter is determined through a systematic analysis.

Determination of Significance of Impacts

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale (i.e. site, local, national or global), whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in Table 1.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

Impact Rating System

The impact assessment must take account of the nature, scale and duration of effects on the environment and whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the various project stages, as follows:

- Planning;
- Construction;
- Operation; and
- Decommissioning.

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

The significance of Cumulative Impacts should also be rated (As per the Excel Spreadsheet Template).

Rating System Used to Classify Impacts

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the possible mitigation of the impact. Impacts have been consolidated into one (1) rating. In assessing the significance of each issue, the following criteria (including an allocated point system) is used.

Refer to Table 9 for impact assessment of PV facility, Table 10 for Grid Connection Option 1 and Table 11 for Grid Connection option 2.

Table 8: Rating of impacts criteria.

ENVIRONMENTAL PARAMETER		
A brief description of the environmental aspect likely to be affected by the proposed activity (e.g. Surface Water).		
ISSUE / IMPACT / ENVIRONMENTAL EFFECT / NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity (e.g. oil spill in surface water).		
EXTENT (E)		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	Site	The impact will only affect the site
2	Local/district	Will affect the local area or district
3	Province/region	Will affect the entire province or region
4	International and National	Will affect the entire country
PROBABILITY (P)		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
REVERSIBILITY (R)		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.

3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible, and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES (L)		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
DURATION (D)		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
INTENSITY / MAGNITUDE (I / M)		
Describes the severity of an impact (i.e. whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily).		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component, and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component, and the quality, use, integrity and functionality of the system or component permanently

		ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible, rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
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SIGNIFICANCE (S)

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula:

Significance = (Extent + probability + reversibility + irreplaceability + duration) x magnitude/intensity.

The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	Impact Significance Rating	Description
5 to 23	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
5 to 23	Positive Low impact	The anticipated impact will have minor positive effects.
24 to 42	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
24 to 42	Positive Medium impact	The anticipated impact will have moderate positive effects.
43 to 61	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
43 to 61	Positive High impact	The anticipated impact will have significant positive effects.
62 to 80	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
62 to 80	Positive Very high impact	The anticipated impact will have highly significant positive effects.

Table 9: Impact Assessment for PV facility.

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
CONSTRUCTION PHASE																				
Vegetation	Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> Blanket clearing of vegetation must be limited to the site. No clearing outside of footprint to take place. Topsoil must be striped and stockpiled separately during site preparation and replaced on completion where revegetation will take place. Any site camps and laydown areas requiring clearing must be located within already disturbed areas away from watercourses. 	1	4	2	2	3	1	12	-	Low Negative
Flora Species	Loss of flora species of special concern during pre-construction site clearing activities. Numerous species of special concern are potentially present within the affected area, which could be destroyed during site preparation.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> A flora search and rescue is recommended before commencement. Respective permits to be obtained beforehand. 	1	4	2	2	3	1	12	-	Low Negative
Alien Invasive Species	Susceptibility of post construction disturbed areas to invasion by	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> Alien trees and weeds must be removed from the site as per CARA/NEMBA requirements. 	1	4	2	2	3	1	12	-	Low Negative

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
	exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.											<ul style="list-style-type: none"> • A suitable weed management strategy to be implemented in construction and operation phases. • After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of grasses not take place in a timely manner along road verges. This will also minimise dust. 								
Erosion	Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> • Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed. • Topsoil must be stripped and stockpiled separately and replaced on completion. • If natural vegetation re- 	1	4	2	2	3	1	12	-	Low Negative

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
	completion of the activity.											establishment does not occur, a suitable grass must be applied.								
Ecological Processes	Disturbances to ecological processes. Activity may result in disturbances to ecological processes.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences. 	1	4	2	2	3	1	12	-	Low Negative
Aquatic and Riparian processes	Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> Suitable structures to be constructed at watercourse crossings that do not alter flows. Stormwater discharge into watercourses to be protected against erosion. 	1	4	2	2	3	1	12	-	Low Negative
Faunal Habitat	Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> Blanket clearing of vegetation must be limited to the footprint. It is important that clearing activities are kept to the minimum and take place in a phased manner, where applicable. This allows any smaller 	1	4	2	2	3	1	12	-	Low Negative

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION													
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S					
												animal species to move into safe areas and prevents wind and water erosion of the cleared areas.													
Faunal Processes	Disruptions to faunal processes including barriers to movement and gene dispersal.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to. Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity. Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is 	1	4	2	2	3	1	12	-	Low Negative					

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION																							
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S															
												recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A retiler handler should be on call for such circumstances.																							
Faunal Species	Loss of faunal SSC due to construction activities: Activities associated with bush clearing and ploughing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> • A pre-commencement faunal search and rescue is recommended. • Respective permits to be obtained beforehand. • No animals are to be harmed or killed during the course of operations. • Workers are NOT allowed to snare any faunal species. 	1	4	2	2	3	1	12	-	Low Negative															
OPERATIONAL PHASE																																			

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Alien Invasive Species	Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> • Alien trees and weeds must be removed from the site as per CARA/NEMBA requirements. • A suitable weed management strategy to be implemented in construction and operation phases. • After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of grasses not take place in a timely manner along road verges. This will also minimise dust. 	1	4	2	2	3	1	12	-	Low Negative
Erosion	Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> • Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed. • Topsoil must be stripped and stockpiled separately and replaced on 	1	4	2	2	3	1	12	-	Low Negative

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
	areas being susceptible to soil erosion after completion of the activity.											completion. • If natural vegetation re-establishment does not occur, a suitable grass must be applied.								
Ecological Processes	Disturbances to ecological processes. Activity may result in disturbances to ecological processes.	1	4	2	2	3	2	24	-	Negative Medium	• Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences.	1	4	2	2	3	1	12	-	Low Negative
Aquatic and Riparian processes	Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern.	1	4	2	2	3	2	24	-	Negative Medium	• Suitable structures to be constructed at watercourse crossings that do not alter flows. • Stormwater discharge into watercourses to be protected against erosion.	1	4	2	2	3	1	12	-	Low Negative
Faunal Processes	Disruptions to faunal processes Including	1	4	2	2	3	2	24	-	Negative Medium	• The habitats and microhabitats present on the project site are not unique and are widespread in the	1	4	2	2	3	1	12	-	Low Negative

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION										RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION										
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S	E		P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S			
	barriers to movement and gene dispersal.											general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to. <ul style="list-style-type: none"> • Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity. • Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus 											

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
												move onto site once construction is underway. A retile handler should be on call for such circumstances. <ul style="list-style-type: none"> Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending works in the affected area) should be implemented. 								
DECOMMISSIONING PHASE																				
Vegetation	Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> Blanket clearing of vegetation must be limited to the site. No clearing outside of footprint to take place. Topsoil must be striped and stockpiled separately during site preparation and replaced on completion where revegetation will take place. Any site camps and laydown areas requiring clearing must be located within already disturbed areas away from watercourses. 	1	4	2	2	3	1	12	-	Low Negative
Alien Invasive Species	Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> Alien trees and weeds must be removed from the site as per CARA/NEMBA requirements. A suitable weed management strategy to be implemented in 	1	4	2	2	3	1	12	-	Low Negative

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION													
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S					
	removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.											construction and operation phases. <ul style="list-style-type: none"> After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of grasses not take place in a timely manner along road verges. This will also minimise dust. 													
Erosion	Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed. Topsoil must be stripped and stockpiled separately and replaced on completion. If natural vegetation re-establishment does not occur, a suitable grass must be applied. 	1	4	2	2	3	1	12	-	Low Negative					

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Ecological Processes	Disturbances to ecological processes. Activity may result in disturbances to ecological processes.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences. 	1	4	2	2	3	1	12	-	Low Negative
Aquatic and Riparian processes	Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> Suitable structures to be constructed at watercourse crossings that do not alter flows. Stormwater discharge into watercourses to be protected against erosion. 	1	4	2	2	3	1	12	-	Low Negative
Faunal Habitat	Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> Blanket clearing of vegetation must be limited to the footprint. It is important that clearing activities are kept to the minimum and take place in a phased manner, where applicable. This allows any smaller animal species to move into safe areas 	1	4	2	2	3	1	12	-	Low Negative

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION										RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION												
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S	E		P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S					
													and prevents wind and water erosion of the cleared areas.												
Faunal Processes	Disruptions to faunal processes Including barriers to movement and gene dispersal.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to. Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity. Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal search 	1	4	2	2	3	1	12	-	Low Negative					

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION										RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION													
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S	E		P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S						
													and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A retile handler should be on call for such circumstances. <ul style="list-style-type: none"> Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending works in the affected area) should be implemented. 													
CUMULATIVE IMPACTS																										
Vegetation	Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> Blanket clearing of vegetation must be limited to the site. No clearing outside of footprint to take place. Topsoil must be striped and stockpiled separately during site preparation and replaced on completion where revegetation will take place. Any site camps and laydown areas requiring clearing must be located within already disturbed areas away from watercourses. 	1	4	2	2	3	1	12	-	Low Negative						

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Flora Species	Loss of flora species of special concern during pre-construction site clearing activities. Numerous species of special concern are potentially present within the affected area, which could be destroyed during site preparation.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> • A flora search and rescue is recommended before commencement. • Respective permits to be obtained beforehand. 	1	4	2	2	3	1	12	-	Low Negative
Alien Invasive Species	Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> • Alien trees and weeds must be removed from the site as per CARA/NEMBA requirements. • A suitable weed management strategy to be implemented in construction and operation phases. • After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of grasses not take place in a timely manner along road verges. This will also minimise dust. 	1	4	2	2	3	1	12	-	Low Negative

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
	also prevent natural flora from becoming established.																			
Erosion	Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> • Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed. • Topsoil must be stripped and stockpiled separately and replaced on completion. • If natural vegetation re-establishment does not occur, a suitable grass must be applied. 	1	4	2	2	3	1	12	-	Low Negative
Ecological Processes	Disturbances to ecological processes. Activity may result in disturbances to ecological processes.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> • Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences. 	1	4	2	2	3	1	12	-	Low Negative
Aquatic and Riparian processes	Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> • Suitable structures to be constructed at watercourse crossings that do not alter flows. • Stormwater discharge into watercourses to be protected against erosion. 	1	4	2	2	3	1	12	-	Low Negative

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
	and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern.																			
Faunal Habitat	Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> Blanket clearing of vegetation must be limited to the footprint. It is important that clearing activities are kept to the minimum and take place in a phased manner, where applicable. This allows any smaller animal species to move into safe areas and prevents wind and water erosion of the cleared areas. 	1	4	2	2	3	1	12	-	Low Negative
Faunal Processes	Disruptions to faunal processes Including barriers to movement and gene dispersal.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to. Small mammals within the habitat on and around the affected area are generally mobile and likely to be 	1	4	2	2	3	1	12	-	Low Negative

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION										RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION											
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S	E		P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S				
												transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity. <ul style="list-style-type: none"> • Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A reptile handler should be on call for such circumstances. • Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending 												

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
												works in the affected area) should be implemented.								
Faunal Species	Loss of faunal SSC due to construction activities: Activities associated with bush clearing and ploughing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.	1	4	2	2	3	2	24	-	Negative Medium	<ul style="list-style-type: none"> • A pre-commencement faunal search and rescue is recommended. • Respective permits to be obtained beforehand. • No animals are to be harmed or killed during the course of operations. • Workers are NOT allowed to snare any faunal species. 	1	4	2	2	3	1	12	-	Low Negative

Table 10: Impact Assessment for Grid Option 1 (Preferred).

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
CONSTRUCTION PHASE																				
Vegetation	Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.	1	3	1	2	3	1	10	-	Negative Low	<ul style="list-style-type: none"> • Blanket clearing of vegetation must be limited to the site. No clearing outside of footprint to take place. • Topsoil must be striped and stockpiled separately during site preparation and replaced on completion where revegetation will take place. 	1	3	1	2	3	1	10	-	Negative Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION															
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S							
												<ul style="list-style-type: none"> Any site camps and laydown areas requiring clearing must be located within already disturbed areas away from watercourses. 															
Flora Species	Loss of flora species of special concern during pre-construction site clearing activities. Numerous species of special concern are potentially present within the affected area, which could be destroyed during site preparation.	1	2	1	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> A flora search and rescue is recommended before commencement. Respective permits to be obtained beforehand. 	1	2	1	2	3	1	9	-	Negative Low							
Alien Invasive Species	Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.	1	3	1	2	3	1	10	-	Negative Low	<ul style="list-style-type: none"> Alien trees and weeds must be removed from the site as per CARA/NEMBA requirements. A suitable weed management strategy to be implemented in construction and operation phases. After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of grasses not take place in a timely manner along road verges. This will also minimise dust. 	1	3	1	2	3	1	10	-	Negative Low							
Erosion	Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil	1	1	1	2	3	1	8	-	Negative Low	<ul style="list-style-type: none"> Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed. Topsoil must be stripped and stockpiled 	1	1	1	2	3	1	8	-	Negative Low							

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION											
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S			
	disturbance may result in some areas being susceptible to soil erosion after completion of the activity.											separately and replaced on completion. • If natural vegetation re-establishment does not occur, a suitable grass must be applied.											
Ecological Processes	Disturbances to ecological processes. Activity may result in disturbances to ecological processes.	1	2	1	2	3	1	9	-	Negative Low	• Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences.	1	2	1	2	3	1	9	-	Negative Low			
Aquatic and Riparian processes	Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern.	1	1	1	2	3	1	8	-	Negative Low	• Suitable structures to be constructed at watercourse crossings that do not alter flows. • Stormwater discharge into watercourses to be protected against erosion.	1	1	1	2	3	1	8	-	Negative Low			
Faunal Habitat	Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.	1	1	1	2	3	1	8	-	Negative Low	• Blanket clearing of vegetation must be limited to the footprint. • It is important that clearing activities are kept to the minimum and take place in a phased manner, where applicable. This allows any smaller animal species to move into safe areas and prevents wind and water erosion of the cleared areas.	1	1	1	2	3	1	8	-	Negative Low			
Faunal Processes	Disruptions to faunal processes including barriers to movement and gene dispersal.	1	1	1	2	3	1	8	-	Negative Low	• The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint	1	1	1	2	3	1	8	-	Negative Low			

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											<p>would be of low significance if mitigation measures are adhered to.</p> <ul style="list-style-type: none"> • Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity. • Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A reptile handler should be on call for such circumstances. • Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending works in the affected area) should be implemented. 									
Faunal Species	Loss of faunal SSC due to construction activities: Activities associated with bush clearing and ploughing, killing of	1	1	1	2	3	1	8	-	Negative Low	<ul style="list-style-type: none"> • A pre-commencement faunal search and rescue is recommended. • Respective permits to be obtained beforehand. • No animals are to be harmed or killed during 	1	1	1	2	3	1	8	-	Negative Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
	perceived dangerous fauna, may lead to increased mortalities among faunal species.											the course of operations. • Workers are NOT allowed to snare any faunal species.								
OPERATIONAL PHASE																				
Alien Invasive Species	Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.	1	1	1	1	3	1	7	-	Negative Low	<ul style="list-style-type: none"> • Alien trees and weeds must be removed from the site as per CARA/NEMBA requirements. • A suitable weed management strategy to be implemented in construction and operation phases. • After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of grasses not take place in a timely manner along road verges. This will also minimise dust. 	1	1	1	1	3	1	7	-	Negative Low
Erosion	Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.	1	1	1	1	3	1	7	-	Negative Low	<ul style="list-style-type: none"> • Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed. • Topsoil must be stripped and stockpiled separately and replaced on completion. • If natural vegetation re-establishment does not occur, a suitable grass must be applied. 	1	1	1	1	3	1	7	-	Negative Low
Ecological Processes	Disturbances to ecological processes. Activity may	1	1	1	1	3	1	7	-	Negative Low	• Blanket clearing of vegetation must be limited to the development footprint, and the	1	1	1	1	3	1	7	-	Negative Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
	result in disturbances to ecological processes.											area to be cleared must be demarcated before any clearing commences.								
Aquatic and Riparian processes	Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern.	1	1	1	1	3	1	7	-	Negative Low	<ul style="list-style-type: none"> • Suitable structures to be constructed at watercourse crossings that do not alter flows. • Stormwater discharge into watercourses to be protected against erosion. 	1	1	1	1	3	1	7	-	Negative Low
Faunal Processes	Disruptions to faunal processes including barriers to movement and gene dispersal.	1	1	1	1	3	1	7	-	Negative Low	<ul style="list-style-type: none"> • The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to. • Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity. • Reptiles such as lizards are less mobile compared to mammals, and some mortalities 	1	1	1	1	3	1	7	-	Negative Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION										
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		
												could arise. It is recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A retile handler should be on call for such circumstances. <ul style="list-style-type: none"> • Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending works in the affected area) should be implemented. 										
DECOMMISSIONING PHASE																						
Vegetation	Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.	1	1	1	2	3	1	8	-	Negative Low	<ul style="list-style-type: none"> • Blanket clearing of vegetation must be limited to the site. No clearing outside of footprint to take place. • Topsoil must be striped and stockpiled separately during site preparation and replaced on completion where revegetation will take place. • Any site camps and laydown areas requiring clearing must be located within already disturbed areas away from watercourses. 	1	1	1	2	3	1	8	-	Negative Low		
Alien Invasive Species	Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation	1	1	1	2	3	1	8	-	Negative Low	<ul style="list-style-type: none"> • Alien trees and weeds must be removed from the site as per CARA/NEMBA requirements. • A suitable weed management strategy to be implemented in construction and operation phases. • After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of 	1	1	1	2	3	1	8	-	Negative Low		

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Faunal Habitat	Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.	1	1	1	2	3	1	8	-	Negative Low	<ul style="list-style-type: none"> Blanket clearing of vegetation must be limited to the footprint. It is important that clearing activities are kept to the minimum and take place in a phased manner, where applicable. This allows any smaller animal species to move into safe areas and prevents wind and water erosion of the cleared areas. 	1	1	1	2	3	1	8	-	Negative Low
Faunal Processes	Disruptions to faunal processes including barriers to movement and gene dispersal.	1	1	1	2	3	1	8	-	Negative Low	<ul style="list-style-type: none"> The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to. Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity. Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once 	1	1	1	2	3	1	8	-	Negative Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION													
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S					
												construction is underway. A retile handler should be on call for such circumstances. <ul style="list-style-type: none"> Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending works in the affected area) should be implemented. 													
CUMULATIVE																									
Vegetation	Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.	1	1	1	2	3	1	8	-	Negative Low	<ul style="list-style-type: none"> Blanket clearing of vegetation must be limited to the site. No clearing outside of footprint to take place. Topsoil must be striped and stockpiled separately during site preparation and replaced on completion where revegetation will take place. Any site camps and laydown areas requiring clearing must be located within already disturbed areas away from watercourses. 	1	1	1	2	3	1	8	-	Negative Low					
Flora Species	Loss of flora species of special concern during pre-construction site clearing activities. Numerous species of special concern are potentially present within the affected area, which could be destroyed during site preparation.	1	1	1	2	3	1	8	-	Negative Low	<ul style="list-style-type: none"> A flora search and rescue is recommended before commencement. Respective permits to be obtained beforehand. 	1	1	1	2	3	1	8	-	Negative Low					
Alien Invasive Species	Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species	1	1	1	2	3	1	8	-	Negative Low	<ul style="list-style-type: none"> Alien trees and weeds must be removed from the site as per CARA/NEMBA requirements. A suitable weed management strategy to be implemented in construction and operation phases. 	1	1	1	2	3	1	8	-	Negative Low					

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION														
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S						
	during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.											<ul style="list-style-type: none"> After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of grasses not take place in a timely manner along road verges. This will also minimise dust. 														
Erosion	Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.	1	1	1	2	3	1	8	-	Negative Low	<ul style="list-style-type: none"> Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed. Topsoil must be stripped and stockpiled separately and replaced on completion. If natural vegetation re-establishment does not occur, a suitable grass must be applied. 	1	1	1	2	3	1	8	-	Negative Low						
Ecological Processes	Disturbances to ecological processes. Activity may result in disturbances to ecological processes.	1	1	1	2	3	1	8	-	Negative Low	<ul style="list-style-type: none"> Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences. 	1	1	1	2	3	1	8	-	Negative Low						
Aquatic and Riparian processes	Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of	1	1	1	2	3	1	8	-	Negative Low	<ul style="list-style-type: none"> Suitable structures to be constructed at watercourse crossings that do not alter flows. Stormwater discharge into watercourses to be protected against erosion. 	1	1	1	2	3	1	8	-	Negative Low						

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
	riparian vegetation / aquatic habitat. Loss of species of special concern.																			
Faunal Habitat	Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.	1	1	1	2	3	1	8	-	Negative Low	<ul style="list-style-type: none"> Blanket clearing of vegetation must be limited to the footprint. It is important that clearing activities are kept to the minimum and take place in a phased manner, where applicable. This allows any smaller animal species to move into safe areas and prevents wind and water erosion of the cleared areas. 	1	1	1	2	3	1	8	-	Negative Low
Faunal Processes	Disruptions to faunal processes Including barriers to movement and gene dispersal.	1	1	1	2	3	1	8	-	Negative Low	<ul style="list-style-type: none"> The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to. Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity. Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal search and rescue be conducted before construction commences, although 	1	1	1	2	3	1	8	-	Negative Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION												
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S				
												experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A retire handler should be on call for such circumstances. <ul style="list-style-type: none"> • Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending works in the affected area) should be implemented. 												
Faunal Species	Loss of faunal SSC due to construction activities: Activities associated with bush clearing and ploughing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.	1	1	1	2	3	1	8	-	Negative Low	<ul style="list-style-type: none"> • A pre-commencement faunal search and rescue is recommended. • Respective permits to be obtained beforehand. • No animals are to be harmed or killed during the course of operations. • Workers are NOT allowed to snare any faunal species. 	1	1	1	2	3	1	8	-	Negative Low				

Table 11: Impact Assessment for Grid Option 2 (Alternative).

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
CONSTRUCTION PHASE																				
Vegetation	Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site	1	3	2	2	3	1	11	-	Negative Low	<ul style="list-style-type: none"> • Blanket clearing of vegetation must be limited to the site. No clearing outside of footprint to take place. • Topsoil must be striped and stockpiled 	1	3	2	2	3	1	11	-	Negative Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION												
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S				
	clearing before construction will result in the blanket clearing of vegetation within the affected footprint.											separately during site preparation and replaced on completion where revegetation will take place. <ul style="list-style-type: none"> Any site camps and laydown areas requiring clearing must be located within already disturbed areas away from watercourses. 												
Flora Species	Loss of flora species of special concern during pre-construction site clearing activities. Numerous species of special concern are potentially present within the affected area, which could be destroyed during site preparation.	1	2	2	2	3	1	10	-	Negative Low	<ul style="list-style-type: none"> A flora search and rescue is recommended before commencement. Respective permits to be obtained beforehand. 	1	2	2	2	3	1	10	-	Negative Low				
Alien Invasive Species	Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.	1	3	2	2	3	1	11	-	Negative Low	<ul style="list-style-type: none"> Alien trees and weeds must be removed from the site as per CARA/NEMBA requirements. A suitable weed management strategy to be implemented in construction and operation phases. After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of grasses not take place in a timely manner along road verges. This will also minimise dust. 	1	3	2	2	3	1	11	-	Negative Low				
Erosion	Susceptibility of some areas to erosion because of	1	1	2	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> Suitable measures must be implemented in areas that are susceptible to erosion. Areas 	1	1	2	2	3	1	9	-	Negative Low				

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION														
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S						
	construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.											must be rehabilitated, and a suitable cover crop planted once construction is completed. <ul style="list-style-type: none"> • Topsoil must be stripped and stockpiled separately and replaced on completion. • If natural vegetation re-establishment does not occur, a suitable grass must be applied. 														
Ecological Processes	Disturbances to ecological processes. Activity may result in disturbances to ecological processes.	1	2	2	2	3	1	10	-	Negative Low	<ul style="list-style-type: none"> • Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences. 	1	2	2	2	3	1	10	-	Negative Low						
Aquatic and Riparian processes	Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern.	1	1	2	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> • Suitable structures to be constructed at watercourse crossings that do not alter flows. • Stormwater discharge into watercourses to be protected against erosion. 	1	1	2	2	3	1	9	-	Negative Low						
Faunal Habitat	Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.	1	1	2	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> • Blanket clearing of vegetation must be limited to the footprint. • It is important that clearing activities are kept to the minimum and take place in a phased manner, where applicable. This allows any smaller animal species to move into safe areas and prevents wind and water erosion of the cleared areas. 	1	1	2	2	3	1	9	-	Negative Low						

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Faunal Processes	Disruptions to faunal processes including barriers to movement and gene dispersal.	1	1	2	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to. Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity. Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A reptile handler should be on call for such circumstances. Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending works in the affected area) should be implemented. 	1	1	2	2	3	1	9	-	Negative Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Faunal Species	Loss of faunal SSC due to construction activities: Activities associated with bush clearing and ploughing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.	1	1	2	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> • A pre-commencement faunal search and rescue is recommended. • Respective permits to be obtained beforehand. • No animals are to be harmed or killed during the course of operations. • Workers are NOT allowed to snare any faunal species. 	1	1	2	2	3	1	9	-	Negative Low
OPERATIONAL PHASE																				
Alien Invasive Species	Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.	1	1	2	1	3	1	8	-	Negative Low	<ul style="list-style-type: none"> • Alien trees and weeds must be removed from the site as per CARA/NEMBA requirements. • A suitable weed management strategy to be implemented in construction and operation phases. • After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of grasses not take place in a timely manner along road verges. This will also minimise dust. 	1	1	2	1	3	1	8	-	Negative Low
Erosion	Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being	1	1	2	1	3	1	8	-	Negative Low	<ul style="list-style-type: none"> • Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed. • Topsoil must be stripped and stockpiled separately and replaced on completion. 	1	1	2	1	3	1	8	-	Negative Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION												
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S				
	susceptible to soil erosion after completion of the activity.											• If natural vegetation re-establishment does not occur, a suitable grass must be applied.												
Ecological Processes	Disturbances to ecological processes. Activity may result in disturbances to ecological processes.	1	1	2	1	3	1	8	-	Negative Low	• Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences.	1	1	2	1	3	1	8	-	Negative Low				
Aquatic and Riparian processes	Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern.	1	1	2	1	3	1	8	-	Negative Low	• Suitable structures to be constructed at watercourse crossings that do not alter flows. • Stormwater discharge into watercourses to be protected against erosion.	1	1	2	1	3	1	8	-	Negative Low				
Faunal Processes	Disruptions to faunal processes including barriers to movement and gene dispersal.	1	1	2	1	3	1	8	-	Negative Low	• The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to. • Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of	1	1	2	1	3	1	8	-	Negative Low				

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity. <ul style="list-style-type: none"> • Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A reptile handler should be on call for such circumstances. • Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending works in the affected area) should be implemented. 									
DECOMMISSIONING PHASE																				
Vegetation	Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.	1	1	2	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> • Blanket clearing of vegetation must be limited to the site. No clearing outside of footprint to take place. • Topsoil must be striped and stockpiled separately during site preparation and replaced on completion where revegetation will take place. • Any site camps and laydown areas requiring clearing must be located within already disturbed areas away from watercourses. 	1	1	2	2	3	1	9	-	Negative Low
Alien Invasive Species	Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species	1	1	2	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> • Alien trees and weeds must be removed from the site as per CARA/NEMBA requirements. • A suitable weed management strategy to be 	1	1	2	2	3	1	9	-	Negative Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION													
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S					
	and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.											implemented in construction and operation phases. <ul style="list-style-type: none"> After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of grasses not take place in a timely manner along road verges. This will also minimise dust. 													
Erosion	Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.	1	1	2	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed. Topsoil must be stripped and stockpiled separately and replaced on completion. If natural vegetation re-establishment does not occur, a suitable grass must be applied. 	1	1	2	2	3	1	9	-	Negative Low					
Ecological Processes	Disturbances to ecological processes. Activity may result in disturbances to ecological processes.	1	1	2	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences. 	1	1	2	2	3	1	9	-	Negative Low					
Aquatic and Riparian processes	Aquatic and Riparian processes. Diversion and increased velocity of surface water flows – Changes to the hydrological regime and increased potential for	1	1	2	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> Suitable structures to be constructed at watercourse crossings that do not alter flows. Stormwater discharge into watercourses to be protected against erosion. 	1	1	2	2	3	1	9	-	Negative Low					

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
	erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern.																			
Faunal Habitat	Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.	1	1	2	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> Blanket clearing of vegetation must be limited to the footprint. It is important that clearing activities are kept to the minimum and take place in a phased manner, where applicable. This allows any smaller animal species to move into safe areas and prevents wind and water erosion of the cleared areas. 	1	1	2	2	3	1	9	-	Negative Low
Faunal Processes	Disruptions to faunal processes Including barriers to movement and gene dispersal.	1	1	2	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to. Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity. Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal 	1	1	2	2	3	1	9	-	Negative Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S	
												search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A retile handler should be on call for such circumstances. <ul style="list-style-type: none"> • Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending works in the affected area) should be implemented. 									
CUMULATIVE																					
Vegetation	Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.	1	1	2	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> • Blanket clearing of vegetation must be limited to the site. No clearing outside of footprint to take place. • Topsoil must be striped and stockpiled separately during site preparation and replaced on completion where revegetation will take place. • Any site camps and laydown areas requiring clearing must be located within already disturbed areas away from watercourses. 	1	1	2	2	3	1	9	-	Negative Low	
Flora Species	Loss of flora species of special concern during pre-construction site clearing activities. Numerous species of special concern are potentially present within the affected area, which could be destroyed during site preparation.	1	1	2	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> • A flora search and rescue is recommended before commencement. • Respective permits to be obtained beforehand. 	1	1	2	2	3	1	9	-	Negative Low	

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Alien Invasive Species	Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also prevent natural flora from becoming established.	1	1	2	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> • Alien trees and weeds must be removed from the site as per CARA/NEMBA requirements. • A suitable weed management strategy to be implemented in construction and operation phases. • After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of grasses not take place in a timely manner along road verges. This will also minimise dust. 	1	1	2	2	3	1	9	-	Negative Low
Erosion	Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.	1	1	2	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> • Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed. • Topsoil must be stripped and stockpiled separately and replaced on completion. • If natural vegetation re-establishment does not occur, a suitable grass must be applied. 	1	1	2	2	3	1	9	-	Negative Low
Ecological Processes	Disturbances to ecological processes. Activity may result in disturbances to ecological processes.	1	1	2	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> • Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences. 	1	1	2	2	3	1	9	-	Negative Low
Aquatic and Riparian processes	Aquatic and Riparian processes. Diversion and increased velocity of	1	1	2	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> • Suitable structures to be constructed at watercourse crossings that do not alter flows. 	1	1	2	2	3	1	9	-	Negative Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
	surface water flows – Changes to the hydrological regime and increased potential for erosion. Impact of changes to water quality. Loss of riparian vegetation / aquatic habitat. Loss of species of special concern.											• Stormwater discharge into watercourses to be protected against erosion.								
Faunal Habitat	Loss of Faunal Habitat: Activity will result in the loss of habitat for faunal species.	1	1	2	2	3	1	9	-	Negative Low	• Blanket clearing of vegetation must be limited to the footprint. • It is important that clearing activities are kept to the minimum and take place in a phased manner, where applicable. This allows any smaller animal species to move into safe areas and prevents wind and water erosion of the cleared areas.	1	1	2	2	3	1	9	-	Negative Low
Faunal Processes	Disruptions to faunal processes Including barriers to movement and gene dispersal.	1	1	2	2	3	1	9	-	Negative Low	• The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to. • Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such	1	1	2	2	3	1	9	-	Negative Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											species because of the activity. <ul style="list-style-type: none"> • Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A reptile handler should be on call for such circumstances. • Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending works in the affected area) should be implemented. 									
Faunal Species	Loss of faunal SSC due to construction activities: Activities associated with bush clearing and ploughing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.	1	1	2	2	3	1	9	-	Negative Low	<ul style="list-style-type: none"> • A pre-commencement faunal search and rescue is recommended. • Respective permits to be obtained beforehand. • No animals are to be harmed or killed during the course of operations. • Workers are NOT allowed to snare any faunal species. 	1	1	2	2	3	1	9	-	Negative Low

Summary of Impacts for PV infrastructure:

- Impacts relating to loss of vegetation and disruption to ecological processes are deemed to be **medium** before mitigation and **low** after mitigation.
- Impacts relating to disturbance and displacement of faunal habitat and faunal species of conservation concern are deemed to be **medium** before mitigation and **low** after mitigation. Any impact is likely to be temporary during construction.
- Impacts relating to disturbance of flora species of conservation concern located in the site will be **medium** before mitigation and **low** after mitigation.
- All other impacts are assessed to be of **medium** significance before mitigation and can be reduced to **low** with the implementation of the mitigation measures.

Summary of Impacts for Grid Connection 1 and 2:

- Grid connection option 1 will be negligibly lower than grid connection option 2, primarily due to the shorter length, including access road and fewer watercourse or sensitive areas that will require crossing. Both are deemed to have low impacts before and after mitigation.
- Impacts relating to loss of vegetation and disruption to ecological processes are deemed to be **low** before and after mitigation.
- Impacts relating to disturbance and displacement of faunal habitat and faunal species of conservation concern are deemed to be **low** before and after mitigation. Any impact is likely to be temporary during construction.
- Impacts relating to disturbance of flora species of conservation concern located in the site will be **low** before and after mitigation.
- All other impacts are assessed to be of **low** significance before and after mitigation.

3.3.2 Terrestrial Biodiversity Impact Reversibility

In general, most impacts will have a moderate to high reversibility due to the nature of the project as well as the vegetation unit, being a grassland, it would be conducive to rehabilitation.

3.3.3 Impacts and Risks to Irreplaceable Biodiversity Resources

Risks to Irreplaceable Biodiversity Resources is low but will require investigation of the potential faunal and flora species that may be present.

3.3.4 Residual Risks and Uncertainties

Site investigations would be required to confirm the state of the habitat, as well as species composition to confirm various aspects that cannot be determined in a desktop assessment.

3.4 COMPARATIVE ASSESSMENT OF ALTERNATIVES

The respective alternatives being considered as part of the EIA process for the proposed development are comparatively assessed as per the table below. Two alternatives are provided for the Grid Connection, no alternatives are considered for the PV facility.

Key

PREFERRED	The alternative will result in a low impact / reduce the impact / result in a positive impact
FAVOURABLE	The impact will be relatively insignificant
LEAST PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

GRID CONNECTION ALTERNATIVES		
Grid Option 1 (Preferred)	Preferred	Preferred option as terrestrial biodiversity impact will be less due to shorter length and avoiding traversing various sensitive habitats including hills, watercourses and riverine areas.
Grid Option 2	Favourable	Longer length and presence of several more sensitive habitats including hills, watercourses and riverine habitat will result in a higher terrestrial biodiversity impact. These higher impacts would not be considered fatal flaws to the alternative overhead powerline.

3.5 Findings, Outcomes and Recommendations

3.5.1 Summary of Findings

Due to the scale of the project and largely indigenous nature of the site, more than 20 Ha of indigenous vegetation will require clearing, hence triggering a Full Scoping & EIA process. The proposed activity will also require the clearing of more than 300 m² of indigenous vegetation and greater than 1 Ha of indigenous vegetation and/or an activity in a watercourse to construct access road crossings and/or being in proximity to a nature reserve, hence additional listed activities will be triggered.

The DEA screening tool identifies Very High & Low Terrestrial Biodiversity, Medium & Low Animal Species (two species), Low Plant Species and (no species), Very High & Low Aquatic, High, Medium & Low Agricultural and Very High/High/Medium Landscape (Solar) Sensitivities within or in proximity to the site.

The vegetation unit present, Central Free State Grassland, has a Least Concern status, indicating that less than 40% has been transformed regionally and there will likely be minimal loss or disruptions to ecological functioning. Elements of Vaal-Vet Sandy Grassland (Endangered), Eastern Free State Sandy Grassland (Least Concern), and Winburg Grassy Shrubland (Least Concern) may be present on slopes and rocky hills or mesas, which will be assessed further during the assessment process, while Highveld Alluvial Vegetation elements may occur around alluvial or wetland areas. Development of a portion of the site will thus not significantly affect conservation targets for the affected vegetation unit(s), as significantly more than 24 % (i.e. the conservation target) is retained.

The site is near several aquatic features or aquatic functional zones that traverse the property. The closest perennial rivers are the Vals River (Class C: Moderately Modified) to the north-east, along the north-eastern boundary of the site as well as the Blomspruit River situated further to the south and west of the site. All drainage lines and water courses within the site drain north-east directly into the Valsrivier (Figure 9). The proposed activity is however unlikely to significantly affect these rivers (or wetlands & seeps) above surrounding levels of disturbance as long as they do not encroach into the remaining vegetation buffers around any watercourses and runoff is managed appropriately. Any aquatic, riverine or riparian habitat has been excluded from the site layout other than strategically sited linear activities such as access roads and powerlines.

The site falls predominantly within an ESA 1 designated area, with patches of ESA 2, Other Natural Areas and Degraded Areas (Figure 8). Two key ESA designated corridors are represented by the regional planning designations, the first to the north and east of the site, following the Valsrivier and the second

to the south along the Blomspruit River. The site falls across a portion of designated ESA that serves to connect these two corridors, thus the site will serve as an integral part in the connectivity of these corridors. Land use guidelines indicate that while ESA sites are not essential for meeting biodiversity targets, they play an important role both in delivering ecosystem services as well as supporting ecological functioning and connectivity. Some habitat loss is generally acceptable within these areas; however, ecological functioning and connectivity should not be compromised. Any development of the site should thus make allowances for ecological connectivity as a minimum, which has been achieved through maintain corridors.

The purpose of ecological corridors is to provide intact pathways for long-term biological movement. They also support the natural movement of species between populations to ensure population viability. Landscape corridors are aligned with areas that have maximum amounts of remaining natural habitat. Local corridors are fine-scale corridors that contribute to connectivity.

Key Ecosystem Processes within the site will include connectivity within these areas, which should be retained to maintain species migration and gene flow. Game fencing around the site or portions of the site (Portion 1 of Farm Scheveningen 636, being a game farm with introduced extra limital species) may act as a barrier to the free movement of certain faunal groups such as medium to large sized mammals. They will not however act as significant barriers to movement of birds, reptiles and amphibians as well as seed dispersal which is largely wind driven in grassland habitat.

No National Parks are situated within 10 km of the site and a single Private nature Reserve is situated within 5 km of the site, the Erfdeel Private Nature Reserve which abuts the north-eastern boundary of the site. The actual PV is just under 3 km (2.8 km) from this reserve which is deemed to be sufficient. No specific guidelines are provided for such buffers in regional planning guidelines.

Some rocky areas are present, in particular a series of small hills situated surrounding the dam on Portion 1 of Farm Scheveningen 636. These have been excluded from the PV layout, other than grid connection alternative which will not have any significant impact. Steep slopes are generally not likely to be suitable for PV facilities.

No flora species of conservation concern with an elevated conservation status are flagged. Site survey determined that several Free State Nature Conservation Ordinance species are present, for which permits will be required. All of these species are generally widespread and not under threat.

Two faunal species of conservation concern are flagged in the SCREENING. The Spotted Necked Otter is unlikely to be affected were it to be present, as its preferred habitat (standing water and adjacent riparian vegetation) is outside of the project footprint. Sensitive Species 15 could potentially be present but site sampling did not locate this species nor any evidence thereof within the project footprint. This correlates with known records which indicate the species is generally more prevalent to the east and south of the site. Should any be located during construction, relocation would be feasible.

Due to having a low conservation status, the grassland habitat is deemed to have a moderate sensitivity status and would provide a suitable footprint for the proposed activity, bearing in mind watercourse and ecological process and connectivity buffers which have been incorporated into the design to incorporate an undeveloped network for connectivity purposes within the site and the surrounding landscape, due to ESA designation.

All impacts are deemed to be medium before and low after mitigation .

3.5.2 Recommendations

In terms of identifying a suitable footprint for the proposed PV facility, the following approach is recommended.

- Natural vegetation does not have an elevated conservation status and is not designated a Critical Biodiversity Area status but rather an Ecological Support Area. This does not preclude for further development, as long as ecological connectivity and processes are accommodated, and further assessment will identify most suitable areas that would minimise biodiversity loss. As a minimum, the conservation target of the vegetation unit (24 %) should be retained across the site as well as a contiguous network with the site and the surrounding landscape as a corridor or series of viable ecological corridors, which is significantly exceeded.
- Watercourses, Riverine (Riparian) & Wetland areas, dams and rivers as well as rocky hills are not suitable and have been excluded from any development footprint other than for strategic infrastructure requirements including the grid connection powerlines.
-

4 Management Programs

Table 12 lists specific mitigation measures that must be implemented and adhered to. These must be considered to be conditions of authorisation.

Table 12: Specific Mitigation Measures and Recommendations

IMPACT	MITIGATION/MANAGEMENT ACTIONS	RESPONSIBILITY	METHODOLOGY	MITIGATION/MANAGEMENT OBJECTIVES AND OUTCOMES	FREQUENCY
Vegetation Loss	<ul style="list-style-type: none"> Blanket clearing of vegetation must be limited to the site. No clearing outside of footprint to take place. Topsoil must be striped and stockpiled separately during site preparation and replaced on completion where revegetation will take place. Any site camps and laydown areas requiring clearing must be located within already disturbed areas away from watercourses. 	Authorisation Holder	As outlined in EMPr	To minimise vegetation loss	Pre-commencement
Flora Species Loss	<ul style="list-style-type: none"> A flora search and rescue is <u>recommended before commencement</u>. Respective permits to be obtained beforehand. 	Authorisation Holder	As outlined in EMPr	To minimise flora species loss	Pre-commencement
Alien Invasive Species Invasion	<ul style="list-style-type: none"> Alien trees and weeds must be removed from the site as per CARA/NEMBA requirements. A suitable weed management strategy to be implemented in construction and operation phases. After clearing and construction is completed, an appropriate cover may be required, should natural re-establishment of grasses not take place in a timely manner along road verges. This will also minimise dust. 	Authorisation Holder	As outlined in EMPr	To minimise regeneration of alien species and weeds	Quarterly and on completion
Erosion	<ul style="list-style-type: none"> Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed. Topsoil must be stripped and stockpiled separately and replaced on completion. If natural vegetation re-establishment does not occur, a suitable grass must be applied. 	Authorisation Holder	As outlined in EMPr	To minimise erosion and erosion risk	Pre-commencement, Quarterly and on completion
Ecological Process Disruptions	<ul style="list-style-type: none"> Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences. 	Authorisation Holder	As outlined in EMPr	To minimise disruptions to ecological processes	Pre-commencement
Aquatic and Riparian process disruptions	<ul style="list-style-type: none"> Suitable structures to be constructed at watercourse crossings that do not alter flows. Stormwater discharge into watercourses to be protected against erosion. 	Authorisation Holder	As outlined in EMPr	To minimise loss of riparian habitat	Pre-commencement, ongoing during construction in aquatic habitat
Faunal Habitat Loss	<ul style="list-style-type: none"> Blanket clearing of vegetation must be limited to the footprint. It is important that clearing activities are kept to the minimum and take place in a phased manner, where applicable. This allows any 	Authorisation Holder	As outlined in EMPr	To minimise faunal habitat loss.	Pre-commencement

IMPACT	MITIGATION/MANAGEMENT ACTIONS	RESPONSIBILITY	METHODOLOGY	MITIGATION/MANAGEMENT OBJECTIVES AND OUTCOMES	FREQUENCY
	smaller animal species to move into safe areas and prevents wind and water erosion of the cleared areas.				
Faunal Process Disruptions	<ul style="list-style-type: none"> The habitats and microhabitats present on the project site are not unique and are widespread in the general area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to. Small mammals within the habitat on and around the affected area are generally mobile and likely to be transient to the area. They will most likely vacate the area once construction commences. As with all construction sites there is a latent risk that there will be some accidental mortalities. Specific measures are made to reduce this risk. The risk of species of special concern is low, and it is unlikely that there will be any impact to populations of such species because of the activity. Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. It is recommended that a faunal search and rescue be conducted before construction commences, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A reptile handler should be on call for such circumstances. Should any amphibian migrations occur between wetland areas during construction, appropriate measures (including temporarily suspending works in the affected area) should be implemented. 	Authorisation Holder	As outlined in EMPr	To minimise disruptions of faunal ecological processes	Pre-commencement
Faunal Species Loss	<ul style="list-style-type: none"> A pre-commencement faunal search and rescue is recommended. Respective permits to be obtained beforehand. No animals are to be harmed or killed during the course of operations. Workers are NOT allowed to snare any faunal species. 	Authorisation Holder	As outlined in EMPr	To minimise faunal species loss.	Pre-commencement, quarterly during construction

4.1 Site Preparation and Vegetation Clearing Plan

The following flora relocation plan is recommended for inclusion in the EMP and Flora removal permit applications:

- A pre-commencement fauna relocation is recommended. Most larger faunal species in proximity are likely to vacate the area once earth moving equipment commences clearing and construction, however some species including reptiles may require manual relocation. Fauna relocation permits will be required.
- A pre-commencement flora relocation is also recommended. Several species protected in terms of the Free State Nature Conservation Ordinance are present for which permits will be required.
- Any topsoil that is stripped must be stockpiled for replacement after construction of the PV and associated infrastructure. Additional measures should be implemented to stabilise eroded areas where necessary.

4.2 Rehabilitation and Landscaping Plan

- On completion of construction, the surface of any work areas, especially if compacted due to hauling and dumping operations shall be scarified to a depth of at least 200 mm and graded to an even surface condition and the previously stored topsoil will be returned to its original depth over the area.
- The disturbed areas can be seeded with suitable grasses and local indigenous seed mix, if deemed to be required, however, vegetation is likely to re-establish without input.
- Excavations may not be used for the dumping of construction wastes.
- Waste (non-biodegradable refuse) will not be permitted to be deposited in the excavations and must be disposed of appropriately.
- Final rehabilitation must comply with the requirements mentioned in the Rehabilitation Plan.

4.3 Open Space Management/Conservation Plan

None are applicable for this project.

4.4 Maintenance Management Plan

Ongoing maintenance is likely to be required in the long-term, which could include re-excavation of portions of the site and infrastructure for maintenance/replacement of defective components where applicable. All measures of this report, including the EMP should be adhered for any such maintenance requirements. Any excavated areas must be stabilised and rehabilitated as per the measures indicated in this report.

5 Organizational Capacity and Competency

Successful Implementation will be in part be dependent on the organisational capacity and competency of the applicant and any implementing agents. The following aspects are likely to pose risk to the successful mitigation of the project:

- Budget constraints – budget allocated for environmental management tends to be inadequate for construction projects.
- Organisational Structure – implementing agents may or may not have adequate capacity and competency to ensure appropriate and adequate environmental management.

6 Emergency Preparedness and Response

Emergency Preparedness Plan must be included in the EMPr and should address specific measures relating to the following emergency risks:

- Fire management and response
- Spill management and incident response
- Waste management and incident response
- Response to emergency site shutdown, including labour and protest actions.

7 Stakeholder Engagement

Possible Stakeholders relating to Biodiversity could include the following key groups:

- Neighbouring Property Owners
- Local Regional and National Conservation Authorities

No Stakeholder Engagement was conducted specifically by the Specialist. Stakeholder Engagement will be undertaken by the EAP as part of the environment application public participatory process. Any comments raised relating to Biodiversity will be addressed by the specialist in the final report.

8 Monitoring and Review

Key monitoring activities should include the following:

1. Pre-construction
 - a) Ensure flora permits are in place timeously (PNCO only) – allow at least 1 or 2 months before commencement.
 - b) Environmental Awareness and training (EAT) – Ensure all labour are informed and plant operators are aware of risks, issues, dos and don'ts and no-go areas.
2. Bush clearing
 - a) Ensure working plant has no oil or hydraulic leaks
 - b) Check delineated footprints area not exceeded
3. Construction
 - a) Regular checks on trenches for trapped animals and possible drowning risks
 - b) Regular checks of fences for snares
4. Rehabilitation
 - a) Check quality of topsoil and weed free
 - b) Check for weed regrowth and manage timeously (before seed is set)
5. Operation monitoring
 - a) Weed management on ongoing basis
 - b) Erosion to be addressed on ongoing basis

9 Annexures

9.1 Annexure A: References

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9.2 Annexure B: Site Photographic Record













9.3 Annexure C: Flora and Fauna Species Lists

9.3.1 Flora

Marked species were flagged from various database sources as occurring in the region and having an elevated status. All were cross checked for distribution overlay and were actively screened for presence/absence on site.

SCIENTIFIC NAME	FAMILY	STATUS ⁷	COMMENT/PRESENCE ⁸
<i>Agrostis lachnantha</i>	Poaceae	LC	AZa 5, Gh 6
<i>Alternanthera sessilis</i>	Amaranthaceae	NE	AZa 5, Present
<i>Andropogon appendiculatus</i>	Poaceae	LC	AZa 5, Gh 6
<i>Andropogon eucomus</i>	Poaceae	LC	AZa 5
<i>Anthospermum rigidum subsp. pumilum</i>	Rubiaceae	LC	Gh 6, Present
<i>Aristida adscensionis</i>	Poaceae	LC	Gh 6, Present
<i>Aristida bipartita</i>	Poaceae	LC	Gh 6
<i>Aristida canescens</i>	Poaceae	LC	Gh 6, Present
<i>Aristida congesta</i>	Poaceae	LC	Gh 6, Present
<i>Asparagus laricinus</i>	Asparagaceae	LC	AZa 5, Present
<i>Asparagus suaveolens</i>	Asparagaceae	LC	AZa 5, Present
<i>Barleria macrostegia</i>	Acanthaceae	LC	AZa 5, Present
<i>Berkheya onopordifolia var. onopordifolia</i>	Asteraceae	LC	Gh 6, Present
<i>Brachiaria marlothii</i>	Poaceae	LC	AZa 5
<i>Celtis africana</i>	Celtidaceae	LC	AZa 5, Present
<i>Chamaesyce inaequilatera</i>	Euphorbiaceae	LC	Gh 6
<i>Chloris virgata</i>	Poaceae	LC	AZa 5
<i>Clematis brachiata</i>	Ranunculaceae	LC	AZa 5
<i>Conyza pinnata</i>	Asteraceae	LC	Gh 6, Present
<i>Corchorus asplenifolius</i>	Malvaceae	LC	AZa 5
<i>Crabbea acaulis</i>	Acanthaceae	LC	Gh 6, Present
<i>Crinum bulbispermum</i>	Amaryllidaceae	LC, FSNCO	AZa 5, Not recorded
<i>Cymbopogon pospischilii</i>	Poaceae	NE	Gh 6, Present
<i>Cynodon dactylon</i>	Poaceae	LC	AZa 5, Gh 6
<i>Cynodon transvaalensis</i>	Poaceae	LC	Gh 6, Present
<i>Cyperus denudatus</i>	Cyperaceae	LC	AZa 5, Present
<i>Cyperus longus</i>	Cyperaceae	LC	AZa 5, Present
<i>Digitaria argyrograpta</i>	Poaceae	LC	Gh 6, Present
<i>Diospyros lycioides</i>	Ebenaceae	LC	AZa 5, Present
<i>Echinochloa holubii</i>	Poaceae	LC	AZa 5
<i>Ehretia rigida</i>	Boraginaceae	LC	AZa 5, Present
<i>Elionurus muticus</i>	Poaceae	LC	Gh 6, Present

⁷ IUCN - Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Least Concern (LC); End – Endemic; FSNCO – Free State Provincial Nature Conservation Ordinance; Ex, Exotic/Invasive/Weed; NFA – National Forest Act; ToPS – Threatened or Protected Species.

⁸ Gh 10 – Central Free State Grassland; AZa 5 - Highveld Alluvial Vegetation

SCIENTIFIC NAME	FAMILY	STATUS ⁷	COMMENT/PRESENCE ⁸
<i>Equisetum ramosissimum</i>	Equisetaceae	LC	AZa 5, Present
<i>Eragrostis chloromelas</i>	Poaceae	LC	Gh 6, Present
<i>Eragrostis curvula</i>	Poaceae	LC	Gh 6, Present
<i>Eragrostis lehmanniana</i>	Poaceae	LC	Gh 6, Present
<i>Eragrostis micrantha</i>	Poaceae	LC	Gh 6
<i>Eragrostis obtusa</i>	Poaceae	LC	AZa 5, Gh 6
<i>Eragrostis plana</i>	Poaceae	LC	AZa 5, Gh 6
<i>Eragrostis porosa</i>	Poaceae	LC	AZa 5
<i>Eragrostis racemosa</i>	Poaceae	LC	Gh 6, Present
<i>Eragrostis trichophora</i>	Poaceae	LC	Gh 6
<i>Felicia muricata</i>	Asteraceae	LC	AZa 5, Gh 6
<i>Fimbristylis ferruginea</i>	Cyperaceae	LC	AZa 5, Present
<i>Galium capense</i>	Rubiaceae	LC	AZa 5
<i>Geigeria aspera var. aspera</i>	Asteraceae	LC	Gh 6
<i>Gomphocarpus fruticosus</i>	Apocynaceae	LC	AZa 5, Present
<i>Grewia flava</i>	Malvaceae	LC	AZa 5, Present
<i>Gymnosporia buxifolia</i>	Celastraceae	LC	AZa 5, Present
<i>Haplocarpha lyrata</i>	Asteraceae	LC	AZa 5
<i>Helichrysum dregeanum</i>	Asteraceae	LC	Gh 6, Present
<i>Hemarthria altissima</i>	Poaceae	LC	AZa 5
<i>Hermannia depressa</i>	Malvaceae	LC	Gh 6, Present
<i>Heteropogon contortus</i>	Poaceae	LC	Gh 6, Present
<i>Hibiscus pusillus</i>	Malvaceae	LC	AZa 5, Gh 6, Present
<i>Imperata cylindrica</i>	Poaceae	LC	AZa 5
<i>Ischaemum fasciculatum</i>	Poaceae	LC	AZa 5
<i>Lobelia angolensis</i>	Lobeliaceae	LC	AZa 5
<i>Lycium hirsutum</i>	Solanaceae	LC	AZa 5, Present
<i>Melolobium candicans</i>	Fabaceae	LC	Gh 6
<i>Microchloa caffra</i>	Poaceae	LC	Gh 6, Present
<i>Miscanthus junceus</i>	Poaceae	LC	AZa 5
<i>Myriophyllum spicatum</i>	Haloragaceae	NE	AZa 5
<i>Nidorella resedifolia</i>	Asteraceae	LC	AZa 5, Present
<i>Oxalis depressa</i>	Oxalidaceae	LC	Gh 6, Present
<i>Panicum coloratum</i>	Poaceae	LC	AZa 5, Gh 6
<i>Panicum maximum</i>	Poaceae	LC	AZa 5
<i>Paspalum distichum</i>	Poaceae	LC	AZa 5
<i>Pentzia globosa</i>	Asteraceae	LC	Gh 6, Present
<i>Persicaria amphibia</i>	Polygonaceae	LC	AZa 5
<i>Persicaria hystricula</i>	Polygonaceae	LC	AZa 5
<i>Persicaria lapathifolia</i>	Polygonaceae	NE	AZa 5
<i>Phragmites australis</i>	Poaceae	LC	AZa 5, Present
<i>Pollichia campestris</i>	Caryophyllaceae	LC	AZa 5
<i>Pseudognaphalium luteo-album</i>	Asteraceae	LC	Gh 6
<i>Pseudognaphalium oligandrum</i>	Asteraceae	LC	AZa 5
<i>Pulicaria scabra</i>	Asteraceae	LC	AZa 5
<i>Pycreus mundii</i>	Cyperaceae	LC	AZa 5
<i>Raphionacme dyeri</i>	Apocynaceae	LC	Gh 6, Present

SCIENTIFIC NAME	FAMILY	STATUS ⁷	COMMENT/PRESENCE ⁸
<i>Rhus lancea</i>	Anacardiaceae	LC	AZa 5, Present
<i>Rhus pyroides</i>	Anacardiaceae	LC	AZa 5, Present
<i>Rorippa fluviatilis</i> var. <i>fluviatilis</i>	Brassicaceae	LC	AZa 5
<i>Salix mucronata</i> subsp. <i>mucronata</i>	Salicaceae	LC	AZa 5, Present
<i>Salix mucronata</i> subsp. <i>woodii</i>	Salicaceae	LC	AZa 5, Present
<i>Salsola rabieana</i>	Chenopodiaceae	LC	AZa 5
<i>Salvia stenophylla</i>	Lamiaceae	LC	Gh 6, Present
<i>Selago densiflora</i>	Scrophulariaceae	LC	Gh 6, Present
<i>Senecio inornatus</i>	Asteraceae	LC	AZa 5, Present
<i>Setaria incrassata</i>	Poaceae	LC	Gh 6
<i>Setaria sphacelata</i>	Poaceae	LC	Gh 6, Present
<i>Setaria verticillata</i>	Poaceae	LC	AZa 5, Present
<i>Sonchus dregeanus</i>	Asteraceae	LC	Gh 6, Present
<i>Sporobolus africanus</i>	Poaceae	LC	AZa 5
<i>Sporobolus discosporus</i>	Poaceae	LC	Gh 6, Present
<i>Sporobolus fimbriatus</i>	Poaceae	LC	AZa 5
<i>Stachys hyssopoides</i>	Lamiaceae	LC	AZa 5, Present
<i>Themeda triandra</i>	Poaceae	LC	AZa 5, Gh 6
<i>Tragus koelerioides</i>	Poaceae	LC	Gh 6, Present
<i>Tripteris aghillana</i> var. <i>integrifolia</i>	Asteraceae	NE	Gh 6
<i>Urochloa panicoides</i>	Poaceae	LC	AZa 5
<i>Vachellia (Acacia) karroo</i>	Fabaceae	LC	AZa 5, Present
<i>Vahlia capensis</i>	Vahliaceae	LC	AZa 5
<i>Ziziphus mucronata</i>	Rhamnaceae	LC	AZa 5, Present

9.3.2 Fauna

Marked species were flagged from various database sources as occurring in the region and having an elevated status. All were cross checked for distribution overlay and were actively screened for presence/absence on site.

SCIENTIFIC NAME	COMMON NAME	STATUS ⁹	COMMENT/PRESENCE
MAMMALS			
<i>Aepyceros melampus</i>	Impala	LC	
<i>Aethomys namaquensis</i>	Namaqua Rock Mouse	LC	Possibly present
<i>Alcelaphus buselaphus</i>	Hartebeest		Present, Introduced
<i>Amblysomus hottentotus</i>	Hottentot Golden Mole	LC (2016)	
<i>Antidorcas marsupialis</i>	Springbok	LC (2016)	Present
<i>Aonyx capensis</i>	African Clawless Otter	NT (2016)	Likely present
<i>Atelerix frontalis</i>	Southern African Hedgehog	NT (2016)	Possibly present
<i>Atilax paludinosus</i>	Marsh Mongoose	LC (2016)	Possibly present
<i>Canis mesomelas</i>	Black-backed Jackal	LC (2016)	Possibly present
<i>Caracal caracal</i>	Caracal	LC (2016)	Present
<i>Cephalophus natalensis</i>	Red Duiker	NT (2016)	Possibly present
<i>Chlorocebus pygerythrus</i>	Vervet Monkey	LC (2016)	Possibly present
<i>Chlorotalpa sclateri</i>	Sclater's Golden Mole	LC (2016)	
<i>Connochaetes gnou</i>	Black Wildebeest	LC (2016)	
<i>Connochaetes taurinus</i>	Blue Wildebeest	LC (ver 3.1, 2017)	Present, Introduced
<i>Cryptomys hottentotus</i>	Southern African Mole-rat	LC (2016)	
<i>Cynictis penicillata</i>	Yellow Mongoose	LC (2016)	Possibly present
<i>Dama dama</i>	Fallow Deer	Introduced	
<i>Damaliscus lunatus lunatus</i>	(Southern African) Tsessebe	VU (2016)	
<i>Damaliscus pygargus phillipsi</i>	Blesbok	LC (2016)	Present, Introduced
<i>Damaliscus pygargus pygargus</i>	Bontebok	VU (2016)	
<i>Desmodillus auricularis</i>	Cape Short-tailed Gerbil	LC (2016)	Possibly present
<i>Eidolon helvum</i>	African Straw-colored Fruit Bat	LC (2016)	Possibly present
<i>Elephantulus myurus</i>	Eastern Rock Elephant Shrew	LC (2016)	Possibly present
<i>Eptesicus sp.</i>	Serotines		
<i>Equus quagga</i>	Plains Zebra	NT (IUCN, 2016)	
<i>Equus zebra hartmannae</i>	Hartmann's Mountain Zebra	VU A3bcd (IUCN, 2019)	
<i>Equus zebra zebra</i>	Cape Mountain Zebra	LC (2016)	
<i>Felis catus</i>	Domestic Cat	Introduced	
<i>Felis nigripes</i>	Black-footed Cat	VU (2016)	
<i>Felis silvestris</i>	Wildcat	LC (2016)	
<i>Genetta genetta</i>	Common Genet	LC (2016)	Possibly present
<i>Geosciurus inauris</i>	Ground Squirrel	LC	Present
<i>Gerbilliscus brantsii</i>	Highveld Gerbil	LC (2016)	Possibly present
<i>Gerbilliscus leucogaster</i>	Bushveld Gerbil	LC (2016)	
<i>Giraffa giraffa giraffa</i>	South African Giraffe	LC (2016)	
<i>Herpestes sanguineus</i>	Slender Mongoose	LC (2016)	Possibly present
<i>Herpestes sp.</i>	Common Mongooses		Possibly present
<i>Hippotragus equinus</i>	Roan Antelope	EN (2016)	
<i>Hippotragus niger</i>	Sable	LC	Present, Introduced
<i>Hippotragus niger niger</i>		VU (2016)	
<i>Hyaena brunnea</i>	Brown Hyena	NT (2015)	
<i>Hydrictis maculicollis</i>	Spotted-necked Otter	NEST (M), NT	The Spotted-necked Otter inhabits freshwater habitats where water is unsilted, unpolluted, and rich in small to

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SCIENTIFIC NAME	COMMON NAME	STATUS ⁹	COMMENT/PRESENCE
			medium sized fishes. it is found in streams, rivers and impoundments up to altitudes of 2,500m. Wherever it occurs, the spotted-necked otter prefers shallow to deep waters. Unlikely to be affected if present near the Vals River.
<i>Hystrix africaeaustralis</i>	Cape Porcupine	LC	Possibly present
<i>Ichneumia albicauda</i>	White-tailed Mongoose	LC (2016)	Possibly present
<i>Ictonyx striatus</i>	Striped Polecat	LC (2016)	Possibly present
<i>Kobus ellipsiprymnus</i>	Waterbuck	LC	Present, Introduced
<i>Kobus leche</i>	Lechwe	NT (2017)	Present, Introduced
<i>Leptailurus serval</i>	Serval	NT (2016)	
<i>Lepus capensis</i>	Cape Hare	LC	Possibly present
<i>Lepus saxatilis</i>	Scrub Hare	LC	Possibly present
<i>Malacothrix typica</i>	Large-eared African Desert Mouse	LC (2016)	
<i>Mastomys coucha</i>	Southern African Mastomys	LC (2016)	Possibly present
<i>Mastomys natalensis</i>	Natal Mastomys	LC (2016)	
<i>Mellivora capensis</i>	Honey Badger	LC (2016)	Possibly present
<i>Miniopterus schreibersii</i>	Schreibers's Long-fingered Bat	NT	
<i>Mus (Nannomys) minutoides</i>	Southern African Pygmy Mouse	LC	
<i>Mus musculus musculus</i>		LC	
<i>Myosorex varius</i>	Forest Shrew	LC (2016)	
<i>Mystromys albicaudatus</i>	African White-tailed Rat	VU (2016)	Possibly present
<i>Neoromicia capensis</i>	Cape Serotine	LC (2016)	Possibly present
<i>Orycteropus afer</i>	Aardvark	LC (2016)	Possibly present
<i>Oryx gazella</i>	Gemsbok	LC (2016)	Not recorded
<i>Otocyon megalotis</i>	Bat-eared Fox	LC (2016)	Possibly present
<i>Otomys auratus</i>	Southern African Vlei Rat (Grassland type)	NT (2016)	Possibly present
<i>Ourebia ourebi</i>	Oribi	EN	
<i>Panthera pardus</i>	Leopard	VU (2016)	
<i>Papio ursinus</i>	Chacma Baboon	LC (2016)	
<i>Pedetes capensis</i>	South African Spring Hare	LC (2016)	Possibly present
<i>Pelea capreolus</i>	Vaal Rhebok	NT (2016)	
<i>Phacochoerus africanus</i>	Common Warthog	LC (2016)	Possibly present
<i>Potamochoerus porcus</i>	Red River Hog		
<i>Procavia capensis</i>	Cape Rock Hyrax	LC (2016)	Possibly present
<i>Pronolagus rupestris</i>	Smith's Red Rock Hare	LC (2016)	
<i>Proteles cristata</i>	Aardwolf	LC (2016)	Possibly present
<i>Raphicerus campestris</i>	Steenbok	LC (2016)	Possibly present
<i>Rattus rattus</i>	Roof Rat	LC	
<i>Redunca arundinum</i>	Southern Reedbuck	LC (2016)	Not recorded
<i>Redunca fulvorufula</i>	Mountain Reedbuck	LC	Not recorded
<i>Rhabdomys dilectus</i>	Mesic Four-striped Grass Rat	LC (2016)	
<i>Rhabdomys pumilio</i>	Xeric Four-striped Grass Rat	LC (2016)	
<i>Rhinolophus darlingi</i>	Darling's Horseshoe Bat	LC (2016)	
<i>Smutsia temminckii</i>	Ground Pangolin	VU (2016)	Possibly present
<i>Suricata suricatta</i>	Meerkat	LC (2016)	Possibly present
<i>Sylvicapra grimmia</i>	Bush Duiker	LC (2016)	
<i>Sylvicapra sp.</i>	Common Duiker		Possibly present
<i>Syncerus caffer</i>	African Buffalo	LC (2008)	Not recorded
<i>Taurotragus oryx</i>	Common Eland	LC (2016)	
<i>Taurotragus oryx oryx</i>	Cape eland	LC (2016)	
<i>Thryonomys swinderianus</i>	Greater Cane Rat	LC (2016)	
<i>Tragelaphus angasii</i>	Nyala	LC (2016)	Not recorded
<i>Tragelaphus scriptus</i>	Bushbuck	LC	Not recorded
<i>Tragelaphus spekii</i>	Sitatunga	LC (IUCN 3.1)	Not recorded
<i>Tragelaphus strepsiceros</i>	Greater Kudu	LC (2016)	Not recorded

SCIENTIFIC NAME	COMMON NAME	STATUS ⁹	COMMENT/PRESENCE
<i>Vulpes chama</i>	Cape Fox	LC (2016)	
<i>Xerus inauris</i>	South African Ground Squirrel	LC	Present
REPTILES			
<i>Acontias gracilicauda</i>	Thin-tailed Legless Skink	LC (SARCA 2014)	Possibly present
<i>Aparallactus capensis</i>	Black-headed Centipede-eater	LC (SARCA 2014)	Possibly present
<i>Boaedon capensis</i>	Brown House Snake	LC (SARCA 2014)	Possibly present
<i>Crotaphopeltis hotamboeia</i>	Red-lipped Snake	LC (SARCA 2014)	Possibly present
<i>Dasypeltis scabra</i>	Rhombic Egg-eater	LC (SARCA 2014)	Possibly present
<i>Elapsoidea sundevallii media</i>	Highveld Garter Snake		Possibly present
<i>Gerrhosaurus flavigularis</i>	Yellow-throated Plated Lizard	LC (SARCA 2014)	Possibly present
<i>Hemachatus haemachatus</i>	Rinkhals	LC (SARCA 2014)	Possibly present
<i>Homoroselaps lacteus</i>	Spotted Harlequin Snake	LC (SARCA 2014)	Possibly present
<i>Lycophidion capense capense</i>	Cape Wolf Snake	LC (SARCA 2014)	Possibly present
<i>Nucras holubi</i>	Holub's Sandveld Lizard	LC (SARCA 2014)	Possibly present
<i>Pachydactylus capensis</i>	Cape Gecko	LC (SARCA 2014)	Possibly present
<i>Panaspis wahlbergii</i>	Wahlberg's Snake-eyed Skink	LC (SARCA 2014)	Possibly present
<i>Prosymna sundevallii</i>	Sundevall's Shovel-snout	LC (SARCA 2014)	Possibly present
<i>Psammophis crucifer</i>	Cross-marked Grass Snake	LC (SARCA 2014)	Possibly present
<i>Psammophylax rhombeatus</i>	Spotted Grass Snake	LC (SARCA 2014)	Possibly present
<i>Rhinotyphlops lalandei</i>	Delalande's Beaked Blind Snake	LC (SARCA 2014)	Possibly present
Sensitive Species 15		NEST (M), VU	This species is found in Highveld grassland. It is unique among the cordylids as it an obligate burrower living in self-excavated burrows. Considered a habitat specialist, that is highly philopatric for burrowing sites. Although large, it will not easily disperse across landscapes to make new burrows should its habitat be destroyed.
<i>Trachylepis capensis</i>	Cape Skink	LC (SARCA 2014)	Possibly present
<i>Trachylepis punctatissima</i>	Speckled Rock Skink	LC (SARCA 2014)	Possibly present
<i>Trachylepis varia sensu lato</i>	Common Variable Skink Complex	LC (SARCA 2014)	Possibly present
AMPHIBIANS			
<i>Amietia delalandii</i>	Delalande's River Frog	LC (2017)	Possibly present
<i>Cacosternum boettgeri</i>	Common Caco	LC (2013)	Possibly present
<i>Sclerophrys capensis</i>	Raucous Toad	LC	Possibly present
<i>Sclerophrys gutturalis</i>	Guttural Toad	LC (IUCN, 2016)	Possibly present
<i>Tomopterna cryptotis</i>	Tremelo Sand Frog	LC	Possibly present
<i>Xenopus laevis</i>	Common Platanna	LC	Possibly present
INVERTEBRATES			
<i>Opisthophthalmus pugnax</i>		ToPS	Possibly present
<i>Pseudolychas ochraceus</i>		ToPS	Possibly present
<i>Uroplectes triangulifer</i>		ToPS	Possibly present

9.4 Appendix D: Systematic Planning Frameworks

9.4.1 Vegetation of Southern Africa

A general description of the vegetation units is provided below (as per Mucina & Rutherford, 2006, as amended) as a reference point for the baseline vegetation composition.

Central Free State Grassland (Gh 6)

VT 49 Transitional Cymbopogon–Themeda Veld (50%) (Acocks 1953). LR 39 Moist Cool Highveld Grassland (78%) (Low & Rebelo 1996).

Distribution: Free State Province and marginally into Gauteng Province: A broad zone from around Sasolburg in the north to Dewetsdorp in the south. Other major settlements located within this unit include Kroonstad, Ventersburg, Steynsrus, Winburg, Lindley and Edenville.

Altitude: 1 300–1 640 m, most of the area at 1 400–1 460 m.

Vegetation & Landscape Features: Undulating plains supporting short grassland, in natural condition dominated by *Themeda triandra* while *Eragrostis curvula* and *E. chloromelas* become dominant in degraded habitats. Dwarf karoo bushes establish in severely degraded clayey bottomlands. Overgrazed and trampled low-lying areas with heavy clayey soils are prone to *Acacia karroo* encroachment.

Geology & Soils: Sedimentary mudstones and sandstone mainly of the Adelaide Subgroup (Beaufort Group, Karoo Supergroup) as well as those of the Ecca Group (Karoo Supergroup) found in the extreme northern section of this grassland, giving rise to vertic, melanic and red soils (typical forms are Arcadia, Bonheim, Kroonstad, Valsrivier and Rensburg)—typical of Dc land type (dominating the landscape). The less common intrusive dolerites of the Jurassic Karoo Dolerite Suite support dry clayey soils typical of the Ea land type.

Climate: Summer-rainfall seasonal precipitation region, with **MAP 560 mm**. Much of the rainfall is of convectional origin and peaks in December to January. The overall MAT around 15 °C. Incidence of frost relatively high (43 days on average).

Important Taxa: **Graminoids:** *Aristida adscensionis* (d), *A. congesta* (d), *Cynodon dactylon* (d), *Eragrostis chloromelas* (d), *E. curvula* (d), *E. plana* (d), *Panicum coloratum* (d), *Setaria sphacelata* (d), *Themeda triandra* (d), *Tragus koelerioides* (d), *Agrostis lachnantha*, *Andropogon appendiculatus*, *Aristida bipartita*, *A. canescens*, *Cymbopogon pospischilii*, *Cynodon transvaalensis*, *Digitaria argyrograpta*, *Elionurus muticus*, *Eragrostis lehmanniana*, *E. micrantha*, *E. obtusa*, *E. racemosa*, *E. trichophora*, *Heteropogon contortus*, *Microchloa caffra*, *Setaria incrassata*, *Sporobolus discosporus*. **Herbs:** *Berkheya onopordifolia* var. *onopordifolia*, *Chamaesyce inaequilatera*, *Conyza pinnata*, *Crabbea acaulis*, *Geigeria aspera* var. *aspera*, *Hermannia depressa*, *Hibiscus pusillus*, *Pseudognaphalium luteo-album*, *Salvia stenophylla*, *Selago densiflora*, *Sonchus dregeanus*. **Geophytic Herbs:** *Oxalis depressa*, *Raphionacme dyeri*. **Succulent Herb:** *Tripteris aghillana* var. *integrifolia*. **Low Shrubs:** *Felicia muricata* (d), *Anthospermum rigidum* subsp. *pumilum*, *Helichrysum dregeanum*, *Melolobium candicans*, *Pentzia globosa*.

Conservation: **Least Concern (NBA, 2019)**. Target 24%. Only small portions enjoy statutory conservation (Willem Pretorius, Rustfontein and Koppies Dam Nature Reserves) as well as some protection in private nature reserves. Almost a quarter of the area has been transformed either for cultivation or by building of dams (Allemankraal, Erfenis, Groothoek, Koppies, Kroonstad, Lace Mine, Rustfontein and Weltevrede). No serious infestation by alien flora has been observed, but encroachment of dwarf karoo shrubs becomes a problem in the degraded southern parts of this vegetation unit. Erosion low (45%), moderate (30%) or very low (20%).

Remarks: On cool moist southern slopes, elements of the Eastern Free State Sandy Grassland (Gm 4) are notable. Stands of Winburg Grassy Shrubland (Gh 7) are present on outcrops (dykes and sills) of dolerite embedded within this grassland. Representation of these units is probable on solitary hills and slopes, rocky outcrops and mesas that may be present, which will be assessed further in the detailed assessment report.

References: Acocks (1953, 1988), Müller (1986), Du Preez & Bredenkamp (1991), Fuls et al. (1992), Müller (2002).

Highveld Alluvial Vegetation (AZa 5)

Distribution Free State, North-West, Mpumalanga and Gauteng Provinces as well as in Lesotho and Swaziland: Alluvial drainage lines and floodplains along rivers embedded within the Grassland Biome and marginal (eastern) units of the Kalahari (Savanna Biome), such as along upper Riet, Harts, upper Modder, upper Caledon, Vet, Sand, Vals, Wilge, Mooi, middle and upper Vaal Rivers etc. and their numerous tributaries. Altitude ranging from 1 000–1 500 m.

Vegetation & Landscape Features Flat topography supporting riparian thickets mostly dominated by *Acacia karroo*, accompanied by seasonally flooded grasslands and disturbed herblands often dominated by alien plants.

Geology, Soil & Hydrology Deep sandy to clayey (but mostly coarse sand) alluvial soils developed over Quaternary alluvial (fluvial) sediments. Oakleaf, Dundee, Shortlands, Glenrosa and Mispah soil forms were identified in the Vaal River floodplain (Bezuidenhout 1994). The rivers are perennial, often in flood in summer. Erosion of banks and deposition of new fine soil on alluvium can be of considerable extent. Some smaller anastomosing channels of major rivers can dry out in winter.

Climate Seasonal, mainly summer rainfall. Precipitation in the western part of the highveld is erratic (MAP 300–400 mm), increasing sharply towards the east and north (up to 600 mm in places). The overall MAP is almost 500 mm (range 373 mm at the western distribution limit and 593 mm at the northern distribution limit near Carletonville). Typical continental thermal regime, showing subtropical features is typical of the summer season (daily temperature often surpassing 35°C), while cold-temperate features (such as frequent frost) prevail in winter.

Important Taxa Riparian thickets **Small Trees:** *Acacia karroo* (d), *Salix mucronata* subsp. *mucronata* (d), *S. mucronata* subsp. *woodii*, *Ziziphus mucronata* (d), *Celtis africana*, *Rhus lancea*. **Tall Shrubs:** *Gymnosporia buxifolia* (d), *Rhus pyroides* (d), *Diospyros lycioides*, *Ehretia rigida*, *Grewia flava*. **Low Shrubs:** *Asparagus laricinus* (d), *A. suaveolens* (d). **Woody Climber:** *Clematis brachiata*. **Succulent Shrub:** *Lycium hirsutum* (d). **Graminoids:** *Setaria verticillata* (d), *Panicum maximum*. **Herb:** *Pollichia campestris*. **Reed beds** **Megagraminoid:** *Phragmites australis* (d). **Flooded grasslands & herblands** **Low Shrubs:** *Gomphocarpus fruticosus* (d), *Felicia muricata*. **Succulent Shrub:** *Salsola rabieana*. **Graminoids:** *Agrostis lachnantha* (d), *Andropogon eucomus* (d), *Chloris virgata* (d), *Cynodon dactylon* (d), *Eragrostis plana* (d), *Hemarthria altissima* (d), *Imperata cylindrica* (d), *Ischaemum fasciculatum* (d), *Miscanthus junceus* (d), *Paspalum distichum* (d), *Andropogon appendiculatus*, *Brachiaria marlothii*, *Cyperus denudatus*, *C. longus*, *Echinochloa holubii*, *Eragrostis obtusa*, *E. porosa*, *Fimbristylis ferruginea*, *Panicum coloratum*, *Pycreus mundii*, *Sporobolus africanus*, *S. fimbriatus*, *Themeda triandra*, *Urochloa panicoides*. **Herbs:** *Persicaria lapathifolia* (d), *Alternanthera sessilis*, *Barleria macrostegia*, *Corchorus asplenifolius*, *Equisetum ramosissimum*, *Galium capense*, *Hibiscus pusillus*, *Lobelia angolensis*, *Nidorella resedifolia*, *Persicaria amphibia*, *P. hystricula*, *Pseudognaphalium oligandrum*, *Pulicaria scabra*, *Rorippa fluviatilis* var. *fluviatilis*, *Senecio inornatus*, *Stachys hyssopoides*, *Vahlia capensis*. **Geophytic Herbs:** *Crinum bulbispermum*, *Haplocarpha lyrata*. **Open water Aquatic Herb:** *Myriophyllum spicatum*.

Conservation Least threatened. Target 31%. Nearly 10% statutorily conserved in the Barberspan (a Ramsar site), Bloemhof Dam, Christiana, Faan Meintjes, Sandveld, Schoonspruit, Soetdoring and Wolwespruit Nature Reserves. More than a quarter has been transformed for cultivation and by building of dams (Bloemhof, Erfenis, Krugersdrif, Mockes and Vaalharts Dams). The highveld alluvia are prone to invasion by a number of weeds, obviously encouraged by the high nutrient status of soils and ample water supply. Woody plants such as *Salix babylonica*, *Schinus molle*, *Melia azedarach*, *Celtis sinensis*, *Morus alba*, *Populus x canescens*, *Nicotiana glauca* and *N. longiflora* and forbs such as *Argemone ochroleuca*, *Chenopodium strictum*, *Conyza canadensis*, *Datura stramonium*, *Melilotus alba*, *Oenothera indecora*, *Paspalum dilatatum*, *P. urvillei*, *Pennisetum clandestinum*, *Tagetes minuta*, *Verbena bonariensis*, *Xanthium strumarium* agg. and *Zinnia peruviana* (see Cilliers et al. 1998, Malan et al. 2001a, b, L. Mucina, unpublished data) often dominate either the riverine thickets or grasslands or form ruderal communities in disturbed habitats. The undergrowth of the alluvial riparian thickets and the accompanying grasslands suffer from heavy overgrazing in many places.

Remark Many patches of this vegetation escaped our mapping efforts due to a lack of proper geographical coverage.

References Acocks (1976), Roussouw (1983), Müller (1986), Bezuidenhout (1988, 1994), Bredenkamp et al. (1989), Bredenkamp & Bezuidenhout (1990), Du Preez & Venter (1990), Kooij et al. (1990a, b), Du Preez (1991), Du Preez & Bredenkamp (1991), Eckhardt et al. (1993b, 1996), Bezuidenhout et al. (1994), Bredenkamp et al. (1994), Hoare (1997), Cilliers et al. (1998), Eckhardt (1998), Malan (1998), Boucher & Tlale (1999a, b), Hoare & Bredenkamp (1999), Myburgh (2000, 2001), Van Wyk et al. (2000), Dinga et al. (2001), Malan et al. (2001a, b), Myburgh & Bredenkamp (2004), http://www.ngo.grida.no/soesa/nsoer/resource/wetland/sa_ramsar.htm.

9.4.2 National Biodiversity Assessment

The NBA is the primary tool for monitoring and reporting on the state of biodiversity in South Africa and informs policies, strategic objectives, and activities for managing and conserving biodiversity more effectively. The NBA is especially important for informing the National Biodiversity Strategy and Action Plan (NBSAP), the National Biodiversity Framework (NBF) and the National Protected Area Expansion Strategy (NPAES), and also informs other national strategies and frameworks across a range of sectors, such as the National Spatial Development Framework, the National Water and Sanitation Master Plan and the National Biodiversity Economy Strategy. Ecosystem protection level is an indicator that tracks how well represented an ecosystem type is in the protected area network. It has been used as a headline indicator in national reporting in South Africa since 2005. It is computed by intersecting maps of ecosystem types and ecological condition with the map of protected areas. Ecosystem types are then categorised based on the proportion of the biodiversity target for each ecosystem type that is included in one or more protected areas. For terrestrial ecosystems, biodiversity targets are set for each ecosystem type using established species–area accumulation curves (ranging between 16 % and 34%). The status categorisation is based on a complex set of criteria, but for the purposes of this reporting, can be summarised as follows (NBA, 2019; IUCN RLE, 2017):

STATUS	DESCRIPTION
Least Concern	These <u>ecosystems</u> have lost only a small proportion (~more than 80 % remains) of their original natural habitat and are largely intact (although they may be degraded to varying degrees, for example by invasive alien species, overgrazing, or overharvesting from the wild).
Vulnerable	<u>Vulnerable terrestrial ecosystems</u> have lost some (~more than 60 % remains) of their original natural habitat and their functioning will be compromised if they continue to lose natural habitat.
Endangered	<u>Endangered terrestrial ecosystems</u> have lost significant amounts (~less than 40 % remains) of their original natural habitat, so their functioning is compromised.
Critically Endangered	<u>Critically Endangered terrestrial ecosystems</u> have lost significant amounts (~less than 20 % remains) of their original natural habitat, and therefore considered to have an extremely high risk of collapse.

9.4.3 Free State Bioregional Plan

Much of the current conservation effort in South Africa is focused on promoting land-use practices that reconcile development opportunities and spatial planning at a landscape scale, with the over-arching goal of maintaining and increasing the resilience of ecosystems, especially in the face of climate change. This landscape approach to biodiversity conservation involves working within and beyond the boundaries of protected areas to manage biodiversity within a mosaic of land-uses.

One of the primary aims is to achieve economic goals whilst the health of ecosystems is maintained, and the loss of important or threatened species or habitats is avoided. Creating functional connectivity in landscapes is a key aspect of promoting ecosystem resilience (the ability of the ecosystem to absorb a certain amount of change yet remain functional). Ecosystem resilience can be maintained or built through an approach that focuses on intact areas, maintaining biodiversity priority areas in a natural or near-natural state, maximising connectivity between these areas and maximising the diversity of species and ecosystems. Resilient ecosystems can:

- Maintain the ecological and evolutionary processes that allow biodiversity to persist in these ecosystems;
- Better-withstand human-induced pressures (from, for example, too frequent fires);
- Adapt to the impacts of climate change, such as increased rainfall variability;
- Mitigate the effects of climate change by continuing to capture and store carbon;
- Deliver ecosystem services, such as the provision of clean water and flood attenuation.

The main purpose of a biodiversity sector plan is to ensure that the most recent and best quality spatial biodiversity information can be accessed and used to inform land-use and development planning, environmental assessments and authorisations, and natural resource management. A biodiversity sector plan achieves this by providing a map (or maps) of terrestrial and freshwater areas that are important for conserving biodiversity pattern and ecological processes – these areas are called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). The maps are provided together with contextual information on biodiversity, and land-use guidelines that can be incorporated into the policies and decisions of a wide range of sectors. A Biodiversity Sector Plan is based on a fine-scale systematic biodiversity plan (1:50 000 or finer), and has boundaries aligned with administrative boundaries (such as a municipality or groups of municipalities).

A Biodiversity Conservation Plan can be used to guide conservation action (such as identifying priority sites for expansion of protected areas), or to feed spatial biodiversity priorities into planning and decision-making in a wide range of cross-sectoral planning processes and instruments such as provincial and municipal integrated development plans and spatial development frameworks, land-use management schemes, environmental management frameworks and environmental management plans. The following core categories are designated:

- Protected Areas: Areas that are formally protected by law and recognised in terms of the Protected Areas Act (this includes contract protected areas declared through the biodiversity stewardship programme).
- Critical Biodiversity Areas (CBAs): Areas that are required to meet biodiversity targets for species, ecosystems or ecological processes. These include:
 - All areas required to meet biodiversity pattern targets and to ensure continued existence and functioning of species and ecosystems, special habitats and species of conservation concern;
 - Critically Endangered ecosystems; and
 - Critical linkages (corridor ‘pinch-points’) to maintain connectivity.

CBAs are areas of high biodiversity value and need to be kept in a natural state, with no further loss of habitat or species.

- Ecological Support Areas (ESAs): Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of protected areas or CBAs and for delivering ecosystem services. In the terrestrial assessment they support landscape connectivity and strengthen resilience to climate change. ESAs need to be maintained in at least a functional and often natural state, supporting the purpose for which they were identified. They include features such as riparian habitat surrounding rivers or wetlands, corridors, over-wintering sites for Blue Cranes, and so on.
- Other Natural Areas (ONAs): Areas that have not been identified as a priority in the current systematic biodiversity plan but retain most of their natural character and perform a range of biodiversity and ecological infrastructural functions.
- Moderately or Heavily Modified Areas (sometimes called ‘transformed’): Areas that have been heavily modified by human activity so that they are by-and-large no longer natural, and do not contribute to biodiversity targets. Some of these areas may still provide limited biodiversity and ecological infrastructural functions but, their biodiversity value has been significantly and, in many cases, irreversibly compromised.

Table 13: Summary of map categories shown in the terrestrial CBA map, and their meanings.

Map Category	Description	Sub- Category	Description
Protected Areas	Areas that are formally protected by law and recognised in terms of the Protected Areas Act, including contract protected areas declared through the biodiversity stewardship programme.	National Parks & nature Reserves	Includes formally proclaimed national Parks, nature Reserves, Special nature Reserve, and Forest nature Reserves.
		Protected Environments: Natural	Includes Protected Environments, declared in terms of Protected Areas Act (Act 57 of 2003, as amended).
		Protected Environments: Modified	Heavily modified areas in formally proclaimed Protected Environments.
Critical Biodiversity Areas (CBA)	All areas required to meet biodiversity pattern and process targets; critically Endangered ecosystems, critical linkages (corridor pinch-points) to maintain connectivity; CBAs are areas of high biodiversity value that must be maintained in a natural state.	CBA: Irreplaceable	This category includes: (1) Areas required to meet targets and with irreplaceability values of more than 80%. (2) critical linkages or pinch-points in the landscape that must remain natural; (3) critically Endangered Ecosystems.
		CBA: Optimal	The CBA Optimal Areas (previously called ‘important and necessary’ in the MBCP) are the areas optimally located to meet both the various biodiversity targets and other criteria defined in the analysis. Although these areas are not ‘irreplaceable’ they are the most efficient land configuration to meet all biodiversity targets and design criteria.
Ecological Support Areas (ESA)	Areas that are not essential for meeting targets, but that play an important role in supporting the functioning of CBAs and that deliver important ecosystem services	ESA: Landscape corridor	The best option to support landscape-scale ecological processes, especially allowing for adaptation to the impacts of climate change.
		ESA: Local corridor	Finer-scale alternative pathways that build resilience into the corridor network by ensuring connectivity between climate change focal areas, reducing reliance on single landscape-scale corridors.
		ESA: Species Specific	Areas required for the persistence of particular species. Although these may be production landscapes, a change in land-use may result in loss of this species from the area. (Only one species-specific ESA was included in the analysis — an over-wintering site for blue cranes).
		ESA: Protected Area Buffers	Areas surrounding protected areas that moderate the impacts of undesirable land-uses that may affect the ecological functioning or tourism potential of PA’s. Buffer distance varies according to reserve status: national Parks — 10 km; nature Reserves — 5 km buffer; Protected Environments — 1 km buffer.
Other Natural Areas (ONA)	Areas that have not been identified as a priority in the current systematic biodiversity plan but retain most of their natural character and perform a range of biodiversity and ecological infrastructural functions.		
Moderately or Heavily Modified Areas	Areas in which significant or complete loss of natural habitat and ecological function has taken place due to activities such as ploughing, hardening of surfaces, open-cast mining, cultivation and so on.	Heavily Modified	All areas currently modified to such an extent that any valuable biodiversity and ecological functions have been lost.
		Moderately Modified: Old lands	Old, cultivated lands that have been allowed to recover (within the last 80 years), and support some natural vegetation. Although biodiversity pattern and ecological functioning may have been compromised, the areas may still play a role in supporting biodiversity and providing ecosystem services.

Networks of ecological corridors

Ecological corridors of natural and near-natural land ensure connectivity between various spatial elements in the land- scape. They link key protected areas with climate change refugia and other features of the landscape that promote adaptation to the effects of climate change. Two types of ecological corridors are differentiated:

- Landscape corridors, which are the best large-scale options for linking areas that are important for climate change resilience across provinces.
- Local corridors, which take effect at a finer scale to make the network of landscape corridors more robust to disturbance; they provide alternative pathways and critical linkages that should not be lost in the land- scape.

Because of the technology used in the development of Systematic Planning it was possible to minimise the presence of ‘narrow bottlenecks’ and avoid including large areas of modified land in the network of ecological corridors, wherever possible. Special attention was also paid to ensuring seamless alignment with ecological corridors that have been identified in the biodiversity plans of KwaZulu-Natal, Free State and Gauteng.

Areas important for climate change resilience

The spatial analysis undertaken identified parts of the landscape where it is likely that ecosystems will be most able to maintain a stable ecological composition and structure in the face of climate change, based on a range of possible future climate change scenarios (NBA 2011; Holness, pers. comm.). These areas are referred to as areas important for climate change resilience. They include diverse landscapes such as:

- Local refugia (e.g. kloofs and south facing slopes): Areas important for landscape connectivity (e.g. riparian corridors)
- Areas with steep temperature, precipitation and altitude gradients (e.g. south-facing slopes);
- Areas of high biotic diversity where many different habitat and biome types are found in close proximity and plant endemism is high.

Desired Management Objectives

The desired management objective for a parcel of land, or freshwater feature, refers to the ecological condition in which it should be maintained. These not only determine the ecological state or condition in which the land or freshwater feature should be maintained, but also provide the broad direction for appropriate land- or resource-use activities and management practices. Only those land- or resource-use activities that are compatible with maintaining the desired management objective should be encouraged. Different categories on the CBA maps have specific desired management objectives, according to their biodiversity priority (Table 14). In broad terms, the biodiversity priority areas need to be maintained in a healthy and functioning condition, whilst those that are less important for biodiversity can be used for a variety of other land-uses.

Table 14: Map categories, definitions, and desired management objectives

Map Category	Definition	Desired Management Objectives
Protected Areas	Those areas that are proclaimed as protected areas under national or provincial legislation, including gazetted Protected Environments.	Areas that are meeting biodiversity targets and therefore must be kept in a natural state, with a management plan focused on maintaining or improving the state of biodiversity.
Critical Biodiversity Areas (CBAs)	Areas that are required to meet biodiversity targets, for species, ecosystems, or ecological processes.	Must be kept in a natural state, with no further loss of habitat. Only low-impact, biodiversity-sensitive land-uses are appropriate.
Ecological Support Areas (ESAs)	Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of protected areas or CBAs and for delivering ecosystem services.	<u>Maintain in a functional, near-natural state, but some habitat loss is acceptable.</u> A greater range of land-uses over wider areas is appropriate, subject to an authorisation process that ensures the underlying biodiversity objectives are not compromised.
Other natural Areas (ONAs)	Areas that have not been identified as a priority in the current systematic biodiversity plan but retain most of their natural character and perform a range of biodiversity and ecological infrastructural functions. Although they have not	An overall management objective should be to minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning. These areas offer the greatest flexibility in terms of management objectives and permissible land-uses, but

	been prioritised for biodiversity, they are still an important part of the natural ecosystem.	some authorisation may still be required for high-impact land-uses.
Heavily or Moderately Modified Areas	Areas that have been modified by human activity to the extent that they are no longer natural, and do not contribute to biodiversity targets. These areas may still provide limited biodiversity and ecological infrastructural functions, even if they are never prioritised for conservation action.	Such areas offer the most flexibility regarding potential land-uses, but these should be managed in a biodiversity-sensitive manner, aiming to maximise ecological functionality and authorisation is still required for high-impact land-uses. Moderately modified areas (old lands) should be stabilised and restored where possible, especially for soil carbon and water-related functionality.

The general guideline recommendations for these categorisations are described below.

Land-use guidelines for terrestrial Critical Biodiversity Areas (CBAs)

Critical Biodiversity Areas are required to meet biodiversity targets and need to be maintained in a healthy natural state.

Irreplaceable CBAs are the most important biodiversity areas in the province, outside of the protected area network. They represent the last remaining options for securing critical biodiversity and ecosystems and for achieving biodiversity targets. If these areas suffer any further loss of habitat or ecological function, it is likely that the biodiversity targets will not be met and the status of species and ecosystems will decline.

Some CBAs are considered irreplaceable because they form what are called ‘critical linkages or pinch-points, or because they incorporate threatened ecosystems. critical linkages are highly constrained areas within a natural landscape that are vital for maintaining the linkage and ecological integrity of the corridor network. If these critical linkages are lost, it would result in disruption of the corridor network.

Optimal CBAs have an irreplaceability of less than 80% but are the most optimally located and the most efficient solution (i.e., occupying the smallest possible area) to meet biodiversity targets as well as other criteria such as avoiding high-cost areas where there are competing land-uses. There may be options to achieve the targets elsewhere, but these will require more land or may lead to increasing conflict between competing land uses.

Permissible land uses are those that are compatible with maintaining the natural vegetation cover of CBAs in a healthy ecological state, and that do not result in loss or degradation of natural habitat. Some low-intensity agricultural land-uses, such as grazing of livestock, may be acceptable in CBAs, on condition that best-practice guidelines aimed at benefiting the biodiversity assets and reducing the vulnerability of each site are implemented. An example of such best-practice guidelines is the recently released grazing and burning guidelines for managing grasslands for biodiversity and livestock production (SANBI, 2014). Land uses that should not be in terrestrial CBAs because they cause loss of natural habitat or ecosystem functionality, include:

- Any form of mining or prospecting.
- Extensive or intensive grazing that results in species diversity being lost through selective- or over-grazing.
- conversion of natural habitat for intensive agriculture (cultivation) or plantation forestry.
- Expansion of existing settlements or residential, commercial or industrial infrastructure.
- new hard infrastructure, and linear developments such as roads, railways and pipelines.
- complete-barrier fencing (i.e. game-proof fences) in in CBA (or ESA) corridors.
- Linear infrastructure of any sort that disrupts the connectivity of CBA (or ESA) corridors.

Land-use guidelines for terrestrial Ecological Support Areas

Ecological support areas (ESAs) are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of CBAs and deliver important ecosystem services. They facilitate landscape connectivity, promote resilience to climate change, and buffer elements of the landscape including protected areas and sites that are important for the survival of individual species.

ESA: Landscape and Local Corridors: The purpose of ecological corridors is to provide intact pathways for long-term biological movement. Landscape-scale corridors represent the best option for promoting resilience to climate change and the persistence of biodiversity as they provide pathways for the movement of plants and animals in response to environmental change. They also support the natural movement of species between populations to ensure population viability. Landscape corridors are aligned with areas that have maximum amounts of remaining natural habitat. Local corridors are fine-scale corridors that contribute to connectivity between climate change refugia. They represent alternative pathways for movement of species, and thus lessen impacts on critical linkages and landscape-scale corridors and provide networks that are more resistant to disturbance.

ESA: Species-Specific Sites: These are areas required for the persistence of specific species. Only one area, an important over-wintering site for blue cranes, that is shared with Gauteng, and which comprises a matrix of natural and cultivated lands, was identified as an ESA in the MBSP.

ESA: Protected Area Buffers: These are areas around protected areas where changes in land-use may affect the ecological functioning or tourism potential of the adjacent protected area. The purpose of buffer zones is to reduce the impacts of undesirable land-uses on the environment, and to provide opportunities for tourism. Modification of the natural habitat within the buffer zones may have negative impacts on the zonation and management plan of the adjacent protected area.

Permissible land-uses: There is more flexibility in terms of options for compatible land-uses in ESAs than there is in CBAs. However, ESAs do need to remain ecologically functional, which means that they need to be maintained in at least a near-natural state, although some loss of biodiversity pattern through a variety of land uses is acceptable.

Land-use guidelines for terrestrial Other Natural Areas

The overall purpose of these land-use guidelines is to promote the effective management of biodiversity as required in Section 41(a) of the Biodiversity Act (Act 10 of 2004, as amended) and in terms of the National Environmental Management Act (Act 107 of 1998, as amended). The guidelines provide advice on which land-uses and activities are most compatible with maintaining the ecological integrity of CBAs and ESAs, and other parts of the landscape, based on the desired management objectives for the land and the anticipated impact of each land-use activity on biodiversity patterns and ecological processes. The land-use guidelines have been developed in consultation with some planners from other sectors, and in a way that aims to minimise potential conflict between land uses. However, their focus is on identifying land-uses that are biodiversity compatible. They should, therefore, be used in conjunction with any other sector-specific guidelines that may be available for the province.

Land-use guidelines are presented below for terrestrial and freshwater ecosystems. These guidelines are intended primarily to guide planning and decision-making in terrestrial and freshwater Critical Biodiversity Areas and Ecological Support Areas on land outside of protected areas. However, brief guidelines are also provided for certain categories of protected areas, such as Protected Environments, in which a range of land uses other than biodiversity conservation is possible. In the sections that

follow, general recommendations are given for each category on the CBA maps, relating to desired management objectives and appropriate land uses.

Other natural Areas (OnAs) are not required to meet biodiversity targets, and so are not identified as a priority. They do, however, retain much of their natural character. The biodiversity in these non-priority landscapes may still be of value and contribute to maintenance of viable species populations and natural ecosystem functioning and Other natural Areas may provide essential ecological infrastructure and ecosystem services.

Permissible land uses: ONA's offer the greatest flexibility in terms of management objectives and permissible land-uses and are generally recommended (along with Modified Areas) as the sites for higher-impact land-uses. However, because ONAs may still have significant ecological, aesthetic and social value, they should not be regarded as 'ecological wastelands' or areas where 'anything goes.' Planners are still required to give due consideration to assessing environmental factors, socio-economic efficiency, aesthetics and impacts on the sense-of-place in making decisions about the location of land uses in these areas. Environmental authorisation may still be required for high-impact land-uses in terms of the listed activities in the EIA Regulations, and other relevant legislation.

Land-use guidelines for terrestrial Heavily or Moderately Modified Areas

Heavily modified areas are those in which significant or complete loss of natural habitat and ecological functioning has taken place due to activities such as ploughing, hardening of surfaces, mining, cultivation, and other activities that modify natural habitat. Even so, they may include small remnants of natural habitat such as the patches or strips of natural habitat that survive between cultivated lands, along river-lines and ridges and in open spaces in towns. These disconnected remnants are often biologically impoverished, highly vulnerable to damage and have limited likelihood of being able to persist but may contain residual biodiversity value or may provide ecological infrastructure or certain ecosystem services.

Moderately Modified - Old Lands (sometimes called 'old fields' in other documents) are those areas that were used for cultivation or mining in the past (within the last 80 years) but are no longer used for these purposes and have been left to re-vegetate. These old lands are areas where biodiversity pattern and ecological function have been seriously compromised in the past, but they may still play an important role in the provision of ecosystem services or may provide important habitats for certain animal species. For example, old lands can provide important feeding grounds for birds such as blue cranes, and disused mine shafts can provide suitable habitats for certain bats.

Permissible land-uses: Heavily modified areas are those preferred for intensive land-uses such as the construction of settlements, industrial development and other land-uses that have a high impact. These land-uses should still be located and managed in ways that maintain any residual ecological functionality, and that does not impact negatively on species for which these modified sites may be important. In some cases, restoration may be advisable.

9.4.4 Other Biodiversity Sector Plans

The site is outside of the planning domain of any other Biodiversity Sector Plans.

9.4.5 Strategic Water Source Areas

Strategic water source areas (Figure 27) are those that supply substantial downstream economies and urban centres. These water source areas are vital to the national economy. Strategic water source

areas are those that supply substantial downstream economies and urban centres. These water source areas are vital to the national economy.

Strategic water source areas can be regarded as natural “water factories”, supporting growth and development needs that are often far away. Deterioration of water quality and quantity in these areas can have a disproportionately large negative effect on the functioning of downstream ecosystems and the overall sustainability of growth and development in the regions they support. Appropriate management of these areas, which often occupy only a small fraction of the land surface area, can greatly support downstream sustainability of water quality and quantity.

In South Africa, such management is particularly important for enhancing downstream water quality and quantity. Not only are the country’s surface water resources extremely limited – South Africa is considered to be one of the driest countries (per capita), with 98 per cent of its surface water already developed – but the country also has a growing water quality problem.

Overloading with nutrients and other pollutants from urban, agricultural and industrial waste has resulted in many dams shifting to an algae-dominated, or eutrophic, state. Sixty-five per cent of the country’s dams are now estimated to be eutrophic or borderline eutrophic, with most of these algal blooms containing cyanobacteria (blue-green algae) that is toxic to human health. This renders water of high quality unavailable if not treated, which coupled with failing water infrastructure, represents a major challenge to water security in the near future. Water managers are inevitably faced with finding new and innovative ways of improving both water quality and quantity to meet the increasing water demands of the country. Managing strategic water source areas is one way to meet this challenge.

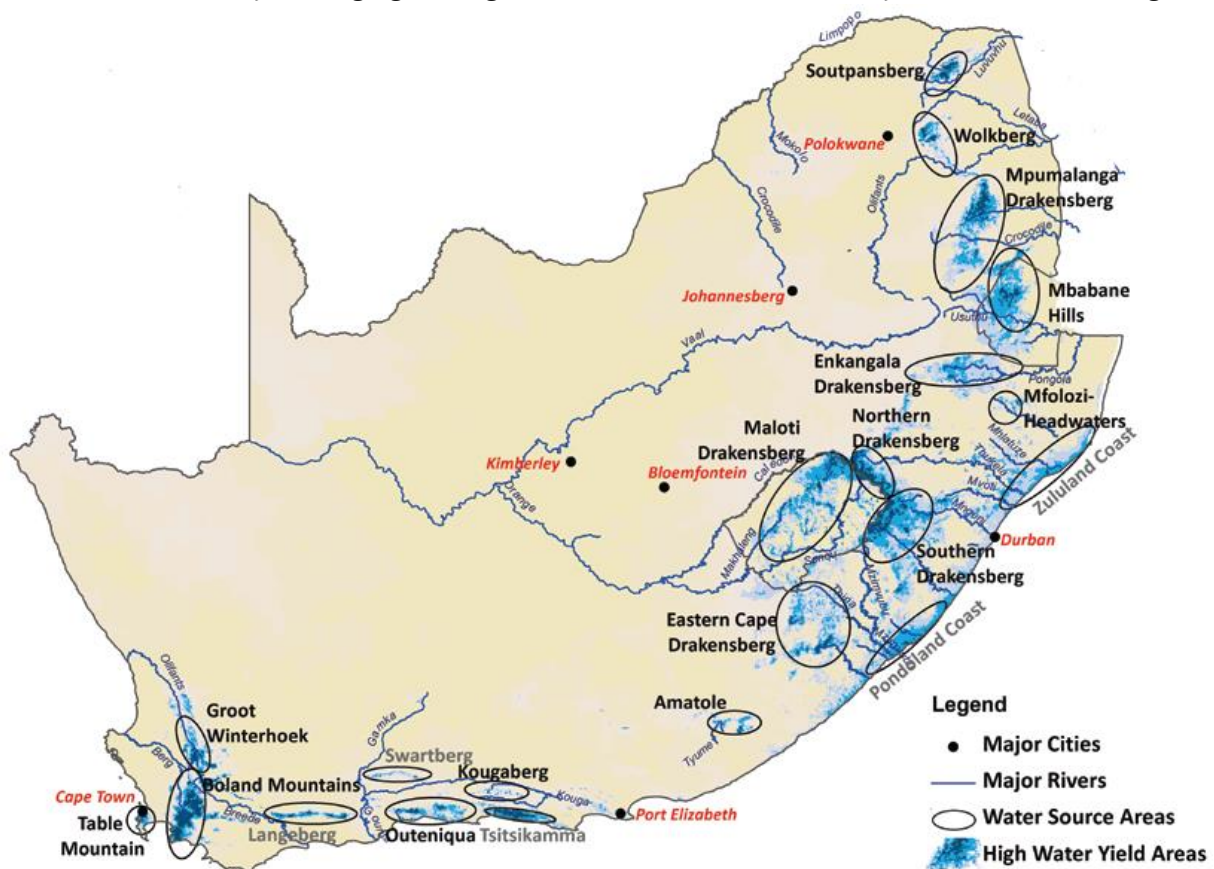


Figure 27: South Africa Water Source Areas [Source: Nel, et al, 2013]

9.4.6 Freshwater Ecosystem Priority Areas

The National Freshwater Ecosystem Priority Areas (NFEPA) project responds to the high levels of threat prevalent in river, wetland and estuary ecosystems of South Africa. It provides strategic spatial priorities for conserving the country's freshwater ecosystems and supporting sustainable use of water resources. These strategic spatial priorities are known as Freshwater Ecosystem Priority Areas, or 'FEPAs'.

Biodiversity targets set minimum, quantitative requirements for biodiversity conservation. They reflect scientific best judgement and will need to be refined as knowledge evolves. Quantitative biodiversity targets were set for fish species, river ecosystem types, wetland ecosystem types, priority estuaries, wetland clusters and free-flowing rivers:

1. Threatened and near-threatened freshwater fish species – all populations (100%) of considered to be critically endangered or endangered species, and at least ten populations of species that are in the International Union for Conservation of Nature (IUCN) vulnerable or near threatened categories and some populations of special concern (e.g., very restricted distributions in South Africa)
2. River ecosystem types – 20% of total length per type
3. Wetland ecosystem types – 20% of total area per type
4. Wetland clusters – 20% of total area per wetland vegetation group
5. Free-flowing rivers – 20% of total length per ecoregion group
6. Priority estuaries – 100% of all priority estuaries, which already took into account biodiversity targets of 20% for estuary ecosystem types and habitat, 50% of the populations of threatened species; 40% of the populations of exploited estuarine species; 30% of the populations of all other estuarine species.

Terrestrial and aquatic resources are interdependent, with one affecting the other. For example, to ensure the healthy functioning of rivers, wetlands and estuaries, it is essential to protect mountain catchment areas where the water originates, and to safeguard riverside vegetation because these plants prevent soil erosion, sedimentation and water pollution (Vromans et al., 2012).

The health of a river ecosystem is largely dependent on the presence of natural vegetation or “riparian habitat” along its banks, including good vegetative cover within the surrounding landscape (catchment area). Riparian bank vegetation filters pollutants, helps maintain water temperatures, supplies organic matter (“food”) in support of aquatic life (fish, insects etc.) and acts as a buffer to adjacent land-uses. The roots of the riparian plants also reduce the effects of floods, by binding riverbanks and thus preventing erosion. Furthermore, bank storage is increased by slowing run off during floods. For these reasons, it is essential that new developments are separated from a river and its “riparian habitat” by a buffer area.

9.4.7 Key Biodiversity Areas

Important Bird Areas

Important Bird and Biodiversity Areas (IBA's) are sites of international significance for the conservation of the world's birds and other biodiversity. They also provide essential benefits to people, such as food, materials, water, climate regulation and flood attenuation, as well as opportunities for recreation and spiritual fulfilment. By conserving IBA's, we look after all the ecosystem goods and services they provide, which means in effect that we support a meaningful component of the South African economy (such as water management and agriculture). Since the late 1970s, more than 12 000 IBA's have been identified in virtually all of the world's countries and territories, both on land and at sea. In 1998, 122 South African IBA's were identified and listed in Barnes (1998). This inventory was revised to 112 IBA's

in 2015. IBA's have also had considerable and increasing relevance when responses have been developed to several wider environmental issues, such as habitat loss, ecosystem degradation, climate change and the sustainable use of resources. The core aims of the IBA Programme are:

- To identify, monitor and conserve the sites and habitats that support South Africa's priority bird species.
- To develop a network of partners, from grassroots to national level, who collaborate to conserve IBA's.
- To gather new data regularly and monitor IBA's in order to track status and trends across the network and so that up-to-date information can be passed on to decision-makers, enabling them to take appropriate conservation action.
- To confirm periodically that existing IBA's continue to meet the selection criteria and to identify other critical sites that may qualify for recognition as IBA's as new information becomes available.
- To build capacity in the IBA Programme by sourcing funding, and to acquire and develop appropriate skills in staff and volunteers so that these objectives can be implemented at a regional scale.

The extension of the IBA approach to several other wildlife groups has led to the identification of Important Plant Areas, Prime Butterfly Areas, Important Mammal Areas and Key Biodiversity Areas for Freshwater Biodiversity. South Africa is also the first mega diverse country to practically test the Key Biodiversity Areas (KBA's) standards across a full range of species groups and ecosystems but is not yet published.

9.5 Vegetation and Ecological Processes and Corridors

9.5.1 Critical Biodiversity Areas

Given that the objective of CBAs is to identify biodiversity priority areas which should be maintained in a natural to near natural state, development within these areas is not encouraged. The following issues need to be considered when considering development within a CBA:

- Are there alternative areas within the site but outside of the CBA that could be developed?
- Does the project undermine the overall ecological functioning of the broad CBA area?
- Can mitigation measures reduce the impact of the development on ecological processes?

9.5.2 Ecosystem Processes

Distinct ecological processes are generally associated with surface geology and soils, climate, topography, drainage systems, and the make-up of the remaining native vegetation. These features could be missed or only partly incorporated into land use plans unless they are specifically identified and targeted. Ideally, areas maintaining adaptive diversification (e.g., environmental gradients) or containing historically isolated populations should be identified and protected. The spatial aspect of ecological processes also needs to be determined and such insights incorporated in conservation planning. Finally, connectivity within these areas should be ensured to maintain species migration and gene flow. However, the spatial components of processes have rarely been considered in conservation planning – an approach that is also especially useful for development planning in biodiversity hotspots. Three types of ecological processes are discussed below.

9.5.3 Ecosystem Services

“Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food, water, timber, and fibre; regulating services that affect climate, floods, disease, wastes, and

water quality; cultural services, recreational, aesthetic, and spiritual benefits; and supporting services such as soil formation, photosynthesis, and nutrient cycling". (Millennium Ecosystem Assessment (MEA), 2005)

Terrestrial (or land) ecosystems provide valuable ecosystem services that contribute to human well-being. They can provide¹⁰:

- buffers against natural hazards such as fire and floods[®]
- carbon sequestration (storage), important for reducing the impacts of climate change[®]
- regulation of water supply[®]
- grazing for wild animals and livestock[®]
- natural spaces for recreation & tourism[®]
- the air we breathe[®]
- spiritual, ritual and ceremonies[®]
- horticultural & wildflower industries
- natural heritage[®]
- food, timber, fibre and medicinal plants[®]

Rivers are central to human welfare and economic development. They provide:

- water for agricultural, industrial and domestic uses[®]
- flood attenuation and regulation[®]
- food and medicinal plants[®]
- transport and/or purification of biodegradable wastes[®]
- tourism, recreational and cultural use[®]
- enhanced property values

Estuaries, together with an associated buffer of natural vegetation, perform several valuable functions, especially in relation to:

- subsistence fishing
- commercial fisheries (as they provide a refuge for commercial fishes when they are young)
- wildlife habitat e.g., nursery and refuge (providing habitat for amphibians, birds, fish and mammals for all or portions of their life cycles)
- tourism, recreational, cultural use and craft materials
- enhanced property values

Ecological corridors provide valuable ecosystem services that are often impossible or very costly to replicate or offset. For example, they:

- support the migration (movement) and long-term survival of plant and animal species and their ecological processes (e.g., fire, pollination, seed dispersal), in response to global climate change
- are important areas for storing carbon to reduce the impacts of global climate change
- are important areas for regulating water supply (e.g., filtering and storing drinking water, keeping excess nutrients out of wetlands and rivers, ensuring a high-water yield from mountain catchments)
- supply good quality water from mountain catchment areas, both surface and groundwater.
- the supply of water quality and quantity is not only for human consumption but for ensuring the survival of downstream estuaries, wetlands (vleis) and streams (which in turn provide us with other ecosystem services).

¹⁰ Within the study area, terrestrial ecosystem services are marked (®).

- are of important scenic value, contributing to tourism and the ‘sense of place’.[®]
- Coastal & marine areas
- Subsistence & commercial fishing (food)
- Medicinal & Cosmetic resources e.g., kelp & microscopic plants for the feed, food, cosmetics, & pharmaceutical industries.
- Mining (sand and heavy mineral)
- Recreational value (sport and fishing)
- Retail value (market-value of housing)[®]

Net Primary production[®]: This critical ecological process involves the process of photosynthesis – which translates into the amount of carbon plants can fix on an annual basis. This is important for each LM within the district as the amount of carbon fixed translates directly into the amount of forage produced and thus made available for grazing. Consequently, livestock management directly impacts upon forage production as overgrazing reduces the vegetations’ ability to maintain this ecosystem process. This ecological process is especially significant for the ORT, as the main land use comprises of livestock grazing. Therefore, this factor has a direct bearing on both the amount of food available for livestock, and the amount of plant material available regarding reducing runoff in wetland areas.

Water production: In more arid areas, many municipalities and towns rely on groundwater or local water resources to supply to town with drinking water. Thus, the higher rainfall areas are key recharge zones for these groundwater resources. Consequently, land use management of these catchment areas are critical for the maintenance of the quality and quantity of water sourced from each area. For example, water courses and wetlands that have been cleared for agricultural purposes, or overgrazed, will not only cause soil erosion, but most importantly cause increased water runoff, thus reducing the amount of water that feeds back into the water table for consumption. Groundwater is also a critical resource for agriculture and food production.

Species movement corridors and climatic refuges: Global climate change is undoubtedly a threat in the coming decades. A key action to mitigate its effects is the maintenance of species’ ability to migrate to new locations as the climatic conditions which they require move across the landscape. These corridor and refuge migration strategies occur on both a micro and macro level. On the macro scale corridors provide for species movement at landscape scales. This entails the ability of fauna and flora to undertake large scale movements towards areas which continue to provide the conditions required by a species for growth and reproduction. Movements could entail migrations of up to hundreds of kilometres, and corridors of mostly natural or near natural vegetation across the landscape are needed to permit this to occur. Climatic refuges can be localized areas that have moderated climates – such as mountain kloofs and south facing slopes. These areas provide cooler habitats where species under threat from changing climates can colonise or species and vegetation not widely found in surrounding area.

9.5.4 Ecological Support Areas

These include supporting zones required to prevent the degradation of Critical Biodiversity Areas and Protected Areas. An ESA may be an ecological process area that connects and therefore sustains Critical Biodiversity Areas or a terrestrial feature. The ESA’S are not well defined in the ECBCP (refer to Section 2.3.5). ESAs are generally extensions to the CBA area incorporating small areas that are perhaps no longer natural, or are comprised of secondary vegetation, generally following the drainage line ecological corridors within the wider surrounding landscape that will improve connectivity.

9.5.5 Critical/Important Terrestrial Habitats

Special Habitats include areas that are rare within a region, or which support important species, ecosystems or ecological processes. Species of Special Concern refers to red data species and

important habitats include the locations where these species are known to occur. Red data species are plant, animal or other organisms (e.g., reptiles, insects etc) that have been assessed and classified according to their potential for extinction in the near future. All known species are listed in the Red Data Book and classified as Extinct, Critically Endangered, Endangered, Vulnerable, Near Threatened or Least Concern. Red Data species are those species classified as Extinct, Critically Endangered, Endangered or Vulnerable. Some of the red data species are listed within the NEMBA Threatened or Protected Species (TOPS), and some are protected by provincial ordinances. Critical habitats include those areas that are known locations for such red data species that are under threat of extinction.

9.5.6 Alien Invasive Species

On 18 September 2020, the Minister of Environmental Affairs published the Alien and Invasive Species Regulations (“the Regulations”) which came into effect on the 18 October 2020 in a bid to curb the negative effects of IAPs. The Regulations call on landowners and sellers of land alike to assist the Department of Environmental Affairs to conserve our indigenous fauna and flora and to foster sustainable use of our land. Non-adherence to the Regulations by a landowner or a seller of land can result in a criminal offence punishable by a fine of up to R 5 million (R 10 million in case of a second offence) and/or a period of imprisonment of up to 10 years.

Category 1a and 1b listed invasive species must be controlled and eradicated. Category 2 plants may only be grown if a permit is obtained, and the property owner ensures that the invasive species do not spread beyond his or her property. The growing of Category 3 species is subject to various exemptions and prohibitions. Some invasive plants are categorised differently in different provinces. For example: the Spanish Broom plant is categorised as a category 1b (harmful) invasive plant in Eastern Cape and Western Cape, but it is a category 3 (less harmful) invasive plant in the other seven provinces.

Invasive alien plants have a significant negative impact on the environment by causing direct habitat destruction, increasing the risk and intensity of wildfires, and reducing surface and sub-surface water. Landowners are under legal obligation to control alien plants occurring on their properties. Alien Invasive Plants require removal according to the Conservation of Agricultural Resources Act 43 of 1983 (CARA) and the National Environmental Management: Biodiversity Act (10 of 2004; NEMBA): Alien and Invasive Species Lists (GN R598 and GN R599 of 2014). Alien control programs are long-term management projects and a clearing plan, which includes follow up actions for rehabilitation of the cleared area, is essential. This will save time, money and significant effort. Collective management and planning with neighbours allow for more cost-effective clearing and maintenance considering aliens seeds as easily dispersed across boundaries by wind or water courses. All clearing actions should be monitored and documented to keep track of which areas are due for follow-up clearing. A general rule of thumb is to first target lightly infested areas before tackling densely invaded areas and prioritize sensitive areas such as riverbanks and wetlands. Alien grasses are among the worst invaders in lowland ecosystems adjacent to farms but are often the most difficult to detect and control.

Eradication protocol

The act required the removal of these species, being the responsibility of the landowner, as described in Table 15 below.

Table 15: Legislation regarding invasive alien species.

The National Environmental Management Act: Alien and Invasive Species Act (18 September 2020) stipulates the following:

6. *Control measures*

(1) In order to achieve the objects of this Act the Minister may prescribe control measures which shall be complied with by land users to whom they apply.

(2) Such control measures may relate to –

(1) the control of weeds and invader plants.

(3) A control measure may –

(a) contain a prohibition or an obligation with regard to any matter referred to in subsection (2).

(5) Any land user who refuses or fails to comply with any control measure which is binding on him, shall be guilty of an offence.

In this regard, Government Notice R. 598 – National Environmental Management: Biodiversity Act (10/2004): Alien and Invasive Species Regulations, 2014 (Gazette number 37885), dated August 2014, further stipulates the following:

CHAPTER 2: CATEGORIES OF LISTED INVASIVE SPECIES

2. Category 1a: Listed Invasive Species

(1) Category 1a Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be combatted or eradicated.

(2) A person in control of a Category 1a Listed Invasive Species must-

(a) comply with the provisions of section 73(2) of the Act.

(b) immediately take steps to combat or eradicate listed invasive species in compliance with sections 75(1), (2) and (3) of the Act; and

© allow an authorised official from the Department to enter onto land to monitor, assist with or implement the combatting or eradication of the listed invasive species.

If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must combat or eradicate the listed invasive species in accordance with such programme.

3. Category 1b: Listed Invasive Species

(1) Category 1b Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be controlled.

(2) A person in control of a Category 1 b Listed Invasive Species must control the listed invasive species in compliance with sections 75(1), (2) and (3) of the Act.

(3) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.

(4) A person contemplated in sub-regulation (2) must allow an authorised official from the Department to enter onto the land to monitor, assist with or implement the control of the listed invasive species, or compliance with the Invasive Species Management Programme contemplated in section 75(4) of the Act.

4. Category 2: Listed Invasive Species

(1) Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be.

(2) Unless otherwise indicated in the Notice, no person may carry out a restricted activity in respect of a Category 2 Listed Invasive Species without a permit.

(3) A landowner on whose land a Category 2 Listed Invasive Species occurs or person in possession of a permit, must ensure that the specimens of the species do not spread outside of the land or the area specified in the Notice or permit.

(4) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.

(5) Unless otherwise specified in the Notice, any species listed as a Category 2 Listed Invasive Species that occurs outside the specified area contemplated in sub-regulation (1), must, for purposes of these regulations, be considered to be a Category 1 b Listed Invasive Species and must be managed according to Regulation 3.

(6) Notwithstanding the specific exemptions relating to existing plantations in respect of Listed Invasive Plant Species published in Government Gazette No. 37886, Notice 599 of 1 August 2014 (as amended), any

person or organ of state must ensure that the specimens of such Listed Invasive Plant Species do not spread outside of the land over which they have control.

5. Category 3: Listed Invasive Species

(1) Category 3 Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of the Act, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of Act, as specified in the Notice.

(2) Any plant species identified as a Category 3 Listed Invasive Species that occurs in riparian areas, must, for the purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to regulation 3.

(3) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.

CHAPTER 7: ISSUING, AMENDMENT AND CANCELLATION OF PERMITS

29. Sale or transfer of alien and listed invasive species

(1) If a permit-holder sells a specimen of an alien or listed invasive species or sells the property on which a specimen of an alien or listed invasive species is under the permit-holder's control, the new owner of such specimen or such property must apply for a permit in terms of Chapter 7 of the Act.

(2) The new permit-holder contemplated in sub-regulation (1) will be subject to the same conditions as the permit-holder who has sold the specimen of an alien or listed invasive species, or the property on which a specimen of an alien or listed invasive species occurs, unless specific circumstances require all such permit conditions to be revised, in which case full reasons must be giving in writing by the issuing authority.

(3) The seller of any immovable property must, prior to the conclusion of the relevant sale agreement, notify the purchaser of that property in writing of the presence of listed invasive species on that property.

CHAPTER 9: COMPLIANCE AND ENFORCEMENT

35. Offences and penalties

(1) Any offence committed in terms of section 101 of the Act shall, upon conviction, carry the penalties referred to in section 102 of the Act.

(2) Any person who contravenes or fails to comply with a provision of these regulations is guilty of an offence and is liable, on conviction, to-

(a) a fine not exceeding five million rand, and in the case of a second or subsequent conviction, to a fine not exceeding R 10 million; or

(b) imprisonment for a period not exceeding 10 years; or

© to both such fine and imprisonment.

The seller of any immovable property must also, prior to the conclusion of the relevant sale agreement, notify the purchaser of that property in writing of the presence of listed IAPs on the property. Property sales agreements dated 1 October 2014 and onwards, should also incorporate a clause in terms of which the purchaser acknowledges that he has acquainted himself with the extent and the nature of the property he is buying and that he accepts the property as such, including the vegetation on the property.

Specific eradication and management procedures must be stipulated in the EMP as to the methods to be implemented to remove and control the various alien invasive species as they tend to require species specific techniques. A management plan should be incorporated into the construction EMP, and a detailed action plan compiled and implemented by the ECO. Any seed-bearing material is to be disposed of at a registered landfill.

9.6 Annexure E: Abbreviations and Glossary

9.6.1 Abbreviations

CARA	Conservation of Agricultural Resources Act, Act 43 of 1983
CBA	Critical Biodiversity Area
DEA	Department of Environmental Affairs (now DEFF, see below)
DFFE	The Department of Environmental Affairs was renamed the <u>Department of Forestry Fisheries and the Environment</u> , incorporating the forestry and fisheries functions from the previous Department of Agriculture, Forestry and Fisheries.
DEA&DP	Western Cape Department of Environmental Affairs and Development Planning Eastern Cape Department of Economic Development, Environmental Affairs and Tourism
DEDEAT	Tourism
DEMC	Desired Ecological Management Class
DWS	Department of Water Affairs and Sanitation
DWAF	Department of Water Affairs and Forestry (former department name)
EA	Environmental Authorisation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMC	Ecological Management Class
EMP	Environmental Management Plan
EMPr	Environmental Management Programme report
ER	Environmental Representative
ESS	Ecosystem Services
IAP's	Interested and Affected Parties
IEM	Integrated Environmental Management
LM	Local Municipality
masl	meters above sea level
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act, Act 107 of 1998
NFA	National Forests Act
NEM:BA	National Environmental Management: Biodiversity Act 10 of 2004
NFA	National Forest Act, Act 84 of 1998
PEMC	Present Ecological Management Class
PES	Present Ecological State
PNCO	Provincial Nature and Environment Conservation Ordinance (No. 19 of 1974).
RDL	Red Data List
RHS	Right Hand Side
RoD	Record of Decision
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SoER	State of the Environment Report
SSC	Species of Special Concern
ToPS	Threatened of Protected Species
ToR	Terms of Reference
+ve	Positive
-ve	Negative

9.6.2 Glossary

Alien Invasive Species (AIS)	An alien species whose introduction and/or spread threaten biological diversity (Convention on Biological Diversity). Note: “Alien invasive species” is considered to be equivalent to “invasive alien species”. An alien species which becomes established in natural or semi-natural ecosystems or habitat, is an agent of change, and threatens native biological diversity (IUCN).
Best Environmental Practice	The application of the most appropriate combination of environmental control measures and strategies (Stockholm Convention).
Best Management Practice	Established techniques or methodologies that, through experience and research, have proven to lead to a desired result (BBOP).
Biodiversity	Biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems.
Biodiversity Offset	Measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure and ecosystem function and people’s use and cultural values associated with biodiversity (BBOP).
Bioremediation	The use of organisms such as plants or microorganisms to aid in removing hazardous substances from an area. Any process that uses microorganisms, fungi, green plants, or their enzymes to return the natural environment altered by contaminants to its original condition.
Boundary	Landscape patches have a boundary between them which can be defined or fuzzy (Sanderson and Harris, 2000). The zone composed of the edges of adjacent ecosystems is the boundary.
Connectivity	The measure of how connected or spatially continuous a corridor, network, or matrix is. For example, a forested landscape (the matrix) with fewer gaps in forest cover (open patches) will have higher connectivity.
Corridors	Have important functions as strips of a landscape differing from adjacent land on both sides. Habitat, ecosystems or undeveloped areas that physically connect habitat patches. Smaller, intervening patches of surviving habitat can also serve as “steppingstones” that link fragmented ecosystems by ensuring that certain ecological processes are maintained within and between groups of habitat fragments.
Critically Endangered (CR)	A category on the IUCN Red List of Threatened Species which indicates a taxon is considered to be facing an <u>extremely high risk of extinction in the wild</u> (IUCN).
Cultural Ecosystem Services	The non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experience, including, e.g., knowledge systems, social relations, and aesthetic values (Millennium Ecosystem Assessment).
Cumulative Impacts	The total impact arising from the project (under the control of the developer), other activities (that may be under the control of others, including other developers, local communities, government) and other background pressures and trends which may be unregulated. The project’s impact is therefore one part of the total cumulative impact on the environment. The analysis of a project’s incremental impacts combined with the effects of other projects can often give a

	more accurate understanding of the likely results of the project's presence than just considering its impacts in isolation (BBOP).
Data Deficient (DD)	A <u>taxon is Data Deficient</u> when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat(IUCN).
Degraded Habitat/Land	Land that has been impacted upon by human activities (including introduction of invasive alien plants, light to moderate overgrazing, accelerated soil erosion, dumping of waste), but still retains a degree of its original structure and species composition (although some species loss would have occurred) and where ecological processes still occur (albeit in an altered way). Degraded land is capable of being restored to a near-natural state with appropriate ecological management.
Disturbance	An event that significantly alters the pattern of variation in the structure or function of a system, while fragmentation is the breaking up of a habitat, ecosystem, or land-use type into smaller parcels. Disturbance is generally considered a natural process.
Ecological Processes	Ecological processes typically only function well where natural vegetation remains, and where the remaining vegetation is well-connected with other nearby patches of natural vegetation. Loss and fragmentation of natural habitat severely threatens the integrity of ecological processes. Where basic processes are intact, ecosystems are likely to recover more easily from disturbances or inappropriate actions if the actions themselves are not permanent. Conversely, the more interference there has been with basic processes, the greater the severity (and longevity) of effects. Natural processes are complex and interdependent, and it is not possible to predict all the consequences of loss of biodiversity or ecosystem integrity. When a region's natural or historic level of diversity and integrity is maintained, higher levels of system productivity are supported in the long run and the overall effects of disturbances may be dampened.
Ecology	Ecology (from Greek: οἶκος, "house" and -λογία, "study of") is the study of the <u>relationships between living organisms, including humans, and their physical environment</u> . Ecology considers organisms at the individual, population, community, ecosystems, and biosphere level. Ecology overlaps with the closely related sciences of biogeography, evolutionary biology, genetics, ethology and natural history. Ecology is a branch of biology, and it is not synonymous with environmentalism.
Ecosystem Status	Ecosystem status of terrestrial ecosystems is based on the degree of habitat loss that has occurred in each ecosystem, relative to two thresholds: one for maintaining healthy ecosystem functioning, and one for conserving the majority of species associated with the ecosystem. As natural habitat is lost in an ecosystem, its functioning is increasingly compromised, leading eventually to the collapse of the ecosystem and to loss of species associated with that ecosystem (Millennium Ecosystem Assessment).
Ecosystem Services	A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit. Supporting Ecosystem services are those that are necessary for the maintenance of all other ecosystem services. Some examples include biomass production, production of atmospheric oxygen, soil formation and retention, nutrient cycling, water cycling, and provisioning of habitat.
Ecosystem	All the organisms of a habitat, such as a lake or forest, together with the physical environment in which they live. A dynamic complex of plant, animal and micro-

	organism communities and their non-living environment interacting as a functional unit.
Ecotone	The transitional zone between two communities. Ecotones can arise naturally, such as a lakeshore, or can be human created, such as a cleared agricultural field from a forest. The ecotonal community retains characteristics of each bordering community and often contains species not found in the adjacent communities. Classic examples of ecotones include fencerows; forest to marshlands transitions; forest to grassland transitions; or land-water interfaces such as riparian zones in forests. Characteristics of ecotones include vegetational sharpness, physiognomic change, and occurrence of a spatial community mosaic, many exotic species, ecotonal species, spatial mass effect, and species richness higher or lower than either side of the ecotone.
Edge	The portion of an ecosystem near its perimeter, where influences of the adjacent patches can cause an environmental difference between the interior of the patch and its edge. This edge effect includes a distinctive species composition or abundance in the outer part of the landscape patch. For example, when a landscape is a mosaic of perceptibly different types, such as a forest adjacent to a grassland, the edge is the location where the two types adjoin. In a continuous landscape, such as a forest giving way to open woodland, the exact edge location is fuzzy and is sometimes determined by a local gradient exceeding a threshold, as an example, the point where the tree cover falls below thirty-five percent.
Emergent Tree	Trees that grow above the top of the canopy
Endangered (En)	<u>Endangered terrestrial ecosystems</u> have lost significant amounts (more than 60 % lost) of their original natural habitat, so their functioning is compromised. <u>A taxon (species)</u> is Endangered when the best available evidence indicates that it meets any of the criteria for Endangered, and it is therefore considered to be facing a <u>very high risk</u> of extinction in the wild (<u>IUCN</u>).
Endemic	A plant or animal species, or a vegetation type, which is naturally restricted to a defined region or limited geographical area. Many endemic species have widespread distributions and are common and thus are not considered to be under any threat. They are however noted to be unique to a region, which can include South Africa, a specific province or a bioregion, vegetation type, or a localised area. In cases where it is highly localised or known only from a few or a few localities, and is under threat, it may be red listed either in terms of the South Africa Threatened Species Programme, NEMBA Threatened or Protected Species (ToPS) or the IUCN Red List of Threatened Species.
Environment	The external circumstances, conditions and objects that affect the existence and development of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Exotic	Non-indigenous; introduced from elsewhere, may also be a weed or alien invasive species. Exotic species may be invasive or non-invasive.
Ecological Structure	The composition, or configuration, and the proportion of different patches across the landscape. Relates to species diversity, the greater the diversity, the more complex the structure. A description of the organisms and physical features of environment including nutrients and climatic conditions.
Ecological Function	How each of the elements in the landscape interacts based on its life cycle events [Producers, Consumers, Decomposers Transformers]. Includes the capacity of natural processes and components to provide goods and services that satisfy human needs, either directly or indirectly.
Ecological Pattern	The contents and internal order of the landscape, or its spatial (and temporal) components. May be homogenous or heterogenous. Result from the ecological processes that produce them.

Ecological Process	Includes <i>Physical processes</i> [Climate (precipitation, insolation), hydrology, geomorphology]; <i>Biological processes</i> [Photosynthesis, respiration, reproduction]; <i>Ecological processes</i> [Competition, predator-prey interactions, environmental gradients, life histories]
Fragmentation (Habitat Fragmentation)	The ‘breaking apart’ of continuous habitat into distinct pieces. Causes land transformation, an important current process in landscapes as more and more development occurs.
Habitat Banking	A market where credits from actions with beneficial biodiversity outcomes can be purchased to offset the debit from environmental damage. Credits can be produced in advance of, and without ex-ante links to, the debits they compensate for, and stored over time (IEEP).
Habitat	The home of a plant or animal species. Generally, those features of an area inhabited by animal or plant which are essential to its survival.
IFC PS6	International Finance Corporation Performance Standard 6 – A standard guiding biodiversity conservation and sustainable management of living natural resources for projects financed by the International Finance Corporation (IFC)
Indicator	Information based on measured data used to represent an attribute, characteristic, or property of a system.
Indicator species	A species whose status provides information on the overall condition of the ecosystem and of other species in that ecosystem. They reflect the quality and changes in environmental conditions as well as aspects of community composition.
Indigenous	Native; occurring naturally in a defined area.
Indigenous Species (Native species)	A species that has been observed in the form of a naturally occurring and self-sustaining population in historical times (<i>Bern Convention 1979</i>). A species or lower taxon living within its natural range (past or present) including the area which it can reach and occupy <u>using its natural dispersal systems</u> (<i>modified after the Convention on Biological Diversity</i>)
Indirect Impact	Impacts triggered in response to the presence of a project, rather than being directly caused by the project’s own operations (BBOP)
Intact Habitat / Vegetation	Land that has not been significantly impacted upon by man’s activities. These are ecosystems that are in a near-pristine condition in terms of structure, species composition and functioning of ecological processes.
Intrinsic Value	The inherent worth of something, independent of its value to anyone or anything else.
Keystone Species	Species whose influence on ecosystem function and diversity are disproportionate to their numerical abundance. Although all species interact, the interactions of some species are more profound and far-reaching than others, such that their elimination from an ecosystem often triggers cascades of direct and indirect changes on more than a single trophic level, leading eventually to losses of habitats and extirpation of other species in the food web.
Landscape	An area of land that contains a mosaic of ecosystems, including human-dominated ecosystems (Millennium Ecosystem Assessment).
Landscape Approach	Dealing with large-scale processes in an integrated and multidisciplinary manner, combining natural resources management with environmental and livelihood considerations (FAQ).
Landscape connectivity	The degree to which the landscape facilitates or impedes movement among resource patches.
Least threatened / Least Concern (LC)	These <u>ecosystems</u> have lost only a small proportion (more than 80 % remains) of their original natural habitat and are largely intact (although they may be degraded to varying degrees, for example by invasive alien species, overgrazing, or overharvesting from the wild).

	A <u>taxon (species)</u> is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category (<i>IUCN</i>).
Matrix	The “background ecological system” of a landscape with a high degree of connectivity.
Natural Forest (Indigenous Forest)	<p>The definition of “natural forest” in the National Forests Act of 1998 (NFA) Section 2(1)(xx) is as follows: ‘A natural forest means a group of indigenous trees</p> <ul style="list-style-type: none"> • whose crowns are largely contiguous • or which have been declared by the Minister to be a natural forest under section 7(2) <p>This definition should be read in conjunction with Section 2(1)(x) which states that ‘Forest’ includes:</p> <ul style="list-style-type: none"> • A natural forest, a woodland, and a plantation • The forest-produce in it; and • The ecosystems which it makes up. <p>The legal definition must be supported by a technical definition, as demonstrated by a court case in the Umzimkulu magisterial district, relating to the illegal felling of Yellowwood (<i>Podocarpus latifolius</i>) and other species in the Gonqogonqo forest. From scientific definitions (also see Appendix B) we can define natural forest as:</p> <ul style="list-style-type: none"> • A generally multi-layered vegetation unit • Dominated by trees that are largely evergreen or semi-deciduous • The combined tree strata have overlapping crowns, and crown cover is >75% • Grasses in the herbaceous stratum (if present) are generally rare • Fire does not normally play a major role in forest function and dynamics except at the fringes • The species of all plant growth forms must be typical of natural forest (check for indicator species) • The forest must be one of the national forest types
Near Threatened (NT)	A <u>taxon (species)</u> is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future (<i>IUCN</i>).
Patch	A term fundamental to landscape ecology, is defined as a relatively homogeneous area that differs from its surroundings. Patches are the basic unit of the landscape that change and fluctuate, a process called patch dynamics. Patches have a definite shape and spatial configuration and can be described compositionally by internal variables such as number of trees, number of tree species, height of trees, or other similar measurements.
Protected Area	A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.
Range restricted species	<p>Species with a geographically restricted area of distribution. Note: Within the IFC PS6, restricted range refers to a limited <u>extent of occurrence</u> (EOO):</p> <ul style="list-style-type: none"> • For terrestrial vertebrates and plants, restricted-range species are defined as those species that have an EOO less than 50,000 square kilometres (km²).
Refugia	A location which supports an isolated or relict population of a once more widespread species. This isolation can be due to climatic changes, geography, or human activities such as deforestation and overhunting.
Resilience	The capacity of a natural system to recover from disturbance (<i>OECD</i>).

Rehabilitation	Measures taken to rehabilitate degraded ecosystems or restore cleared ecosystems following exposure to impacts that cannot be completely avoided and/ or minimised. Rehabilitation emphasizes the reparation of ecosystem processes, productivity and services, whereas the goals of restoration also include the re-establishment of the pre-existing biotic integrity in terms of species composition and community structure (BBOP).
Restoration	The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. An ecosystem has recovered when it contains sufficient biotic and abiotic resources to continue its development without further assistance or subsidy. It would sustain itself structurally and functionally, demonstrate resilience to normal ranges of environmental stress and disturbance, and interact with contiguous ecosystems in terms of biotic and abiotic flows and cultural interactions (IFC).
Riparian	Pertaining to, situated on or associated with the banks of a watercourse, usually a river or stream.
River Corridors	River corridors perform several ecological functions such as modulating stream flow, storing water, removing harmful materials from water, and providing habitat for aquatic and terrestrial plants and animals. These corridors also have vegetation and soil characteristics distinctly different from surrounding uplands and support higher levels of species diversity, species densities, and rates of biological productivity than most other landscape elements. Rivers provide for migration and exchange between inland and coastal biotas.
Sustainable Development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED).
Terrestrial	Occurring on, or inhabiting, land.
Threatened Species	Umbrella term for any species categorised as Critically Endangered, Endangered or Vulnerable by the IUCN Red List of Threatened Species (IUCN). Any species that is likely to become extinct within the foreseeable future throughout all or part of its range and whose survival is unlikely if the factors causing numerical decline or habitat degradation continue to operate (EU).
Traditional Ecological Knowledge	Knowledge, innovations and practices of indigenous and local communities around the world. Developed from experience gained over the centuries and adapted to the local culture and environment, traditional knowledge is transmitted orally from generation to generation. It tends to be collectively owned and takes the form of stories, songs, folklore, proverbs, cultural values, beliefs, rituals, community laws, local language, and agricultural practices, including the development of plant species and animal breeds. Traditional knowledge is mainly of a practical nature, particularly in such fields as agriculture, fisheries, health, horticulture, and forestry (CBD).
Transformation	In ecology, transformation refers to adverse changes to biodiversity, typically habitats or ecosystems, through processes such as cultivation, forestry, drainage of wetlands, urban development or invasion by alien plants or animals. Transformation results in habitat fragmentation – the breaking up of a continuous habitat, ecosystem, or land-use type into smaller fragments.
Transformed Habitat/Land	Land that has been significantly impacted upon as a result of human interferences/disturbances (such as cultivation, urban development, mining, landscaping, severe overgrazing), and where the original structure, species composition and functioning of ecological processes have been irreversibly altered. Transformed habitats are not capable of being restored to their original states.
Tributary	A small stream or river flowing into a larger one.

Untransformed Habitat/Land	Land that has not been significantly impacted upon by man's activities. These are ecosystems that are in a near-pristine condition in terms of structure, species composition and functioning of ecological processes.
Vulnerable (Vu)	<u>Vulnerable terrestrial ecosystems</u> have lost some (more than 60 % remains) of their original natural habitat and their functioning will be compromised if they continue to lose natural habitat. A <u>taxon (species)</u> is Vulnerable when the best available evidence indicates that it meets any of the criteria for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild (<u>IUCN</u>).
Watercourse	Natural or man-made channel through or along which water may flow. A river or spring; a natural channel in which water flows regularly or intermittently; a wetland, lake or dam into which, or from which, water flows. and a reference to a watercourse includes, where relevant, its bed and banks;
Weed	An indigenous or non-indigenous plant that grows and reproduces aggressively, usually a ruderal pioneer of disturbed areas. Weeds may be unwanted because they are unsightly, or they limit the growth of other plants by blocking light or using up nutrients from the soil. They can also harbour and spread plant pathogens. Weeds are generally known to proliferate through the production of large quantities of seed.
Wetlands	A collective term used to describe lands that are sometimes or always covered by shallow water or have saturated soils, and where plants adapted for life in wet conditions usually grow.
Catchment	In relation to a watercourse or watercourses or part of a watercourse, means the area from which any rainfall will drain into the watercourse or watercourses or part of a watercourse, through surface flow to a common point or common points.
Estuary	a partially or fully enclosed body of water - (a) which is open to the sea permanently or periodically; and (b) within which the sea water can be diluted, to an extent that is measurable, with fresh water drained from land.
Instream habitat	Includes the physical structure of a watercourse and the associated vegetation in relation to the bed of the watercourse;
Riparian Habitat	Includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas.

9.7 Annexure F: Biodiversity Environmental Management Plan

Specific measures relating to management of Biodiversity Impacts that must be included in the project Environmental Management Programme (EMPr). This Environmental Management Plan (EMP) contains guidelines, operating procedures and rehabilitation control requirements, which will be binding on the holder of the environmental authorisation after approval of the EMP. The impacts identified and listed in 3.3 will be managed / controlled as set out under mitigating measures (3.3) and as detailed in this section for the more significant impacts during the operational phase.

9.7.1 Protection of Flora and Fauna

The following actions must be implemented at construction phase.

- Search and rescue operations for Species of Conservation Concern must be undertaken before the commencement of site clearing activities.
- Indigenous vegetation encountered on the sites that are to be conserved and left intact.
- It is important that clearing activities are kept to the minimum and take place in a phased manner. This allows animal species to move into safe areas and prevents wind and water erosion of the cleared areas.
- Stripped vegetation should be temporarily stored during operations and to be used later to stabilise slopes. This excludes exotic invasive species.
- No animals are to be harmed or killed during the course of operations.
- Workers are NOT allowed to collect any flora or snare any faunal species. All flora and fauna remain the property of the landowner and must not be disturbed, upset or used without their expressed consent.
- It is the responsibility of the Contractor to provide sufficient fuel for cooking and heated as needed by the staff.
- No domestic animals are permitted on the sites.
- Trees and shrubs that are directly affected by the operations may be felled or cleared but only by the expressed written permission of the ECO.
- Rehabilitation of vegetation of the site must be done as described in the Rehabilitation Plans.

Flora search and Rescue

The following flora relocation plan is recommended:

- Once the final layout has been determined the botanist will be consulted in order to finalise the plant relocation and vegetation clearing plan.
- Respective permits to be obtained.
- Flora search and rescue is to be conducted before vegetation clearing takes place.
- Areas should only be stripped of vegetation as and when required and once species of special concern have been relocated for that area.
- Once site clearing is to commence, the area to be cleared of vegetation will be surveyed by the vegetation and plant search and rescue team clearing under the supervision of the botanist to identify and remove species suitable for rescue and commence removal of plants.
- These species are to be replanted immediately in a suitable area of similar vegetation, where future development is unlikely to occur, or within a protected area.

9.7.2 Alien and Invasive Plant Management Plan

The following mitigation measures have been identified in order to ensure that the introduction and spread of alien invasive vegetation is minimised:

- Alien species must be removed from the site as per the National Environmental Management: Biodiversity Act (No. 10 of 2004) requirements.

- A suitable weed management strategy must be implemented in the construction phase and carried through the operational phase.
- Weeds and alien species must be cleared by hand before the rehabilitation phase of the areas. Removal of alien plants are to be done according to the Working for Water Guidelines.
- The Contractor is responsible for the removal of alien species within all areas disturbed during construction activities. Disturbed areas include (but are not limited to) access roads, construction camps, site areas and temporary storage areas.
- In consultation with relevant authorities, the Engineer may order the removal of alien plants (when necessary). Areas within the confines of the site are to be included.
- All alien plant material (including brushwood and seeds) should be removed from site and disposed of at a registered waste disposal site. Should brushwood be utilised for soil stabilization or mulching, it must be seed free.
- After clearing is completed, an appropriate cover crop may be required, should natural re-establishment of grasses not take place in a timely manner.

9.7.3 Fires

- The Contractor must ensure that an emergency preparedness plan is in place in order to fight accidental fires or veld fires, should they occur. The adjacent landowners/users/managers should also be informed or otherwise involved.
- Enclosed areas for food preparation should be provided and the Contractor must strictly prohibit the use of open fires for cooking and heating purposes.
- The use of branches of trees and shrubs for fire-making must be strictly prohibited.
- The Contractor should take all reasonable and active steps to avoid increasing the risk of fire through their activities on-site. No fires may be lit except at places approved by the ECO.
- The Contractor must ensure that the basic fire-fighting equipment is to the satisfaction of the Local Emergency Services.
- The Contractor must supply all living quarters, site offices, kitchen areas, workshop areas, materials, stores and any other relevant areas with tested and approved fire-fighting equipment.
- Fires and “hot work” must be restricted to demarcated areas.
- A braai facility may be considered at the discretion of the Contractor and in consultation with the ECO. The area must be away from flammable stores. All events must be under management’s supervision and a fire extinguisher will be immediately available. “Low-smoke” fuels must be used (e.g., charcoal) and smoke control regulations, if applicable, must be considered.
- The Contractor must take precautions when working with welding or grinding equipment near potential sources of combustion. Such precautions include having a suitable, tested and approved fire extinguisher immediately at hand and the use of welding curtains.

9.7.4 Soil Aspects

- Sufficient topsoil must be stored for later use during decommissioning, particularly from outcrop areas.
- Topsoil shall be removed from all areas where physical disturbance of the surface will occur.
- All available topsoil shall be removed after consultation with the botanist and horticulturalist prior to commencement of any operations.
- The removed topsoil shall be stored on high ground within the site footprint outside the 1:50 flood level within demarcated areas.
- Topsoil shall be kept separate from overburden and shall not be used for building or maintenance of roads.
- The stockpiled topsoil shall be protected from being blown away or being eroded. The application of a suitable grass seed/runner mix will facilitate this and reduce the minimise weeds.

9.7.5 Dust

- To manage complaints relation to impacts on the nearby communities, a dust register will be developed.
- If required, water spray vehicles will be used to control wind cause by strong winds during activities on the works.
- No over-watering of the site or road surfaces.
- Wind screens should be used to reduce wind and dust in open areas.

9.7.6 Infrastructural Requirements

Topsoil

- Topsoil shall be removed from all areas where physical disturbance of the surface will occur.
- All available topsoil shall be removed after consultation with the Regional Manager prior to commencement of any operations.
- The removed topsoil shall be stored on high ground within the footprint outside the 1:50 flood level within demarcated areas (Appendix 1)
- Topsoil shall be kept separate from overburden and shall not be used for building or maintenance of roads.
- The stockpiled topsoil shall be protected from being blown away or being eroded. The use of a suitable grass seed/runner mix will facilitate soil protection and minimise weeds/weed growth.

Stormwater and Erosion Control

- Stormwater Management Plans must be developed for the site and should include the following:
 - The management of stormwater during construction.
 - The installation of stormwater and erosion control infrastructure.
 - The management of infrastructure after completion of construction.
- Temporary drainage works may be required to prevent stormwater to prevent silt laden surface water from draining into river systems in proximity to the site. Stormwater must be prevented from entering or running off site.
- To ensure that site is not subjected to excessive erosion and capable of drainage runoff with minimum risk of scour, their slopes should be profiled at a maximum 1:3 gradient.
- Diversion channels should be constructed ahead of the open cuts, and above emplacement areas and stockpiles to intercept clean runoff and divert it around disturbed areas into the natural drainage system downstream of the site.
- Rehabilitation is necessary to control erosion and sedimentation of all eroded areas (where works will take place).
- Existing vegetation must be retained as far as possible to minimise erosion problems.
- It is importation that the rehabilitation of site is planned and completed in such a way that the runoff water will not cause erosion.
- Visual inspections will be done on a regular basis with regard to the stability of water control structure, erosion and siltation.
- Sediment-laden runoff from cleared areas must be prevented from entering rivers and streams.
- No river or surface water may be affected by silt emanating from the site.

Site Office / Camp Sites

- No site offices or camp sites will be constructed on the site under current operating conditions, existing structures will be used.

Operating Procedures in the Site

- Construction shall only take place within the approved demarcated site.

- Construction may be limited to the areas indicated by the Regional Manager on assessment of the application.
- The holder of the environmental authorisation shall ensure that operations take place only in the demarcated areas as described in this report.
- Watering to minimise the effect of dust generation should be carried out as frequently as necessary. Noise should also be kept within reason.
- No workers will be allowed to damage or collect any indigenous plant or snare any animal.
- Grass and vegetation of the immediate environment or adapted grass / vegetation will be re-established on completion of construction activities, where applicable.
- No firewood to be collected on site and the lighting of fires must be prohibited.
- Cognisance is to be taken of the potential for endangered species occurring in the area. It is considered unlikely, however, that these species will be affected by the proposed activity.

Excavations

Whenever any excavation is undertaken, the following procedures shall be adhered to:

- Topsoil shall be handled as described in this EMP.
- Excavations shall take place only within the approved demarcated site.
- Excavations must follow the contour lines where possible.
- The construction site will not be left in any way to deteriorate into an unacceptable state.
- The excavated area must serve as a final depositing area for waste rock and overburden during the rehabilitation process.
- Once excavations have been filled with overburden, rocks and coarse natural materials and profiled with acceptable contours (including erosion control measures), the previous stored topsoil shall be returned to its original depth over the area.
- The area shall be fertilised, if necessary, to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix in order to propagate the locally occurring flora.

Rehabilitation of Processing and Excavation Areas

- On completion of construction, the surface of the processing areas especially if compacted due to hauling and dumping operations shall be scarified to a depth of at least 200 mm and graded to an even surface condition and the previously stored topsoil will be returned to its original depth over the area.
- The area shall be fertilised, if necessary, to allow vegetation to establish rapidly. The site shall be seeded with suitable grasses and local indigenous seed mix.
- Excavations may be used for the dumping of construction wastes. This shall be done in such a way as to aid rehabilitation.
- Waste (non-biodegradable refuse) will not be permitted to be deposited in the excavations.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the activity, be corrected and the area be seeded with a vegetation seed mix to his or her satisfaction. This must be done in conjunction with the ECO.
- Final rehabilitation must comply with the requirements mention in the Rehabilitation Plan.

9.7.7 Rehabilitation Plan

Rehabilitation Objective

The overall objective of the rehabilitation plan is to minimize adverse environmental impacts associated with the activity whilst maximizing the future utilization of the property. Significant aspects to be borne in mind in this regard is, revegetation of undeveloped footprint and stability and

environmental risk. The depression and immediate area of the working must also be free of alien vegetation. Additional broad rehabilitation strategies / objectives include the following:

- Rehabilitating the worked-out areas to take place concurrently within prescribed framework established in the EMP.
- All infrastructure, equipment, plant and other items used during the construction period will be removed from the site.
- Waste material of any description, including scrap, rubble and tyres, will be removed entirely from the site and disposed of at a recognised landfill facility. It will not be permitted to be buried or burned on site.
- Final rehabilitation shall be completed within a period specified by the Regional Manager.

Topsoil and Subsoil Replacement

Topsoil and subsoil will be stripped and stockpiled separately and only used in rehabilitation work towards the end of the operation. This is in contrast to the gravel activity where rehabilitation and topsoil replacement was earmarked at the completion of each phase.

Stripped overburden will be backfilled into the worked-out areas where needed. Stripped topsoil will be spread over the re-profiled areas to an adequate depth to encourage plant regrowth. The vegetative cover will be stripped with the thin topsoil layer to provide organic matter to the relayed material and to ensure that the seed store contained in the topsoil is not diminished. Reseeding may be required should the stockpiles stand for too long and be considered barren from a seed bank point of view. Stockpiles should ideally be stored for no longer than a year.

The topsoil and overburden will be keyed into the reprofiled surfaces to ensure that they are not eroded or washed away. The topsoiled surface will be left fairly rough to enhance seedling establishment, reduce water runoff and increase infiltration.

Revegetation

All prepared surfaces will be seeded with suitable grass species to provide an initial ground cover and stabilize the soil surface. The following grass seed that is commonly available and suitable.

Botanical name	Common name	Approx seed mixture /Ha
<i>Cynodon dactylon</i>	Kweek	12 kg/ Ha
<i>Eragrostis curvula</i>	Weeping Love Grass	6 kg/ Ha
<i>Eragrostis tef</i>	Teff	2 kg/ Ha
<i>Digitaria eriantha</i>	Smuts Grass	4 kg/ Ha
Other indigenous veld grasses can be added to the seed mix		± 4 kg/Ha

The overall revegetation plan will, therefore, be as follows:

- Ameliorate the aesthetic impact of the site
- Stabilise disturbed soil and rock faces
- Minimize surface erosion and consequent siltation of natural water course located on site
- Control wind-blown dust problems
- Enhance the physical properties of the soil
- Re-establish nutrient cycling
- Re-establish a stable ecological system

Every effort must be made to avoid unnecessary disturbance of the natural vegetation during operations.

Drainage and Erosion Control

To control the drainage and erosion at site the following procedures will be adopted:

- Areas where construction is completed should be rehabilitated immediately.
- Areas to be disturbed in future activities will be kept as small as possible (i.e., conducting the operations in phases), thereby limiting the scale of erosion.
- Slopes will be profiled to ensure that they are not subjected to excessive erosion but capable of drainage runoff with minimum risk of scour (maximum 1:3 gradient).
- All existing disturbed areas will be re-vegetated to control erosion and sedimentation
- Existing vegetation will be retained as far as possible to minimize erosion problems.

Visual Impacts Amelioration

The overall visual impact of the proposed activities will be minimised by the following mitigating measures:

- Confining the footprint to an area as small as possible
- Re-topsoiling and vegetating all disturbed areas

9.7.8 Monitoring and Reporting

Adequate management, maintenance and monitoring will be carried out annually by the applicant to ensure successful rehabilitation of the property until a closure certificate is obtained.

To minimise adverse environmental impacts associated with operations it is intended to adopt a progressive rehabilitation programme, which will entail carrying out the proposed rehabilitation procedures concurrently with activity.

9.7.9 Closure objectives and extent of alignment to pre-construction environment

Closure Objectives

The closure of the site will involve removal of all debris and rehabilitation of areas disturbed during the construction phase of the project. This will comprise the scarification of compacted areas, reshaping of areas, topsoiling and rehabilitating all prepared surfaces.

9.8 Annexure G: General Impact Rating Scale

To ensure a direct comparison between various specialist studies, six standard rating scales are defined and used to assess and quantify the identified impacts. This is necessary since impacts have several parameters that need to be assessed.

These scales are:

1. The Severity/ Benefit Scale, which assesses the importance of the impact from a purely technical perspective.
2. The Spatial Impact Scale, which assesses the extent or magnitude of the impact (the area that will be affected by the impact).
3. The Temporal Impact Scale, which assesses how long the impact will be felt. Some impacts are of a short duration, whereas others are permanent.
4. The Degree of Certainty Scale, which provides a measure of how confident the author feels about their prediction.
5. The Likelihood Scale, which provides an indication of the risk or chance of an impact taking place.
6. The Environmental Significance Scale, which assesses the importance of the impact in the overall context of the affected system or party.

To ensure integration of social and ecological impacts, to facilitate specialist assessment of impact significance, and to reduce reliance on value judgments, the severity of the impact within the scientific field in which it takes place (e.g., vegetation, fauna etc.) was assessed first. Thereafter, each impact was assessed within the context of time and space, and the probability of the impact occurring was quantified using the degree of certainty scale.

The impact was then assessed in the context of the whole environment to establish the “environmental significance” of the impact to the flora and vegetation.

The scales are described in detail below.

9.8.1 The Severity/ Beneficial Scale

The *severity scale* was used to scientifically evaluate how severe negative impacts would be, or how beneficial positive impacts would be on an affected system (for ecological impacts) or an affected party. This methodology attempts to remove any value judgments from the assessment, although it relies on the professional judgment of the specialist.

NEGATIVE IMPACT	POSITIVE IMPACT
<p><u>Very severe</u> An irreversible and permanent change to the affected system(s) which cannot be mitigated. For example, change in topography resulting from a quarry.</p>	<p><u>Very Beneficiary</u> A permanent and very substantial benefit to the affected system(s) with no alternative to achieve this benefit.</p>
<p><u>Severe</u> Long-term impacts on the affected system(s) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming or some combination of these.</p>	<p><u>Beneficial</u> A long-term impact and substantial benefit to the affected system(s). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these.</p>
<p><u>Moderately severe</u> Medium- to long-term impact on the affected system(s) that could be mitigated.</p>	<p><u>Moderately beneficial</u> A medium- to long-term impact of real benefit to the affected system(s) Other ways of optimising are equally difficult, expensive and time consuming (or a combination of these), as achieving them in this way.</p>
<p><u>Slight</u></p>	<p><u>Slightly beneficial</u> A short- to medium-term impact and negligible benefit to the affected system(s) Other ways of</p>

NEGATIVE IMPACT	POSITIVE IMPACT
Medium- to short term impacts on the affected system(s) Mitigation is very easy, cheap, less time consuming or not necessary.	optimising the beneficial effects are easier, cheaper and quicker, or some combination of these.
<u>No effect</u> The system(s) is not affected by the proposed development.	<u>Do not know/Cannot know</u> In certain cases, it may not be possible to determine the severity of the impact.

The severity of impacts can be evaluated with and without mitigation order to demonstrate how serious the impact is when nothing is done about it. For beneficial impacts, optimisation means anything that can enhance the benefits. However, mitigation or optimisation must be practical, technically feasible and economically viable.

9.8.2 Spatial and Temporal Scales

Two additional factors were considered when assessing the impacts, namely the relationship of the impact to Spatial and Temporal Scales.

The *spatial scale* (shown in italics) defines the impact at the following scales.

SPATIAL SCALE	EXPLANATION
Localised	at a localised scale (i.e., few hectares in extent). The specific area to which this scale refers is defined for the impact to which it refers.
Study Area	the site, some effects to surrounding area (~10 km)
District	the site, some effects to wider surrounding area (~100 km)
Regional	the site, some effects to surrounding area (+250 km)
National	Impacts will affect at a country level
International	Impacts extend beyond country boundary

The *temporal scale* (shown in italics) defines the impact at the following scales.

TEMPORAL SCALE	EXPLANATION
Short Term	Less than 5 years. Many construction phase impacts will be of a short duration
Medium Term	Between 5 and 20 years
Long Term	Between 20 and 40 years, and from a human perspective essentially permanent.
Permanent	Over 40 years and resulting in a permanent and lasting change.

9.8.3 The Degree of Certainty and the Likelihood Scale

It is also for each specialist to state the degree of certainty, or the confidence attached to their prediction of significance. For this reason, a 'degree of certainty' scale (shown in bold) must be used.

DEGREE	DESCRIPTION
Definite:	More than 90% sure of fact. To use this one will need to substantial supportive data.
Probable:	Between 70% and 90% sure of fact.
Possible:	Between 40% and 70% sure of fact.
Unsure:	Less than 40% sure of fact.

The risk or likelihood (shown in normal font) of impacts being manifested differs. There is no doubt that some impacts would occur, but certain other (usually secondary data) impacts are not as likely and

may or may not result. Although these impacts maybe severe, the likelihood of them occurring may affect their overall significance and must therefore be considered. It is therefore necessary for the author to state his estimate of the likelihood of an impact occurring, using the following likelihood scale:

DEGREE	DESCRIPTION
Very unlikely	The chance of these impacts occurring is extremely slim, e.g., natural forces destroying a dam wall.
Unlikely	The risk of these impacts occurring is slight.
May occur	The risk of these impacts is more likely, although it is not definite.
Very Likely	Slight chance that this impact will not occur.
Definite	There is no chance that this impact will not occur.

9.8.4 The Environmental Significance Scale

The environmental significance scale is an attempt to evaluate the significance of an impact, the severity or benefit of which has already been assessed. This evaluation needs to be assessed in the relevant context, as an impact can either be ecological or social, or both. Since the severity of impacts with and without mitigation will already have been assessed, significance was only evaluated after mitigation. In many cases, this mitigation will take place, as it has been incorporated into project design. A six-point significance scale is applied as follows:

SIGNIFICANCE	DESCRIPTION
Very High (6)	Impacts considered to have a major and permanent change to natural environment and are rate as VERY HIGH, usually resulting to severe or very severe/ beneficial to highly beneficial effects.
High (5)	Long term change and are rated as HIGH resulting to severe or moderately severe effects/ beneficial to moderately beneficial.
Moderate (4)	Medium to long-term effects. Impacts are rated as MODERATE with moderately severe or moderately beneficial effects.
Low (3)	Medium to short term effects. Impacts are rated as MODERATE resulting in moderately severe or moderately beneficial effects.
Insignificant (2)	Short term effects are present. Impacts are rated as SLIGHT resulting in SLIGHTLY BENEFICIAL effects. Residual effects are present but are of no consequence.
No Significance (1)	No primary or secondary effects, resulting in NO SIGNIFICANT impact.
Do not Know (0)	Not possible to determine the significance of impacts

9.8.5 Absence of Data

In certain instances, an assessment must be produced in the absence of all the relevant and necessary data, due to paucity or lack of scientific information on the study area. It is more important to identify all the likely environmental impacts than to precisely evaluate the more obvious impacts. It is important to be on the conservative side in reporting likely environmental impacts. Because assessing impacts with a lack of data is more dependent on scientific judgment, the rating on the certainty scale cannot be too high. It is for these reasons that a degree of certainty scale has been provided, as well as the categories DON'T KNOW or CAN'T KNOW.

9.9 Appendix H: Declaration, Specialist Profile and Registration



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Proposed Bonsmara PV (Solar) facility

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.environment.gov.za/documents/forms>.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at
Email: EIAAdmin@environment.gov.za

Details of Specialist, Declaration and Undertaking Under Oath

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1. SPECIALIST INFORMATION

Specialist Company Name:	None		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition
			100 %
Specialist name:	Jamie Pote		
Specialist Qualifications:	BSc (Hons)		
Professional affiliation/registration:	SACNASP (115233) – Ecological Science IAIAsa (5045)		
Physical address:			
Postal address:	Postnet Suite 57, PBag X13130, Humewood		
Postal code:	6013	Cell:	
Telephone:		Fax:	
E-mail:	jamiapote@gmail.com		

2. DECLARATION BY THE SPECIALIST

I, Mr Jamie Pote _____, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist

N/A

Name of Company:

02 January 2023

Date

Details of Specialist, Declaration and Undertaking Under Oath

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3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Mr Jamie Pote _____, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.



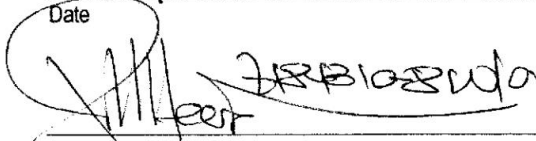
Signature of the Specialist

N/A

Name of Company

02/01/2023

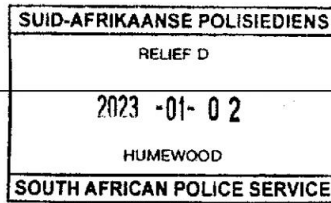
Date



Signature of the Commissioner of Oaths

2023-01-02

Date











Jamie Pote

SENIOR ECOLOGIST AND ENVIRONMENTAL
SCIENTIST

CONTACT

-  (+27) 76 888 9890
-  jamiepote@live.co.za
-  Port Elizabeth, South Africa
-  [Linkedin.com](https://www.linkedin.com)
-  JamiePote
-  [Bluesky-SA](https://bluesky.com)

EDUCATION

- Bachelor of Science
Rhodes University
2001 (Botany & Environmental Science)
- Bachelor of Science (Honours)
Rhodes University
2002 (Botany)
- Professional Natural Scientist
SACNASP
2016

SERVICES

- Terrestrial Biodiversity/Ecological Assessments*
- Environmental & Ecological Risk-Assessments*
- Bioremediation, Restoration & Rehabilitation Plans*
- Environmental Management Plans & Programmes*
- GIS Mapping & Analysis & Web maps*
- Alien Invasive Management (Terrestrial)*
- Environmental Auditing & Monitoring (ECO)*
- Flora Search & Rescue & Relocation*
- Independent Environmental & Ecological review*
- Permit and License applications*
- Environmental & Mining Applications*

ABOUT ME

16 years broad professional experience in Biodiversity, Ecological and Vegetation Assessments on over 220 projects in southern, western and central Africa. Senior Environmental Consultant and EAP on over 50 projects in the mining, infrastructure, housing and agricultural sectors. Environmental monitoring and auditing on over 50 civil infrastructure and construction projects. Have managed all aspects of projects from inception through to implementation. GIS mapping and analytics.

EXPERIENCE AND CLIENTS

Key Sectors

- *Wind, Solar Energy Facilities*
- *Infrastructure and Housing*
- *Agriculture and Forestry*
- *Mining and Industrial*

Key Projects

- *Over 220 independent Biodiversity/Ecological Assessments throughout southern, western and central Africa.*
- *Mining applications and construction auditing on over 40 projects and more than 300 gravel borrow pits for the Eastern Cape Department of Roads and Public Works, Department of Transport and the South African National Roads Agency (SANRAL) throughout the Eastern Cape.*
- *South-End Precinct Mixed Use Development for Mandela Bay Development Agency - Environmental application, Ecological assessments and Construction monitoring.*
- *Coega Development Corporation IDZ projects – Ecological assessments, Flora search & rescue and Construction monitoring.*
- *Environmental applications, construction monitoring and auditing for a wide range of projects, including infrastructure and housing for various clients including the Department of Transport and SANRAL.*
- *Various agricultural expansion and infrastructure projects.*
- *Various wind and solar energy and associated infrastructure projects.*
- *Numerous infrastructure projects including electrical, water and roads.*
- *Various Environmental Management and Rehabilitation Plans.*



herewith certifies that
Jamie Robert Claude Pote
Registration Number: 115233
is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule 1 of the Act)
Ecological Science (Professional Natural Scientist)

Effective **20 July 2016**

Expires **31 March 2023**



Handwritten signature of the Chairperson in black ink.

Chairperson

Handwritten signature of the Chief Executive Officer in black ink.

Chief Executive Officer



To verify this certificate scan this code

MR JAMIE POTE BSC (HONS) PR.SCI.NAT.

PROJECT EXPERIENCE

PERFORMANCE STANDARD BIODIVERSITY AND CRITICAL HABITAT ASSESSMENTS

- Critical Habitat & Biodiversity Assessment - Roggeveld Wind Energy Project 2020
- Biodiversity Assessment for Kalukundi Copper/Cobalt Mine, Democratic Republic of Congo 2008

WIND FARM AND PHOTOVOLTAIC INFRASTRUCTURE PROJECTS

- Ecological Assessment for Windcurrent Wind Farm, Eastern Cape 2012
- Ecological Assessment for Universal Windfarm, NMB 2011
- Ecological Assessment for Inca Energy Windfarm, Northern Cape 2011
- Ecological Assessment for Broadlands Photovoltaic Farm, Eastern Cape 2011
- Botanical Assessment for Electrawinds Windfarm Coega, NMB 2010
- Botanical Assessment and Open Space Management Plan for Mainstream WEF Phase 2, Eastern Cape 2010

SPECIALISED ECOLOGICAL REPORTS

- Rehabilitation Plan for Hitgeheim Farm (Farm 960), Sunland, Eastern Cape 2017
- Green Star Rating Ecological Assessment for SANRAL office, Bay West City, NMBM 2015
- Section 24G Assessment and Rehabilitation Plan for Bingo Farm, Eastern Cape 2014
- Mapping and Ecological services for Congo Agriculture, Republic of Congo 2013
- Rehabilitation Plan for Nieu Bethesda, Eastern Cape 2011
- Mapping of pipeline for Kenton Water Board, Eastern Cape 2010
- Rehabilitation Plan for N2 Upgrade - Coega to Colchester, NMB 2010
- Representative for landowner group for Seaview burial Park, NMB 2010
- Botanical Sensitivity Analysis for LSDF, Greenbushes-Hunters Retreat, NMB 2008
- Forestry Rehabilitation Assessment Report for Amahlathi Forest Rehabilitation, Eastern Cape 2007
- Botanical & Riparian Assessment for Orange River Weirs-Boegoeberg, Douglas Dam and Sendelingsdrif, Northern Cape 2006
- Botanical Assessment for State of the Environment Report for Chris Hani District Municipality SoER, Eastern Cape 2003

GENERAL INFRASTRUCTURE DEVELOPMENT PROJECTS

- Ecological Assessment for Vermaak Boerdery Hydro Turbine (Cookhouse), Eastern Cape 2020
- Ecological Assessment for Amalinda crossing, BCM, Eastern Cape 2019
- Ecological Assessment for Cookhouse Bridge rehabilitation and temporary deviation, Eastern Cape 2019
- Ecological Assessment for Nelson Mandela University Access Road, NMB 2019
- Botanical Assessment for Zachtevlei Dam (Lady Grey), Eastern Cape 2017
- Botanical Assessment for Gcebula River bridge (Peddie), Eastern Cape 2017
- Botanical Assessment for Kouga Dam wall upgrade, Eastern Cape 2012
- Botanical Assessment for Jansenville Cemetery, Eastern Cape 2009
- Botanical Assessment for Radar Mast construction for South African Weather Service – BCM & NMB 2008
- Botanical Assessment and GIS mapping for golf course realignment for East London Golf Course, BCM, Eastern Cape 2007
- Botanical Assessment for PE Airport Extension, NMB 2006
- Botanical Assessment for Kidd's Beach Desalination Plant, BCM, Eastern Cape 2006

ROAD AND RAILWAY INFRASTRUCTURE PROJECTS

- Ecological Assessment for CDC IDZ Mn Terminal, conveyor and railway line, NMB 2013

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• Ecological Assessment Review for Penhoek Road widening, Eastern Cape	2012
• Ecological Assessment for R61 road widening, Eastern Cape	2012
• Botanical Assessment for Chelsea RD - Walker Drive Ext., NMB	2010
• Botanical Assessment for Motherwell - Blue Water Bay Road, NMB	2010
• Ecological Assessment for Port St John Road, Eastern Cape	2010
• Botanical Basic Assessment for Bholani Village Rd, Port St Johns, Eastern Cape	2009
• Botanical Report, EMP and Rehab Plan for Coega-Colchester N2 Upgrade, NMB	2009
• Botanical Assessment for Manganese Conveyor Screening Report, NMB	2008
• Ecological Assessment for Road Layout for Whiskey Creek- Kenton, Eastern Cape	2006

MINING PROJECTS

• Ecological Assessment for Bochum Borrow Pits, Limpopo	2013
• Ecological Assessment and Mining and Rehabilitation Plan for Greater Soutpansberg Mining Project, Limpopo (3 proposed Mines)	2013
• Ecological Assessment for Thulwe Road Borrow Pits, Limpopo	2013
• Ecological Assessment and Mining and Rehabilitation Plan for Baghana Mining, Ghana	2010
• Botanical Assessment for Zwartbosch Quarry, Eastern Cape	2008
• Botanical description & map production for Quarry - Rudman Quarry, Eastern Cape	2008
• Botanical Basic Assessment, Rehab Plan & Maps for Borrow Pit - Rocklands/Patensie, Eastern Cape	2008
• Botanical Assessment & Maps for Sandman Sand Gravel Mine, Eastern Cape	2008
• Botanical Assessment & GIS maps for Shamwari Borrow Pit, Eastern Cape	2008
• Detailed Botanical Assessment, EMP and Rehab Plan for Kalukundi Copper/Cobalt Mine, Democratic Republic of Congo	2008
• Botanical Assessment, Rehab Plan & Maps for Borrow Pit Humansdorp/Oyster Bay, Eastern Cape	2008
• Botanical Assessment, Rehab Plan & Maps for AWRM - Cala, Eastern Cape	2008
• Botanical Assessment, Rehab Plan & Maps for AWRM - Camdeboo, Eastern Cape	2008
• Botanical Assessment, Rehab Plan & Maps for AWRM - Somerset East, Eastern Cape	2008
• Botanical Assessment, Rehab Plan & Maps for AWRM - Nkonkobe, Eastern Cape	2008
• Botanical Assessment, Rehab Plan & Maps for AWRM - Ndlambe, Eastern Cape	2008
• Botanical Assessment, Rehab Plan & Maps for AWRM - Blue Crane Route, Eastern Cape	2008
• Botanical Assessment, EMP and Rehabilitation Plan for AWRM - Cathcart, Eastern Cape	2008
• Botanical Assessment, GIS maps and Rehab Plan for Mthatha Prospecting, Eastern Cape	2008
• Regional Botanical Map for mining prospecting permit, Welkom	2008
• Botanical Assessment for Scoping Report and Detailed Botanical Assessment and Rehab Plan for Elitheni Coal Mine, Eastern Cape	2007
• Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Oyster Bay, Eastern Cape	2007
• Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Bathurst/GHT, Eastern Cape	2007
• Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Jeffreys Bay, Eastern Cape	2007
• Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Storms river/Kareedouw, Eastern Cape	2007
• Biophysical Assessment for Humansdorp Quarry, Eastern Cape	2006
• Botanical Assessment, Rehab Plan & Maps for Quarry-Cathcart & Somerset East, Eastern Cape	2006
• Botanical Assessment, Rehab Plan & Maps for Quarry - Despatch Quarry, NMB	2006
• GIS Mapping & Botanical Assessment and Rehab Plan for Quarry - JBay Crushers, Eastern Cape	2006
• Botanical Assessment, EMP and Rehabilitation Plan for Polokwane Silicon Smelter, Limpopo	2006
• Application for Mining Permit for Bruce Howarth Quarry, Eastern Cape	2006

POWERLINE INFRASTRUCTURE PROJECTS

• Ecological Assessment: Dieprivier-Karreedouw 132kV Powerline realignment, Kouga LM	2016
• Eskom Ecological Walkdown: Dieprivier-Karreedouw 132 kV Powerline, Kouga LM	2016
• Eskom Solar one Ecological Walkdown: Nieuwehoop 400 kV powerline	2015
• Rehabilitation Plan and Auditing for Grassridge-Poseidon Powerline Rehab, Eastern Cape	2013
• Ecological Assessment for Dieprivier Karreedouw 132kV Powerline, Eastern Cape	2012

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• Flora and Fauna search and Rescue plan for Van Stadens Windfarm Powerline, NMB	2012
• Botanical Assessment for Dedisa-Grassridge Powerline, Eastern Cape	2010
• Ecological Assessment for Grahamstown-Kowie Powerline, Eastern Cape	2010
• Species of Special Concern Mapping Transmission Line for San Souci to Nivens Drift 132kV powerline, NMB	2009
• Botanical Assessment for Eskom Powerline - Albany-Kowie, Eastern Cape	2009
• Botanical Assessment for Eskom 132 kV Dedisa Grassridge Power line-Coega, NMB	2006
• Botanical Assessment for Eskom Power line – Tylara-Wilo, Eastern Cape	2006
• Botanical Assessment for Steynsburg - Teebus 132 kV powerline, Eastern Cape	2004

PIPELINE INFRASTRUCTURE PROJECTS

• Terrestrial Biodiversity Assessment for Thornhill Phase 2 Sanitation Link, Ndlambe, Eastern Cape	2020
• Botanical Assessment for Ngqamakhwe Regional Water Supply Scheme (Phase 3)	2018
• Ecological Assessment for Butterworth Emergency Bulk Water Supply Scheme	2017
• Ecological Assessment for Karringmelkspruit Emergency Bulk Water Supply (Lady Grey)	2017
• Ecological Assessment for Wanhoop-Willowmore Bulk Water Supply, Eastern Cape	2016
• Ecological Assessment for Steytlerville Bulk Water Supply, Eastern Cape (Phase 4)	2013
• Ecological Assessment for Steytlerville Bulk Water Supply, Eastern Cape (Phase 5)	2013
• Detailed Ecological Assessment for Suikerbos Pipeline, Gauteng	2012
• Basic Botanical Assessment for Wanhoop farm pipeline, Eastern Cape	2010
• Basic Botanical Assessment for Chatty Sewer, NMB	2010
• Species of Special Concern Mapping for Seaview Pipeline, NMB	2009
• Species of Special Concern Mapping for Chelsea Bulk Water Pipeline, NMB	2009
• Map Production for Russell Rd Stormwater, NMB	2008
• Basic Botanical Assessment for Albany Pipeline, Eastern Cape	2008
• Environmental Risk Assessment for Elands River pipeline, Eastern Cape	2007
• Detailed Botanical Assessment for Motherwell Pipeline, NMB	2007
• Detailed Botanical Assessment, GIS maps for Erasmuskloof Pipeline, Eastern Cape	2007
• Botanical & Floristic Report for Hankey pipeline, Eastern Cape	2006
• Detailed Botanical Assessment for Port Alfred water pipeline, Eastern Cape	2004

HOUSING DEVELOPMENT PROJECTS

• Terrestrial Biodiversity Assessment for Erf 1820 Mthatha, KSDM, Eastern Cape	2020
• Ecological Assessment for Erf 599 Walmer Mixed Use Development, Nelson Mandela Bay	2019
• Ecological Assessment for erf 14, Kabega, Port Elizabeth	2017
• Ecological Assessment for Fairwest Rental Housing, Port Elizabeth	2017
• Ecological Assessment for Hankey Housing, Kouga District Municipality	2015
• Ecological Assessment for Lebowakgoma Housing, Limpopo	2013
• Ecological Assessment for Giyani Development, Limpopo	2013
• Ecological Assessment for Palmietfontein Development, Limpopo	2013
• Ecological Assessment for Seshego Development, Limpopo	2013
• Botanical Assessment for Sheerness Road, BCM, Eastern Cape	2013
• Ecological Assessment for Ethembeni Housing, NMB	2012
• Ecological Assessment for Pelana Housing, Limpopo	2012
• Flora Search and Rescue Plan for Kwanobuhle Housing, Western Cape	2011
• Botanical Assessment for The Craggs 288/03, Western Cape	2010
• Ecological Assessment Revision Report for Fairview Housing, NMB	2010
• Botanical Assessment, EMP and Open Space Management Plan for Hornlee Housing Development, Western Cape	2010
• Botanical Assessment for Little Ladywood, Western Cape	2010
• Botanical Assessment and Open Space Management Plan for Motherwell NU31, NMB	2010
• Botanical Assessment and Open Space Management Plan for Plett 443/07, Western Cape	2010

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• Botanical Assessment for Willow Tree Farm, NMB	2010
• Botanical Assessment for Kouga RDP Housing, Eastern Cape	2009
• Botanical Assessment for Fairview Erf 1226 (Wonderwonings), NMB	2009
• Species List Compilation for Zeekoerivier Humansdorp, Eastern Cape	2009
• Botanical Assessment for Woodlands Golf Estate (Farm 858), BCM, Eastern Cape	2009
• Botanical Assessment for Plettenberg Bay - 438/4, Western Cape	2009
• Vegetation Assessment for Kwanokuthula RDP housing project, Western Cape	2008
• Site screening assessment for Greenbushes Site screening, NMB	2008
• Botanical Assessment for Fairfax development, Eastern Cape	2008
• Botanical Assessment for Plettenberg Bay Brakkloof 50&51, Western Cape	2008
• Botanical Assessment, GIS mapping for Theescombe Erf 325, NMB	2008
• Site Screening for Mount Road, NMB	2008
• Botanical Assessment for Greenbushes Farm 40 Swinburne 404, NMB	2008
• Botanical Assessment for Greenbushes 130, NMB	2008
• Botanical Assessment for Greenbushes Kuyga no. 10, NMB	2008
• Botanical Assessment for Plettenberg Bay - 438/24, Western Cape	2007
• Botanical Assessment for Plettenberg Bay - Olive Hills 438/7, Western Cape	2007
• Botanical Assessment for Gonubie Portion 809/9, BCM, Eastern Cape	2006
• Botanical Assessment for Glengariff Farm 723, BCM, Eastern Cape	2006
• Botanical Assessment for Gonubie Portion 809/10, BCM, Eastern Cape	2006
• Botanical Assessment for Gonubie Portion 809/4 & 5, BCM, Eastern Cape	2006
• Botanical Assessment for Plettenberg bay - Ladywood 438/1&3, Western Cape	2006
• Botanical Assessment and Rehab Plan for Winterstrand Desalination Plant, BCM	2006
• Botanical Assessment for Bosch Hoogte, NMB	2006
• Botanical Assessment for Plettenberg bay Farm 444/38, Western Cape	2006
• Botanical Assessment for Plettenberg Bay - 444/27, Western Cape	2006
• Botanical Assessment for Leisure Homes, BCM, Eastern Cape	2006
• Botanical Basic Assessment for Trailees Wetland Assessment, Eastern Cape	2005
• Botanical Assessment and Rehab Plan for Arlington Racecourse - PE, NMB	2005
• Botanical Assessment for Smart Stone, NMB	2005
• Botanical Assessment for Peninsular Farm (Port Alfred), Eastern Cape	2005
• Botanical Assessment for Mount Pleasant - Bathurst, Eastern Cape	2005
• Botanical Assessment and RoD amendments for Colchester Erven 1617 & 1618 (Riverside), NMB	2005
• Basic Botanical Assessment for Parsonsvelei 3/4, Eastern Cape	2005
• Botanical Assessment for Bridgemed – Malabar PE, NMB	2004

AGRICULTURAL PROJECTS

• Ecological Assessment for Citrus expansion on Hitgeheim Farm, Sunland, Eastern Cape	2015
• Ecological Assessment for Doornkraal Pivot (Hankey), Eastern Cape	2014
• Ecological Assessment for Citrus expansion on Farm 960, Patensie	2014
• Ecological Assessment for Tzaneen Chicken Farm, Limpopo	2013
• Botanical Assessment and Open Space Management Plan for Kudukloof, NMB	2010
• Botanical Assessment and Open Space Management Plan for Landros Veeplaats, NMB	2010
• Botanical Assessment and Flora Relocation Plan for Wildemans Plaas, NMB	2006

GOLF ESTATE AND RESORT DEVELOPMENT PROJECTS

• Species List& Comments Report for Kidds Beach Golf Course, BCM, Eastern Cape	2009
• Botanical Assessment for Plettenberg Bay -Farm 288/03, Western Cape	2009
• Botanical Assessment for Rockcliff Golf Course, BCM, Eastern Cape	2008
• Botanical Assessment for Rockcliff Resort Development, BCM, Eastern Cape	2007
• Botanical Assessment, EMP and Rehabilitation Plan for Tiffendel Ski Resort, Eastern Cape	2006

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MIXED USE DEVELOPMENT PROJECTS

- Ecological Assessment for South-End Precinct Mixed Use Development, Nelson Mandela Bay 2018
- Botanical Assessment, EMP and Open Space Management Plan for Bay West City, NMB 2010
- Botanical Assessment, GIS maps, Open Space and Rehab Plans for Fairview Erf 1082, NMB 2009
- Botanical Assessment and GIS maps for Utopia Estate PE, NMB 2008
- Botanical Assessment and GIS mapping for Madiba Bay Leisure Park, NMB 2007
- Botanical Assessment and GIS mapping for Madiba Bay Leisure Park, NMB 2007
- Botanical Basic Assessment for Cuyler Manor (Farm 320), Uitenhage, NMB 2007

BUSINESS AND INDUSTRIAL DEVELOPMENT PROJECTS

- Ecological Assessment for Parsonsvei Erf 984 & 1134 Parsonsvei, NMB 2020
- Ecological Assessment for Walmer Erf 11667 - Bidfood Warehousing Development, NMB 2020
- Ecological Assessment for Portion 87 of the Farm Little Chelsea No 10, NMB 2020
- Ecological Assessment for Bay West City ENGEN Service Station, NMB 2015
- Ecological Assessment for Green Star grading for SANRAL, NMB 2014
- Ecological Assessment for OTGC Tank Farm, NMB 2012
- Botanical Assessment and Open Space Management Plan for Petro SA Refinery, Coega IDZ, NMB 2010
- Botanical Assessment for Bluewater Bay Erf 805, NMB 2009
- Ecological Assessment for Bay West City, NMB 2007
- Botanical Assessment for Kenton Petrol Station, Eastern Cape 2005
- Botanical Assessment and RoD amendments for Colchester Petrol Station, NMB 2005

ECO-ESTATE DEVELOPMENT PROJECTS

- Botanical Re-Assessment of Swanlake Eco Estate, Aston Bay, Eastern Cape 2018
- Detailed Botanical Assessment and Open Space Management Plan for Olive Hills, Western Cape 2010
- Botanical Assessment and EMP for Zwartbosch Road, Eastern Cape 2010
- Botanical Assessment - Poultry Farm for Coega Kammaskloof Farm 191, NMB 2008
- Botanical Assessment - Housing development for Coega Ridge, NMB 2008
- Botanical Assessment, Rehabilitation Plan, EMP and GIS maps for Amanzi Estate, NMB, 2008
- Botanical Assessment for Roydon Game farm, Queenstown, Eastern Cape 2007
- Botanical Assessment for Winterstrand Estate (Farm 1008), BCM, Eastern Cape 2007
- Botanical Assessment for Homeleigh Farm 820, BCM, Eastern Cape 2007
- Botanical Basic Assessment, Rehab Plan & Maps for Candlewood, Tsitsikamma, Western Cape 2007
- Botanical Assessment, EMP and Rehab Plan for Carpe Diem Eco development, Eastern Cape 2007
- Botanical Assessment, EMP and Rehabilitation Plan for Seaview Eco-estate, NMB 2006
- Botanical Assessment for Kidd's Beach portion 1076, BCM, Eastern Cape 2006
- Botanical Assessment for Palm Springs, Kidds Beach East London, BCM, Eastern Cape 2006
- Botanical Assessment for Nahoon Farm 29082, BCM, Eastern Cape 2006
- Botanical Assessment for Rosehill Farm, Eastern Cape 2005
- Botanical Assessment for Resolution Game Farm, Eastern Cape 2005
- Botanical Assessment for Gonubie Portion 809/11, BCM, Eastern Cape 2005
- Botanical Assessment for Kidd's Beach portion 1075, BCM, Eastern Cape 2005

FLORA AND FAUNA RELOCATION PLANS, PERMITS AND IMPLEMENTATION

- Flora Search and Rescue for Nelson Mandela University Phase 2 & 3 Residences, Eastern Cape 2020
- Flora Search and Rescue for Fairwest Housing Estate, Nelson Mandela Bay, Eastern Cape 2019
- Flora Search and Rescue for Utopia Estate, Nelson Mandela Bay, Eastern Cape 2019
- Flora Search and Rescue for Citrus expansion on Boschkraal Citrus Farm, Sunland, Eastern Cape 2018
- Flora Search and Rescue for Wanhoop pipeline, Willowmore, Eastern Cape 2018
- Flora Search and Rescue for Citrus expansion on Hitgeheim Farm (Farm 960), Sunland, Eastern Cape 2017

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• Flora Search and Rescue for Steytlerville Bulk Water Supply, Eastern Cape (Phase 5)	2016
• Flora Search and Rescue for Citrus expansion on Farm 960, Patensie (AIN du Preez Boerdery)	2016
• Flora Search and Rescue for Steytlerville Bulk Water Supply & WTW, Eastern Cape (Phase 4)	2015
• Flora and Fauna Search and Rescue for Riversbend Citrus Farm, NMB	2014
• Flora and Fauna Search and Rescue for Mainstream Windfarm, Eastern Cape	2013
• Flora Search and Rescue for Steytlerville Bulk Water Supply, Eastern Cape (Phase 1, 2 & 3)	2013
• Flora and Fauna Search and Rescue for OTGC Tank Farm, Coega IDZ, NMB	2013
• Flora and Fauna Search and Rescue for Jeffreys Bay School, Eastern Cape	2013
• Flora Search and Rescue Plan for Red Cap Wind Farm, Eastern Cape	2012
• Flora Relocation for Disco Poultry Farm, NMB	2010
• Flora Relocation for Mainstream Windfarm, Eastern Cape	2010

ENVIRONMENTAL MANAGEMENT PLANS

• Final Environmental Management Programme (EMPr) and Maintenance Management Plan for South End Precinct Mixed Use Zone, Nelson Mandela Bay Municipality	2020
• Final Environmental Management Programme (EMPr) for Coega Land-Based Aquaculture Development Zone (ADZ), Coega Industrial Development Zone (IDZ), Nelson Mandela Bay Municipality	2019
• Basic Botanical Assessment for Kromensee EMP (Jeffries Bay), Eastern Cape	2010
• Wetland Management Plan for NMB Portnet, NMB	2010
• Baseline Botanical Study, Vegetation mapping and EMP for Local Nature Reserve for Plettenberg Bay Lookout LNA, Western Cape	2009
• Biodiversity & Ecological Processes for Bathurst-Commonage, Eastern Cape	2006
• EMP for Kromensee EMP (Jeffries Bay), Eastern Cape	2006
• Floral Survey for Mbotyi Conservation Assessment, Eastern Cape	2005
• Identifying and Assessment on Aquatic Weeds for Pumba Private Game Reserve, Eastern Cape	2005

ENVIRONMENTAL MANAGEMENT, AUDITING, COMPLIANCE AND MONITORING PROJECTS

• ECO for DRPW IRM Road Maintenance projects, Baviaans LM	2019
• ECO for DRPW IRM Road Maintenance projects, Senqu LM	2019
• ECO for DRPW IRM Road Maintenance projects, Kouga/Koukamma LM	2019
• ECO for DRPW IRM Road Maintenance projects, Sakhisizwe/Engcobo LM	2019
• ECO for DRPW IRM Road Maintenance projects, Elundini LM	2019
• ECO for DRPW IRM Road Maintenance projects, Emalahleni/Intsika Yethu LM	2019
• ECO for Construction of Fairwest Village Housing Project	2019
• ECO for Construction of Utopia Estate	2019
• ECO for Construction of NMU West End Student Residences Phases 1 & 3	2019
• ECO for DRPW IRM Road Maintenance projects, Raymond Mahlaba LM	2018
• ECO for DRPW IRM Road Maintenance projects, Inkwanca (Enoch Mgijima) LM	2018
• ECO for Citrus expansion on Farm 960, Patensie (AIN du Preez Boerdery)	2017
• ECO for Citrus expansion on Hitgeheim Farm (Farm 960), Sunland, Eastern Cape	2017
• DEO for improvement of national route R67 section 5 from Whittlesea (km 0.00) to Swart Kei river (km 15.40) – Murray & Roberts	2017
• ECO for SANRAL RRP Road Maintenance projects, Mbizana LM	2017
• ECO and Botanical Specialist for the special maintenance of national route R61 Section 2 from Elinus Farm (km 42.2) to N10 (km 85.0) (SANRAL)	2016
• Environmental Control Officer (ECO): Construction of NSRI Slipway - Port Elizabeth Harbour	2016
• ECO for SANRAL RRP Road Maintenance projects, Mbashe LM	2016
• ECO for SANRAL RRP Road Maintenance projects, Nkonkobe LM	2016
• ECO for SANRAL RRP Road Maintenance projects, Mbizana LM	2016
• ECO for SANRAL RRP Road Maintenance projects, Senqu LM	2016
• ECO for SANRAL RRP Road Maintenance projects, Elundini LM	2016

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• ECO and Environmental Management for closure of Bushmans River Landfill site	2016
• ECO for DRPW IRM Road Maintenance projects, Amahlathi Municipality	2015
• ECO for DRPW IRM Road Maintenance projects, Makana/Ndlambe Municipality	2015
• ECO for DRPW IRM Road Maintenance projects, Mbashe/Mqume Municipality	2015
• ECO for DRPW IRM Road Maintenance projects, Port St Johns, Mbizana, Ingquza Hill LM's	2015
• ECO for Riversbend Citrus Farm, NMB	2014
• ECO for Alfred Nzo DM Road resurfacing - DR08071, DR08649, DR08092, DR08418, DR08452, DR08015, DR08085, DR08639 & DR08073, Eastern Cape - MSBA	2014
• ECO Audits for Koukamma Flood Damage Road Repairs – Hatch Goba	2014
• EMP and ECO for Utopia Estate, NMB	2013
• Final EMP submission for Seaview Garden Estate, NMB	2012
• ECO audits for NMB Road surfacing, NMB (multiple contacts)	2011
• EMP submission and ECO for Seaview Garden Estate, NMB	2010
• ECO for Mainstream Windfarm wind monitoring mast installation, Eastern Cape	2010
• EMP and ECO for Sinati Golf Estate EMP, BCM, Eastern Cape	2009
• Flora Relocation Plan and Permit application for Wildemans Plaas, NMB	2006

BASIC ASSESSMENT APPLICATION PROJECTS (DEDEAT)

• Basic Assessment Application for Parsonsvei Erf 984 & 1134 Parsonsvei	2020
• Basic Assessment Application for Vermaak Boerdery Hydro Turbine (Cookhouse)	2020
• Basic Assessment Application for Walmer Erf 11667 Bidfood Warehousing Development	2020
• Basic Assessment Application for Portion 87 of the Farm Little Chelsea No 10	2020
• Basic Assessment Application for Nelson Mandela University Access Road, NMB	2019
• Basic Assessment Application for Erf 599 Walmer Mixed Use Development, Nelson Mandela Bay	2019
• Basic Assessment Application for Cookhouse Bridge rehabilitation and temporary deviation	2019
• Basic Assessment Application for Erf 14 Kabega, NMBM	2017
• Basic Assessment Application for Hankey Housing, Kouga District Municipality	2017
• Basic Assessment Application for Fairwest Rental Housing, Nelson Mandela Bay	2017
• Basic Assessment Application for Citrus expansion on Hitgeheim Farm, Sunland, Eastern Cape	2015
• Basic Assessment Application for Hankey Housing, Kouga District Municipality	2015
• Basic Assessment Application for Citrus expansion on farm 960, Patensie (AIN du Preez Boerdery)	2014
• Basic Assessment Application for South-End Precinct Mixed Use Development, Nelson Mandela Bay 2018	

ENVIRONMENTAL SCREENING PROJECTS

• Environmental Screening Report for Proposed Life Hospital parking expansion, NMB	2019
• Environmental Screening Report for Erf 984 & 1134 development, Parsonsvei, NMB	2019
• Environmental Screening Report for proposed Khayaletu School, Buffalo City	2018
• Environmental Screening Report for Proposed Housing Development of Erf 8700, Kabega Park, NMB	2017
• Environmental Screening Report for Proposed Housing Development of Erf 14, Kabega Park, NMB	2017
• Environmental Screening Report for Proposed Fairwest Social Housing project, Fairview, NMB	2016
• Environmental Screening Report for Development of Little Chelsea No 25, NMB	2016
• Terrestrial Vegetation Risk Assessment for proposed Skietnek Citrus Farm development (Kirkwood)	2015
• Preliminary Environmental Risk Assessment: NSRI Slipway Port Elizabeth	2015
• Environmental Screening Report for Proposed Development of a Dwelling on Erf 899, Theescombe	2015
• Environmental Screening Report for Proposed Development on Erf 559, Walmer, Port Elizabeth	2015
• Environmental Screening Report for Proposed Housing Scheme Development of Erf 8709, Wells Estate	2015
• Environmental Screening Report for Development of Portion 10 of Little Chelsea No 87, NMB	2015

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MINING PERMIT/ENVIRONMENTAL MANAGEMENT PROGRAMME APPLICATIONS (DMR)

• Mining BAR/EMP's for Blue Crane Route LM Borrow Pits – (DoT)	2019
• Mining BAR/EMP's for 24 Borrow Pits in 6 districts within the Eastern Cape– (SANRAL)	2018
• Mining BAR/EMP's for Ingquza Hill LM Borrow Pits – (SANRAL)	2017
• Mining BAR/EMP's for Baviaans LM Borrow Pits – (DRPW)	2017
• Mining BAR/EMP's for Senqu LM Borrow Pits – (DRPW)	2017
• Mining BAR/EMP's for Kouga/Koukamma LM Borrow Pits – (DRPW)	2017
• Mining BAR/EMP's for Inkwanca (Enoch Mgiijima) LM Borrow Pits – (DRPW)	2017
• Mining BAR/EMP's for Kouga/Koukamma LM Borrow Pits – (DRPW)	2017
• Mining BAR/EMP's for Sakhisizwe/Engcobo LM Borrow Pits – (DRPW)	2017
• Mining BAR/EMP's for Raymond Mahlaba LM Borrow Pits – (DRPW)	2017
• Mining BAR/EMP's for Camdeboo LM Borrow Pits – (DRPW)	2017
• Mining BAR/EMP's for Elundini LM Borrow Pits – (DRPW)	2017
• Mining BAR/EMP's for Emalahleni/Intsika Yethu LM Borrow Pits – (DRPW)	2017
• Mining BAR/EMP's for Nkonkobe LM Borrow Pits – (SANRAL)	2016
• Mining BAR/EMP's for Mbashe LM Borrow Pits – (SANRAL)	2016
• Mining BAR/EMP's for Mbizana LM Borrow Pits – (SANRAL)	2016
• Mining BAR/EMP's for Senqu LM Borrow Pits – (SANRAL)	2016
• Mining BAR/EMP's for Elundini LM Borrow Pits – (SANRAL)	2016
• Mining BAR/EMP's for Emalahleni LM Borrow Pits – (SANRAL)	2016
• Mining BAR/EMP's for Emalahleni LM Borrow Pits – (DRPW)	2016
• Mining BAR/EMP's for Ikwezi/Baviaans LM Borrow Pits – (DRPW)	2016
• Mining BAR/EMP's for Chris Hani DM Borrow Pits - MR00716 (Tarkastad) (DRPW)	2015
• Mining BAR/EMP's for Chris Hani DM Borrow Pits – Intsika Yethu and Emalahleni (DRPW)	2015
• Mining BAR/EMP's for Joe Gqabi DM Borrow Pits – Senqu (DRPW)	2015
• Mining BAR/EMP's for Makana/Ndlambe LM Borrow Pits – Sarah Baartman (DRPW)	2015
• Mining BAR/EMP's for Amahlathi LM Borrow Pits – Amatole (DRPW)	2015
• Mining BAR/EMP's for Mbashe/Mqume LM Borrow Pits – Amatole (DRPW)	2015
• Mining BAR/EMP's for Sundays River Valley LM Borrow Pits – Sarah Baartman (DRPW)	2015
• Mining BAR/EMP's for Kouga LM Borrow Pits – Sarah Baartman (DRPW)	2015
• Mining BAR/EMP's for Chris Hani DM Borrow Pits - MR00716 (DRPW)	2014
• Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR02581 (DRPW)	2014
• Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR08041, DR08247, DR08248 & DR08504 (DRPW)	2014
• Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR08599, DR08601 & DR08570 (DRPW)	2014
• Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR08235, DR08551 & DR08038 (DRPW)	2014
• Mining BAR/EMP's for Alfred Nzo DM Borrow Pits - DR08092, DR08093 & DR08649 (DRPW)	2014
• Mining BAR/EMP's for Alfred Nzo DM Borrow Pits - DR08090, DR08412, DR08425, DR08129, DR08109, DR08106, DR08104 & DR08099 – Matatiele (DRPW)	

SECTION 24G APPLICATIONS

• 12 000 ML Dam constructed on farm 960, Patensie (MGM Trust)	2015
• Illegal clearing of 20 Ha of lands on Hitgeheim Farm, Sunland, Eastern Cape	2015

GIS AND IT DEVELOPMENT

• Development of iAuditor Environmental Audit templates (DRPW audits)	2014
• Landsat Image classification and analysis (Congo Agriculture)	2010
• Development of GIS databases and mapping tools for Manifold GIS software	2008

CONFERENCES AND PUBLICATIONS

- Pote, J., Shackleton, C.M., Cocks, M. & Lubke, R. 2006. Fuelwood harvesting and selection in Valley Thicket, South Africa. *Journal of Arid Environments*, 67: 270-287.
- Pote, J., Cocks, M., Dold, T., Lubke, R.A. and Shackleton, C. 2004. The homegarden cultivation of indigenous medicinal plants in the Eastern Cape. *Indigenous Plant Use Forum*, 5 - 8 July 2004, Augsburg Agricultural School, Clanwilliam, Western Cape.
- Pote, J. & Lubke, R.A. 2003. The selection of indigenous species suitable for use as fuelwood and building materials as a replacement of invasive species that are currently used by the under-privileged in the Grahamstown commonage. *Working for Water Inaugural Research Symposium* 19 - 21 August 2003, Kirstenbosch. Poster presentation.
- Pote, J. & Lubke, R.A. 2003. The screening of indigenous pioneer species for use as a substitute cover crop for rehabilitation after removal of woody alien species by WfW in the grassy fynbos biome in the Eastern Cape. *Working for Water Inaugural Research Symposium* 19 - 21 August 2003, Kirstenbosch, South Africa.

OTHER RESEARCH EXPERIENCE

- Resource assessment of bark stripped trees in indigenous forests in Weza/Kokstad area (June 2000; Dr C. Geldenhuis & Mr. M. Kaplin).
- Working for Water research project for indigenous trees for woodlots (December 2000/January 2001; Prof R.A. Lubke, Rhodes University).
- Project coordinator and leader of the REFYN project – A BP conservation gold award: Conservation and Restoration of Grassy-Fynbos. A multidisciplinary project focusing on management, restoration and public awareness/education (2001 – 2002).
- Conservation Project Management Training Workshops: Royal Geographical Society, London 2001 – Fieldwork Techniques, Habitat Assessment, Biological Surveys, Project Planning, Public Relations and Communications, Risk Assessment, Conservation Education
- Selection and availability of wood in Crossroads village, Eastern Cape, South Africa. Honours Research Project 2002. Supervisors: Prof. R.A. Lubke & Prof. C. Shackleton.
- Floral Morphology, Pollination and Reproduction in *Cyphia* (LOBELIACEAE). Honours Research Project 2002. Supervisor: Mr. P. Phillipson.
- Forestry resource assessment of bark-stripped species in Amatola District (December 2002; Prof R.A. Lubke).
- Homegarden Cultivation of Medicinal Plants in the Amathole area. Postgraduate Research Project (2003-2005; Prof R.A. Lubke, Prof C.M. Shackleton and Ms C.M., Cocks).

9.10 Appendix I: Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity

SCOPE

The protocol (*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 (GN 320, 20 March 2020)*) provides the criteria for the assessment and reporting of impacts on terrestrial biodiversity for activities requiring environmental authorisation.

The protocol (*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 NEMA, gazetted on 30 October 2020*), provides the criteria for the assessment and reporting of impacts on plant and animal species for activities requiring environmental authorisation.

These protocols replace the requirements of Appendix 6 of the Environmental Impact Assessment Regulation¹¹.

The assessment and minimum reporting requirements of this protocol are associated with a level of environmental sensitivity identified by the national web based environmental screening tool (<https://screening.environment.gov.za/screeningtool>). The requirements for terrestrial biodiversity are for landscapes or sites which support various levels of biodiversity. The relevant terrestrial biodiversity data in the screening tool has been provided by the South African National Biodiversity Institute¹².

SITE SENSITIVITY VERIFICATION AND MINIMUM REPORT CONTENT REQUIREMENTS

Prior to commencing with a specialist assessment, the current use of the land and the potential environmental sensitivity of the site under consideration as identified by the screening tool must be confirmed by undertaking a site sensitivity verification.

1. The site sensitivity verification must be undertaken by an environmental assessment practitioner or a specialist.
2. The site sensitivity verification must be undertaken using:
 - a. a desk top analysis, using satellite imagery,
 - b. a preliminary on-site inspection; and
 - c. any other available and relevant information.
3. The outcome of the site sensitivity verification must be recorded in the form of a report that:
 - a. confirms or disputes the current use of the land and environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc.
 - b. contains a motivation and evidence (e.g., photographs) of either the verified or different use of the land and environmental sensitivity; and
 - c. is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

TERRESTRIAL BIODIVERSITY SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS

¹¹ The Environmental Impact Assessment Regulations, as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act 107 of 1998).

¹² The biodiversity dataset has been provided by the South African National Biodiversity Institute (for details of the dataset, click on the options button to the right of the various biodiversity layers on the screening tool).

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
1	General Information	
1.1	An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified on the screening tool as being "very high sensitivity" for terrestrial biodiversity, must submit a Terrestrial Biodiversity Specialist Assessment.	✓
1.2	An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being 'low sensitivity' for terrestrial biodiversity, must submit a Terrestrial Biodiversity Compliance Statement.	✓
1.3	However, where the information gathered from the site sensitivity verification differs from the designation of 'very high' terrestrial biodiversity sensitivity on the screening tool and it is found to be of a 'low' sensitivity, then a Terrestrial Biodiversity Compliance Statement must be submitted.	✓
1.4	Similarly, where the information gathered from the site sensitivity verification differs from that identified as having a 'low' terrestrial biodiversity sensitivity on the screening tool, a Terrestrial Biodiversity Specialist Assessment must be conducted.	✓
1.5	If any part of the proposed development footprint falls within an area of 'very high' sensitivity, the assessment and reporting requirements prescribed for the 'very high' sensitivity apply to the entire footprint, excluding linear activities for which impacts on terrestrial biodiversity are temporary and the land in the opinion of the terrestrial biodiversity specialist, based on the mitigation and remedial measures, can be returned to the current state within two years of the completion of the construction phase, in which case a compliance statement applies. Development footprint in the context of this protocol means the area on which the proposed development will take place and includes any area that will be disturbed.	✓
	VERY HIGH SENSITIVITY RATING for terrestrial biodiversity features	
2	Terrestrial Biodiversity Specialist Assessment	
2.1	The assessment must be prepared by a specialist registered with the South African Council for Natural Scientific Professionals (SACNASP) with expertise in the field of terrestrial biodiversity.	✓
2.2	The assessment must be undertaken on the preferred site and within the proposed development footprint.	✓
2.3	The assessment must provide a baseline description of the site which includes, as a minimum, the following aspects:	✓
2.3.1	a description of the ecological drivers or processes of the system and how the proposed development with impact these;	✓
2.3.2	ecological functioning and ecological processes (e.g., fire, migration, pollination, etc.) that operate within the preferred site;	✓
2.3.3	the ecological corridors that the proposed development would impede including migration and movement of flora and fauna;	✓
2.3.4	the description of any significant terrestrial landscape features (including rare or important flora-faunal associations, presence of strategic water source areas (SWSAs) or freshwater ecosystem priority area (FEPA) sub catchments);	✓

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
2.3.5	a description of terrestrial biodiversity and ecosystems on the preferred site, including:	✓
(a)	main vegetation types;	✓
(b)	threatened ecosystems, including fisted ecosystems as well as locally important habitat types identified;	✓
(c)	ecological connectivity, habitat fragmentation, ecological processes and fine- scale habitats; and	✓
(d)	species, distribution, important habitats (e.g., feeding grounds, nesting sites, etc.) and movement patterns identified;	✓
2.3.6	the assessment must identify any alternative development footprints within the preferred site which would be of 'low' sensitivity as identified by the screening tool and verified through the site sensitivity verification; and	✓
2.3.7	the assessment must be based on the results of a site inspection undertaken on the preferred site and must identify:	✓
2.3.7.1	terrestrial critical biodiversity areas (CBAs), including:	✓
(a)	the reasons why an area has been identified as a CBA;	✓
(b)	an indication of whether or not the proposed development is consistent with maintaining the CBA in a natural or near natural state or in achieving the goal of rehabilitation;	✓
(c)	the impact on species composition and structure of vegetation with an indication of the extent of clearing activities in proportion to remaining extent of the ecosystem type(s);	✓
(d)	the impact on ecosystem threat status;	✓
(e)	the impact on explicit subtypes in the vegetation;	✓
(f)	the impact on overall species and ecosystem diversity of the site; and	✓
(g)	the impact on any changes to threat status of populations of species of conservation concern in the CBA;	✓
2.3.7.2	terrestrial ecological support areas (ESAs), including:	✓
(a)	the impact on the ecological processes that operate within or across the site;	✓
(b)	the extent the proposed development will impact on the functionality of the ESA; and	✓
(c)	loss of ecological connectivity (on site, and in relation to the broader landscape) due to the degradation and severing of ecological corridors or introducing barriers that impede migration and movement of flora and fauna;	✓
2.3.7.3	protected areas as defined by the National Environmental Management: Protected Areas Act, 2004 including	✓
(a)	an opinion on whether the proposed development aligns with the objectives or purpose of the protected area and the zoning as per the protected area management plan;	✓
2.3.7.4	priority areas for protected area expansion, including-	✓
(a)	the way in which in which the proposed development will compromise or contribute to the expansion of the protected area I network;	✓
2.3.7.5	Strategic Water Source Areas (SWSAs) including:	✓
(a)	the impact(s) on the terrestrial habitat of SWSA; and	✓

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
(b)	the impacts of the proposed development on the SWSA water quality and quantity (e.g., describing potential increased runoff leading to increased sediment load in water courses),	✓
2.3.7.6	FEPA sub catchments, including-	✓
(a)	the impacts of the proposed development on habitat condition and species in the FEPA sub catchment;	✓
2.3.7.7	indigenous forests, including:	✓
(a)	impact on the ecological integrity of the forest and	✓
(b)	percentage of natural or near natural indigenous forest area lost and a statement on the implications in relation to the remaining areas.	✓
2.4	The findings of the assessment must be written up in a Terrestrial Biodiversity Specialist Assessment Report	✓
3	Terrestrial Biodiversity Specialist Assessment Report	
3.1	The Terrestrial Biodiversity Specialist Assessment Report must contain, as a minimum, the following information:	✓
3.1.1	contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	✓
3.1.2	a signed statement of independence by the specialist;	✓
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,	✓
3.1.4	description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modeling used, where relevant;	✓
3.1.5	a description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations;	✓
3.1.6	a location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	✓
3.1.7	additional environmental impacts expected from the proposed development;	✓
3.1.8	any direct, indirect, and cumulative impacts of the proposed development;	✓
3.1.9	the degree to which impacts, and risks can be mitigated;	✓
3.1.10	the degree to which the impacts and risks can be reversed;	✓
3.1.11	the degree to which the impacts and risks can cause loss of irreplaceable resources;	✓
3.1.12	proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr),	✓
3.1.13	a motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified as having a 'low' terrestrial biodiversity sensitivity and that were not considered appropriate,	✓
3.1.14	a substantiated statement based on the findings of the specialist assessment, regarding the acceptability, or not. of the proposed development if it should receive approval a not; and	✓
3.1.15	any conditions to which this statement is subjected.	✓

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
3.2	The findings of the Terrestrial Biodiversity Specialist Assessment must be incorporated into the Basic Assessment Report or the Environmental Impact Assessment Report, including the mitigation and monitoring measures as identified, which must be incorporated into the EMPr where relevant.	✓
3.3	A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	✓
LOW SENSITIVITY RATING – for terrestrial biodiversity features		
4	Terrestrial Biodiversity Compliance Statement	✓
4.1	The compliance statement must be prepared by a specialist registered with the SACNASP and having expertise in the field of ecological sciences.	✓
4.2	The compliance statement must:	✓
4.2.1	be applicable to the preferred site and proposed development footprint;	✓
4.2.2	confirm that the site is of 'low' sensitivity for terrestrial biodiversity; and	✓
4.2.3	indicate whether or not the proposed development will have any impact on the biodiversity feature.	✓
4.3	The compliance statement must contain, as a minimum, the following information:	✓
4.3.1	the contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	✓
4.3.2	a signed statement of independence by the specialist;	✓
4.3.3	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	✓
4.3.4	a baseline profile description of biodiversity and ecosystems of the site;	✓
4.3.5	the methodology used to verify the sensitivities of the terrestrial biodiversity features on the site, including equipment and modeling used, where relevant;	✓
4.3.6	in the case of a linear activity, confirmation from the terrestrial biodiversity specialist that, in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase;	✓
4.3.7	where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr;	✓
4.3.8	a description of the assumptions made and any uncertainties or gaps in knowledge or data; and	✓
4.3.9	any conditions to which this statement is subjected.	✓
4.4	A signed copy of the compliance statement must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	✓

ANIMAL SPECIES SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
1	General Information	
1.1	An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of "very high" or "high" sensitivity for terrestrial animal species must submit a Terrestrial Animal Species Specialist Assessment Report.	✓

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
1.2	An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of “medium sensitivity” for terrestrial animal species must submit either a Terrestrial Animal Species Specialist Assessment Report or a Terrestrial Animal Species Compliance Statement, depending on the outcome of a site inspection undertaken in accordance with paragraph 4.	✓
1.3	An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of “low” sensitivity for terrestrial animal species must submit a Terrestrial Animal Species Compliance Statement.	✓
1.4	Where the information gathered from the site sensitivity verification differs from the screening tool designation of “very high” or “high”, for terrestrial animal species sensitivity and it is found to be of a “low” sensitivity, then a Terrestrial Animal Species Compliance Statement must be submitted.	✓
1.5	Where the information gathered from the site sensitivity verification differs from the screening tool designation of “low” terrestrial animal species sensitivity and it is found to be of a “very high” or “high” terrestrial animal species sensitivity, a Terrestrial Animal Species Specialist Assessment must be conducted.	✓
1.6	If any part of the development falls within an area of confirmed “very high” or “high” sensitivity, the assessment and reporting requirements prescribed for the “very high” or “high” sensitivity, apply to the entire development footprint. Development footprint in the context of this protocol means, the area on which the proposed development will take place and includes the area that will be disturbed or impacted.	✓
1.7	The Terrestrial Animal Species Specialist Assessment and the Terrestrial Animal Species Compliance Statement must be undertaken within the study area.	✓
1.8	Where the nature of the activity is not expected to have an impact on species of conservation concern (SCC) beyond the boundary of the preferred site, the study area means the proposed development footprint within the preferred site.	✓
1.9	Where the nature of the activity is expected to have an impact on SCC beyond the boundary of the preferred site, the project areas of influence (PAOI) must be determined by the specialist in accordance with Species Environmental Assessment Guideline ¹³ , and the study area must include the PAOI, as determined.	✓
	VERY HIGH AND HIGH SENSITIVITY RATING for terrestrial animal species	
2	Terrestrial Animal Species Specialist Assessment	✓
	VERY HIGH SENSITIVITY RATING Critical habitat for range-restricted species ¹⁴ of conservation concern, that have a global range of less than 10 km ² .	✓

¹³ Available at <https://bgis.sanbi.org/>

¹⁴ Species with a geographically restricted area of distribution.

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
	<p>SCC listed on the IUCN Red List of Threatened Species¹⁵ or on South Africa's National Red List website¹⁶ as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1. Categories and Criteria or listed as Nationally Rare.</p> <p>Species aggregations that represent $\geq 1\%$ of the global population size of a species, over a season, and during one or more key stages of its life cycle.</p> <p>The number of mature individuals that ranks the site among the largest 10 aggregations known for the species.</p> <p>These areas are irreplaceable for SCC.</p> <p>HIGH SENSITIVITY RATING</p> <p>Confirmed habitat for SCC.</p> <p>SCC, listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable, according to the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare.</p> <p>These areas are unsuitable for development due to a very likely impact on SCC.</p>	
2.1	The assessment must be undertaken by a specialist registered with the South African Council for Natural Scientific Professionals (SACNASP) with a field of practical experience relevant to the taxonomic group ("taxa") for which the assessment is being undertaken.	✓
2.2	The assessment must be undertaken in accordance with the Species Environmental Assessment Guideline ¹⁷ ; and must:	✓
2.2.1	identify the SCC which were found, observed or are likely to occur within the study area;	✓
2.2.2	provide evidence (photographs or sound recordings) of each SCC found or observed within the study area, which must be disseminated by the specialist to a recognized online database facility ¹⁸ , immediately after the site inspection has been performed (prior to preparing the report contemplated in paragraph 3);	✓
2.2.3	identify the distribution, location, viability ¹⁹ and provide a detailed description of population size of the SCC, identified within the study area;	✓
2.2.4	identify the nature and the extent of the potential impact of the proposed development on the population of the SCC located within the study area;	✓
2.2.5	determine the importance of the conservation of the population of the SCC identified within the study area, based on information available in national and international databases, including the IUCN Red List of Threatened Species, South African Red List of Species, and/or other relevant databases;	✓
2.2.6	determine the potential impact of the proposed development on the habitat of the SCC located within the study area;	✓

¹⁵ <https://www.iucnredlist.org/>

¹⁶ This category includes the categories Extremely Rare, Critically Rare, and Rare

¹⁷ Available at <https://bgis.sanbi.org/>

¹⁸ The preferred platform is iNaturalist.org but any other national or international virtual museum.

¹⁹ the ability to survive and reproduce in the long term.

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
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;	✓
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;	✓
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;	✓
2.2.10	determine buffer distances as per the Species Environmental Assessment Guidelines used for the population of each SCC;	✓
2.2.11	discuss the presence or likelihood of additional SCC including threatened species not identified by the screening tool, Data Deficient or Near Threatened Species, as well as any undescribed species ²⁰ ; or roosting and breeding or foraging areas used by migratory species where these species show significant congregations, occurring in the vicinity; and	✓
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.	✓
2.3	The findings of the assessment must be written up in a Terrestrial Animal Species Specialist Assessment Report.	✓
3	Terrestrial Animal Species Specialist Assessment Report	✓
3.1	This report must include as a minimum the following information:	✓
3.1.1	contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the assessment including a curriculum vitae;	✓
3.1.2	a signed statement of independence by the specialist;	✓
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;	✓
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;	✓
3.1.5	a description of the mean density of observations/number of sample sites per unit area ²¹ and the site inspection observations;	✓
3.1.6	a description of the assumptions made and any uncertainties or gaps in knowledge or data;	✓

²⁰ Undescribed species are to be assessed as “High Sensitivity”.

²¹ Species Environmental Assessment Guideline

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
3.1.7	details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported ²² ;	✓
3.1.8	the online database name, hyperlink, and record accession numbers for disseminated evidence of SCC found within the study area;	✓
3.1.9	the location of areas not suitable for development and to be avoided during construction where relevant;	✓
3.1.10	a discussion on the cumulative impacts;	✓
3.1.11	impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	✓
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; and	✓
3.1.13	a motivation must be provided if there were any development footprints identified as per paragraph 2.2.12 above that were identified as having “low” or “medium” terrestrial animal species sensitivity and were not considered appropriate.	✓
3.2	A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	✓
4	MEDIUM SENSITIVITY SPECIES OF CONSERVATION CONCERN CONFIRMATION	
	MEDIUM SENSITIVITY RATING – for terrestrial animal species: Suspected habitat for SCC based either on historical records (prior to 2002) or being a natural area included in a habitat suitability model for this species ²³ . SCC listed on the IUCN Red List of Threatened Species or South Africa’s National Red List website as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare.	✓
4.1	Medium sensitivity data represents suspected habitat for SCC based on occurrence records for these species collected prior to 2002 or is based on habitat suitability modelling.	✓
4.2	The presence or likely presence of the SCC identified by the screening tool must be investigated through a site inspection by a specialist registered with the SACNASP with a field of practice relevant to the taxonomic groups (“taxa”) for which the assessment is being undertaken.	✓
4.3	The assessment must be undertaken within the study area.	✓

²² The actual name of the sensitive species may not appear in the final EIA report nor any of the specialist reports released into the public domain. It should be referred to as a sensitive plant or animal and its IUCN extinction risk category should be included e.g., Critically Endangered sensitive plant or Endangered sensitive butterfly.

²³ The methodology by which habitat suitability models have been developed are explained within the Species Environmental Assessment Guideline.

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
4.4	The site inspection to determine the presence or likely presence of SCC must be undertaken in accordance with the Species Environmental Assessment Guidelines.	✓
4.5	The site inspection is to confirm the presence, likely presence or confirmed absence of a SCC identified within the site identified as “medium” sensitivity by the screening tool.	✓
4.6	Where SCC are found on site or have been confirmed to be likely present, a Terrestrial Animal Species Specialist Assessment must be submitted in accordance with the requirements specified for “very high” and “high” sensitivity in this protocol.	✓
4.7	Similarly, where no SCC are found on site during the site inspection or the presence is confirmed to be unlikely, a Terrestrial Animal Species Compliance Statement must be submitted.	✓
5	LOW SENSITIVITY RATING – for terrestrial animal species	
	Terrestrial Animal Species Compliance Statement Areas where no natural habitat remains. Natural areas where there is no suspected occurrence of SCC.	✓
5.1	The compliance statement must be prepared by a SACNASP registered specialist under one of the two fields of practice (Zoological Science or Ecological Science).	✓
5.2	The compliance statement must:	✓
5.2.1	be applicable to the study area;	✓
5.2.2	confirm that the study area, is of “low” sensitivity for terrestrial animal species; and	✓
5.2.3	indicate whether or not the proposed development will have any impact on SCC.	✓
5.3	The compliance statement ²⁴ must contain, as a minimum, the following information:	✓
5.3.1	contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the compliance statement including a curriculum vitae;	✓
5.3.2	a signed statement of independence by the specialist;	✓
5.3.3	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	✓
5.3.4	a description of the methodology used to undertake the site survey and prepare the compliance statement, including equipment and modelling used where relevant;	✓
5.3.5	the mean density of observations/ number of samples sites per unit area.	✓
5.3.6	where required, proposed impact management actions and outcomes or any monitoring requirements for inclusion in the EMPr;	✓
5.3.7	a description of the assumptions made and any uncertainties or gaps in knowledge or data; and	✓
5.3.8	any conditions to which the compliance statement is subjected.	✓

²⁴ An example of a what is contained in a Compliance Statement for Animal Species Impact Assessment can be found in the Species Environmental Impact Assessment Guideline

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
6	A signed copy of the Terrestrial Animal Species Compliance Statement must be appended to the Basic Assessment Report or the Environmental Impact Assessment Report.	✓

PLANT SPECIES SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
1	General Information	
1.1	An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of “very high” or “high” sensitivity for terrestrial plant species must submit a Terrestrial Plant Species Specialist Assessment Report.	✓
1.2	An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of “medium sensitivity” for terrestrial plant species must submit either a Terrestrial Plant Species Specialist Assessment Report or a Terrestrial Plant Species Compliance Statement, depending on the outcome of a site inspection undertaken in accordance with paragraph 4.	✓
1.3	An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of “low” sensitivity for terrestrial plant species must submit a Terrestrial Plant Species Compliance Statement.	✓
1.4	Where the information gathered from the site sensitivity verification differs from the screening tool designation of “very high” or “high”, for terrestrial plant species sensitivity and it is found to be of a “low” sensitivity, then a Terrestrial Plant Species Compliance Statement must be submitted.	✓
1.5	Where the information gathered from the site sensitivity verification differs from the screening tool designation of “low” terrestrial plant species sensitivity and it is found to be of a “very high” or “high” terrestrial plant species sensitivity, a Terrestrial Plant Species Specialist Assessment must be conducted.	✓
1.6	If any part of the development falls within an area of confirmed “very high” or “high” sensitivity, the assessment and reporting requirements prescribed for the “very high” or “high” sensitivity, apply to the entire development footprint. Development footprint in the context of this protocol means, the area on which the proposed development will take place and includes the area that will be disturbed or impacted.	✓
1.7	The Terrestrial Plant Species Specialist Assessment and the Terrestrial Plant Species Compliance Statement must be undertaken within the study area.	✓
1.8	Where the nature of the activity is not expected to have an impact on species of conservation concern (SCC) beyond the boundary of the preferred site, the study area means the proposed development footprint within the preferred site.	✓
1.9	Where the nature of the activity is expected to have an impact on SCC beyond the boundary of the preferred site, the project areas of influence (PAOI) must be determined by the specialist in accordance with Species	✓

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
	Environmental Assessment Guideline ²⁵ , and the study area must include the PAOI, as determined.	
	VERY HIGH AND HIGH SENSITIVITY RATING for terrestrial plant species	
2	Terrestrial Plant Species Specialist Assessment	✓
	<p>VERY HIGH SENSITIVITY RATING Critical habitat for range-restricted species²⁶ of conservation concern, that have a global range of less than 10 km². SCC listed on the IUCN Red List of Threatened Species²⁷ or on South Africa's National Red List website²⁸ as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1. Categories and Criteria or listed as Nationally Rare. Species aggregations that represent ≥1% of the global population size of a species, over a season, and during one or more key stages of its life cycle. The number of mature individuals that ranks the site among the largest 10 aggregations known for the species. These areas are irreplaceable for SCC.</p> <p>HIGH SENSITIVITY RATING Confirmed habitat for SCC. SCC, listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable, according to the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare. These areas are unsuitable for development due to a very likely impact on SCC.</p>	✓
2.1	The assessment must be undertaken by a specialist registered with the South African Council for Natural Scientific Professionals (SACNASP) with a field of practical experience relevant to the taxonomic group ("taxa") for which the assessment is being undertaken.	✓
2.2	The assessment must be undertaken within the study area.	✓
2.3	The assessment must be undertaken in accordance with the Species Environmental Assessment Guideline ²⁹ ; and must:	✓
2.3.1	Identify the SCC which were found, observed or are likely to occur within the study area;	✓
2.3.2	provide evidence (photographs) of each SCC found or observed within the study area, which must be disseminated by the specialist to a recognized online database facility ³⁰ , immediately after the site inspection has been performed (prior to preparing the report contemplated in paragraph 3);	✓
2.3.3	identify the distribution, location, viability ³¹ and provide a detailed description of population size of the SCC, identified within the study area;	✓

²⁵ Available at <https://bgis.sanbi.org/>

²⁶ Species with a geographically restricted area of distribution.

²⁷ <https://www.iucnredlist.org/>

²⁸ This category includes the categories Extremely Rare, Critically Rare, and Rare

²⁹ Available at <https://bgis.sanbi.org/>

³⁰ The preferred platform is iNaturalist.org but any other national or international virtual museum.

³¹ the ability to survive and reproduce in the long term.

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
2.3.4	identify the nature and the extent of the potential impact of the proposed development on the population of the SCC located within the study area;	✓
2.3.5	determine the importance of the conservation of the population of the SCC identified within the study area, based on information available in national and international databases, including the IUCN Red List of Threatened Species, South African Red List of Species, and/or other relevant databases;	✓
2.3.6	determine the potential impact of the proposed development on the habitat of the SCC located within the study area;	✓
2.3.7	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;	✓
2.3.8	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;	✓
2.3.9	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;	✓
2.3.10	determine buffer distances as per the Species Environmental Assessment Guidelines used for the population of each SCC;	✓
2.3.11	discuss the presence or likelihood of additional SCC including threatened species not identified by the screening tool, Data Deficient or Near Threatened Species, as well as any undescribed species ³² ;	✓
2.3.12	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.	✓
2.4	The findings of the assessment must be written up in a Terrestrial Plant Species Specialist Assessment Report.	✓
3	Terrestrial Plant Species Specialist Assessment Report	✓
3.1	This report must include as a minimum the following information:	✓
3.1.1	contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the assessment including a curriculum vitae;	✓
3.1.2	a signed statement of independence by the specialist;	✓
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;	✓
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;	✓
3.1.5	a description of the assumptions made and any uncertainties or gaps in knowledge or data;	✓

³² Undescribed species are to be assessed as “High Sensitivity”.

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
3.1.6	a description of the mean density of observations/number of sample sites per unit area ³³ and the site inspection observations;	✓
3.1.7	details of all SCC found or suspected to occur on site, ensuring sensitive species ³⁴ are appropriately reported;	✓
3.1.8	the online database name, hyperlink, and record accession numbers for disseminated evidence of SCC found within the study area;	✓
3.1.9	the location of areas not suitable for development and to be avoided during construction where relevant;	✓
3.1.10	a discussion on the cumulative impacts;	✓
3.1.11	impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	✓
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; and	✓
3.1.13	a motivation must be provided if there were any development footprints identified as per paragraph 2.3.12 above that were identified as having “low” or “medium” terrestrial plant species sensitivity and were not considered appropriate.	✓
3.2	A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	✓
4	MEDIUM SENSITIVITY SPECIES OF CONSERVATION CONCERN CONFIRMATION	
	MEDIUM SENSITIVITY RATING – for terrestrial plant species: Suspected habitat for SCC based either on there being records for this species collected in the past, prior to 2002, or being a natural area included in a habitat suitability model ³⁵ . SCC listed on the IUCN Red List of Threatened Species or South Africa’s National Red List website as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare.	✓
4.1	Medium sensitivity data represents suspected habitat for SCC based on occurrence records for these species collected prior to 2002 or is based on habitat suitability modelling.	✓
4.2	The presence or likely presence of the SCC identified by the screening tool must be investigated through a site inspection by a specialist registered with the SACNASP with a field of practice relevant to the taxonomic groups (“taxa”) for which the assessment is being undertaken.	✓

³³ Species Environmental Assessment Guideline

³⁴ The actual name of the sensitive species may not appear in the final EIA report nor any of the specialist reports released into the public domain. It should be referred to as a sensitive plant or animal and its IUCN extinction risk category should be included e.g., Critically Endangered sensitive plant or Endangered sensitive butterfly.

³⁵ The methodology by which habitat suitability models have been developed are explained within the Species Environmental Assessment Guideline.

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
4.3	The assessment must be undertaken within the study area.	✓
4.4	The site inspection to determine the presence or likely presence of SCC must be undertaken in accordance with the Species Environmental Assessment Guidelines.	✓
4.5	The site inspection is to confirm the presence, likely presence or confirmed absence of a SCC identified within the site identified as “medium” sensitivity by the screening tool.	✓
4.6	Where SCC are found on site or have been confirmed to be likely present, a Terrestrial Plant Species Specialist Assessment must be submitted in accordance with the requirements specified for “very high” and “high” sensitivity in this protocol.	✓
4.7	Similarly, where no SCC are found on site during the site inspection or the presence is confirmed to be unlikely, a Terrestrial Plant Species Compliance Statement must be submitted.	✓
5	LOW SENSITIVITY RATING – for terrestrial plant species	
	Terrestrial Plant Species Compliance Statement Areas where no natural habitat remains. Natural areas where there is no suspected occurrence of SCC.	✓
5.1	The compliance statement must be prepared by a SACNASP registered specialist under one of the two fields of practice (Botanical Science or Ecological Science).	✓
5.2	The compliance statement must:	✓
5.2.1	be applicable to the study area;	✓
5.2.2	confirm that the study area, is of “low” sensitivity for terrestrial plant species; and	✓
5.2.3	indicate whether or not the proposed development will have any impact on SCC.	✓
5.3	The compliance statement ³⁶ must contain, as a minimum, the following information:	✓
5.3.1	contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the compliance statement including a curriculum vitae;	✓
5.3.2	a signed statement of independence by the specialist;	✓
5.3.3	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	✓
5.3.4	a description of the methodology used to undertake the site survey and prepare the compliance statement, including equipment and modelling used where relevant;	✓
5.3.5	where required, proposed impact management actions and outcomes or any monitoring requirements for inclusion in the EMPr;	✓
5.3.6	a description of the assumptions made and any uncertainties or gaps in knowledge or data;	✓

³⁶ An example of a what is contained in a Compliance Statement for Plant Species Impact Assessment can be found in the Species Environmental Impact Assessment Guideline

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
5.3.7	the mean density of observations/ number of samples sites per unit area ³⁷ ; and	✓
5.3.8	any conditions to which the compliance statement is subjected.	✓
6	A signed copy of the Terrestrial Plant Species Compliance Statement must be appended to the Basic Assessment Report or the Environmental Impact Assessment Report.	✓

³⁷ Refer to the Species Environmental Assessment Guideline

9.11 Appendix J: Site Sensitivity Verification Report

9.11.1 Purpose of Report

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 Act, when applying for Environmental Authorisation”, as published on 20 March, 2020 in National Gazette, No. 43110 in terms of NEMA (Act 107 of 1998) sections 24(5)(a), (h) and 44, lists protocols and minimum report requirements for environmental impacts on terrestrial biodiversity and provides the criteria for the assessment and reporting of impacts on terrestrial biodiversity for activities requiring environmental authorisation. The assessment and minimum reporting requirements of this protocol are associated with a level of environmental sensitivity identified by the National web based Environmental Screening Tool. Prior to commencing with a specialist assessment, the current use of the land and the environmental sensitivity of the site under consideration, identified by the screening tool, must be confirmed by undertaking a **site sensitivity verification**, which must include the following.

1. The site sensitivity verification must be undertaken by an environmental assessment practitioner or a specialist.
2. The site sensitivity verification must be undertaken through the use of:
 - a. a desk top analysis, using satellite imagery.
 - b. a preliminary on-site inspection; and
 - c. any other available and relevant information.
3. The outcome of the site sensitivity verification must be recorded in the form of a report that:
 - a. confirms or disputes the current use of the land and environmental sensitivity as identified by the screening tool.
 - b. contains a motivation and evidence of either the verified or different use of the land and environmental sensitivity; and
 - c. is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

The National Web Based Screening Tool was used to generate the potential environmental sensitivity of the site which has then been compared to various online and other databases and information sources in order to verify and confirm the validity of the screening tool findings. This was further supported with on-site observations and analysis of most recent aerial photography.

This terrestrial biodiversity site verification has been undertaken as per the requirements of 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 (GN 320, 20 March 2020).

9.11.2 Data sources and references

Data sources that were utilised for this report include the following:

- National (DFFE) Web Based Screening Tool – to generate the sites potential environmental sensitivity.
- National Vegetation Map 2018 (NVM, 2018), Mucina & Rutherford (2006) and National Biodiversity Assessment (NBA, 2019) – description of vegetation types, species (including endemic) and vegetation unit conservation status.
- National and Regional Legislation including Provincial Nature Conservation Ordinance (P.N.C.O). NEM:BA Threatened or Protected Species (ToPS).
- Botanical Database of Southern Africa (BODATSA) and New Plants of Southern Africa (POSA) – lists of plant species and potential species of concern found in the general area (SANBI.)
- International Union for Conservation of Nature (IUCN) - Red List of Threatened Species.

- Animal Demography Unit Virtual Museum (VM) – potential faunal species.
- Global Biodiversity Information Facility (GBIF) – potential faunal species.
- Southern African Bird Atlas Project 2 (SABAP2) – for bird species records.
- National Red Books and Lists - mammals, reptiles, frogs, dragonflies & butterflies.
- National Freshwater Ecosystem Priority Areas assessment (NFEPA, 2011) - important catchments.
- National Protected Areas Expansion Strategy (NPAES, 2018) and South Africa Protected Area database (2020) – protected area information.
- Critical Biodiversity Areas of the Northern Cape (2016) – Bioregional Plan.
- Namakwa District Biodiversity Sector Plan (2008) – Bioregional Plan.
- Succulent Karoo Ecosystem Planning (SKEP, 2002).
- SANBI BGIS – All other biodiversity GIS datasets.
- Aerial Imagery – Google Earth, ESRI, Chief Surveyor General (<http://csg.dla.gov.za>).
- Cadastral and other topographical country data - Chief Surveyor General (<http://csg.dla.gov.za>).
- Other sources include peer-reviewed journals, regional and local assessments, and studies in the general location of the project and its area of influence, landscape prioritization schemes (Key Biodiversity Areas), systematic conservation planning assessments and plans (as above), and any pertinent masters and doctoral theses, among others.

9.11.3 Site visit

A site visit was conducted on the 29th & 30th September 2022, during early to mid-spring and again on the 27 and 28 February 2023 during late summer. The site falls within a summer rainfall area and for the purposes of this report, based on favourable seasonal rainfall and on-site observations, the site visits are deemed to be adequate. The site visit and assessment were undertaken by Mr Jamie Pote, SACNASP registered ecological scientist with a BSc (Hons) degree in Botany and a BSc degree in Botany and environmental Science, with nearly 20 years' experience undertaking ecological assessments.

9.11.4 Assumptions, Uncertainties and Gaps in Knowledge

The findings and recommendations of this report may be susceptible to the following uncertainties and limitation:

- No assessment has been made of aquatic aspects relating to any wetlands, pans and rivers/seeps and/or estuaries outside of the scope of a terrestrial biodiversity report and have been undertaken by an aquatic specialist.
- No specific faunal assessment has been undertaken, but animals have been assessed in term of the terrestrial Biodiversity Assessment requirements.
- Any flora surveys based upon a limited sampling time-period, may not reflect the actual species composition of the site due to seasonal variations in flowering times.
- As far as possible, site collected data has been supplemented with desktop and database-centred distribution data as well as previous studies undertaken in the area.

9.11.5 Site and Activity Description

The proposed site is situated approximately 9 km south-east of Kroonstad, along the R 76 road in the direction of Steynsrus, in the Free State province. The site is situated within a commercial farming area (Refer to Figure 1) and is comprised of two farm portions, a north-western portion, Remainder of Farm Scheveningen 636 (~575 Ha) and a south-eastern portion, Portion 1 of Farm Scheveningen 636 (~429 Ha). The sites are within a predominantly commercial stock and game farming area, generally comprising dryland grazing in the surrounding area. The proposed activity will be to construct PV

energy facilities, which will most likely feed into the national grid, being accessible in proximity to the site via Portion 0 of Farm Oslaagte No 2564.

9.11.6 National Environmental Screening Tool

The DEA Screening Tool indicates the following:

- Terrestrial Biodiversity is **Very High** and **Low** (Figure 28).
- Plant species sensitivity is **Low** (Figure 29).
- Animal Species sensitivity is **Medium** and **Low** (Figure 30).
- Aquatic Sensitivity is **Very High & Low** (Figure 31).
- Agricultural Sensitivity is **High, Medium, & Low** (Figure 32).
- Landscape (Solar) Sensitivity is **Very High, High, Medium, & Low** (Figure 33).

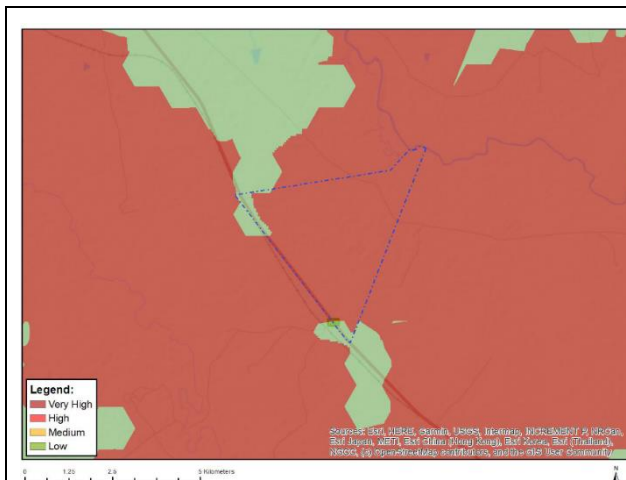


Figure 28: Terrestrial Biodiversity Sensitivity

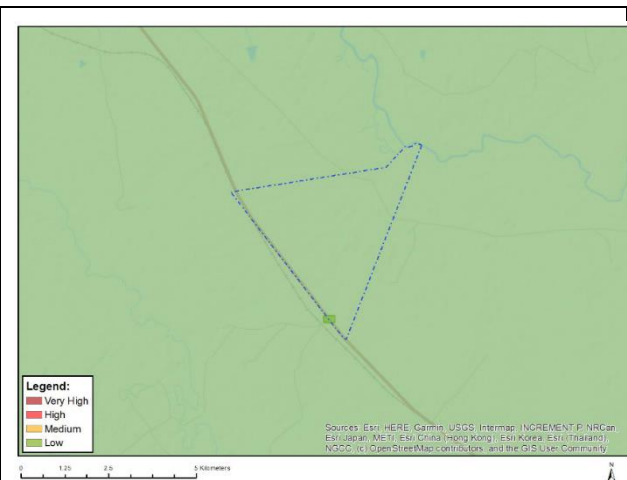


Figure 29: Plant Species Sensitivity

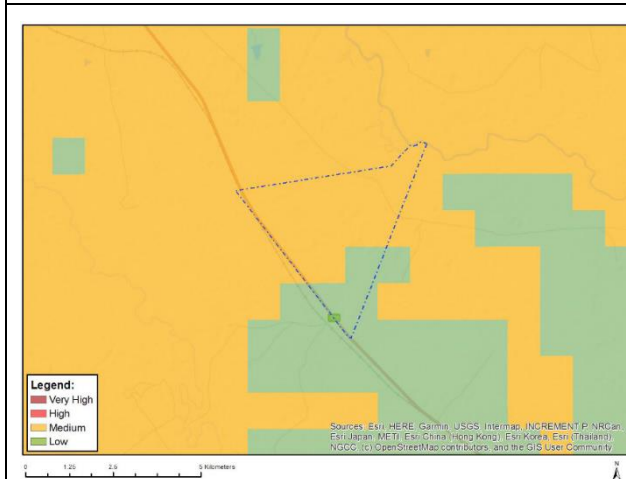


Figure 30: Animal Species Sensitivity

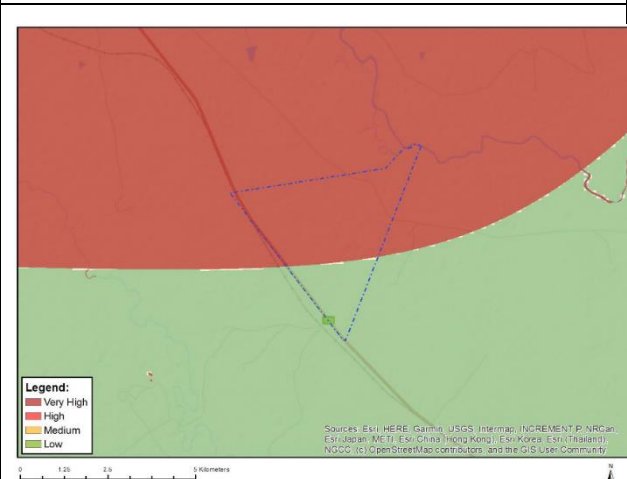


Figure 31: Aquatic Sensitivity

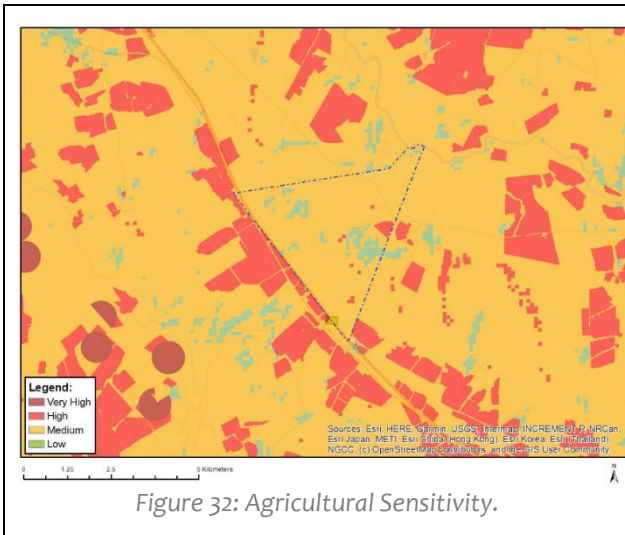


Figure 32: Agricultural Sensitivity.

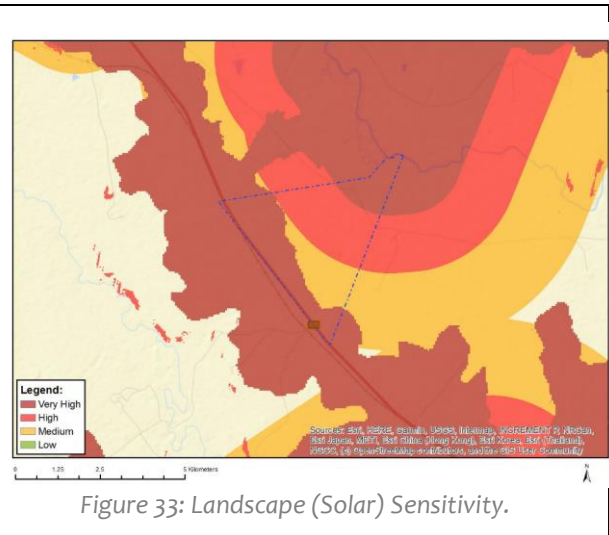


Figure 33: Landscape (Solar) Sensitivity.

SENSITIVITY	DESCRIPTION - FEATURE(S) IN PROXIMITY
TERRESTRIAL SENSITIVITY	
Very High	ESA 1 & 2; Erfdeel Private Nature reserve, NPAES
High	None
Medium	None
Low	Present
PLANT SENSITIVITY	
Very High	None
High	None
Medium	None
Low	Present
ANIMAL SENSITIVITY	
Very High	None
High	None
Medium	Sensitive Species 15, <i>Hydrictis maculicollis</i> (Mammal)
Low	Present
AQUATIC SENSITIVITY	
Very High	Strategic water source area & Wetlands
High	None
Medium	None
Low	Present
AGRICULTURAL SENSITIVITY	
Very High	None
High	Land capability: 09. Moderate-High; 10. Moderate-High High Annual Crop Cultivation / Planted Pastures Rotation: Land capability: 06. Low-Moderate; 07. Low-Moderate; 08. Moderate High Annual Crop Cultivation / Planted Pastures Rotation: Land capability: 01. Very low/02. Very low/03.; Low-Very low/04. Low-Very low/05. Low
Medium	Land capability: 06. Low-Moderate; 07. Low-Moderate; 08. Moderate
Low	Land capability: 01. Very low; 02. Very low; 03. Low-Very low; 04. Low-Very low; 05. Low
LANDSCAPE SENSITIVITY	

SENSITIVITY	DESCRIPTION - FEATURE(S) IN PROXIMITY
Very High	Nature Reserve, Within 1.5 km of a nature reserve, Mountain tops and high ridges
High	Slope between 1:4 and 1:10, Between 1.5 and 3 km of a nature reserve
Medium	Between 3 and 5 km of a nature reserve
Low	None

NOTE: as per point 1.5 of the Terrestrial Biodiversity Specialist Assessment and Minimum Report Content Requirements:

*'If any part of the proposed development footprint falls within an area of 'very high' sensitivity, the assessment and reporting requirements prescribed for the 'very high' sensitivity apply to the entire footprint, **excluding linear activities** for which impacts on terrestrial biodiversity are temporary and the land in the opinion of the terrestrial biodiversity specialist, based on the mitigation and remedial measures, can be returned to the current state within two years of the completion of the construction phase, in which case a compliance statement applies. Development footprint in the context of this protocol means the area on which the proposed development will take place and includes any area that will be disturbed.'*

Based on the above reporting protocol condition, the overhead powerline and fall into the above category, which implies that for a temporary linear activity, the screening tool designated high sensitivity should be reduced to a low sensitivity and only a complicated statement would be required.

The site assessment will physically screen for the presence of these, and other possible species or sensitivities that are not identified in the screening tool. Not all features are directly affected, but being in proximity, the risks associated with the activity will be investigated further and addressed in the report.

The following is deduced from the DFFE National Environmental Screening Tool:

- As apparent from the National Environmental Screening Tool, the terrestrial biodiversity theme is Very-High due to portions of the site having ESA 1 & 2 and NPAES. Note general comment above.
- No flora (plant) species regarded as being of concern are flagged. The assessment will undertake a flora screening based on site observations.
- Two fauna (animal) species regarded as being of concern are flagged. The Spotted Necker Otter is known to occur only in or near standing water and since no such habitat is within or close to the proposed PV site, this species would not be at risk. No evidence of Sensitive Species 15 was found despite two site visits being undertaken, during spring and late summer, which included broad sampling across the site.
- The aquatic sensitivity is High due to the site being within a designated SWSA area. Refer to Aquatic Assessment but the proposed development is unlikely to pose any risk and riverine habitat has been demarcated and excluded. All riverine areas have been demarcated and designated no go areas.
- The terrestrial flora and fauna impacts are assessed further in the relevant report sections for flora and fauna in the accompanying report.

The site assessment has physically screened for the presence of any species as listed in the National Environmental Screening Tool, as well as other possible species or sensitivities that are not identified in the screening tool. Not all features are directly affected, but being in proximity, the risks associated with the activity will be investigated further and addressed in the report.

9.11.7 Findings, Outcomes and Recommendations

Terrestrial Biodiversity

Site verification of the Terrestrial Biodiversity sensitivities is summarised in Table 16 and depicted in Figure 34. Rivers and Wetlands are also indicated.

Table 16: Terrestrial Biodiversity Features.

Feature		COMMENT
Ecological Support Area 1	Present	The majority of the site footprint falls within an ESA 1 with a portion containing an ESA 2.
Ecological Support Area 2	Present	The majority of the site footprint falls within an ESA 1 with a portion containing an ESA 2.

Project : WKN Bonsmara PV Layout - Free State BSP (Terrestrial)

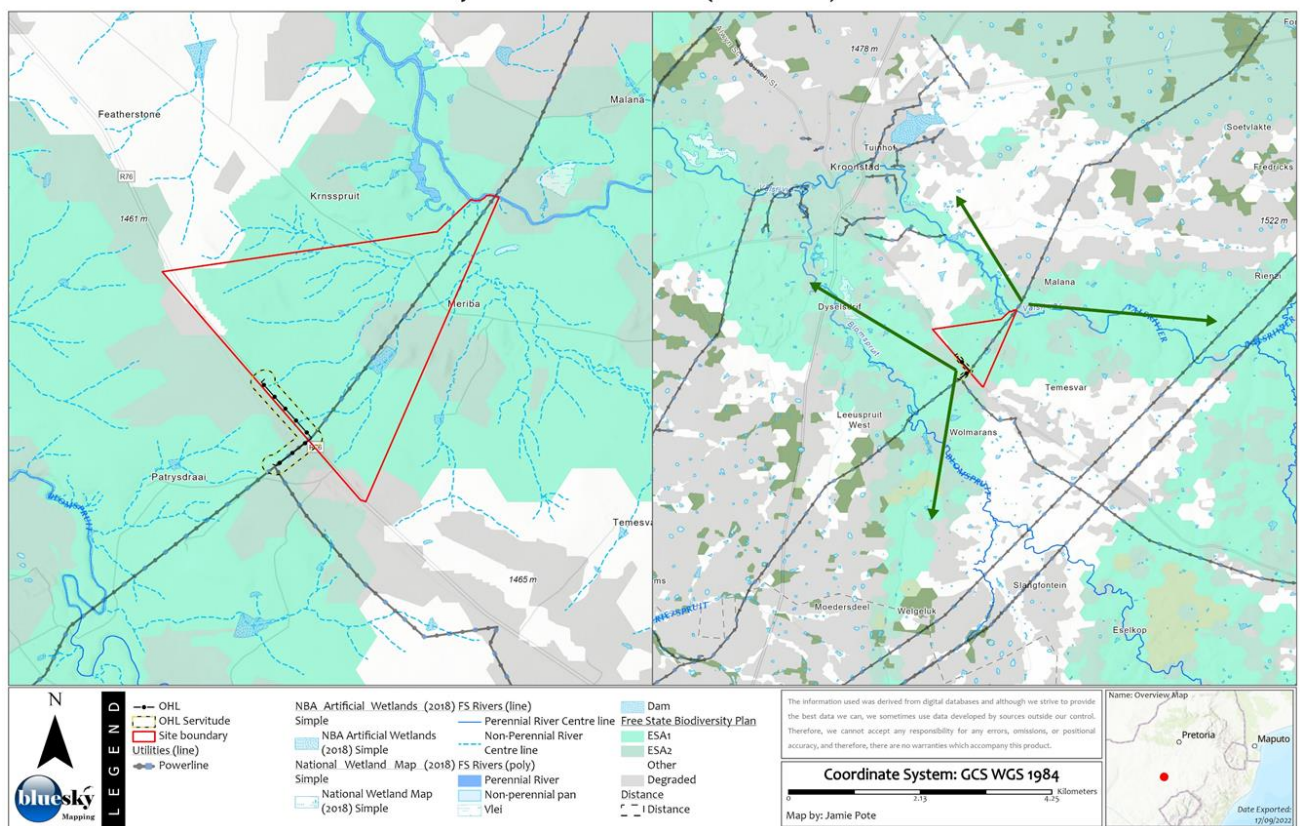


Figure 34: Map indicating Free State Bioregional Plan (FSBSP, 2016) and Rivers and Wetlands.

Plant Species (Flora)

National Environmental Screening Tool flagged no flora species. Further screening of species on the site concluded that no species of conservation concern having an elevated status and/or limited distribution range are confirmed present. Several species protected in terms of the Free State Nature Conservation Ordinance are present but none are deemed under threat.

Animal Species (Fauna)

Two fauna (animal) species regarded as being of concern are flagged. The Spotted Necker Otter is known to occur only in or near map standing water and since no such habitat is within or close to the proposed PV site, this species would not be at risk. No evidence of Sensitive Species 15 was found

despite two site visits being undertaken, during spring and late summer, which included broad sampling across the site.

Aquatic

The aquatic sensitivity is High due to the site being within a designated SWSA area. Refer to Aquatic Assessment but the proposed development is unlikely to pose any risk and riverine habitat has been demarcated and excluded. All riverine areas have been demarcated and designated no go areas.

9.11.8 Conclusions

The site verification thus confirms that the site falls within the terrestrial biodiversity screening tool designated Ecological Support Area 1 & 2 and NPAES. These designations are likely associated with broader landscape level ecological processes and conservation priorities of the affected vegetation units. The respective risks and impacts will be assessed in the accompanying terrestrial biodiversity assessment report.

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