



# THE BIODIVERSITY AND WETLAND SCOPING ASSESSMENT FOR THE PROPOSED GRASPAN SOLAR PV DEVELOPMENT

**Witput, Northern Cape Province**

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environmental

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## Table of Contents

1	Introduction .....	1
1.1	Background.....	2
2	Key Legislative Requirements .....	1
2.1	National Environmental Management Act (NEMA, 1998) .....	2
2.2	National Water Act (NWA, 1998).....	4
3	Project Area .....	4
4	Desktop Assessment.....	6
4.1	Ecologically Important Landscape Features.....	6
4.2	Desktop Flora Assessment .....	7
4.3	Desktop Faunal Assessment .....	7
4.4	Desktop Wetland Assessment .....	8
4.5	Assumptions and Limitations .....	8
5	Results & Discussion.....	8
5.1	Desktop Assessment .....	8
5.1.1	Ecologically Important Landscape Features.....	8
5.1.2	Flora Assessment .....	12
5.1.3	Faunal Assessment .....	14
5.2	Site Ecological Importance.....	17
6	Impact Risk Assessment .....	18
6.1	Biodiversity Risk Assessment .....	18
6.1.1	Terrestrial Impact Assessment.....	18
6.1.2	Alternatives considered.....	18
6.1.3	Loss of Irreplaceable Resources.....	18
6.1.4	Anticipated Impacts.....	18
6.1.5	Identification of Additional Potential Impacts .....	19
6.2	Wetland Risk Assessment .....	21
7	Assessment Approach.....	21
7.1	Biodiversity Field Assessment .....	21
7.1.1	Flora Survey .....	21
7.1.2	Fauna Survey .....	21

7.2	Terrestrial Site Ecological Importance.....	22
7.3	Wetland Assessment .....	<b>Error! Bookmark not defined.</b>
7.3.1	Wetland Identification and Mapping .....	<b>Error! Bookmark not defined.</b>
7.3.2	Functional Assessment.....	<b>Error! Bookmark not defined.</b>
7.3.3	Present Ecological Status .....	<b>Error! Bookmark not defined.</b>
7.3.4	Importance and Sensitivity .....	<b>Error! Bookmark not defined.</b>
7.3.5	Ecological Classification and Description .....	<b>Error! Bookmark not defined.</b>
7.3.6	Buffer Requirements .....	<b>Error! Bookmark not defined.</b>
7.3.7	Risk Assessment .....	<b>Error! Bookmark not defined.</b>
8	References.....	25
9	Appendix Items.....	27
9.1	Appendix A – Flora species expected to occur in the project area. ....	27
9.2	Appendix B – Amphibian species expected to occur in the project area.....	36
9.3	Appendix C – Reptile species expected to occur in the project area .....	37
9.4	Appendix D – Mammal species expected to occur within the project area .....	39
9.5	Appendix E -Avifauna Species expected to occur within the project area.....	41

## List of Tables

Table 2-1	A list of key legislative requirements relevant to biodiversity and conservation in the Northern Cape Province.....	1
Table 5-1	Summary of relevance of the proposed project to ecologically important landscape features.....	8
Table 5-2	Flora SCCs expected in the project area.....	14
Table 5-3	Threatened reptile species that are expected to occur within the project area	14
Table 5-4	Threatened mammal species that are expected to occur within the project area. .....	15
Table 5-5	Avifauna SCCs expected in the project area .....	16
Table 6-1	Anticipated impacts for the proposed activities on terrestrial biodiversity .....	18
Table 6-2	Scoping evaluation table summarising the impacts identified to biodiversity ..	19
Table 6-3	Cumulative Impacts to biodiversity associated with the proposed project.....	20
Table 7-1	Summary of Conservation Importance (CI) criteria .....	22
Table 7-2	Summary of Functional Integrity (FI) criteria .....	22
Table 7-3	Matrix used to derive Biodiversity Importance (BI) from Functional Integrity (FI) and Conservation Importance (CI) .....	23
Table 7-4	Summary of Resource Resilience (RR) criteria .....	23
Table 7-5	Matrix used to derive Site Ecological Importance from Receptor Resilience (RR) and Biodiversity Importance (BI) .....	23
Table 7-6	Guidelines for interpreting Site Ecological Importance in the context of the proposed development activities .....	24
Table 7-7	Classes for determining the likely extent to which a benefit is being supplied .....	<b>Error! Bookmark not defined.</b>
Table 7-8	The Present Ecological Status categories (Macfarlane, et al., 2008).....	<b>Error! Bookmark not defined.</b>
Table 7-9	Description of Importance and Sensitivity categories	<b>Error! Bookmark not defined.</b>
Table 7-10	Significance ratings matrix .....	<b>Error! Bookmark not defined.</b>

## List of Figures

Figure 1-1	Proposed location of the project area.....	3
Figure 3-1	Map illustrating the location of the proposed project area .....	5

Figure 4-1 Map illustrating extent of area used to obtain the expected flora species list from the Plants of South Africa (POSA) database. Yellow dot indicates approximate location of the project area. The red squares are cluster markers of botanical records as per POSA data. .... 7

Figure 5-1 Map illustrating the ecosystem threat status associated with the project area.. 9

Figure 5-2 Map illustrating the ecosystem protection level associated with the project area ..... 10

Figure 5-3 Map illustrating the locations of CBAs in relation to the project area ..... 11

Figure 5-4 The inland water features associated with the project area ..... 12

Figure 5-5 Map illustrating the vegetation type associated with the project area ..... 13

Figure 5-6 Terrestrial Biodiversity Theme Sensitivity, National Web based Environmental Screening Tool..... 17

Figure 7-1 Cross section through a wetland, indicating how the soil wetness and vegetation indicators change (Ollis et al. 2013) ..... **Error! Bookmark not defined.**

## 1 Introduction

The Biodiversity Company was appointed to undertake a terrestrial ecology and a wetland delineation and functional scoping assessment for the establishment of a solar photovoltaic (PV) project, namely Graspan Solar PV. The project is found 23 km north east from Witput in the Northern Cape (Figure 2-1).

ENGIE Graspan Solar Project (Pty) Ltd obtained an Environmental Authorisation for the proposed Graspan PV Facility and associated infrastructure, located on remaining extent of Farm Graspan (No. 172), situated in the Siyancuma Local Municipality in the Northern Cape province in April 2013 (DFFE Reference No.: 14/12/16/3/3/276). The project has been selected as a Preferred Bidder project under Round 5 of the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP).

The proposed facility will have a contracted capacity of 90MW and will include the following infrastructure:

- PV solar panels/modules (arranged in arrays);
- PV module mountings;
- DC-AC current inverters and transformers;
- An on-site 132kV Independent Power Producer (IPP) substation to facilitate the grid connection.
- Underground cabling/ overhead power lines;
- On-site buildings (including an operational control centre, office, ablutions and a guard house);
- Access roads and internal road network; and
- Ancillary infrastructure.

A developmental footprint of 150 ha in extent is authorised for the facility and associated infrastructure. In order to implement the project, an additional 50 ha is required. This additional area is immediately adjacent to the authorised area.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations, 2014 (GNR 326, 7 April 2017) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020): "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" (Reporting Criteria). The National Web based Environmental Screening Tool has characterised the terrestrial sensitivity of the solar plant as "Very High" and the aquatic sensitivity as "Low" sensitivity.

The purpose of the specialist studies is to provide relevant input into the Environmental Impact Assessment (EIA) process and provide a report for the proposed activities associated with the project. This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making, as to the ecological viability of the proposed project.

## 2 Key Legislative Requirements

The legislation, policies and guidelines listed below in Table 2-1 are applicable to the current project. The list below, although extensive, may not be complete and other legislation, policies and guidelines may apply in addition to those listed below.

**Table 2-1** *A list of key legislative requirements relevant to biodiversity and conservation in the Northern Cape Province*

Region	Legislation / Guideline
International	Convention on Biological Diversity (CBD, 1993)
	The Convention on Wetlands (RAMSAR Convention, 1971)

	The United Nations Framework Convention on Climate Change (UNFCCC, 1994)
	The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 1973)
	The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, 1979)
	Constitution of the Republic of South Africa (Act No. 108 of 1996)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998)
	The National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
	The National Environmental Management: Biodiversity Act (Act No. 10 of 2004), Threatened or Protected Species Regulations
	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, GNR 320 of Government Gazette 43310 (March 2020)
	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, GNR 1150 of Government Gazette 43855 (October 2020)
	The National Environmental Management: Waste Act, 2008 (Act 59 of 2008);
	The Environment Conservation Act (Act No. 73 of 1989)
	National Protected Areas Expansion Strategy (NPAES)
	Natural Scientific Professions Act (Act No. 27 of 2003)
<b>National</b>	National Biodiversity Framework (NBF, 2009)
	National Forest Act (Act No. 84 of 1998)
	National Veld and Forest Fire Act (101 of 1998)
	National Water Act (NWA) (Act No. 36 of 1998)
	National Spatial Biodiversity Assessment (NSBA)
	World Heritage Convention Act (Act No. 49 of 1999)
	Municipal Systems Act (Act No. 32 of 2000)
	Alien and Invasive Species Regulations and, Alien and Invasive Species List 2014/2020, published under NEMBA
	South Africa's National Biodiversity Strategy and Action Plan (NBSAP)
	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA)
	Sustainable Utilisation of Agricultural Resources (Draft Legislation).
	White Paper on Biodiversity
	Northern Cape Nature Conservation act no. 9 of 2009
<b>Provincial</b>	Northern Cape Planning and Development Act no. 7 of 1998
	Northern Cape Critical Biodiversity Area 2017

## 2.1 Background

The following specialist reports were reviewed and considered to supplement the project findings:

- Fauna and flora specialist report for the impact assessment for the proposed Graspan Solar Facility (Simon Todd, 2012); and
- Soil and agricultural assessment for the proposed Graspan PV Solar Power Facility (SiVest, 2012).



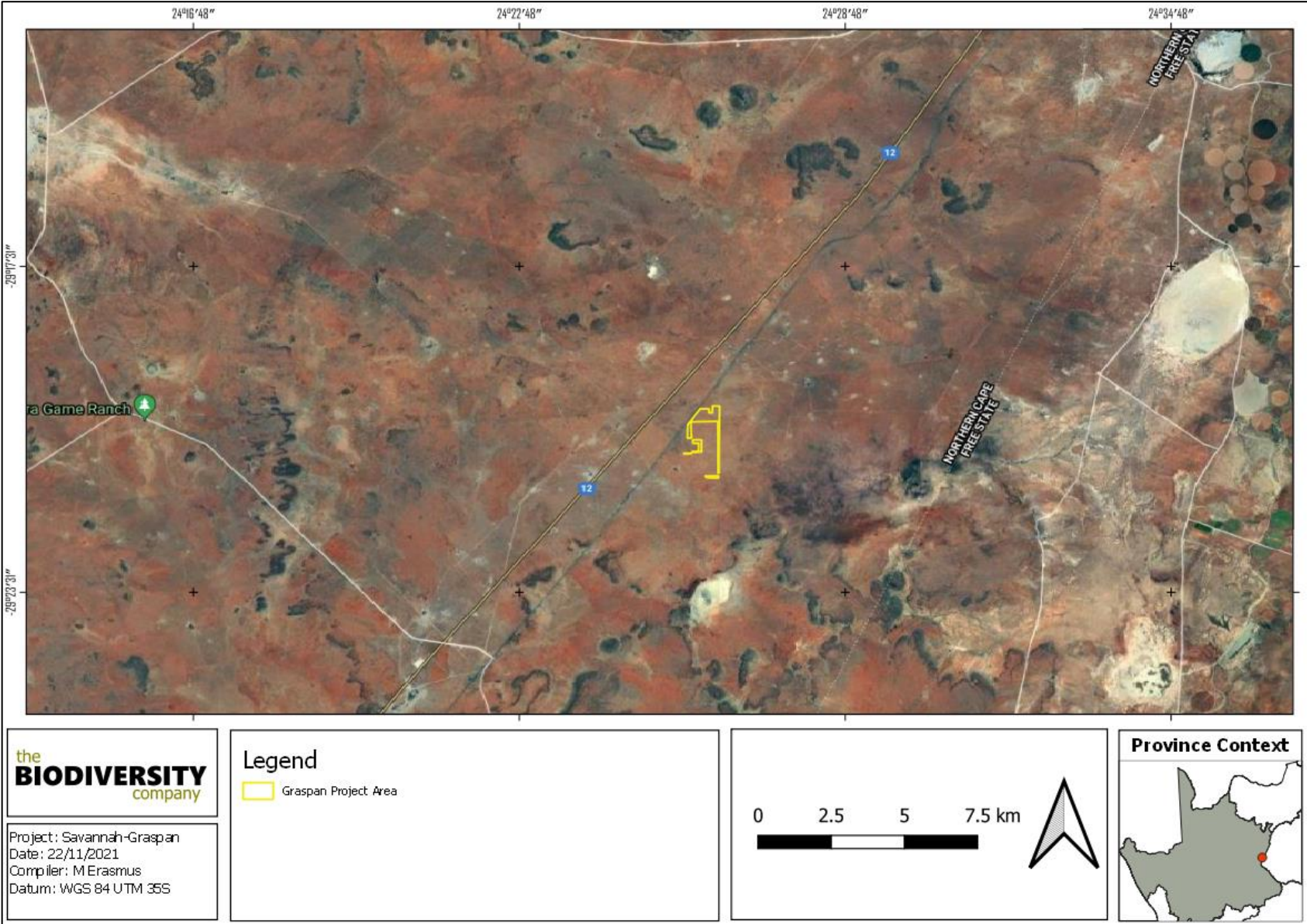


Figure 2-1 Proposed location of the project area



## 2.2 National Environmental Management Act (NEMA, 1998)

The National Environmental Management Act (Act No. 107 of 1998 – NEMA) and the associated Regulations as amended in April 2017, states that prior to any development taking place within a wetland or riparian area, an environmental authorisation application process needs to be followed. This could follow either the Basic Assessment (BA) process or the Environmental Impact Assessment (EIA) process depending on the scale of the impact.

New regulations were gazetted (43110) on the 20 March 2020 which have replaced the requirements of Appendix 6 of the Environmental Impact Assessment Regulations. These regulations provide the criteria and minimum requirements for specialist's assessments in order to consider the impacts on aquatic biodiversity for activities which require Environmental Authorisation (EA).

## 2.3 National Water Act (NWA, 1998)

The Department of Human Settlements Water and Sanitation (DHSWS) is the custodian of South Africa's water resources and therefore assumes public trusteeship of water resources, which includes watercourses, surface water, estuaries, or aquifers. The National Water Act (Act No. 36 of 1998 – NWA) allows for the protection of water resources, which includes:

- The maintenance of the quality of the water resource to the extent that the water resources may be used in an ecologically sustainable way;
- The prevention of the degradation of the water resource; and
- The rehabilitation of the water resource.

A watercourse means;

- 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
- Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

The NWA recognises that the entire ecosystem and not just the water itself, and any given water resource constitutes the resource and as such needs to be conserved. No activity may therefore take place within a watercourse unless it is authorised by the DHSWS. Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DHSWS in terms of Section 21 (c) and (i).

## 3 Project Area

The project is found 23 km north east from Witput and 38 km south of Modderivier in the Northern Cape. Presently, the project area is adjacent to the N12 road and surrounded by some open natural areas and in close proximity to the Driekopspan (Figure 3-1).

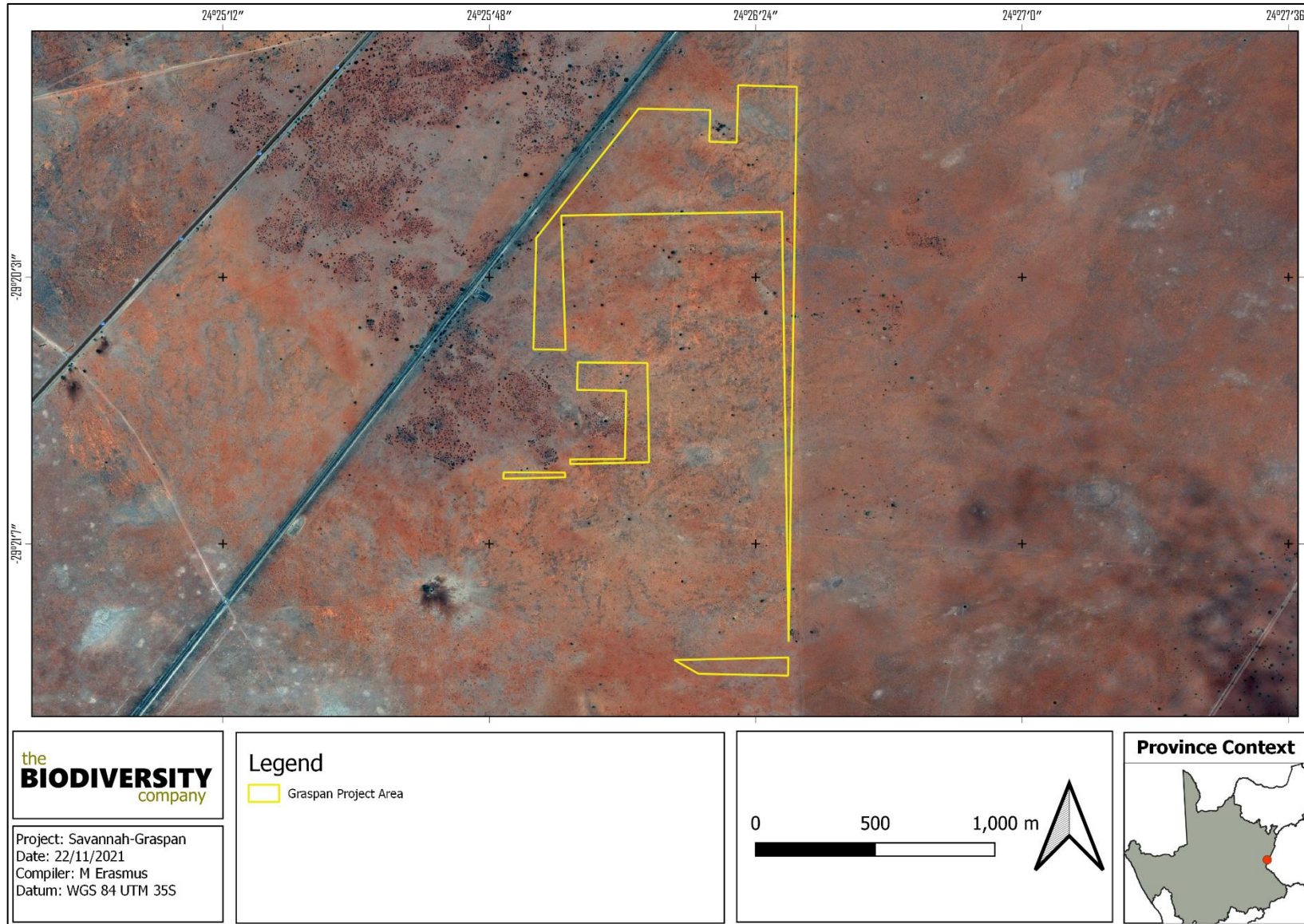


Figure 3-1 Map illustrating the location of the proposed project area

## 4 Desktop Assessment

The desktop assessment was principally undertaken using a Geographic Information System (GIS) to access the latest available spatial datasets to develop digital cartographs and species lists. These datasets and their date of publishing are provided below.

### 4.1 Ecologically Important Landscape Features

Existing ecologically relevant data layers were incorporated into a GIS to establish how the proposed project might interact with any ecologically important entities. Emphasis was placed around the following spatial datasets:

- *National Biodiversity Assessment 2018 (Skowno et al, 2019) (NBA)*- The purpose of the NBA is to assess the state of South Africa's biodiversity based on best available science, with a view to understanding trends over time and informing policy and decision-making across a range of sectors. The NBA deals with all three components of biodiversity: genes, species and ecosystems; and assesses biodiversity and ecosystems across terrestrial, freshwater, estuarine and marine environments. The two headline indicators assessed in the NBA are:
  - *Ecosystem Threat Status* – indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition.
  - *Ecosystem Protection Level* – indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems.
- Protected areas:
  - *South Africa Protected Areas Database (SAPAD) (DEA, 2021)* – The (SAPAD) Database contains spatial data for the conservation of South Africa. It includes spatial and attribute information for both formally protected areas and areas that have less formal protection. SAPAD is updated on a continuous basis and forms the basis for the Register of Protected Areas, which is a legislative requirement under the National Environmental Management: Protected Areas Act, Act 57 of 2003.
  - *National Protected Areas Expansion Strategy (NPAES) (SANBI, 2010)* – The NPAES provides spatial information on areas that are suitable for terrestrial ecosystem protection. These focus areas are large, intact and unfragmented and therefore, of high importance for biodiversity, climate resilience and freshwater protection.
- Northern Cape Critical Biodiversity Areas

The Northern Cape Department of Environment and Nature Conservation has developed the Northern Cape CBA Map which identifies biodiversity priority areas for the province, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). These biodiversity priority areas, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole.

The identification of Critical Biodiversity Areas for the Northern Cape was undertaken using a Systematic Conservation Planning approach. Available data on biodiversity features (incorporating both pattern and process, and covering terrestrial and inland aquatic realms), their condition, current Protected Areas and Conservation Areas, and opportunities and constraints for effective conservation were collated.

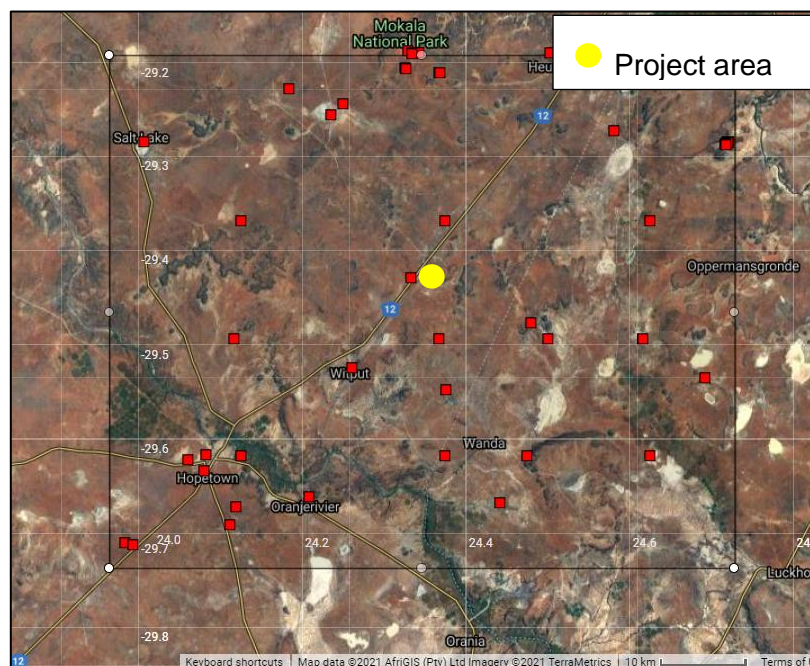


The Northern Cape Critical Biodiversity Area (CBA) Map updates, revises and replaces all older systematic biodiversity plans and associated products for the province. These include the:

- Namakwa District Biodiversity Sector Plan;
  - Cape Fine-Scale Plan (only the extent of the areas in the Northern Cape i.e. Bokkeveld and Nieuwoudtville); and
  - Richtersveld Municipality Biodiversity Assessment.
- Important Bird and Biodiversity Areas (IBAs) (BirdLife South Africa, 2015) – IBAs constitute a global network of over 13 500 sites, of which 112 sites are found in South Africa. IBAs are sites of global significance for bird conservation, identified through multi-stakeholder processes using globally standardised, quantitative and scientifically agreed criteria; and
  - South African Inventory of Inland Aquatic Ecosystems (SAIIAE) (Van Deventer *et al.*, 2018) – A SAIIAE was established during the NBA of 2018. It is a collection of data layers that represent the extent of river and inland wetland ecosystem types and pressures on these systems.

## 4.2 Desktop Flora Assessment

The Vegetation of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006) and SANBI (2019) was used to identify the vegetation type that would have occurred under natural or pre-anthropogenically altered conditions. Furthermore, the Plants of Southern Africa (POSA) database was accessed to compile a list of expected flora species within the project area (Figure 4-1). The Red List of South African Plants (Raimondo *et al.*, 2009; SANBI, 2020) was utilized to provide the most current national conservation status of flora species.



**Figure 4-1** *Map illustrating extent of area used to obtain the expected flora species list from the Plants of South Africa (POSA) database. Yellow dot indicates approximate location of the project area. The red squares are cluster markers of botanical records as per POSA data.*

## 4.3 Desktop Faunal Assessment

The faunal desktop assessment comprised of the following, compiling an expected:

- Amphibian list, generated from the IUCN spatial dataset (2017) and AmphibianMap database (Fitzpatrick Institute of African Ornithology, 2021a), using the 2924 quarter degree square;
- Reptile list, generated from the IUCN spatial dataset (2017) and ReptileMap database (Fitzpatrick Institute of African Ornithology, 2021b), using the 2924 quarter degree square;
- Avifauna list, generated for the SABAP2 dataset by looking at pentads 2925\_2420; 2920\_2420; 2920\_2425; and
- Mammal list from the IUCN spatial dataset (2017).

#### 4.4 Desktop Wetland Assessment

The following spatial datasets were utilised:

- Aerial imagery (Google Earth Pro);
- Land Type Data (Land Type Survey Staff, 1972 - 2006);
- South African Inventory of Inland Aquatic Ecosystems (Van Deventer *et al.*, 2019);
- The National Freshwater Ecosystem Priority Areas (Nel *et al.*, 2011);
- Contour data (5m);
- NASA Shuttle Radar Topography Mission Global 1 arc second digital elevation data; and
- South African Inventory of Inland Aquatic Ecosystems (SAIIAE) (Van Deventer *et al.*, 2018).

#### 4.5 Assumptions and Limitations

The following assumptions and limitations are applicable for this assessment:

- The assessment area was based on a desktop component only.

### 5 Results & Discussion

#### 5.1 Desktop Assessment

##### 5.1.1 Ecologically Important Landscape Features

The GIS analysis pertaining to the relevance of the proposed project to ecologically important landscape features are summarised in Table 5-1.

**Table 5-1** *Summary of relevance of the proposed project to ecologically important landscape features.*

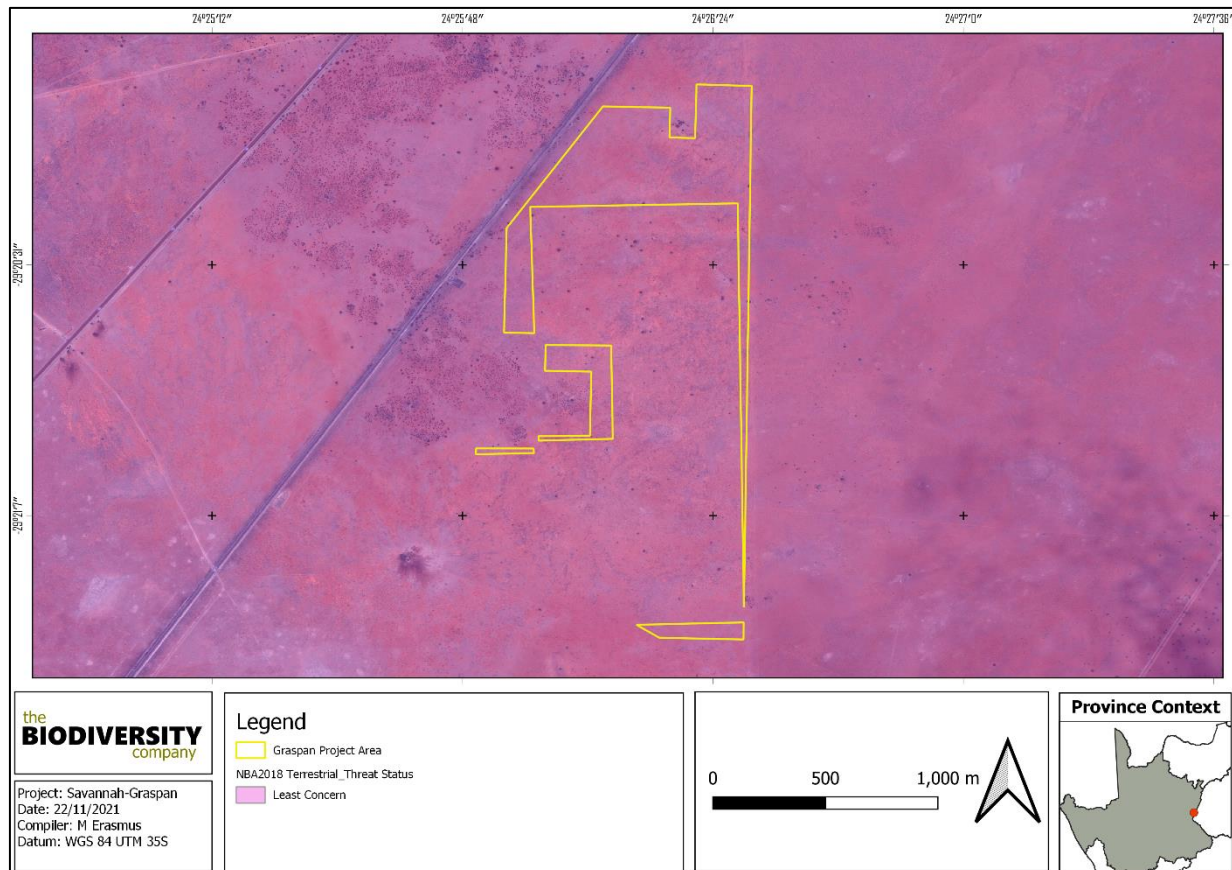
Desktop Information Considered	Relevant/Irrelevant
Ecosystem Threat Status	Relevant – Overlaps with a Least Concern ecosystem
Ecosystem Protection Level	Relevant – Overlaps with a Not Protected ecosystem
Protected Areas	Irrelevant – 17 km from the closest Protected Area
Renewable Energy Development Zones	Irrelevant - The project area falls 37 km from the closest REDZ
National Protected Areas Expansion Strategy	Irrelevant – The project area can be found 26 km from the closest NPAES
Critical Biodiversity Area	Relevant – The project area overlaps with an ONA and an ESA area.
Succulent Karoo Ecosystem Programme	Irrelevant -219 km to a mammal SKEP area
Important Bird and Biodiversity Areas	Irrelevant – Located 51 km from the Platberg Karoo Conservancy IBA

Graspan PV

South African Inventory of Inland Aquatic Ecosystems	Irrelevant - The project area does not overlap with NBA wetlands or rivers
National Freshwater Priority Area	Irrelevant – The project area does not overlap with FEPA wetlands and FEPA river.
Strategic Water Source Areas	Irrelevant- The project area is 293 km from the closest SWSA

**5.1.1.1 Ecosystem Threat Status**

The Ecosystem Threat Status is an indicator of an ecosystem’s wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition. According to the spatial dataset the proposed project overlaps with a LC ecosystem (Figure 5-1).

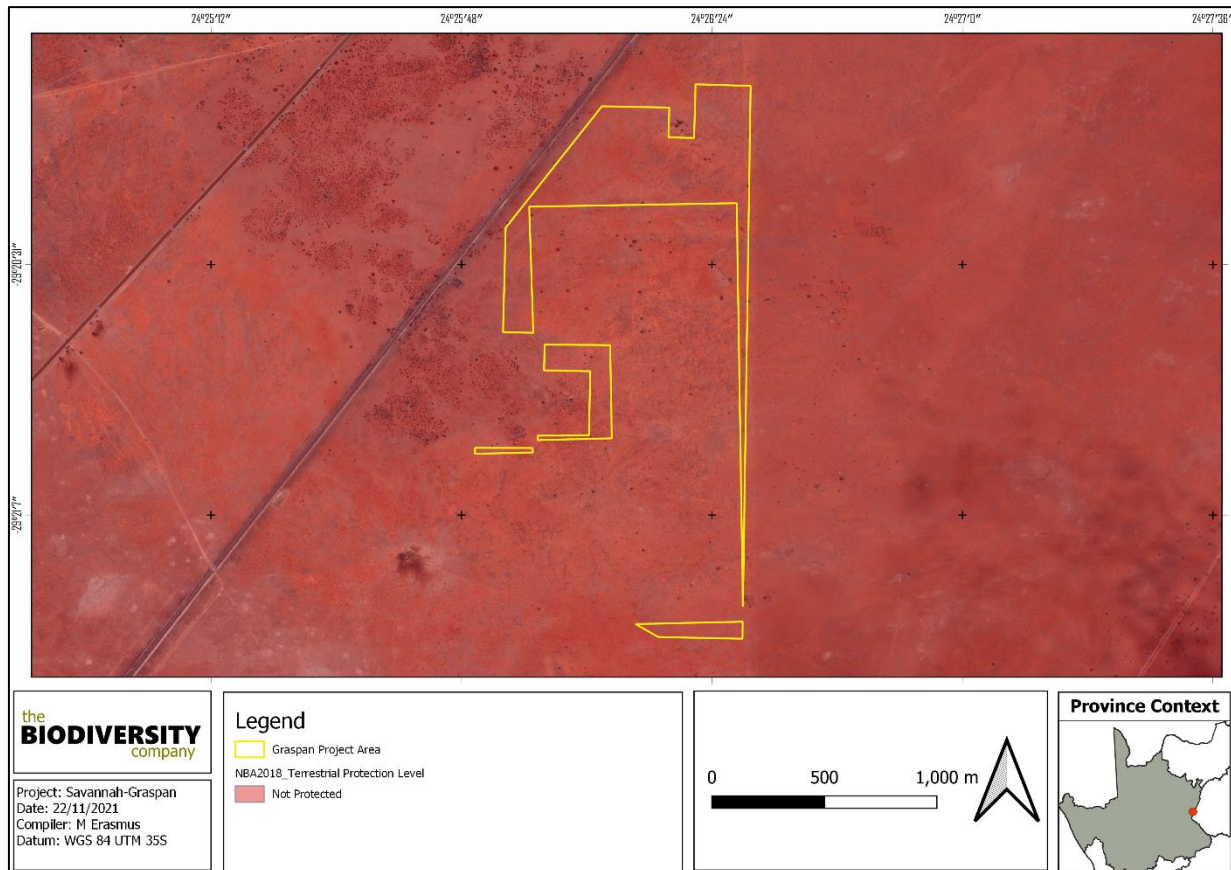


**Figure 5-1** Map illustrating the ecosystem threat status associated with the project area

**5.1.1.2 Ecosystem Protection Level**

This is an indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems. The proposed project overlaps with a NP ecosystem (Figure 5-2).





**Figure 5-2** Map illustrating the ecosystem protection level associated with the project area

### 5.1.1.3 Renewable Energy Development Zones (REDZ)

In 2018 the Government Notice No. 114 in Government Gazette No. 41445 was published where 8 renewable energy development zones important for the development of large scale wind and solar photovoltaic facilities were identified. In 2021 an additional 3 sites were included. The REDZs were identified through the undertaking of 2 Strategic Environmental Assessments.

More detailed information can be obtained from <https://egis.environment.gov.za/redz>. Information here includes the Government Notice No. 142, 144 and 145 in Government Gazette No. 44191 that specifies the procedures to be followed when applying for environmental authorisation for electricity transmission or distribution infrastructure or large-scale wind and solar photovoltaic energy facilities in these REDZs. The project area falls 37 km from the closest REDZ.

### 5.1.1.4 Critical Biodiversity Areas and Ecological Support Areas

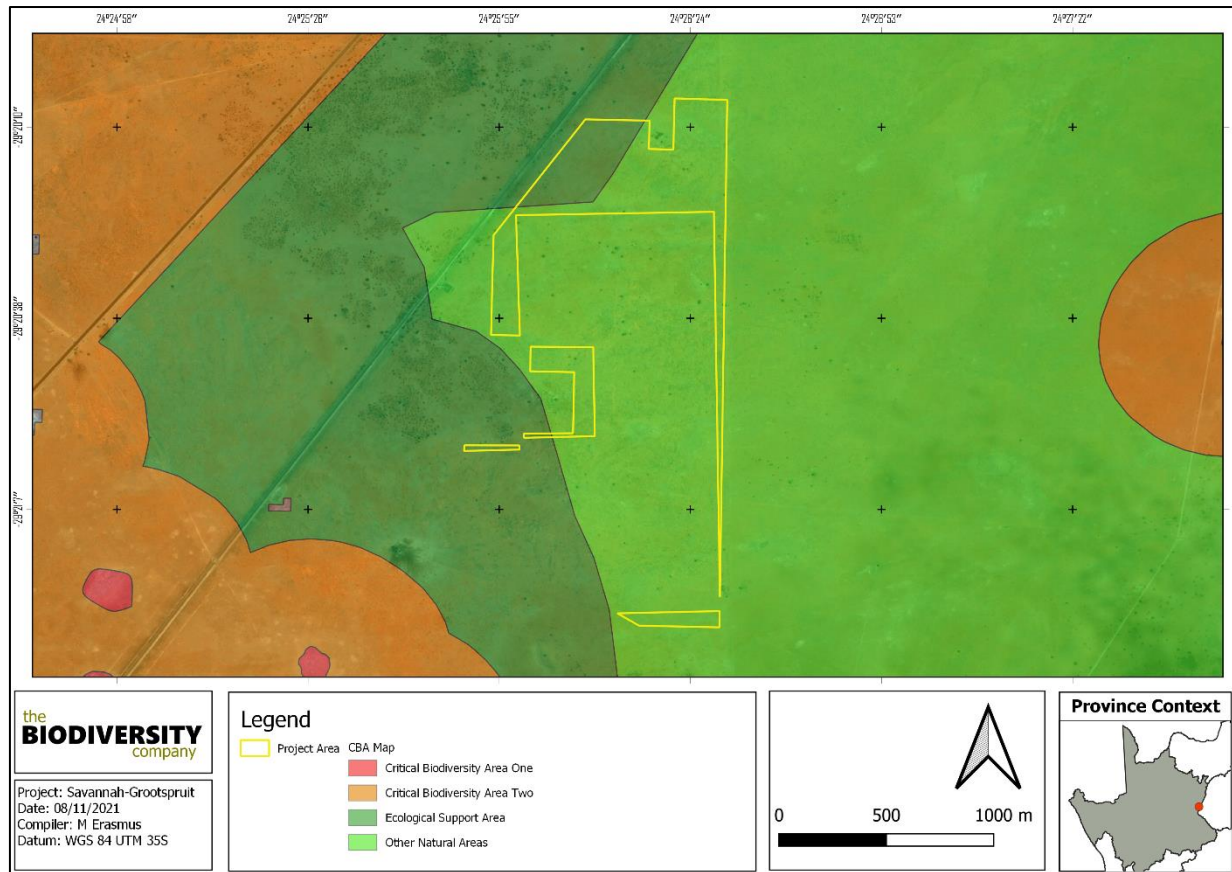
The Northern Cape Department of Environment and Nature Conservation has developed the Northern Cape CBA Map which identifies biodiversity priority areas for the province, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). These biodiversity priority areas, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole.

The identification of Critical Biodiversity Areas for the Northern Cape was undertaken using a Systematic Conservation Planning approach. Available data on biodiversity features (incorporating both pattern and process, and covering terrestrial and inland aquatic realms), their condition, current Protected Areas and Conservation Areas, and opportunities and constraints for effective conservation were collated.

The Northern Cape Critical Biodiversity Area (CBA) Map updates, revises and replaces all older systematic biodiversity plans and associated products for the province. These include the:

- Namakwa District Biodiversity Sector Plan;
- Cape Fine-Scale Plan (only the extent of the areas in the Northern Cape i.e. Bokkeveld and Nieuwoudtville); and
- Richtersveld Municipality Biodiversity Assessment.

Figure 5-3 shows the project area superimposed on the Terrestrial CBA map. The project area overlaps with an ONA and an ESA area.



**Figure 5-3** Map illustrating the locations of CBAs in relation to the project area

### 5.1.1.5 National Protected Area Expansion Strategy

National Protected Area Expansion Strategy 2010 (NPAES) were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for finescale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities (NPAES, 2010). The project area can be found 26 km from the closest NPAES.

### 5.1.1.6 Hydrological Setting

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was released with the NBA 2018. Ecosystem threat status (ETS) of river and wetland ecosystem types are based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as CR, EN, VU or LT, with CR, EN and VU ecosystem types collectively referred to as ‘threatened’ (Van



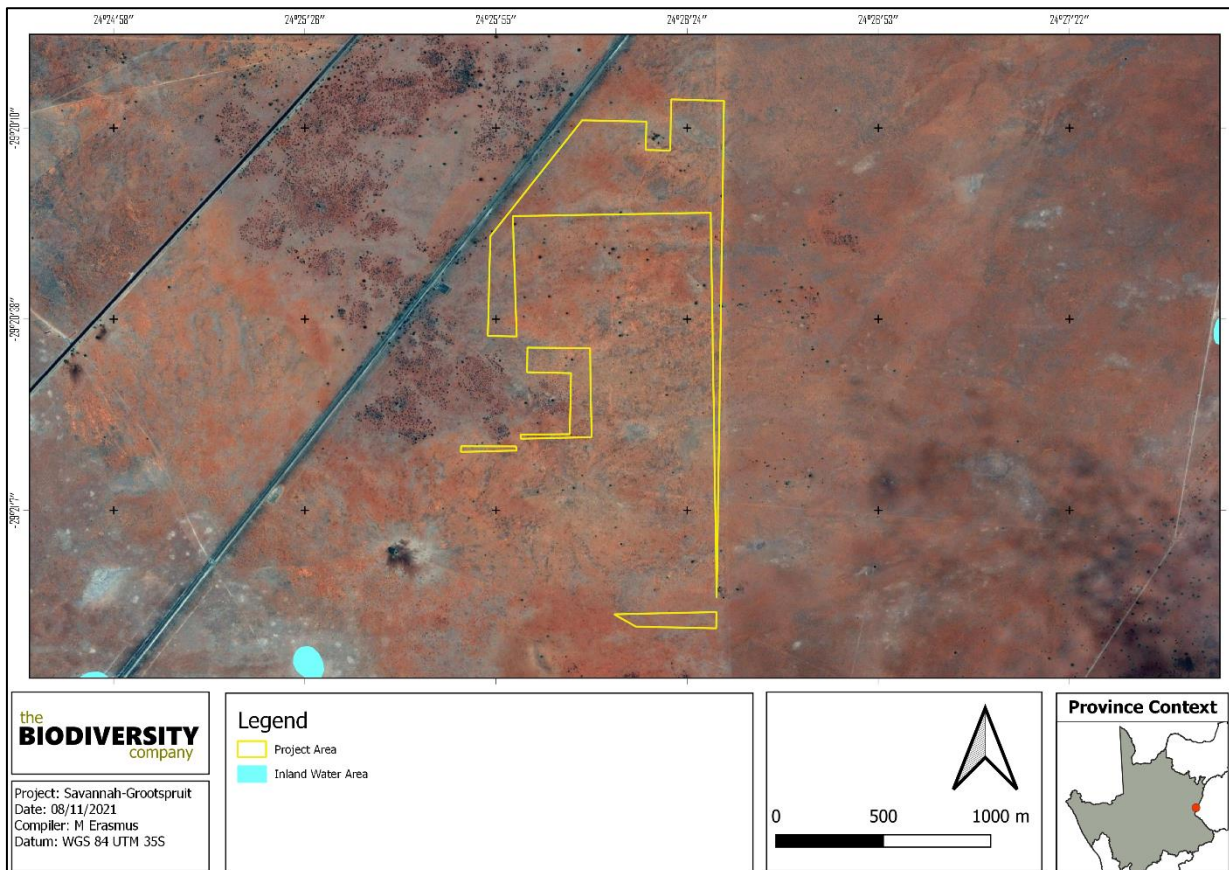
Deventer *et al.*, 2019; Skowno *et al.*, 2019). The project area does not overlap with NBA rivers or NBA wetlands.

**5.1.1.7 National Freshwater Ecosystem Priority Area Status**

In an attempt to better conserve aquatic ecosystems, South Africa has categorised its river systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs) (Driver *et al.*, 2011). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's (NEM:BA) biodiversity goals (Nel *et al.*, 2011). The project area does not overlap with FEPA wetlands or FEPA river.

**5.1.1.8 Inland Water Features**

A review of river lines and water bodies for quarter degree squared (QDS) 2924 indicated no inland water sources or river lines can be found within the project area and 500m regulatory area (Figure 5-4). Non-perennial pans are located south west of the project area.



**Figure 5-4 The inland water features associated with the project area**

**5.1.2 Flora Assessment**

This section is divided into a description of the vegetation type expected under natural conditions and the expected flora species.

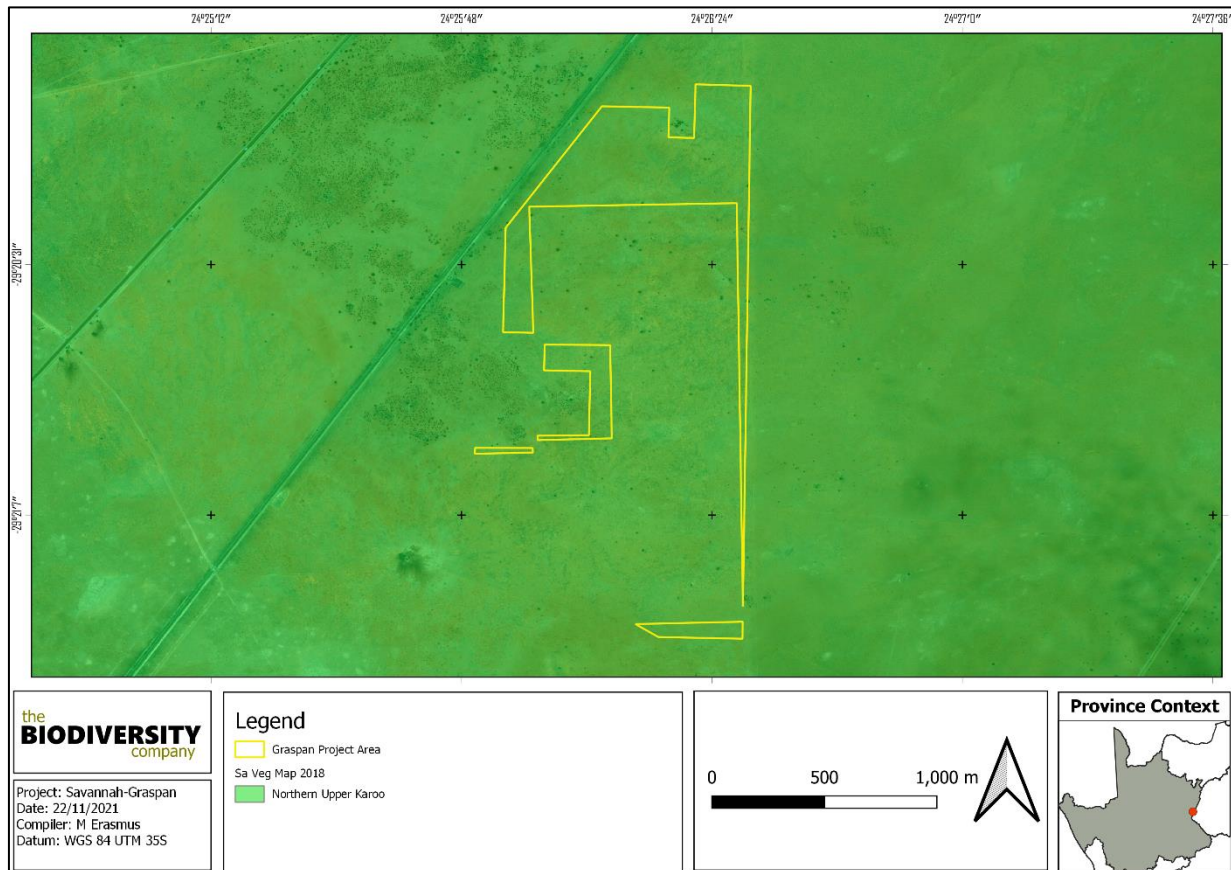
**5.1.2.1 Vegetation Type**

The project area falls within the Nama Karroo Biome. This biome is found in the central plateau of the western half of South Africa. The geology underlying the biome is varied, as the distribution of this biome is determined primarily by rainfall. The rain falls in summer, and varies between 100 and 520mm per year.

This also determines the predominant soil type - over 80% of the area is covered by a lime-rich, weakly developed soil over rock. Although less than 5% of rain reaches the rivers, the high erodibility of soils poses a major problem where overgrazing occurs (SANBI, 2019).

The dominant vegetation is a grassy, dwarf shrubland. Grasses tend to be more common in depressions and on sandy soils, and less abundant on clayey soils. Grazing rapidly increases the relative abundance of shrubs. Most of the grasses are of the C4 type and, like the shrubs, are deciduous in response to rainfall events (SANBI, 2019).

On a fine-scale vegetation type, the project area overlaps with the Northern Upper Karoo (Figure 5-5).



**Figure 5-5** Map illustrating the vegetation type associated with the project area

#### 5.1.2.1.1 Northern Upper Karoo

The Northern Upper Karoo is a shrubland dominated by dwarf karoo shrubs, grasses and *Acacia mellifera* subsp. *detinens* and some other low trees. It is found in the Northern Cape and the Free State Province at an altitude of 1 000- 1 500 m.

#### Important taxa:

Important plant taxa are those species that have a high abundance, a frequent occurrence or are prominent in the landscape within a particular vegetation type (Mucina & Rutherford, 2006).

The following species are important in the **Northern Upper Karoo** vegetation type (d= dominant species):

Small Trees: *Acacia mellifera* subsp. *detinens*, *Boscia albitrunca*.

Tall Shrubs: *Lycium cinereum* (d), *L. horridum*, *L. oxycarpum*, *L. schizocalyx*, *Rhigozum trichotomum*.

Low Shrubs: *Chrysocoma ciliata* (d), *Gnidia polycephala* (d), *Pentzia calcarea* (d), *P. globosa* (d), *P. incana* (d), *P. spinescens* (d), *Rosenia humilis* (d), *Amphiglossa triflora*, *Aptosimum marlothii*, *A.*

*spinescens*, *Asparagus glaucus*, *Barleria rigida*, *Berkheya annectens*, *Eriocephalus ericoides* subsp. *ericoides*, *E. glandulosus*, *E. spinescens*, *Euryops asparagoides*. *Felicia muricata*, *Helichrysum lucilioides*, *Hermannia spinosa*, *Leucas capensis*, *Limeum aethiopicum*, *Melolobium candicans*, *Microloma armatum*, *Osteospermum leptolobum*, *O. spinescens*, *Pegolettia retrofracta*, *Pentzia lanata*, *Phyllanthus maderaspatensis*, *Plinthus karoocicus*, *Pteronia glauca*, *P. sordida*, *Selago geniculata*, *S. saxatilis*, *Tetragonia arbuscula*, *Zygophyllum lichtensteinianum*.

Succulent Shrubs: *Hertia pallens*, *Salsola calluna*, *S. glabrescens*, *S. rabieana*, *S. tuberculata*, *Zygophyllum flexuosum*.

Semiparasitic Shrub: *Thesium hystrix* (d), Herbs: *Chamaesyce inaequilatera*, *Convolvulus sagittatus*, *Dicoma capensis*, *Gazania krebsiana*, *Hermannia comosa*, *Indigofera alternans*, *Lessertia pauciflora*, *Radyera urens*, *Sesamum capense*, *Sutera pinnatifida*, *Tribulus terrestris*, *Vahlia capensis*.

Succulent Herb: *Psilocaulon coriarium*.

Geophytic Herb: *Moraea pallida*. Graminoids: *Aristida adscensionis* (d), *A. congesta* (d), *A. diffusa* (d), *Enneapogon desvauxii* (d), *Eragrostis lehmanniana* (d), *E. obtusa* (d), *E. truncata* (d), *Sporobolus fimbriatus* (d), *Stipagrostis obtusa* (d), *Eragrostis bicolor*, *E. porosa*, *Fingerhuthia africana*, *Heteropogon contortus*, *Stipagrostis ciliata*, *Themeda triandra*, *Tragus berteronianus*, *T. koelerioides*, *T. racemosus*.

**Biogeographically Important Taxa** Herb (western distribution limit): *Convolvulus boedeckerianus*. Tall Shrub (southern limit of distribution): *Gymnosporia szyszylowiczii* subsp. *namibiensis*.

**Endemic Taxa** Succulent Shrubs: *Lithops hookeri*, *Stomatium pluridens*. Low Shrubs: *Atriplex spongiosa*, *Galenia exigua*. Herb: *Manulea deserticola*.

### Conservation Status of the Vegetation Type

The national conservation target is 21% and the conservation status of this vegetation community was listed by Mucina and Rutherford (2006) as Least Threatened and is listed by SANBI (2019) as also LC.

#### 5.1.2.2 Expected Flora Species

The POSA database indicates that 315 species of indigenous plants are expected to occur within the project area. Appendix A provides the list of species and their respective conservation status and endemism. One of the species expected is a species of conservation concern (SCC) (Table 5-2).

**Table 5-2 Flora SCCs expected in the project area**

Family	Taxon	Author	IUCN	Ecology
Aizoaceae	<i>Lithops aucampiae</i> subsp. <i>euniceae</i>	L.Bolus	VU	Indigenous; Endemic

### 5.1.3 Faunal Assessment

#### 5.1.3.1 Amphibians

Based on the IUCN Red List Spatial Data and AmphibianMap, 16 amphibian species are expected to occur within the area (Appendix B). None of the species are SCCs.

#### 5.1.3.2 Reptiles

Based on the IUCN Red List Spatial Data and the ReptileMAP database, 46 reptile species are expected to occur within the area (Appendix C). One (1) is regarded as threatened (Table 5-3).

**Table 5-3 Threatened reptile species that are expected to occur within the project area**

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
<i>Psammobates tentorius verroxii</i>	Tent Tortoise	NT	NT	High



*Psammobates tentorius veroxii* (Tent Tortoise) is categorised as NT both locally and internationally. This species can be found in low densities in the Karoo and semi-desert areas of South Africa and Namibia. It is threatened because of the pet trade and destruction of its habitat. The likelihood of occurrence in the project area is rated as high due to the presence of mesembryanthemums plant, which is suitable food sources for this species.

### 5.1.3.3 Mammals

The IUCN Red List Spatial Data lists 56 mammal species that could be expected to occur within the area (Appendix D). This list excludes large mammal species that are limited to protected areas. Ten (10) of these expected species are regarded as threatened (Table 5-4), five of these have a low likelihood of occurrence based on the lack of suitable habitat and food sources in the project area.

**Table 5-4 Threatened mammal species that are expected to occur within the project area.**

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
<i>Eidolon helvum</i>	African Straw-colored Fruit Bat	LC	NT	Low
<i>Felis nigripes</i>	Black-footed Cat	VU	VU	High
<i>Hydricotis maculicollis</i>	Spotted-necked Otter	VU	NT	Low
<i>Leptailurus serval</i>	Serval	NT	LC	Moderate
<i>Panthera pardus</i>	Leopard	VU	VU	Moderate
<i>Parahyaena brunnea</i>	Brown Hyaena	NT	NT	Moderate
<i>Parotomys littledalei</i>	Littledale's Whistling Rat	NT	LC	Moderate
<i>Poecilogle albinucha</i>	African Striped Weasel	NT	LC	Low
<i>Redunca fulvorufula</i>	Mountain Reedbuck	EN	LC	Low
<i>Rhinolophus denti</i>	Dent's Horseshoe Bat	NT	LC	Low

*Felis nigripes* (Black-footed cat) is endemic to the arid regions of southern Africa. This species is naturally rare, has cryptic colouring is small in size and is nocturnal. These factors have contributed to a lack of information on this species. Given that the highest densities of this species have been recorded in the more arid Karoo region of South Africa, the habitat in the project area can be considered to be optimal for the species and the likelihood of occurrence is rated as high.

*Leptailurus serval* (Serval) occurs widely through sub-Saharan Africa and is commonly recorded from most major national parks and reserves (IUCN, 2017). The Serval's status outside reserves is not certain, but they are inconspicuous and may be common in suitable habitat as they are tolerant of farming practices provided there is cover and food available. In sub-Saharan Africa, they are found in habitat with well-watered savanna long-grass environments and are particularly associated with reedbeds and other riparian vegetation types. Some areas of suitable habitat is present as such a moderate likelihood of occurrence were appointed to this species.

*Panthera pardus* (Leopard) has a wide distributional range across Africa and Asia, but populations have become reduced and isolated, and they are now extirpated from large portions of their historic range (IUCN, 2017). Impacts that have contributed to the decline in populations of this species include continued persecution by farmers, habitat fragmentation, increased illegal wildlife trade, excessive harvesting for ceremonial use of skins, prey base declines and poorly managed trophy hunting (IUCN, 2017). Although known to occur and persist outside of formally protected areas, the densities in these areas are considered to be low. The likelihood of occurrence in the project area is rated as moderate based on the secluded location and lack of development in the project area.

*Parahyaena brunnea* (Brown Hyaena) is endemic to southern Africa. This species occurs in dry areas, generally with annual rainfall less than 100 mm, particularly along the coast, semi-desert, open scrub and



open woodland savanna. Given its known ability to persist outside of formally protected areas the likelihood of occurrence of this species in the project area is moderate to good. The presence of moderate to large herbivores on adjacent farms increases the likelihood of occurrence of this species.

*Parotomys littledalei* (Littledale's Whistling Rat) is listed as NT on a regional scale. This diurnal species occurs in shrubland and is dependent on ground cover. Littledale's Whistling Rat is herbivorous only, feeding on fresh plant material, including annuals, succulent perennials, non-succulent perennials, and grasses. The presence of ground cover increases their likelihood of occurrence in the project area. Suitable but not ideal habitat is found in the project area, therefore the likelihood of occurrence were rated as moderate.

#### 5.1.3.4 Avifauna

The SABAP2 Data lists 77 avifauna species that could be expected to occur within the area (Appendix E). Three of the species were SCCs (Table 5-5).

**Table 5-5 Avifauna SCCs expected in the project area**

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
<i>Ciconia nigra</i>	Stork, Black	VU	LC	Moderate
<i>Grus paradisea</i>	Crane, Blue	NT	VU	Moderate
<i>Gyps africanus</i>	Vulture, White-backed	CR	CR	High

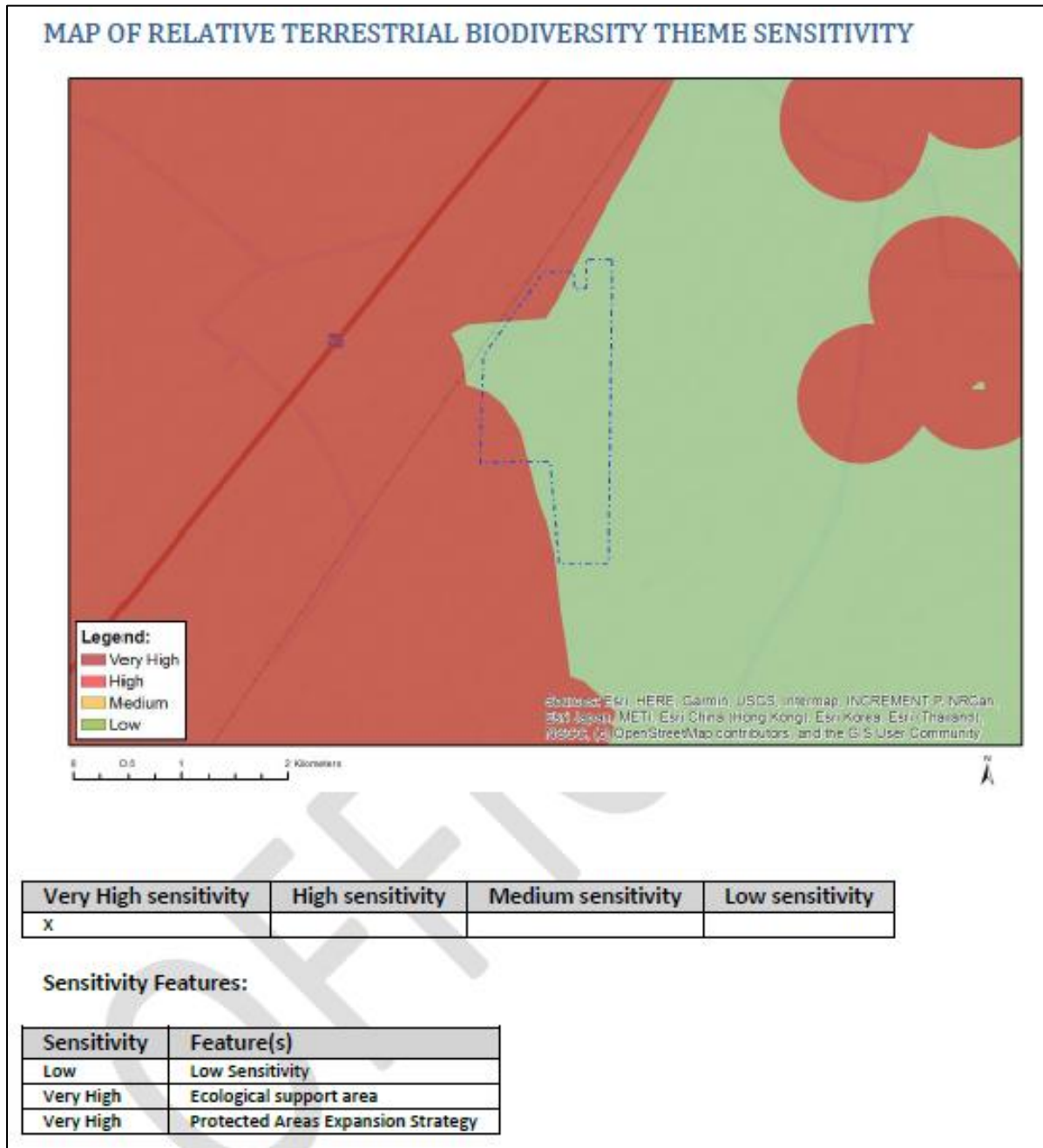
*Ciconia nigra* (Black Stork) is native to South Africa, and inhabits old, undisturbed, open forests. They are known to forage in shallow streams, pools, marshes swampy patches, damp meadows, flood-plains, pools in dry riverbeds and occasionally grasslands, especially where there are stands of reeds or long grass (IUCN, 2017). It is unlikely that this species would breed in the project area due to the lack of forested areas, however some suitable foraging habitat remains in the form of the nearby pan therefore this species has a moderate likelihood of occurrence.

*Grus paradiseus* (Blue Crane) is listed as NT on a regional scale and as VU on a global scale. This species has declined, largely owing to direct poisoning, power-line collisions and loss of its grassland breeding habitat owing to afforestation, mining, agriculture and development (IUCN, 2017). This species breeds in natural grass- and sedge-dominated habitats, preferring secluded grasslands at high elevations where the vegetation is thick and short. Foraging habitat can be found in and around the project area. This species has a moderate likelihood of occurrence.

*Gyps africanus* (White-backed Vulture) has a large range and only occurs throughout sub-Saharan Africa. Primarily a lowland species of open wooded savanna, particularly areas of *Acacia* (*Vachellia*). It requires tall trees for nesting. According to the IUCN (2017) this species faces similar threats to other African vultures, being susceptible to habitat conversion to agro-pastoral systems, loss of wild ungulates leading to a reduced availability of carrion, hunting for trade, persecution and poisoning. The likelihood of occurrence is rated as high as this species has been a breeding program in the nearby Mokala National Park.

## 5.2 Site Ecological Importance

The biodiversity theme sensitivity, as indicated in the screening report, was derived to be High, mainly due to the project area being with an ESA (Figure 5-6).



**Figure 5-6** Terrestrial Biodiversity Theme Sensitivity, National Web based Environmental Screening Tool

## 6 Impact Risk Assessment

The section below and associated tables serve to indicate and summarise the significance of perceived impacts on the terrestrial ecology of the project area.

### 6.1 Biodiversity Risk Assessment

#### 6.1.1 Terrestrial Impact Assessment

Potential impacts were evaluated against the data captured during the desktop assessment to identify relevance to the project area. The relevant impacts associated with the proposed development were then subjected to a prescribed impact assessment methodology which were provided by Savannah Environmental and is available on request. No decommissioning phase was considered based on the nature of the development.

Anthropogenic activities drive habitat destruction causing displacement of fauna and flora and possibly direct mortality. Land clearing destroys local wildlife habitat and can lead to the loss of local breeding grounds, nesting sites and wildlife movement corridors such as rivers, streams and drainage lines, or other locally important features. The removal of natural vegetation may reduce the habitat available for fauna species and may reduce animal populations and species compositions within the area.

#### 6.1.2 Alternatives considered.

No alternatives were provided for the development.

#### 6.1.3 Loss of Irreplaceable Resources

- An ESA and ONA will be lost; and
- SCCs will also be lost.

#### 6.1.4 Anticipated Impacts

The impacts anticipated for the proposed activities are considered in order to predict and quantify these impacts and assess & evaluate the magnitude on the identified terrestrial biodiversity (Table 6-1).

**Table 6-1 Anticipated impacts for the proposed activities on terrestrial biodiversity**

Main Impact	Project activities that can cause loss/impacts to habitat (especially with regard to the proposed infrastructure areas):	Secondary impacts anticipated
<b>1. Destruction, fragmentation and degradation of habitats and ecosystems</b>	Physical removal of vegetation, including protected species.	Displacement/loss of flora & fauna (including possible SCC)
	Access roads and servitudes	Increased potential for soil erosion
	Soil dust precipitation	Habitat fragmentation
	Dumping of waste products	Increased potential for establishment of alien & invasive vegetation
	Random events such as fire (cooking fires or cigarettes)	Erosion
Main Impact	Project activities that can cause the spread and/or establishment of alien and/or invasive species	Secondary impacts anticipated
<b>2. Spread and/or establishment of alien and/or invasive species</b>	Vegetation removal	Habitat loss for native flora & fauna (including SCC)
	Vehicles potentially spreading seed	Spreading of potentially dangerous diseases due to invasive and pest species
	Unsanitary conditions surrounding infrastructure promoting the establishment of alien and/or invasive rodents	Alteration of fauna assemblages due to habitat modification

	Creation of infrastructure suitable for breeding activities of alien and/or invasive birds	
<b>Main Impact</b>	<b>Project activities that can cause direct mortality of fauna</b>	<b>Secondary impacts anticipated</b>
	Clearing of vegetation	Loss of habitat
		Loss of ecosystem services
<b>3. Direct mortality of fauna</b>	Roadkill due to vehicle collision	
	Pollution of water resources due to dust effects, chemical spills, etc.	Increase in rodent populations and associated disease risk
	Intentional killing of fauna for food (hunting)	
<b>Main Impact</b>	<b>Project activities that can cause reduced dispersal/migration of fauna</b>	<b>Secondary impacts anticipated</b>
	Loss of landscape used as corridor	Reduced dispersal/migration of fauna
<b>4. Reduced dispersal/migration of fauna</b>	Compacted roads	Loss of ecosystem services
	Removal of vegetation	Reduced plant seed dispersal
<b>Main Impact</b>	<b>Project activities that can cause pollution in watercourses and the surrounding environment</b>	<b>Secondary impacts anticipated</b>
	Chemical (organic/inorganic) spills	Pollution in watercourses and the surrounding environment
<b>5. Environmental pollution due to water runoff, spills from vehicles and erosion</b>	Erosion	Faunal mortality (direct and indirectly)
		Groundwater pollution
		Loss of ecosystem services
<b>Main Impact</b>	<b>Project activities that can cause disruption/alteration of ecological life cycles due to sensory disturbance.</b>	<b>Secondary impacts anticipated</b>
	Operation of machinery (Large earth moving machinery, vehicles)	Disruption/alteration of ecological life cycles due to noise
<b>6. Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, dust and light pollution.</b>	Project activities that can cause disruption/alteration of ecological life cycles due to dust	Loss of ecosystem services
	Vehicles	Secondary impacts associated with disruption/alteration of ecological life cycles due to dust
		Loss of ecosystem services
<b>Main Impact</b>	<b>Project activities that can cause staff to interact directly with potentially dangerous fauna</b>	<b>Secondary impacts anticipated</b>
<b>8. Staff and others interacting directly with fauna (potentially dangerous) or poaching of animals</b>	All unregulated/supervised activities outdoors	Loss of SCCs

**6.1.5 Identification of Additional Potential Impacts**

The impacts are expected for the project and will be assessed for the impact phase of the process.

**Table 6-2 Scoping evaluation table summarising the impacts identified to biodiversity**

Impact			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Loss of vegetation (& habitat) within development footprint	<u>Direct impacts:</u> >> Disturbance / degradation / loss to vegetation >> Destruction of protected plant species <u>Indirect impacts:</u> >> Loss of ecosystem services	Regional	Very High to High sensitivity areas

	<ul style="list-style-type: none"> <li>» Introduction of alien species, especially plants</li> <li>» Displacement of faunal community due to habitat loss, direct mortalities and disturbance</li> </ul>		
<p><b>Description of expected significance of impact</b></p> <p>The following potential main impacts on the biodiversity were considered for the construction phase of the proposed development. This phase refers to the period during construction when the proposed features are constructed; and is considered to have the largest direct impact on biodiversity. The following potential impacts to terrestrial biodiversity were considered:</p> <ul style="list-style-type: none"> <li>» Destruction, further loss and fragmentation of the of habitats, ecosystems and vegetation community;</li> <li>» Introduction of alien species, especially plants;</li> <li>» Destruction of protected plant species; and</li> <li>» Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, vibration and poaching).</li> </ul>			
<p><b>Gaps in knowledge &amp; recommendations for further study</b></p> <ul style="list-style-type: none"> <li>» This is completed at a desktop level only.</li> <li>» Identification, delineation and characterisation of vegetation communities.</li> <li>» Undertake a sensitivity assessment of systems where applicable.</li> <li>» Determine a suitable buffer width for the resources.</li> </ul> <p><b>Recommendations with regards to general field surveys</b></p> <ul style="list-style-type: none"> <li>» Field surveys to prioritise the development areas, but also consider the Area of Influence.</li> <li>» Beneficial to undertake fieldwork during the wet season period.</li> </ul>			

### 6.1.5.1 Cumulative Impacts

Cumulative impacts are assessed in context of the extent of the proposed project area; other developments in the area; and general loss and transformation resulting from other activities in the area. The expected post-mitigation risk significance is expected to be low, and the overall cumulative impact is therefore expected to be medium.

**Table 6-3 Cumulative Impacts to biodiversity associated with the proposed project**

Impact Nature: Cumulative habitat loss within the region		
The development of the proposed infrastructure will contribute to cumulative habitat loss within ESAs and thereby impact the ecological processes in the region.		
	Overall impact of the proposed development considered in isolation	Cumulative impact of the project and other projects in the area
<b>Extent</b>	Low	Moderate
<b>Duration</b>	Long term	Long term
<b>Magnitude</b>	Low	Moderate
<b>Probability</b>	Probable	Highly probable
<b>Significance</b>	<b>Medium</b>	<b>Medium</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Moderate	Low
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impacts be mitigated</b>	To some degree, but most of the impact results from the presence of the various facilities which cannot be well mitigated.	
<b>Mitigation:</b>		
<ul style="list-style-type: none"> <li>• Ensure that a rehabilitation plan and IAP management plan be compiled for each development and are effectively implemented.</li> </ul>		

## 6.2 Wetland Risk Assessment

The project area is not located within a 500 m regulated area, based on this a Water Use Authorisation is not likely to be required for the project.

## 7 Assessment Approach

### 7.1 Biodiversity Field Assessment

#### 7.1.1 Flora Survey

The fieldwork and sample sites will be placed within targeted areas (i.e., target sites) perceived as ecologically sensitive based on the preliminary interpretation of satellite imagery (Google Corporation) and GIS analysis (which included the latest applicable biodiversity datasets) available prior to the fieldwork. The focus of the fieldwork is therefore to maximise coverage and navigate to each target site in the field, to perform a rapid vegetation and ecological assessment at each sample site. Emphasis will be placed on sensitive habitats, especially those overlapping with the proposed project area.

Homogenous vegetation units will be subjectively identified using satellite imagery and existing land cover maps. The floristic diversity and search for flora SCC will be conducted through timed meanders within representative habitat units delineated during the scoping fieldwork. Emphasis will be placed mostly on sensitive habitats overlapping with the proposed project areas.

The timed random meander method is highly efficient for conducting floristic analysis, specifically in detecting flora SCC and maximising floristic coverage. In addition, the method is time and cost effective and highly suited for compiling flora species lists and therefore gives a rapid indication of flora diversity. The timed meander search will be performed based on the original technique described by Goff *et al.* (1982). Suitable habitat for SCC were identified according to Raimondo *et al.* (2009) and targeted as part of the timed meanders.

At each sample site notes will be made regarding current impacts (e.g., livestock grazing, erosion etc.), subjective recording of dominant vegetation species and any sensitive features (e.g., wetlands, outcrops etc.). In addition, opportunistic observations were made while navigating through the project area.

#### 7.1.2 Fauna Survey

The faunal assessment within this report pertains to herpetofauna (amphibians and reptiles) and mammals. The faunal field survey will comprise of the following techniques:

- Visual and auditory searches - This typically comprised of meandering and using binoculars to view species from a distance without them being disturbed; and listening to species calls;
- Active hand-searches - are used for species that shelter in or under particular micro-habitats (typically rocks, exfoliating rock outcrops, fallen trees, leaf litter, bark etc.); and
- Utilization of local knowledge.

Relevant field guides and texts consulted for identification purposes include the following:

- Field Guide to Snakes and other Reptiles of Southern Africa (Branch, 1998);
- A Complete Guide to the Snakes of Southern Africa (Marais, 2004);
- Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland (Bates *et al.*, 2014);
- A Complete Guide to the Frogs of Southern Africa (du Preez and Carruthers, 2009);
- Smithers' Mammals of Southern Africa (Apps, 2000);
- A Field Guide to the Tracks and Signs of Southern and East African Wildlife (Stuart and Stuart, 2000);



- Book of birds of South Africa, Lesotho and Swaziland (Taylor *et al.*, 2015); and
- Roberts – Birds of Southern Africa (Hockey *et al.*, 2005).

## 7.2 Terrestrial Site Ecological Importance

The different habitat types within the project area will be delineated and identified based on observations during the field assessment, and available satellite imagery. These habitat types are assigned Ecological Importance (EI) categories based on their ecological integrity, conservation value, the presence of species of conservation concern and their ecosystem processes.

Site Ecological Importance (SEI) is a function of the Biodiversity Importance (BI) of the receptor (e.g., SCC, the vegetation/fauna community or habitat type present on the site) and Receptor Resilience (RR) (its resilience to impacts) as follows.

BI is a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor as follows. The criteria for the CI and FI ratings are provided in Table 7-1 and Table 7-2, respectively.

**Table 7-1 Summary of Conservation Importance (CI) criteria**

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

**Table 7-2 Summary of Functional Integrity (FI) criteria**

Functional Integrity	Fulfilling Criteria
<b>Very High</b>	Very large (> 100 ha) intact area for any conservation status of ecosystem type or > 5 ha for CR ecosystem types. High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches. No or minimal current negative ecological impacts, with no signs of major past disturbance.
<b>High</b>	Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types. Good habitat connectivity, with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts, with no signs of major past disturbance and good rehabilitation potential.
<b>Medium</b>	Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types.

Graspan PV

	Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches. Mostly minor current negative ecological impacts, with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential.
<b>Low</b>	Small (> 1 ha but < 5 ha) area. Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential. Several minor and major current negative ecological impacts.
<b>Very Low</b>	Very small (< 1 ha) area. No habitat connectivity except for flying species or flora with wind-dispersed seeds. Several major current negative ecological impacts.

BI can be derived from a simple matrix of CI and FI as provided in Table 7-3.

**Table 7-3 Matrix used to derive Biodiversity Importance (BI) from Functional Integrity (FI) and Conservation Importance (CI)**

Biodiversity Importance (BI)		Conservation Importance (CI)				
		Very high	High	Medium	Low	Very low
Functional Integrity (FI)	Very high	Very high	Very high	High	Medium	Low
	High	Very high	High	Medium	Medium	Low
	Medium	High	Medium	Medium	Low	Very low
	Low	Medium	Medium	Low	Low	Very low
	Very low	Medium	Low	Very low	Very low	Very low

The fulfilling criteria to evaluate RR are based on the estimated recovery time required to restore an appreciable portion of functionality to the receptor, as summarised in Table 7-4.

**Table 7-4 Summary of Resource Resilience (RR) criteria**

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

Subsequent to the determination of the BI and RR, the SEI can be ascertained using the matrix as provided in Table 7-5.

**Table 7-5 Matrix used to derive Site Ecological Importance from Receptor Resilience (RR) and Biodiversity Importance (BI)**

Site Ecological Importance		Biodiversity Importance (BI)				
		Very high	High	Medium	Low	Very low
Receptor Resilience (RR)	Very Low	Very high	Very high	High	Medium	Low
	Low	Very high	Very high	High	Medium	Very low
	Medium	Very high	High	Medium	Low	Very low
	High	High	Medium	Low	Very low	Very low
	Very High	Medium	Low	Very low	Very low	Very low

Interpretation of the SEI in the context of the proposed project is provided in Table 7-6.

**Table 7-6 Guidelines for interpreting Site Ecological Importance in the context of the proposed development activities**

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

The SEI evaluated for each taxon can be combined into a single multi-taxon evaluation of SEI for the assessment area. Either a combination of the maximum SEI for each receptor should be applied, or the SEI may be evaluated only once per receptor but for all necessary taxa simultaneously. For the latter, justification of the SEI for each receptor is based on the criteria that conforms to the highest CI and FI, and the lowest RR across all taxa.

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## 9 Appendix Items

### 9.1 Appendix A – Flora species expected to occur in the project area.

Family	Taxon	Author	IUCN	Ecology
Malvaceae	<i>Abutilon austro-africanum</i>	Hochr.	LC	Indigenous
Lamiaceae	<i>Acrotome inflata</i>	Benth.	LC	Indigenous
Cyperaceae	<i>Afroscleroides dioeca</i>	(Kunth) Garcia-Madr.		Indigenous
Poaceae	<i>Agrostis lachnantha</i> var. <i>lachnantha</i>	Nees	LC	Indigenous
Aizoaceae	<i>Aizoon canariense</i>	L.	LC	Indigenous
Asphodelaceae	<i>Aloe broomii</i> var. <i>broomii</i>	Schonland	LC	Indigenous
Asphodelaceae	<i>Aloe claviflora</i>	Burch.	LC	Indigenous
Asphodelaceae	<i>Aloe</i> sp.			
Amaranthaceae	<i>Amaranthus schinzianus</i>	Thell.	LC	Indigenous
Apiaceae	<i>Ammi majus</i> var. <i>glaucifolium</i>	L.		Not indigenous; Naturalised; Invasive
Asteraceae	<i>Amphiglossa triflora</i>	DC.	LC	Indigenous
Poaceae	<i>Antheophora pubescens</i>	Nees	LC	Indigenous
Scrophulariaceae	<i>Aptosimum marlothii</i>	(Engl.) Hiern	LC	Indigenous
Scrophulariaceae	<i>Aptosimum spinescens</i>	(Thunb.) Emil Weber	LC	Indigenous
Poaceae	<i>Aristida adscensionis</i>	L.	LC	Indigenous
Poaceae	<i>Aristida congesta</i> subsp. <i>barbicollis</i>	Roem. & Schult.	LC	Indigenous
Poaceae	<i>Aristida congesta</i> subsp. <i>congesta</i>	Roem. & Schult.	LC	Indigenous
Poaceae	<i>Aristida junciformis</i> subsp. <i>junciformis</i>	Trin. & Rupr.	LC	Indigenous
Poaceae	<i>Aristida vestita</i>	Thunb.	LC	Indigenous
Asparagaceae	<i>Asparagus cooperi</i>	Baker	LC	Indigenous
Amaranthaceae	<i>Atriplex lindleyi</i> subsp. <i>inflata</i>	Moq.		Not indigenous; Naturalised; Invasive
Amaranthaceae	<i>Atriplex nummularia</i> subsp. <i>nummularia</i>	Lindl.		Not indigenous; Naturalised; Invasive
Amaranthaceae	<i>Atriplex semibaccata</i>	R.Br.		Not indigenous; Naturalised; Invasive
Amaranthaceae	<i>Atriplex vestita</i> var. <i>appendiculata</i>	(Thunb.) Aellen	LC	Indigenous
Iridaceae	<i>Babiana hypogaea</i>	Burch.	LC	Indigenous
Acanthaceae	<i>Barleria irritans</i>	Nees	LC	Indigenous; Endemic
Acanthaceae	<i>Barleria lichtensteiniana</i>	Nees	LC	Indigenous
Acanthaceae	<i>Barleria rigida</i>	Nees	LC	Indigenous
Asteraceae	<i>Berkheya heterophylla</i>	(Thunb.) O.Hoffm.		Indigenous
Poaceae	<i>Brachiaria marlothii</i>	(Hack.) Stent	LC	Indigenous
Bryaceae	<i>Bryum argenteum</i>	Hedw.		Indigenous
Poaceae	<i>Cenchrus ciliaris</i>	L.	LC	Indigenous
Poaceae	<i>Centropodia glauca</i>	(Nees) Cope	LC	Indigenous



<b>Verbenaceae</b>	<i>Chascanum pinnatifidum</i> var. <i>pinnatifidum</i>	(L.f.) E.Mey.	LC	Indigenous
<b>Pteridaceae</b>	<i>Cheilanthes hirta</i> var. <i>hirta</i>	Sw.	LC	Indigenous
<b>Poaceae</b>	<i>Chloris virgata</i>	Sw.	LC	Indigenous
<b>Apiaceae</b>	<i>Choritaenia capensis</i>	Benth.	LC	Indigenous; Endemic
<b>Asteraceae</b>	<i>Chrysocoma ciliata</i>	L.	LC	Indigenous
<b>Poaceae</b>	<i>Chrysopogon serrulatus</i>	Trin.	LC	Indigenous
<b>Cleomaceae</b>	<i>Cleome angustifolia</i> subsp. <i>diandra</i>	Forsk.	LC	Indigenous
<b>Cleomaceae</b>	<i>Cleome gynandra</i>	L.	LC	Indigenous
<b>Colchicaceae</b>	<i>Colchicum burkei</i>	(Baker) J.C.Manning & Vinn.	LC	Indigenous
<b>Colchicaceae</b>	<i>Colchicum melanthioides</i> subsp. <i>melanthioides</i>	(Willd.) J.C.Manning & Vinn.	LC	Indigenous
<b>Combretaceae</b>	<i>Combretum erythrophyllum</i>	(Burch.) Sond.	LC	Indigenous
<b>Commelinaceae</b>	<i>Commelina africana</i> var. <i>barberae</i>	L.	LC	Indigenous
<b>Commelinaceae</b>	<i>Commelina benghalensis</i>	L.	LC	Indigenous
<b>Convolvulaceae</b>	<i>Convolvulus sagittatus</i>	Thunb.	LC	Indigenous
<b>Malvaceae</b>	<i>Corchorus schimperi</i>	Cufod.	LC	Indigenous
<b>Crassulaceae</b>	<i>Crassula corallina</i> subsp. <i>corallina</i>	Thunb.	LC	Indigenous
<b>Fabaceae</b>	<i>Cullen tomentosum</i>	(Thunb.) J.W.Grimes	LC	Indigenous
<b>Poaceae</b>	<i>Cymbopogon pospischilii</i>	(K.Schum.) C.E.Hubb.	NE	Indigenous
<b>Apocynaceae</b>	<i>Cynanchum viminale</i> subsp. <i>viminale</i>	(L.) L.		Indigenous
<b>Poaceae</b>	<i>Cynodon dactylon</i>	(L.) Pers.	LC	Indigenous
<b>Poaceae</b>	<i>Cynodon incompletus</i>	Nees	LC	Indigenous; Endemic
<b>Cyperaceae</b>	<i>Cyperus atriceps</i>	(Kuk.) C.Archer & Goetgh.	LC	Indigenous
<b>Cyperaceae</b>	<i>Cyperus difformis</i>	L.	LC	Indigenous
<b>Cyperaceae</b>	<i>Cyperus laevigatus</i>	L.	LC	Indigenous
<b>Solanaceae</b>	<i>Datura inoxia</i>	Mill.		Not indigenous; Naturalised
<b>Aizoaceae</b>	<i>Delosperma</i> sp.	L.Bolus		
<b>Asteraceae</b>	<i>Dicoma schinzii</i>	O.Hoffm.	LC	Indigenous
<b>Poaceae</b>	<i>Digitaria</i> sp.			
<b>Ebenaceae</b>	<i>Diospyros lycioides</i> subsp. <i>lycioides</i>	Desf.	LC	Indigenous
<b>Hyacinthaceae</b>	<i>Dipcadi gracillimum</i>	Baker	LC	Indigenous
<b>Hyacinthaceae</b>	<i>Dipcadi marlothii</i>	Engl.	LC	Indigenous
<b>Aizoaceae</b>	<i>Drosanthemum hispidum</i>	(L.) Schwantes	LC	Indigenous
<b>Aizoaceae</b>	<i>Drosanthemum lique</i>	(N.E.Br.) Schwantes	LC	Indigenous; Endemic
<b>Amaranthaceae</b>	<i>Dysphania carinata</i>	(R.Br.) Mosyakin & Clemants		Not indigenous; Naturalised; Invasive
<b>Boraginaceae</b>	<i>Ehretia alba</i>	Retief & A.E.van Wyk	LC	Indigenous
<b>Poaceae</b>	<i>Enneapogon cenchroides</i>	(Licht. ex Roem. & Schult.) C.E.Hubb.	LC	Indigenous
<b>Poaceae</b>	<i>Enneapogon desvauxii</i>	P.Beauv.	LC	Indigenous

Poaceae	<i>Enneapogon scaber</i>	Lehm.	LC	Indigenous
Poaceae	<i>Enneapogon scoparius</i>	Stapf	LC	Indigenous
Equisetaceae	<i>Equisetum ramosissimum</i> subsp. <i>ramosissimum</i>	Desf.	LC	Indigenous
Poaceae	<i>Eragrostis annulata</i>	Rendle ex Scott-Elliot	LC	Indigenous
Poaceae	<i>Eragrostis bicolor</i>	Nees	LC	Indigenous
Poaceae	<i>Eragrostis biflora</i>	Hack. ex Schinz	LC	Indigenous
Poaceae	<i>Eragrostis curvula</i>	(Schrad.) Nees	LC	Indigenous
Poaceae	<i>Eragrostis echinochloidea</i>	Stapf	LC	Indigenous
Poaceae	<i>Eragrostis homomalla</i>	Nees	LC	Indigenous
Poaceae	<i>Eragrostis lehmanniana</i> var. <i>lehmanniana</i>	Nees	LC	Indigenous
Poaceae	<i>Eragrostis nindensis</i>	Ficalho & Hiern	LC	Indigenous
Poaceae	<i>Eragrostis porosa</i>	Nees	LC	Indigenous
Poaceae	<i>Eragrostis procumbens</i>	Nees	LC	Indigenous
Poaceae	<i>Eragrostis pseudobtusa</i>	De Winter	NE	Indigenous; Endemic
Poaceae	<i>Eragrostis</i> sp.			
Poaceae	<i>Eragrostis superba</i>	Peyr.	LC	Indigenous
Poaceae	<i>Eragrostis truncata</i>	Hack.	LC	Indigenous
Asteraceae	<i>Eriocephalus ericoides</i> subsp. <i>griquensis</i>	(L.f.) Druce	LC	Indigenous; Endemic
Asteraceae	<i>Eriocephalus glandulosus</i>	M.A.N.Mull.	LC	Indigenous; Endemic
Asteraceae	<i>Eriocephalus merxmulleri</i>	M.A.N.Mull.	LC	Indigenous
Ebenaceae	<i>Euclea undulata</i>	Thunb.	LC	Indigenous
Euphorbiaceae	<i>Euphorbia arida</i>	N.E.Br.	LC	Indigenous; Endemic
Euphorbiaceae	<i>Euphorbia crassipes</i>	Marloth	LC	Indigenous
Euphorbiaceae	<i>Euphorbia davyi</i>	N.E.Br.	LC	Indigenous
Euphorbiaceae	<i>Euphorbia rhombifolia</i>	Boiss.	LC	Indigenous
Euphorbiaceae	<i>Euphorbia spartaria</i>	N.E.Br.	LC	Indigenous
Asteraceae	<i>Euryops subcarnosus</i> subsp. <i>vulgaris</i>	DC.	LC	Indigenous
Asteraceae	<i>Felicia filifolia</i> subsp. <i>filifolia</i>	(Vent.) Burtt Davy	LC	Indigenous
Asteraceae	<i>Felicia hirsuta</i>	DC.	LC	Indigenous
Asteraceae	<i>Felicia muricata</i> subsp. <i>muricata</i>	(Thunb.) Nees	LC	Indigenous
Asteraceae	<i>Felicia</i> sp.			
Poaceae	<i>Fingerhuthia africana</i>	Lehm.	LC	Indigenous
Apocynaceae	<i>Fockea sinuata</i>	(E.Mey.) Druce	LC	Indigenous
Iridaceae	<i>Freesia andersoniae</i>	L.Bolus	LC	Indigenous; Endemic
Fumariaceae	<i>Fumaria parviflora</i> var. <i>parviflora</i>	Lam.		Not indigenous; Naturalised
Aizoaceae	<i>Galenia glandulifera</i>	Bittrich	LC	Indigenous; Endemic
Aizoaceae	<i>Galenia sarcophylla</i>	Fenzl	LC	Indigenous
Asteraceae	<i>Garuleum schinzii</i> subsp. <i>schinzii</i>	O.Hoffm.	LC	Indigenous

<b>Asteraceae</b>	<i>Gazania krebsiana</i> subsp. <i>serrulata</i>	Less.	LC	Indigenous
<b>Asteraceae</b>	<i>Geigeria filifolia</i>	Mattf.	LC	Indigenous
<b>Gisekiaceae</b>	<i>Gisekia pharnaceoides</i> var. <i>pharnaceoides</i>	L.	LC	Indigenous
<b>Asteraceae</b>	<i>Gnaphalium confine</i>	Harv.	LC	Indigenous
<b>Funariaceae</b>	<i>Goniomitrium africanum</i>	(Mull.Hal.) Broth.		Indigenous
<b>Pedaliaceae</b>	<i>Harpagophytum procumbens</i> subsp. <i>procumbens</i>	(Burch.) DC. ex Meisn.	NE	Indigenous
<b>Asphodelaceae</b>	<i>Haworthia bolusii</i> var. <i>blackbeardiana</i>	Baker	NE	Indigenous; Endemic
<b>Asphodelaceae</b>	<i>Haworthia herbacea</i> var. <i>herbacea</i>	(Mill.) Stearn	NE	Indigenous; Endemic
<b>Asphodelaceae</b>	<i>Haworthiopsis tessellata</i> var. <i>tessellata</i>	(Haw.) G.D.Rowley		Indigenous
<b>Asteraceae</b>	<i>Helichrysum arenicola</i>	M.D.Hend.	LC	Indigenous
<b>Asteraceae</b>	<i>Helichrysum lineare</i>	DC.	LC	Indigenous
<b>Asteraceae</b>	<i>Helichrysum lucilioides</i>	Less.	LC	Indigenous
<b>Asteraceae</b>	<i>Helichrysum pumilio</i> subsp. <i>pumilio</i>	(O.Hoffm.) Hilliard & B.L.Burt	LC	Indigenous; Endemic
<b>Brassicaceae</b>	<i>Heliophila digitata</i>	L.f.	LC	Indigenous; Endemic
<b>Boraginaceae</b>	<i>Heliotropium lineare</i>	(A.DC.) Gurke	LC	Indigenous
<b>Malvaceae</b>	<i>Hermannia bicolor</i>	Engl. & Dinter	LC	Indigenous
<b>Malvaceae</b>	<i>Hermannia burkei</i>	Burt Davy	LC	Indigenous
<b>Malvaceae</b>	<i>Hermannia comosa</i>	Burch. ex DC.	LC	Indigenous
<b>Malvaceae</b>	<i>Hermannia cuneifolia</i> var. <i>glabrescens</i>	Jacq.	LC	Indigenous
<b>Malvaceae</b>	<i>Hermannia erodioides</i>	(Burch. ex DC.) Kuntze	LC	Indigenous
<b>Malvaceae</b>	<i>Hermannia linearifolia</i>	Harv.	LC	Indigenous; Endemic
<b>Malvaceae</b>	<i>Hermannia minutiflora</i>	Engl.	LC	Indigenous
<b>Malvaceae</b>	<i>Hermannia pulchella</i>	L.f.	LC	Indigenous
<b>Malvaceae</b>	<i>Hermannia</i> sp.			
<b>Malvaceae</b>	<i>Hermannia spinosa</i>	E.Mey. ex Harv.	LC	Indigenous
<b>Malvaceae</b>	<i>Hermannia tomentosa</i>	(Turcz.) Schinz ex Engl.	LC	Indigenous
<b>Asteraceae</b>	<i>Hertia cluytiifolia</i>	(DC.) Kuntze	LC	Indigenous; Endemic
<b>Asteraceae</b>	<i>Hertia kraussii</i>	(Sch.Bip.) Fourc.	LC	Indigenous; Endemic
<b>Asteraceae</b>	<i>Hertia pallens</i>	(DC.) Kuntze	LC	Indigenous
<b>Malvaceae</b>	<i>Hibiscus pusillus</i>	Thunb.	LC	Indigenous
<b>Asteraceae</b>	<i>Hirpicium echinus</i>	Less.	LC	Indigenous
<b>Fabaceae</b>	<i>Indigostrum niveum</i>	(Willd. ex Spreng.) Schrire & Callm.		Indigenous
<b>Fabaceae</b>	<i>Indigofera alternans</i> var. <i>alternans</i>	DC.	LC	Indigenous
<b>Fabaceae</b>	<i>Indigofera damarana</i>	Merxm. & A.Schreib.	LC	Indigenous
<b>Convolvulaceae</b>	<i>Ipomoea oenotheroides</i>	(L.f.) Raf. ex Hallier f.	LC	Indigenous
<b>Cyperaceae</b>	<i>Isolepis setacea</i>	(L.) R.Br.	LC	Indigenous
<b>Scrophulariaceae</b>	<i>Jamesbrittenia albiflora</i>	(I.Verd.) Hilliard	LC	Indigenous; Endemic

<b>Scrophulariaceae</b>	<i>Jamesbrittenia atropurpurea</i> subsp. <i>atropurpurea</i>	(Benth.) Hilliard	LC	Indigenous
<b>Scrophulariaceae</b>	<i>Jamesbrittenia aurantiaca</i>	(Burch.) Hilliard	LC	Indigenous
<b>Scrophulariaceae</b>	<i>Jamesbrittenia</i> sp.			
<b>Acanthaceae</b>	<i>Justicia incana</i>	(Nees) T.Anderson		Indigenous
<b>Acanthaceae</b>	<i>Justicia thymifolia</i>	(Nees) C.B.Clarke	LC	Indigenous; Endemic
<b>Crassulaceae</b>	<i>Kalanchoe rotundifolia</i>	(Haw.) Haw.	LC	Indigenous
<b>Asteraceae</b>	<i>Kleinia longiflora</i>	DC.	LC	Indigenous
<b>Hyacinthaceae</b>	<i>Lachenalia</i> sp.			
<b>Thymelaeaceae</b>	<i>Lasiosiphon polycephalus</i>	(E.Mey. ex Meisn.) H.Pearson	LC	Indigenous
<b>Hyacinthaceae</b>	<i>Ledebouria undulata</i>	(Jacq.) Jessop ex Willd.	LC	Indigenous
<b>Fabaceae</b>	<i>Leobordea platycarpa</i>	(Viv.) B.-E.van Wyk & Boatwr.	LC	Indigenous
<b>Lamiaceae</b>	<i>Leonotis pentadentata</i>	J.C.Manning & Goldblatt	LC	Indigenous
<b>Brassicaceae</b>	<i>Lepidium africanum</i> subsp. <i>divaricatum</i>	(Burm.f.) DC.	LC	Indigenous
<b>Brassicaceae</b>	<i>Lepidium bonariense</i>	L.		Not indigenous; Naturalised
<b>Brassicaceae</b>	<i>Lepidium englerianum</i>	(Muschl.) Al-Shehbaz		Indigenous
<b>Brassicaceae</b>	<i>Lepidium trifurcum</i>	Sond.	LC	Indigenous
<b>Poaceae</b>	<i>Leptochloa fusca</i>	(L.) Kunth	LC	Indigenous
<b>Fabaceae</b>	<i>Lessertia frutescens</i> subsp. <i>frutescens</i>	(L.) Goldblatt & J.C.Manning	LC	Indigenous
<b>Fabaceae</b>	<i>Lessertia pauciflora</i> var. <i>pauciflora</i>	Harv.	LC	Indigenous
<b>Limeaceae</b>	<i>Limeum fenestratum</i> var. <i>fenestratum</i>	(Fenzl) Heimerl	LC	Indigenous
<b>Aizoaceae</b>	<i>Lithops aucampiae</i> subsp. <i>euniceae</i>	L.Bolus	VU	Indigenous; Endemic
<b>Aizoaceae</b>	<i>Lithops hookeri</i>	(A.Berger) Schwantes	LC	Indigenous; Endemic
<b>Solanaceae</b>	<i>Lycium arenicola</i>	Miers	LC	Indigenous
<b>Solanaceae</b>	<i>Lycium cinereum</i>	Thunb.	LC	Indigenous
<b>Solanaceae</b>	<i>Lycium horridum</i>	Thunb.	LC	Indigenous
<b>Solanaceae</b>	<i>Lycium pilifolium</i>	C.H.Wright	LC	Indigenous
<b>Solanaceae</b>	<i>Lycium pumilum</i>	Dammer	LC	Indigenous
<b>Solanaceae</b>	<i>Lycium schizocalyx</i>	C.H.Wright	LC	Indigenous
<b>Malvaceae</b>	<i>Malva pusilla</i>	Sm.		Not indigenous; Naturalised
<b>Celastraceae</b>	<i>Maytenus undata</i>	(Thunb.) Blakelock	LC	Indigenous
<b>Fabaceae</b>	<i>Medicago laciniata</i> var. <i>laciniata</i>	(L.) Mill.	NE	Not indigenous; Naturalised
<b>Poaceae</b>	<i>Melinis repens</i> subsp. <i>grandiflora</i>	(Willd.) Zizka	LC	Indigenous
<b>Fabaceae</b>	<i>Melolobium candicans</i>	(E.Mey.) Eckl. & Zeyh.	LC	Indigenous
<b>Fabaceae</b>	<i>Melolobium macrocalyx</i> var. <i>macrocalyx</i>	Dummer	LC	Indigenous
<b>Convolvulaceae</b>	<i>Merremia verecunda</i>	Rendle	LC	Indigenous
<b>Aizoaceae</b>	<i>Mesembryanthemum articulatum</i>	Thunb.		Indigenous
<b>Aizoaceae</b>	<i>Mesembryanthemum coriarium</i>	Burch. ex N.E.Br.		Indigenous
<b>Aizoaceae</b>	<i>Mesembryanthemum geniculiflorum</i>	L.		Indigenous

<b>Aizoaceae</b>	<i>Mesembryanthemum guerichianum</i>	Pax	LC	Indigenous
<b>Aizoaceae</b>	<i>Mesembryanthemum splendens</i> subsp. <i>pentagonum</i>	L.		Indigenous; Endemic
<b>Aizoaceae</b>	<i>Mesembryanthemum stenandrum</i>	(L.Bolus) L.Bolus	LC	Indigenous; Endemic
<b>Aizoaceae</b>	<i>Mestoklema arboriforme</i>	(Burch.) N.E.Br. ex Glen	LC	Indigenous; Endemic
<b>Apocynaceae</b>	<i>Microlooma armatum</i> var. <i>armatum</i>	(Thunb.) Schltr.	LC	Indigenous
<b>Geraniaceae</b>	<i>Monsonia salmoniflora</i>	(Moffett) F.Albers	LC	Indigenous
<b>Iridaceae</b>	<i>Moraea polystachya</i>	(Thunb.) Ker Gawl.	LC	Indigenous
<b>Amaryllidaceae</b>	<i>Nerine laticoma</i>	(Ker Gawl.) T.Durand & Schinz	LC	Indigenous
<b>Asteraceae</b>	<i>Nidorella resedifolia</i> subsp. <i>resedifolia</i>	DC.	LC	Indigenous
<b>Asteraceae</b>	<i>Nolletia chrysocomoides</i>	(Desf.) Cass. ex Less.	LC	Indigenous
<b>Asteraceae</b>	<i>Oedera humilis</i>	(Less.) N.G.Bergh		Indigenous
<b>Oleaceae</b>	<i>Olea europaea</i> subsp. <i>cuspidata</i>	L.		Indigenous
<b>Ophioglossaceae</b>	<i>Ophioglossum polyphyllum</i> var. <i>polyphyllum</i>	A.Braun	LC	Indigenous
<b>Apocynaceae</b>	<i>Orbea cooperi</i>	(N.E.Br.) L.C.Leach	LC	Indigenous
<b>Poaceae</b>	<i>Oropetium capense</i>	Stapf	LC	Indigenous
<b>Asteraceae</b>	<i>Osteospermum leptolobum</i>	(Harv.) Norl.	LC	Indigenous; Endemic
<b>Asteraceae</b>	<i>Osteospermum scariosum</i> var. <i>scariosum</i>	DC.	NE	Indigenous
<b>Santalaceae</b>	<i>Osyris lanceolata</i>	Hochst. & Steud.	LC	Indigenous
<b>Oxalidaceae</b>	<i>Oxalis lawsonii</i>	F.Bolus	LC	Indigenous
<b>Polygonaceae</b>	<i>Oxygonum alatum</i> var. <i>alatum</i>	Burch.	LC	Indigenous
<b>Poaceae</b>	<i>Panicum coloratum</i>	L.	LC	Indigenous
<b>Poaceae</b>	<i>Panicum dregeanum</i>	Nees	LC	Indigenous
<b>Poaceae</b>	<i>Panicum impeditum</i>	Launert	LC	Indigenous
<b>Poaceae</b>	<i>Panicum stapfianum</i>	Fourc.	LC	Indigenous
<b>Poaceae</b>	<i>Paspalum distichum</i>	L.	LC	Not indigenous; Naturalised; Invasive
<b>Asteraceae</b>	<i>Pegolettia retrofracta</i>	(Thunb.) Kies	LC	Indigenous
<b>Scrophulariaceae</b>	<i>Peliostomum leucorrhizum</i>	E.Mey. ex Benth.	LC	Indigenous
<b>Scrophulariaceae</b>	<i>Peliostomum organoides</i>	E.Mey. ex Benth.	LC	Indigenous; Endemic
<b>Asteraceae</b>	<i>Pentzia calcarea</i>	Kies	LC	Indigenous
<b>Asteraceae</b>	<i>Pentzia calva</i>	S.Moore	LC	Indigenous
<b>Asteraceae</b>	<i>Pentzia globosa</i>	Less.	LC	Indigenous
<b>Asteraceae</b>	<i>Pentzia incana</i>	(Thunb.) Kuntze	LC	Indigenous
<b>Asteraceae</b>	<i>Pentzia lanata</i>	Hutch.	LC	Indigenous
<b>Asteraceae</b>	<i>Pentzia quinquefida</i>	(Thunb.) Less.	LC	Indigenous; Endemic
<b>Nyctaginaceae</b>	<i>Phaeoptilum spinosum</i>	Radlk.	LC	Indigenous
<b>Poaceae</b>	<i>Phragmites australis</i>	(Cav.) Steud.	LC	Indigenous
<b>Aizoaceae</b>	<i>Plinthus karoocicus</i>	I.Verd.	LC	Indigenous
<b>Aizoaceae</b>	<i>Plinthus sericeus</i>	Pax	LC	Indigenous

<b>Plumbaginaceae</b>	<i>Plumbago zeylanica</i>	L.		Not indigenous; Naturalised
<b>Poaceae</b>	<i>Pogonarthria squarrosa</i>	(Roem. & Schult.) Pilg.	LC	Indigenous
<b>Polygalaceae</b>	<i>Polygala pungens</i>	Burch.	LC	Indigenous; Endemic
<b>Polygalaceae</b>	<i>Polygala seminuda</i>	Harv.	LC	Indigenous
<b>Poaceae</b>	<i>Polypogon monspeliensis</i>	(L.) Desf.	NE	Not indigenous; Naturalised
<b>Portulacaceae</b>	<i>Portulaca hereroensis</i>	Schinz	LC	Indigenous
<b>Fabaceae</b>	<i>Prosopis glandulosa var. glandulosa</i>	Torr.	NE	Not indigenous; Naturalised
<b>Asteraceae</b>	<i>Pteronia glauca</i>	Thunb.	LC	Indigenous
<b>Asteraceae</b>	<i>Pteronia mucronata</i>	DC.	LC	Indigenous
<b>Asteraceae</b>	<i>Pteronia sordida</i>	N.E.Br.	LC	Indigenous
<b>Asteraceae</b>	<i>Pteronia sp.</i>			
<b>Poaceae</b>	<i>Puccinellia acroxantha</i>	C.A.Sm. & C.E.Hubb.	LC	Indigenous
<b>Bignoniaceae</b>	<i>Rhigozum trichotomum</i>	Burch.	LC	Indigenous
<b>Ricciaceae</b>	<i>Riccia albolimbata</i>	S.W.Arnell		Indigenous
<b>Ricciaceae</b>	<i>Riccia okahandjana</i>	S.W.Arnell		Indigenous
<b>Ricciaceae</b>	<i>Riccia pottsiana</i>	Sim		Indigenous; Endemic
<b>Ricciaceae</b>	<i>Riccia sp.</i>			
<b>Zygophyllaceae</b>	<i>Roepera incrustata</i>	(Sond.) Beier & Thulin		Indigenous
<b>Zygophyllaceae</b>	<i>Roepera lichtensteiniana</i>	(Cham.) Beier & Thulin		Indigenous
<b>Brassicaceae</b>	<i>Rorippa fluviatilis var. caledonica</i>	(E.Mey. ex Sond.) R.A.Dyer	LC	Indigenous
<b>Poaceae</b>	<i>Rottboellia cochinchinensis</i>	(Lour.) Clayton	LC	Indigenous
<b>Aizoaceae</b>	<i>Ruschia calcarea</i>	L.Bolus	DD	Indigenous; Endemic
<b>Aizoaceae</b>	<i>Ruschia intricata</i>	(N.E.Br.) H.E.K.Hartmann & Stuber	LC	Indigenous; Endemic
<b>Aizoaceae</b>	<i>Ruschia sp.</i>			
<b>Salicaceae</b>	<i>Salix mucronata subsp. mucronata</i>	Thunb.	LC	Indigenous
<b>Amaranthaceae</b>	<i>Salsola aphylla</i>	L.f.	LC	Indigenous
<b>Amaranthaceae</b>	<i>Salsola calluna</i>	Drege ex C.H.Wright	LC	Indigenous; Endemic
<b>Amaranthaceae</b>	<i>Salsola dealata</i>	Botsch.	LC	Indigenous; Endemic
<b>Amaranthaceae</b>	<i>Salsola decussata</i>	C.A.Sm. ex Botsch.	LC	Indigenous; Endemic
<b>Amaranthaceae</b>	<i>Salsola geminiflora</i>	Fenzl ex C.H.Wright	LC	Indigenous; Endemic
<b>Amaranthaceae</b>	<i>Salsola glabrescens</i>	Burt Davy	LC	Indigenous
<b>Amaranthaceae</b>	<i>Salsola kali</i>	L.		Not indigenous; Naturalised; Invasive
<b>Amaranthaceae</b>	<i>Salsola rabieana</i>	I.Verd.	LC	Indigenous
<b>Lamiaceae</b>	<i>Salvia runcinata</i>	L.f.	LC	Indigenous
<b>Lamiaceae</b>	<i>Salvia verbenaca</i>	L.	LC	Not indigenous; Naturalised; Invasive
<b>Poaceae</b>	<i>Schmidtia kalahariensis</i>	Stent	LC	Indigenous



<b>Poaceae</b>	<i>Schmidtia pappophoroides</i>	Steud.	LC	Indigenous
<b>Cyperaceae</b>	<i>Schoenoplectus muricinux</i>	(C.B.Clarke) J.Raynal	LC	Indigenous
<b>Anacardiaceae</b>	<i>Searsia burchellii</i>	(Sond. ex Engl.) Moffett	LC	Indigenous
<b>Anacardiaceae</b>	<i>Searsia ciliata</i>	(Licht. ex Schult.) A.J.Mill.	LC	Indigenous
<b>Anacardiaceae</b>	<i>Searsia lancea</i>	(L.f.) F.A.Barkley	LC	Indigenous
<b>Anacardiaceae</b>	<i>Searsia pyroides</i> var. <i>pyroides</i>	(Burch.) Moffett	LC	Indigenous
<b>Gentianaceae</b>	<i>Sebaea leiostyla</i>	Gilg	LC	Indigenous
<b>Gentianaceae</b>	<i>Sebaea pentandra</i> var. <i>burchellii</i>	E.Mey.	LC	Indigenous
<b>Scrophulariaceae</b>	<i>Selago acocksii</i>	Hilliard	LC	Indigenous; Endemic
<b>Scrophulariaceae</b>	<i>Selago geniculata</i>	L.f.	LC	Indigenous; Endemic
<b>Scrophulariaceae</b>	<i>Selago mixta</i>	Hilliard	LC	Indigenous; Endemic
<b>Scrophulariaceae</b>	<i>Selago</i> sp.			
<b>Asteraceae</b>	<i>Senecio windhoekensis</i>	Merxm.	LC	Indigenous
<b>Fabaceae</b>	<i>Senegalia mellifera</i> subsp. <i>detinens</i>	(Vahl) Seigler & Ebinger	LC	Indigenous
<b>Fabaceae</b>	<i>Senna italica</i> subsp. <i>arachoides</i>	Mill.	LC	Indigenous
<b>Loranthaceae</b>	<i>Septulina glauca</i>	(Thunb.) Tiegh.	LC	Indigenous
<b>Solanaceae</b>	<i>Solanum retroflexum</i>	Dunal	LC	Indigenous
<b>Poaceae</b>	<i>Sporobolus albicans</i>	(Nees ex Trin.) Nees	LC	Indigenous
<b>Poaceae</b>	<i>Sporobolus coromandelianus</i>	(Retz.) Kunth	LC	Indigenous
<b>Poaceae</b>	<i>Sporobolus fimbriatus</i>	(Trin.) Nees	LC	Indigenous
<b>Poaceae</b>	<i>Sporobolus ioclados</i>	(Trin.) Nees	LC	Indigenous
<b>Poaceae</b>	<i>Sporobolus ludwigii</i>	Hochst.	LC	Indigenous
<b>Poaceae</b>	<i>Sporobolus nervosus</i>	Hochst.	LC	Indigenous
<b>Poaceae</b>	<i>Sporobolus</i> sp.			
<b>Poaceae</b>	<i>Sporobolus tenellus</i>	(Spreng.) Kunth	LC	Indigenous
<b>Lamiaceae</b>	<i>Stachys rugosa</i>	Aiton	LC	Indigenous
<b>Lamiaceae</b>	<i>Stachys spathulata</i>	Burch. ex Benth.	LC	Indigenous
<b>Poaceae</b>	<i>Stipagrostis ciliata</i> var. <i>capensis</i>	(Desf.) De Winter	LC	Indigenous
<b>Poaceae</b>	<i>Stipagrostis namaquensis</i>	(Nees) De Winter	LC	Indigenous
<b>Poaceae</b>	<i>Stipagrostis obtusa</i>	(Delile) Nees	LC	Indigenous
<b>Poaceae</b>	<i>Stipagrostis uniplumis</i> var. <i>uniplumis</i>	(Licht.) De Winter	LC	Indigenous
<b>Talinaceae</b>	<i>Talinum portulacifolium</i>	(Forssk.) Asch. ex Schweinf.		Indigenous
<b>Tamaricaceae</b>	<i>Tamarix ramosissima</i>	Ledeb.		Not indigenous; Naturalised; Invasive
<b>Asteraceae</b>	<i>Tarchonanthus camphoratus</i>	L.	LC	Indigenous
<b>Apocynaceae</b>	<i>Tavaresia barklyi</i>	(Dyer) N.E.Br.	LC	Indigenous
<b>Zygophyllaceae</b>	<i>Tetraena microcarpa</i>	(Licht. ex Cham.) Beier & Thulin		Indigenous
<b>Zygophyllaceae</b>	<i>Tetraena simplex</i>	(L.) Beier & Thulin		Indigenous

<b>Aizoaceae</b>	<i>Tetragonia arbuscula</i>	Fenzl	LC	Indigenous
<b>Aizoaceae</b>	<i>Tetragonia fruticosa</i>	L.	LC	Indigenous
<b>Santalaceae</b>	<i>Thesium hystrioides</i>	A.W.Hill	LC	Indigenous
<b>Santalaceae</b>	<i>Thesium hystrix</i>	A.W.Hill	LC	Indigenous
<b>Aizoaceae</b>	<i>Titanopsis calcarea</i>	(Marloth) Schwantes	LC	Indigenous; Endemic
<b>Asphodelaceae</b>	<i>Trachyandra saltii</i> var. <i>oatesii</i>	(Baker) Oberm.	LC	Indigenous; Endemic
<b>Poaceae</b>	<i>Tragus berteronianus</i>	Schult.	LC	Indigenous
<b>Poaceae</b>	<i>Tragus koelerioides</i>	Asch.	LC	Indigenous
<b>Poaceae</b>	<i>Tragus racemosus</i>	(L.) All.	LC	Indigenous
<b>Zygophyllaceae</b>	<i>Tribulus</i> sp.			
<b>Zygophyllaceae</b>	<i>Tribulus terrestris</i>	L.	LC	Indigenous
<b>Aizoaceae</b>	<i>Trichodiadema pomeridianum</i>	L.Bolus	LC	Indigenous
<b>Pottiaceae</b>	<i>Trichostomum brachydontium</i>	Bruch		Indigenous
<b>Poaceae</b>	<i>Triraphis purpurea</i>	Hack.	LC	Indigenous
<b>Poaceae</b>	<i>Urochloa panicoides</i>	P.Beauv.	LC	Indigenous
<b>Fabaceae</b>	<i>Vachellia haematoxylon</i>	(Willd.) Seigler & Ebinger	LC	Indigenous
<b>Santalaceae</b>	<i>Viscum hoolei</i>	(Wiens) Polhill & Wiens	LC	Indigenous
<b>Santalaceae</b>	<i>Viscum rotundifolium</i>	L.f.	LC	Indigenous
<b>Campanulaceae</b>	<i>Wahlenbergia nodosa</i>	(H.Buek) Lammers	LC	Indigenous; Endemic

## 9.2 Appendix B – Amphibian species expected to occur in the project area

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
<i>Kassina senegalensis</i>	Bubbling Kassina	LC	LC
<i>Poyntonophrynus vertebralis</i>	Southern Pygmy Toad	LC	LC
<i>Sclerophrys gutturalis</i>	Guttural Toad	LC	LC
<i>Tomopterna cryptotis</i>	Tremelo Sand Frog	LC	LC
<i>Tomopterna tandyi</i>	Tandy's Sand Frog	LC	LC
<i>Sclerophrys capensis</i>	Raucous Toad	LC	LC
<i>Pyxicephalus adspersus</i>	Giant Bullfrog	LC	LC
<i>Vandijkophrynus gariensis</i>	Karoo toad	LC	LC
<i>Cacosternum boettgeri</i>	Common Caco	LC	LC
<i>Xenopus laevis</i>	Common Platanna	LC	LC
<i>Breviceps adspersus</i>	Bushveld Rain Frog	LC	LC
<i>Sclerophrys poweri</i>	Power's Toad	LC	LC
<i>Vandijkophrynus gariensis gariensis</i>	Karoo Toad	Not listed	Not listed
<i>Amietia delalandii</i>	Delalande's River Frog	LC	LC
<i>Amietia fuscigula</i>	Common River Frog	LC	LC
<i>Amietia poyntoni</i>	Poynton's River Frog	LC	LC

### 9.3 Appendix C – Reptile species expected to occur in the project area

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
<i>Acontias gracilicauda</i>	Thin-tailed Legless Skink	LC	LC
<i>Afroedura nivaria</i>	Drakensberg Flat Gecko	LC	LC
<i>Agama aculeata aculeata</i>	Western Ground Agama	LC	Unlisted
<i>Agama aculeata distanti</i>	Eastern Ground Agama	LC	LC
<i>Agama atra</i>	Southern Rock Agama	LC	LC
<i>Bitis arietans arietans</i>	Puff Adder	LC	Unlisted
<i>Boaedon capensis</i>	Brown House Snake	LC	LC
<i>Chamaeleo dilepis</i>	Common Flap-neck Chameleon	LC	LC
<i>Chondrodactylus bibronii</i>	Bibron's Gecko	LC	Unlisted
<i>Crotaphopeltis hotamboeia</i>	Red-lipped Snake	LC	Unlisted
<i>Dasypeltis scabra</i>	Rhombic Egg-eater	LC	LC
<i>Dispholidus typus</i>	Boomslang	LC	Unlisted
<i>Hemachatus haemachatus</i>	Rinkhals	LC	LC
<i>Homopus femoralis</i>	Greater Dwarf Tortoise	LC	LC
<i>Karusasaurus polyzonus</i>	Southern Karusa Lizard	LC	LC
<i>Lamprophis aurora</i>	Aurora House Snake	LC	LC
<i>Lycodonomorphus rufulus</i>	Brown Water Snake	LC	Unlisted
<i>Lygodactylus bradfieldi</i>	Bradfield's Dwarf Gecko	LC	Unlisted
<i>Monopeltis capensis</i>	Cape Worm Lizard	LC	LC
<i>Monopeltis infuscata</i>	Dusky Worm Lizard	LC	Unlisted
<i>Naja nivea</i>	Cape Cobra	LC	Unlisted
<i>Nucras holubi</i>	Holub's Sandveld Lizard	LC	Unlisted
<i>Pachydactylus capensis</i>	Cape Gecko	LC	Unlisted
<i>Pachydactylus mariquensis</i>	Common Banded Gecko	LC	LC
<i>Pedioplanis laticeps</i>	Karoo Sand Lizard	LC	LC
<i>Pedioplanis lineocellata lineocellata</i>	Spotted Sand Lizard	LC	Unlisted
<i>Pedioplanis namaquensis</i>	Namaqua Sand Lizard	LC	Unlisted
<i>Pelomedusa galeata</i>	South African Marsh Terrapin	Not evaluated	Unlisted
<i>Prosymna sundevallii</i>	Sundevall's Shovel-snout	LC	LC
<i>Psammobates oculifer</i>	Serrated Tent Tortoise	LC	Unlisted
<i>Psammobates tentorius verroxii</i>	Tent Tortoise	NT	NT
<i>Psammophis notostictus</i>	Karoo Sand Snake	LC	Unlisted
<i>Psammophis trinasalis</i>	Fork-marked Sand Snake	LC	Unlisted
<i>Pseudaspis cana</i>	Mole Snake	LC	Unlisted
<i>Ptenopus garrulus garrulus</i>	Common Barking Gecko	LC	Unlisted
<i>Rhinotyphlops lalandei</i>	Delalande's Beaked Blind Snake	LC	Unlisted
<i>Stigmochelys pardalis</i>	Leopard Tortoise	LC	LC
<i>Trachylepis capensis</i>	Cape Skink	LC	Unlisted
<i>Trachylepis occidentalis</i>	Western Three-striped Skink	LC	Unlisted
<i>Trachylepis punctatissima</i>	Speckled Rock Skink	LC	LC
<i>Trachylepis spilogaster</i>	Kalahari Tree Skink	LC	Unlisted
<i>Trachylepis sulcata sulcata</i>	Westren Rock Skink	LC	Unlisted
<i>Trachylepis variegata</i>	Variegated Skink	LC	Unlisted

<i>Varanus albigularis albigularis</i>	Southern Rock Monitor	LC	Unlisted
<i>Varanus niloticus</i>	Water Monitor	LC	Unlisted
<i>Zygaspis quadrifrons</i>	Kalahari Dwarf Worm Lizard	LC	Unlisted

#### 9.4 Appendix D – Mammal species expected to occur within the project area

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
<i>Aethomys ineptus</i>	Tete Veld Rat	LC	LC
<i>Aethomys namaquensis</i>	Namaqua rock rat	LC	LC
<i>Atilax paludinosus</i>	Water Mongoose	LC	LC
<i>Canis mesomelas</i>	Black-backed Jackal	LC	LC
<i>Caracal caracal</i>	Caracal	LC	LC
<i>Chlorocebus pygerythrus</i>	Vervet Monkey	LC	LC
<i>Cynictis penicillata</i>	Yellow Mongoose	LC	LC
<i>Desmodillus auricularis</i>	Short-tailed Gerbil	LC	LC
<i>Eidolon helvum</i>	African Straw-colored Fruit Bat	LC	NT
<i>Elephantulus myurus</i>	Eastern Rock Sengi	LC	LC
<i>Eptesicus hottentotus</i>	Long-tailed Serotine Bat	LC	LC
<i>Felis nigripes</i>	Black-footed Cat	VU	VU
<i>Felis silvestris</i>	African Wildcat	LC	LC
<i>Genetta genetta</i>	Small-spotted Genet	LC	LC
<i>Gerbilliscus brantsii</i>	Highveld Gerbil	LC	LC
<i>Gerbilliscus leucogaster</i>	Bushveld Gerbil	LC	LC
<i>Gerbillurus paeba</i>	Hairy-footed Gerbil	LC	LC
<i>Herpestes pulverulentus</i>	Cape Grey Mongoose	LC	LC
<i>Herpestes sanguineus</i>	Slender Mongoose	LC	LC
<i>Hydricis maculicollis</i>	Spotted-necked Otter	VU	NT
<i>Hystrix africaeaustralis</i>	Cape Porcupine	LC	LC
<i>Ictonyx striatus</i>	Striped Polecat	LC	LC
<i>Leptailurus serval</i>	Serval	NT	LC
<i>Lepus capensis</i>	Cape Hare	LC	LC
<i>Lepus saxatilis</i>	Scrub Hare	LC	LC
<i>Malacothrix typica</i>	Gerbil Mouse	LC	LC
<i>Mastomys coucha</i>	Multimammate Mouse	LC	LC
<i>Mellivora capensis</i>	Honey Badger	LC	LC
<i>Mus musculus</i>	House Mouse	Unlisted	LC
<i>Neoromicia capensis</i>	Cape Serotine Bat	LC	LC
<i>Orycteropus afer</i>	Aardvark	LC	LC
<i>Otocyon megalotis</i>	Bat-eared Fox	LC	LC
<i>Panthera pardus</i>	Leopard	VU	VU
<i>Papio ursinus</i>	Chacma Baboon	LC	LC
<i>Parahyaena brunnea</i>	Brown Hyaena	NT	NT
<i>Parotomys brantsii</i>	Brants' Whistling Rat	LC	LC



<i>Parotomys littledalei</i>	Littledale's Whistling Rat	NT	LC
<i>Pedetes capensis</i>	Springhare	LC	LC
<i>Poecilogale albinucha</i>	African Striped Weasel	NT	LC
<i>Procavia capensis</i>	Rock Hyrax	LC	LC
<i>Proteles cristata</i>	Aardwolf	LC	LC
<i>Raphicerus campestris</i>	Steenbok	LC	LC
<i>Rattus rattus</i>	House Rat	Exotic (Not listed)	LC
<i>Redunca fulvorufula</i>	Mountain Reedbuck	EN	LC
<i>Rhabdomys pumilio</i>	Xeric Four-striped Mouse	LC	LC
<i>Rhinolophus clivosus</i>	Geoffroy's Horseshoe Bat	LC	LC
<i>Rhinolophus darlingi</i>	Darling's Horseshoe Bat	LC	LC
<i>Rhinolophus denti</i>	Dent's Horseshoe Bat	NT	LC
<i>Saccostomus campestris</i>	Pouched Mouse	LC	LC
<i>Steatomys krebsii</i>	Krebs's Fat Mouse	LC	LC
<i>Suncus varilla</i>	Lesser Dwarf Shrew	LC	LC
<i>Suricata suricatta</i>	Suricate	LC	LC
<i>Sylvicapra grimmia</i>	Common Duiker	LC	LC
<i>Tadarida aegyptiaca</i>	Egyptian Free-tailed Bat	LC	LC
<i>Vulpes chama</i>	Cape Fox	LC	LC
<i>Xerus inauris</i>	Cape Ground Squirrel	LC	LC

## 9.5 Appendix E -Avifauna Species expected to occur within the project area

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
<i>Afrotis afraoides</i>	Korhaan, Northern Black	Unlisted	LC
<i>Alopochen aegyptiaca</i>	Goose, Egyptian	LC	LC
<i>Amadina erythrocephala</i>	Finch, Red-headed	Unlisted	LC
<i>Anthus cinnamomeus</i>	Pipit, African	Unlisted	LC
<i>Anthus nicholsoni</i>	Nicholson's pipit	Unlisted	Unlisted
<i>Apus affinis</i>	Swift, Little	Unlisted	LC
<i>Bostrychia hagedash</i>	Ibis, Hadedda	Unlisted	LC
<i>Brunhilda erythronotos</i>	Waxbill, Black-faced	Unlisted	LC
<i>Calendulauda africanoides</i>	Lark, Fawn-coloured	Unlisted	LC
<i>Cercotrichas coryphoeus</i>	Scrub-robin, Karoo	Unlisted	LC
<i>Cercotrichas paena</i>	Scrub-robin, Kalahari	Unlisted	LC
<i>Chersomanes albofasciata</i>	Lark, Spike-heeled	Unlisted	LC
<i>Ciconia nigra</i>	Stork, Black	VU	LC
<i>Cinnyris fuscus</i>	Sunbird, Dusky	Unlisted	LC
<i>Cinnyris talatala</i>	Sunbird, White-bellied	Unlisted	LC
<i>Circaetus pectoralis</i>	Snake-eagle, Black-chested	Unlisted	LC
<i>Cisticola aridulus</i>	Cisticola, Desert	Unlisted	LC
<i>Colius colius</i>	Mousebird, White-backed	Unlisted	LC
<i>Columba guinea</i>	Pigeon, Speckled	Unlisted	LC
<i>Corvus albus</i>	Crow, Pied	Unlisted	LC
<i>Crithagra albogularis</i>	White-throated Canary	LC	LC
<i>Crithagra atrogularis</i>	Canary, Black-throated	Unlisted	LC
<i>Crithagra flaviventris</i>	Canary, Yellow	Unlisted	LC
<i>Curruca subcoerulea</i>	Tit-babbler, Chestnut-vented	Unlisted	Unlisted
<i>Elanus caeruleus</i>	Kite, Black-shouldered	Unlisted	LC
<i>Emberiza capensis</i>	Bunting, Cape	Unlisted	LC
<i>Emberiza impetuani</i>	Bunting, Lark-like	Unlisted	LC
<i>Eremomela icteropygialis</i>	Eremomela, Yellow-bellied	Unlisted	LC
<i>Euplectes orix</i>	Bishop, Southern Red	Unlisted	LC
<i>Falco rupicoloides</i>	Kestrel, Greater	Unlisted	LC
<i>Grus paradisea</i>	Crane, Blue	NT	VU
<i>Gyps africanus</i>	Vulture, White-backed	CR	CR
<i>Himantopus himantopus</i>	Stilt, Black-winged	Unlisted	LC
<i>Hirundo rustica</i>	Swallow, Barn	Unlisted	LC
<i>Lamprotornis bicolor</i>	Starling, Pied	Unlisted	LC
<i>Lamprotornis nitens</i>	Starling, Cape Glossy	Unlisted	LC

<i>Lanius collaris</i>	Fiscal, Common (Southern)	Unlisted	LC
<i>Malcorus pectoralis</i>	Warbler, Rufous-eared	Unlisted	LC
<i>Melaenornis mariquensis</i>	Flycatcher, Marico	Unlisted	LC
<i>Melaenornis silens</i>	Flycatcher, Fiscal	Unlisted	LC
<i>Melierax canorus</i>	Goshawk, Southern Pale Chanting	Unlisted	LC
<i>Merops bullockoides</i>	Bee-eater, White-fronted	Unlisted	LC
<i>Mirafra fasciolata</i>	Lark, Eastern Clapper	Unlisted	LC
<i>Motacilla capensis</i>	Wagtail, Cape	Unlisted	LC
<i>Muscicapa striata</i>	Flycatcher, Spotted	Unlisted	LC
<i>Myrmecocichla formicivora</i>	Chat, Anteating	Unlisted	LC
<i>Myrmecocichla monticola</i>	Wheatear, Mountain	Unlisted	LC
<i>Numida meleagris</i>	Guineafowl, Helmeted	Unlisted	LC
<i>Oena capensis</i>	Dove, Namaqua	Unlisted	LC
<i>Oenanthe familiaris</i>	Chat, Familiar	Unlisted	LC
<i>Ortygospiza atricollis</i>	Quailfinch, African	Unlisted	LC
<i>Passer diffusus</i>	Sparrow, Southern Grey-headed	Unlisted	LC
<i>Passer domesticus</i>	Sparrow, House	Unlisted	LC
<i>Passer melanurus</i>	Sparrow, Cape	Unlisted	LC
<i>Petrochelidon spilodera</i>	Cliff-swallow, South African	Unlisted	LC
<i>Philetairus socius</i>	Weaver, Sociable	Unlisted	LC
<i>Plocepasser mahali</i>	Sparrow-weaver, White-browed	Unlisted	LC
<i>Ploceus velatus</i>	Masked-weaver, Southern	Unlisted	LC
<i>Polihierax semitorquatus</i>	Falcon, Pygmy	Unlisted	LC
<i>Prinia flavicans</i>	Prinia, Black-chested	Unlisted	LC
<i>Pterocles namaqua</i>	Sandgrouse, Namaqua	Unlisted	LC
<i>Ptyonoprogne fuligula</i>	Martin, Rock	LC	LC
<i>Pycnonotus nigricans</i>	Bulbul, African Red-eyed	Unlisted	LC
<i>Pytilia melba</i>	Pytilia, Green-winged	Unlisted	LC
<i>Spilopelia senegalensis</i>	Dove, Laughing	Unlisted	LC
<i>Sporopipes squamifrons</i>	Finch, Scaly-feathered	Unlisted	LC
<i>Stenostira scita</i>	Flycatcher, Fairy	Unlisted	LC
<i>Streptopelia capicola</i>	Turtle-dove, Cape	Unlisted	LC
<i>Struthio camelus</i>	Ostrich, Common	Unlisted	LC
<i>Tachybaptus ruficollis</i>	Grebe, Little	Unlisted	LC
<i>Tadorna cana</i>	Shelduck, South African	Unlisted	LC
<i>Trachyphonus vaillantii</i>	Barbet, Crested	Unlisted	LC
<i>Tricholaema leucomelas</i>	Barbet, Acacia Pied	Unlisted	LC
<i>Urocolius indicus</i>	Mousebird, Red-faced	Unlisted	LC
<i>Vanellus armatus</i>	Lapwing, Blacksmith	Unlisted	LC

<i>Vanellus coronatus</i>	Lapwing, Crowned	Unlisted	LC
<i>Zosterops pallidus</i>	White-eye, Orange River	Unlisted	LC