



# THE TERRESTRIAL ECOLOGY BASELINE & IMPACT ASSESSMENTS FOR THE PROPOSED CASTLE OHL CORRIDOR

**De Aar, Northern Cape Province**

May 2022

**CLIENT**



**Prepared by:**

**The Biodiversity Company**

Cell: +27 81 319 1225

Fax: +27 86 527 1965

[info@thebiodiversitycompany.com](mailto:info@thebiodiversitycompany.com)

[www.thebiodiversitycompany.com](http://www.thebiodiversitycompany.com)



## Table of Contents

1	Introduction .....	1
1.1	Background.....	1
1.2	Specialist Details .....	3
1.3	Scope of Work .....	4
2	Key Legislative Requirements .....	4
3	Methods .....	5
3.1	Project Area .....	5
3.2	Desktop Assessment .....	7
3.2.1	Ecologically Important Landscape Features.....	7
3.2.2	Desktop Flora Assessment .....	8
3.2.3	Desktop Faunal Assessment .....	8
3.3	Biodiversity Field Assessment .....	9
3.3.1	Flora Survey .....	9
3.3.2	Fauna Survey .....	9
3.4	Terrestrial Site Ecological Importance.....	10
4	Assumptions and Limitations .....	12
5	Results & Discussion.....	12
5.1	Desktop Assessment .....	12
5.1.1	Ecologically Important Landscape Features.....	12
5.1.2	Flora Assessment .....	17
5.1.3	Faunal Assessment .....	20
5.2	Field Assessment.....	23
5.2.1	Flora Assessment .....	23
5.2.2	Faunal Assessment .....	26
6	Habitat Assessment and Site Ecological Importance.....	31
6.1	Habitat Assessment.....	31
6.1.1	Lowland Degraded Northern Upper Karoo Shrubland .....	34
6.1.2	Plateau Besemkaree Koppies Shrubland.....	34
6.1.3	Rocky Outcrops .....	35
6.1.4	Drainage features and washes (Alluvial Shrubland).....	36

6.2	Site Ecological Importance.....	38
7	Impact Risk Assessment .....	43
7.1	Biodiversity Risk Assessment .....	43
7.1.1	Present Impacts to Biodiversity .....	43
7.1.2	Terrestrial Impact Assessment.....	43
7.1.3	Loss of Irreplaceable Resources.....	44
7.1.4	Anticipated Impacts.....	44
7.1.5	Unplanned Events .....	45
7.1.6	Identification of Additional Potential Impacts .....	45
7.1.7	Biodiversity Management Plan.....	58
8	Conclusion and Impact Statement.....	64
8.1	Terrestrial Ecology.....	64
8.2	Recommendations.....	65
8.3	Impact Statement.....	65
9	References.....	66
10	Appendix Items.....	68
10.1	Appendix A – Flora species expected to occur in the project area. ....	68
10.2	Appendix B – Amphibian species expected to occur in the project area.....	77
10.3	Appendix C – Reptile species expected to occur in the project area .....	78
10.4	Appendix D – Mammal species expected to occur within the project area .....	79
10.5	Appendix E -Avifauna Species expected to occur within the project area.....	81

## List of Tables

Table 3-1	A list of key legislative requirements relevant to biodiversity and conservation in the Northern Cape Province.....	4
Table 4-1	Summary of Conservation Importance (CI) criteria .....	10
Table 4-2	Summary of Functional Integrity (FI) criteria .....	10
Table 4-3	Matrix used to derive Biodiversity Importance (BI) from Functional Integrity (FI) and Conservation Importance (CI) .....	11
Table 4-4	Summary of Resource Resilience (RR) criteria .....	11
Table 4-5	Matrix used to derive Site Ecological Importance from Receptor Resilience (RR) and Biodiversity Importance (BI) .....	11
Table 4-6	Guidelines for interpreting Site Ecological Importance in the context of the proposed development activities .....	12
Table 6-1	Summary of relevance of the proposed project to ecologically important landscape features.....	12
Table 6-2	Threatened flora species that may occur within the project area. ....	20
Table 6-3	Threatened amphibian species that are expected to occur within the project area .....	20
Table 6-4	Threatened mammal species that are expected to occur within the project area. ....	21
Table 6-5	Threatened avifauna species that are expected to occur within the project area .....	22
Table 6-6	Summary of herpetofauna species recorded within the project area. ....	27
Table 6-7	Summary of mammal species recorded within the project area .....	27
Table 6-8	A list of avifaunal species recorded for the project area .....	29
Table 7-1	Summary of habitat types delineated within the project area.....	31
Table 7-2	SEI Summary of habitat types delineated within field assessment area of project area .....	40
Table 7-3	Guidelines for interpreting Site Ecological Importance in the context of the proposed development activities .....	40
Table 8-1	Anticipated impacts for the proposed activities on terrestrial biodiversity .....	44
Table 8-2	Summary of unplanned events for terrestrial biodiversity .....	45
Table 8-3	Impacts to biodiversity associated with the proposed construction phase. ....	47
Table 8-4	Impacts to biodiversity associated with the proposed construction phase. ....	48
Table 8-5	Impacts to biodiversity associated with the proposed construction phase. ....	49

Table 8-6	Impacts to biodiversity associated with the proposed construction phase. ....	50
Table 8-7	Impacts to biodiversity associated with the proposed operational phase.....	52
Table 8-8	Impacts to biodiversity associated with the proposed operational phase.....	53
Table 8-9	Impacts to biodiversity associated with the proposed operational phase.....	54
Table 8-10	Impacts to biodiversity associated with the proposed operational phase.....	55
Table 8-11	Cumulative Impacts to biodiversity associated with the proposed project.....	57
Table 8-12	Mitigation measures including requirements for timeframes, roles and responsibilities for the terrestrial study .....	59

### List of Figures

Figure 1-1	Proposed location of the project area in relation to the nearby towns.....	2
Figure 3-1	Map illustrating the location of the proposed project area .....	6
Figure 3-2	Map illustrating extent of area used to obtain the expected flora species list from the Plants of South Africa (POSA) database. Red icon indicates approximate location of the project area. The red squares are cluster markers of botanical records as per POSA data. ....	8
Figure 5-1	Map illustrating the ecosystem threat status associated with the project area.	13
Figure 5-2	Map illustrating the ecosystem protection level associated with the project area .....	14
Figure 5-3	NPAES focus area .....	15
Figure 5-4	Map illustrating the locations of CBAs in the project area.....	16
Figure 5-5	Map illustrating the locations of IBAs in the project area .....	17
Figure 5-6	Map illustrating the vegetation type associated with the project area .....	18
Figure 5-7	Photographs illustrating some of the flora recorded within the assessment area. Clockwise from the top left. Geigeria filifolia, Ammocharis coranica (Protected), Chrysocoma ciliate, Salsola calluna (Endemic).....	25
Figure 5-8	Karoo Girdled Lizard ( <i>Karusasaurus polyzonus</i> ) .....	27
Figure 5-9	Springbuck observed in the project area. ....	28
Figure 5-10	Steenbok observed in the project area.....	28
Figure 5-11	Ground Squirrel observed in the project area.....	29
Figure 5-12	Blue Cranes recorded on site.....	30
Figure 6-1	Habitats identified in the project area. ....	32
Figure 6-2:	Habitats identified in the project area .....	33

---

Figure 6-3	Lowland Degraded Northern Upper Karoo Shrubland, with temporary pool. ..	34
Figure 6-4	Plateau Besemkaree Koppies Shrubland.....	35
Figure 6-5	Rocky Outcrops/Ridges .....	36
Figure 6-6	Stream/drainage feature. ....	37
Figure 6-7	Washes (Alluvial shrubland).....	38
Figure 6-8	Terrestrial Biodiversity Theme Sensitivity, National Web based Environmental Screening Tool.....	39
Figure 6-9	Project Area SEI .....	41
Figure 6-10	Project Area SEI .....	42

## 1 Introduction

### 1.1 Background

The Biodiversity Company was appointed to undertake a fauna and flora baseline and impact assessment for the project consisting of Overhead transmission line (OHL) to connect to the authorised Castle Wind Energy Facility (WEF) to the existing Hydra Main Transmission Substation (MTS), on farms near De Aar in the Northern Cape. The proposed transmission line would consist of a 132kV to 400kV (single or double circuit) OHL. Associated infrastructure will include permanent access/service tracks (where no existing roads exist) as well as temporary laydown areas and site camps that will be rehabilitated after construction (Figure 1-1).

The Proponent obtained Environmental Authorisation (EA) for the construction of the proposed Castle WEF and associated infrastructure, near De Aar (DEA ref: 14/12/16/3/3/2/278) on 8 May 2015. Subsequently the EA has been amended several times to account for changes to the proposed project's scope. Moreover, an EA for a proposed OHL from Castle to the Hydra MTS was obtained by the proponent (DEA ref: 14/12/16/3/3/1/1351), on 5 October 2018. During the several years ensuing these EAs the number of Renewable Energy (RE) developments and associated infrastructure such as transmission lines planned for around the town of De Aar (specifically the Hydra MTS) has increased significantly. This can mainly be attributed to two factors, the availability of RE resources and ability of RE developments to feed into the national grid at the Hydra MTS. The congestion of RE infrastructure has subsequently led to the OHL authorised (DEA ref: 14/12/16/3/3/1/1351) to evacuate electricity generated from the Castle WEF to become unfeasible. Consequently, the Proponent has identified a feasible alternative OHL route to connect the Castle WEF to the Hydra MTS. The new alternative includes in part a new OHL (Section A) and in part the upgrading of an existing OHL (Section B) as well as a small section that could potentially feed into the planned (authorised but not built) De Aar South WEF substation.

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 OHL corridor as "Very High".

The purpose of the specialist studies is to provide relevant input into the basic assessment 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.

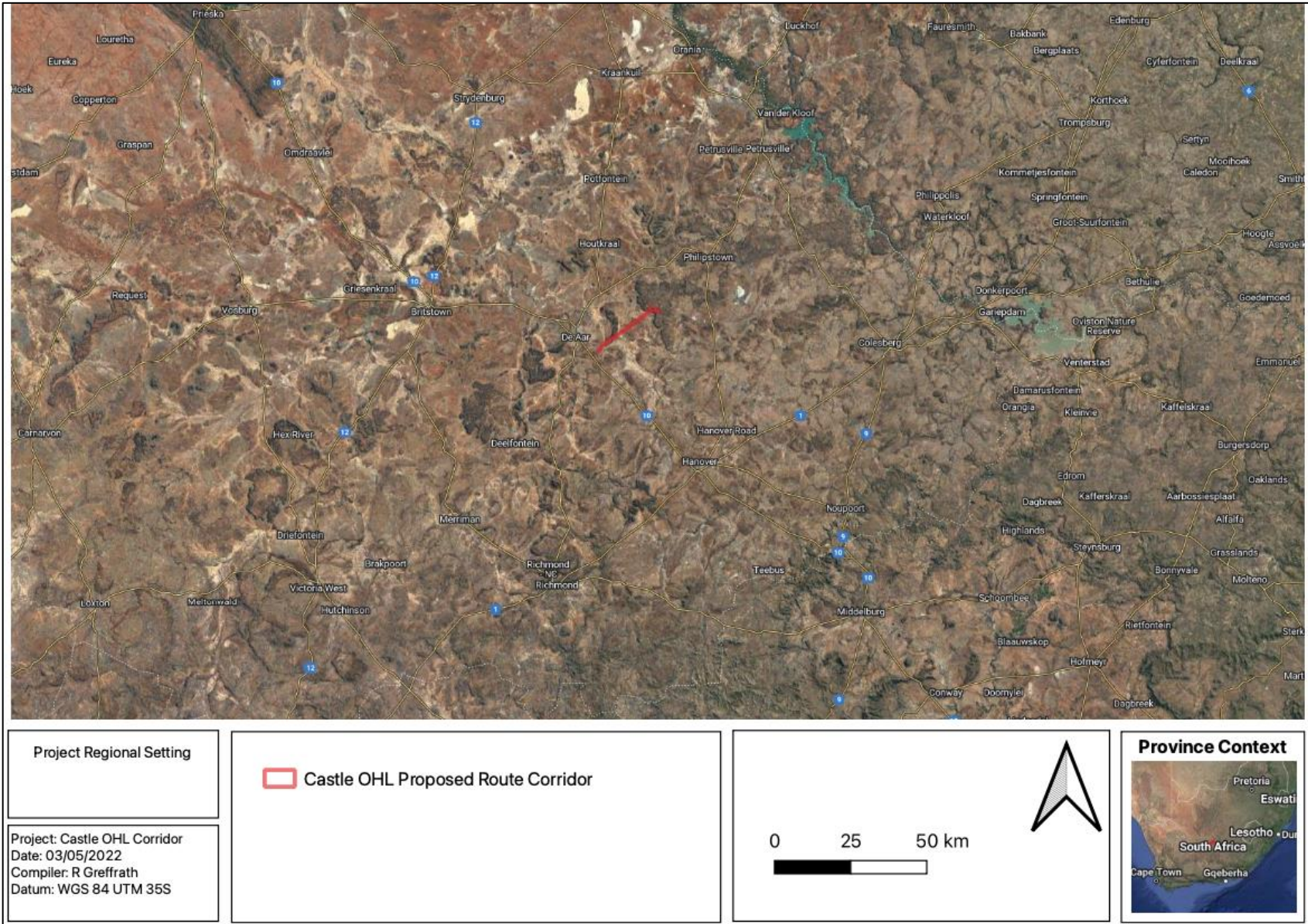





Figure 1-1 Proposed location of the project area in relation to the nearby towns.



**1.2 Specialist Details**

Report Name	<b>THE TERRESTRIAL ECOLOGY BASELINE &amp; IMPACT ASSESSMENTS FOR THE PROPOSED CASTLE OHL CORRIDOR</b>
Reference	<b>Castle OHL Corridor</b>
Submitted to	
Report Writer	<p><b>Rudolph Greffrath</b> </p> <p>Rudolph is a terrestrial ecology specialist with 14 years of experience in biodiversity baseline assessments, biodiversity action planning design and development, biodiversity off-set design and implementation, biodiversity strategy design, conservation management planning and implementation, IFC performance standards best practice, ecological restoration, ecosystems services and environmental impact assessments, across Africa. He is Pr Sci Nat registered (400018/17) in the following fields of practice, Conservation Science.</p>
Reviewer and Wetland Report Writer	<p><b>Andrew Husted</b> </p> <p>Andrew Husted is Pr Sci Nat registered (400213/11) in the following fields of practice: Ecological Science, Environmental Science and Aquatic Science. Andrew is an Aquatic, Wetland and Biodiversity Specialist with more than 12 years' experience in the environmental consulting field. Andrew has completed numerous wetland training courses, and is an accredited wetland practitioner, recognised by the DWS, and also the Mondi Wetlands programme as a competent wetland consultant.</p>
Declaration	<p>The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.</p>

### 1.3 Scope of Work

The principle aim of the assessment was to provide information to guide the risk of the proposed activity to the flora and fauna communities of the associated ecosystems within the project area/corridor. This was achieved through the following:

- Desktop assessment to identify the relevant ecologically important geographical features within the project area;
- Desktop assessment to compile an expected species list and possible threatened flora and fauna species that occur within the project area;
- Desktop assessment to determine the slope percentage and potential soil forms present;
- Field survey to ascertain the species composition of the present flora and fauna community within the project area;
- Delineate and map the habitats and their respective sensitivities that occur within the project area;
- Identify the manner that the proposed project impacts the flora and fauna community and evaluate the level of risk of these potential impacts; and
- The prescription of mitigation measures and recommendations for identified risks.

## 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
<b>International</b>	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)
<b>National</b>	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)
	National Biodiversity Framework (NBF, 2009)
National Forest Act (Act No. 84 of 1998)	

---

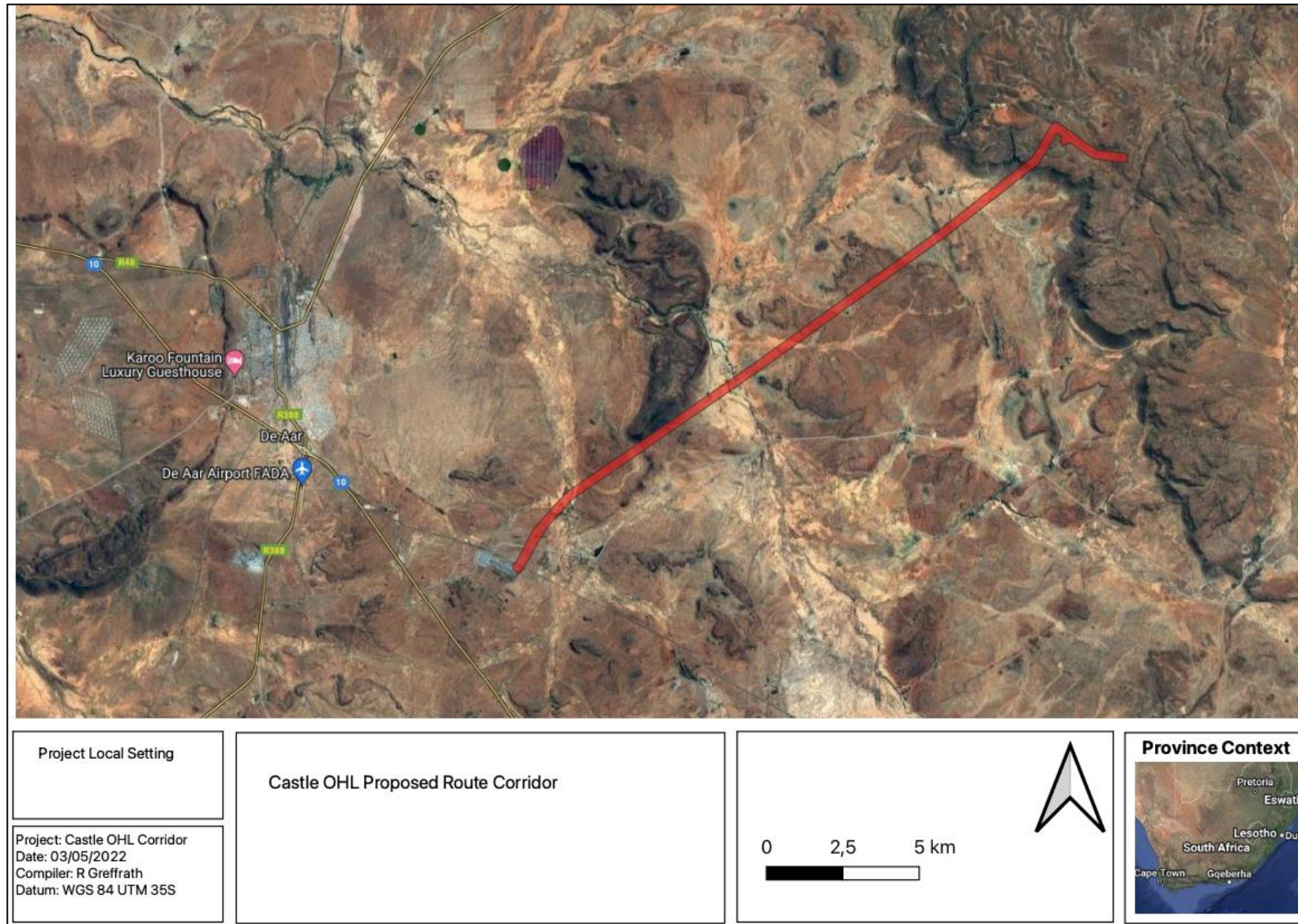
	National Veld and Forest Fire Act (101 of 1998)
	National Water Act (NWA) (Act No. 36 of 1998)
	National Spatial Biodiversity Assessment (NSBA)
	World Heritage Convention Act (Act No. 49 of 1999)
	Municipal Systems Act (Act No. 32 of 2000)
	Alien and Invasive Species Regulations and, Alien and Invasive 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
<b>Provincial</b>	Northern Cape Planning and Development Act no. 7 of 1998
	Northern Cape Nature Conservation act no. 9 of 2009

---

### 3 Methods

#### 3.1 Project Area

The authorised Castle OHL Corridor east of De Aar, Northern Cape. Presently, the project area is surrounded by natural land and is adjacent to a secondary road (Figure 3-1).



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

### 3.2 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.

#### 3.2.1 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, 2020)* – 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, 2016)* – 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 Biodiversity Sector Plan
- 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

## Castle OHL Corridor

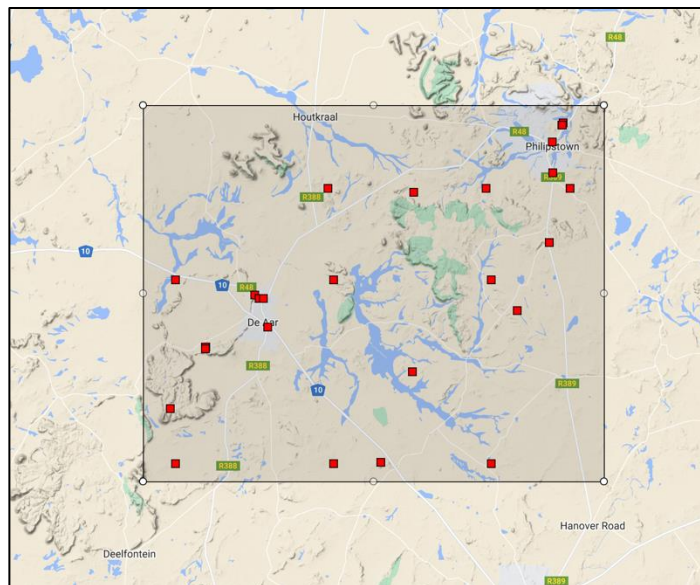
process, and covering terrestrial and inland aquatic realms), their condition, current Protected Areas and Conservation Areas, and opportunities and constraints for effective conservation were collated.

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, 2017) – 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.

### 3.2.2 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 3-2). 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, 331 species are listed as being expected.



**Figure 3-2** *Map illustrating extent of area used to obtain the expected flora species list from the Plants of South Africa (POSA) database. Red icon indicates approximate location of the project area. The red squares are cluster markers of botanical records as per POSA data.*

### 3.2.3 Desktop Faunal Assessment

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

- Amphibian list, generated from the IUCN spatial dataset (2017) and ReptileMap database (Fitzpatrick Institute of African Ornithology, 2021a), using the 2917 quarter degree square;
- Reptile list, generated from the IUCN spatial dataset (2017) and AmphibianMap database (Fitzpatrick Institute of African Ornithology, 2021b), using the 2917 quarter degree square;

- Avifauna list, generated for the SABAP2 dataset by looking at pentads 3035\_2400; 3040\_2400; 3040\_2405; 3035\_2410; 3040\_2410; 3035\_2415; 3040\_2415; and
- Mammal list from the IUCN spatial dataset (2017).

### 3.3 Biodiversity Field Assessment

A single field survey was undertaken in May 2022, which is a dry-season survey, to determine the presence of Species of Conservation Concern (SCC). Effort was made to cover all the different habitat types, within the limits of time and access.

#### 3.3.1 Flora Survey

The fieldwork and sample sites were 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 was 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 was placed on sensitive habitats, especially those overlapping with the proposed project area.

Homogenous vegetation units were subjectively identified using satellite imagery and existing land cover maps. The floristic diversity and search for flora SCC were conducted through timed meanders within representative habitat units delineated during the scoping fieldwork. Emphasis was 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 was 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 were 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.

#### 3.3.2 Fauna Survey

The faunal assessment within this report pertains to herpetofauna (amphibians and reptiles), avifauna and mammals. The faunal field survey comprised 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 included 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).

### 3.4 Terrestrial Site Ecological Importance

The different habitat types within the project area were delineated and identified based on observations during the field assessment, and available satellite imagery. These habitat types were 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 3-1 and Table 3-2, respectively.

**Table 3-1 Summary of Conservation Importance (CI) criteria**

Conservation Importance	Fulfilling Criteria
Very High	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).
High	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).
Medium	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.
Low	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.
Very Low	No confirmed and highly unlikely populations of SCC. No confirmed and highly unlikely populations of range-restricted species. No natural habitat remaining.

**Table 3-2 Summary of Functional Integrity (FI) criteria**

Functional Integrity	Fulfilling Criteria
Very High	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.
High	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.
Medium	Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types. 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 3-3.

**Table 3-3 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 3-4.

**Table 3-4 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 3-5.

**Table 3-5 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

Site Ecological Importance		Biodiversity Importance (BI)				
		Very high	High	Medium	Low	Very low
High	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 3-6.

**Table 3-6 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.

## 4 Assumptions and Limitations

The following assumptions and limitations are applicable for this assessment:

- The assessment area was based on the area provided by the client and any alterations to the route and/or missing GIS information pertaining to the assessment area would have affected the area surveyed;
- The area was only surveyed during a single season site visit and therefore, this assessment does not consider temporal trends;
- Whilst every effort is made to cover as much of the site as possible, representative sampling is completed and by its nature, it is possible that some plant and animal species that are present on site were not recorded during the field investigations; and
- The GPS used in the assessment has an accuracy of 5 m and consequently any spatial features may be offset by 5 m.

## 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.**

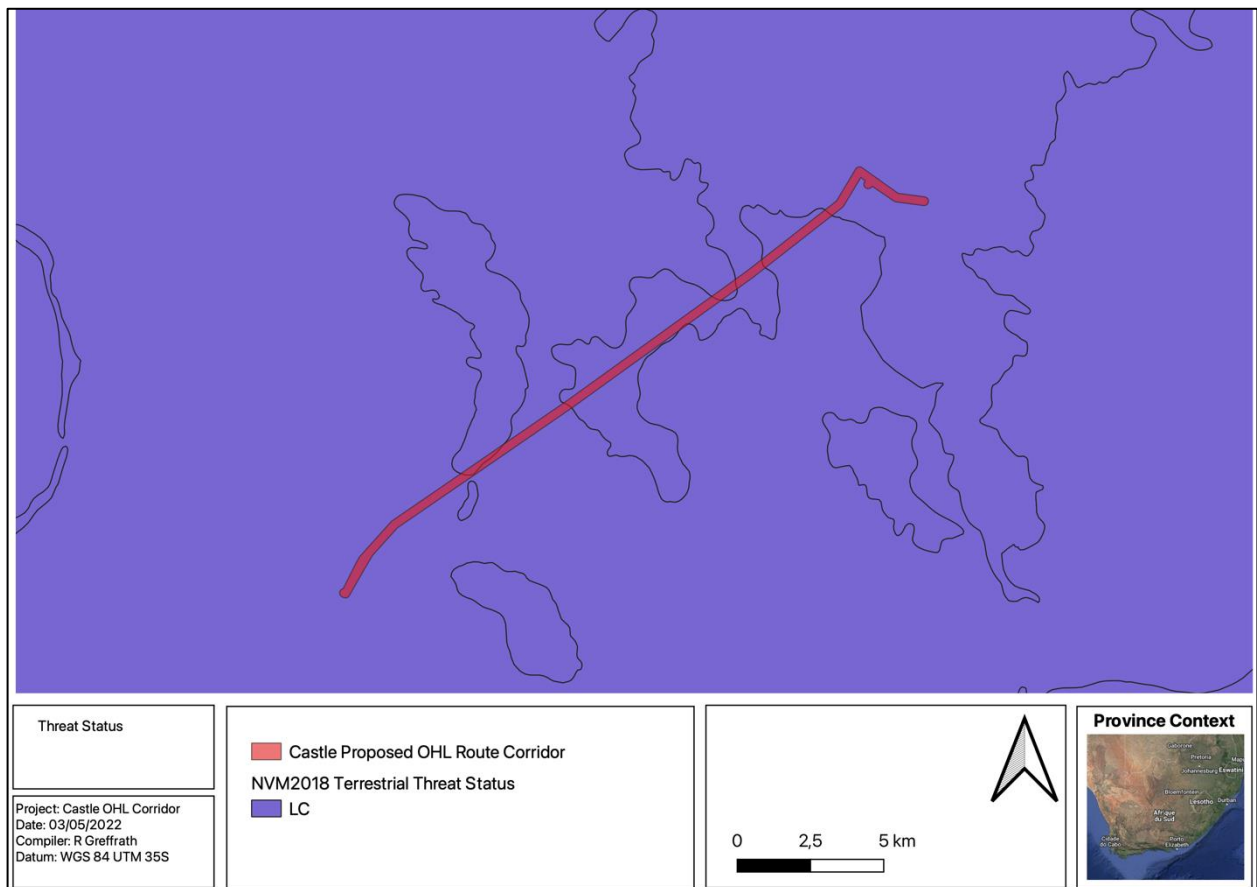
Desktop Information Considered	Relevant/Irrelevant	Section
--------------------------------	---------------------	---------

Castle OHL Corridor

Ecosystem Threat Status	Relevant – Overlaps with a Least Concern ecosystem	5.1.1.1
Ecosystem Protection Level	Relevant – Overlaps with a Not Protected and Partially Ecosystems	5.1.1.2
Protected Areas	Irrelevant – 35km from the closest Protected Area	-
Renewable Energy Development Zones	Irrelevant – The project area falls within the Springbok Wind REDZ	-
Powerline Corridor	Relevant – The project area falls within the Central corridor	-
National Protected Areas Expansion Strategy	Relevant – The northern project area overlaps with Senqu NPAES area	5.1.1.3
Critical Biodiversity Area	Relevant – The project area overlaps with a CBA1, CBA2 and Ecological Support area.	5.1.1.4
Succulent Karoo Ecosystem Programme	Irrelevant – The project area overlaps with no areas	-
Important Bird and Biodiversity Areas	Relevant – Located within the Platberg-Karoo Conservancy IBA	5.1.1.5

**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).

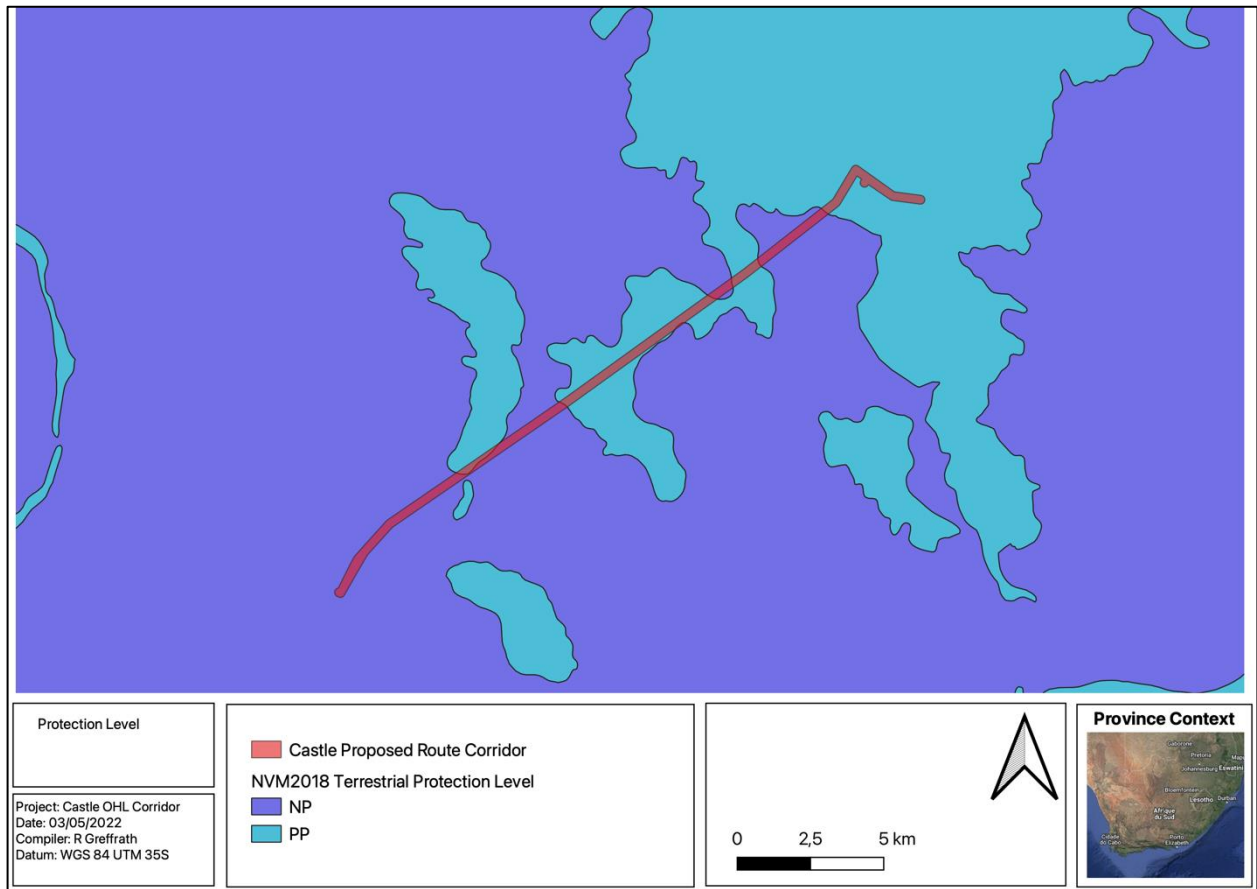


**Figure 5-1** Map illustrating the ecosystem threat status associated with the project area.

**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

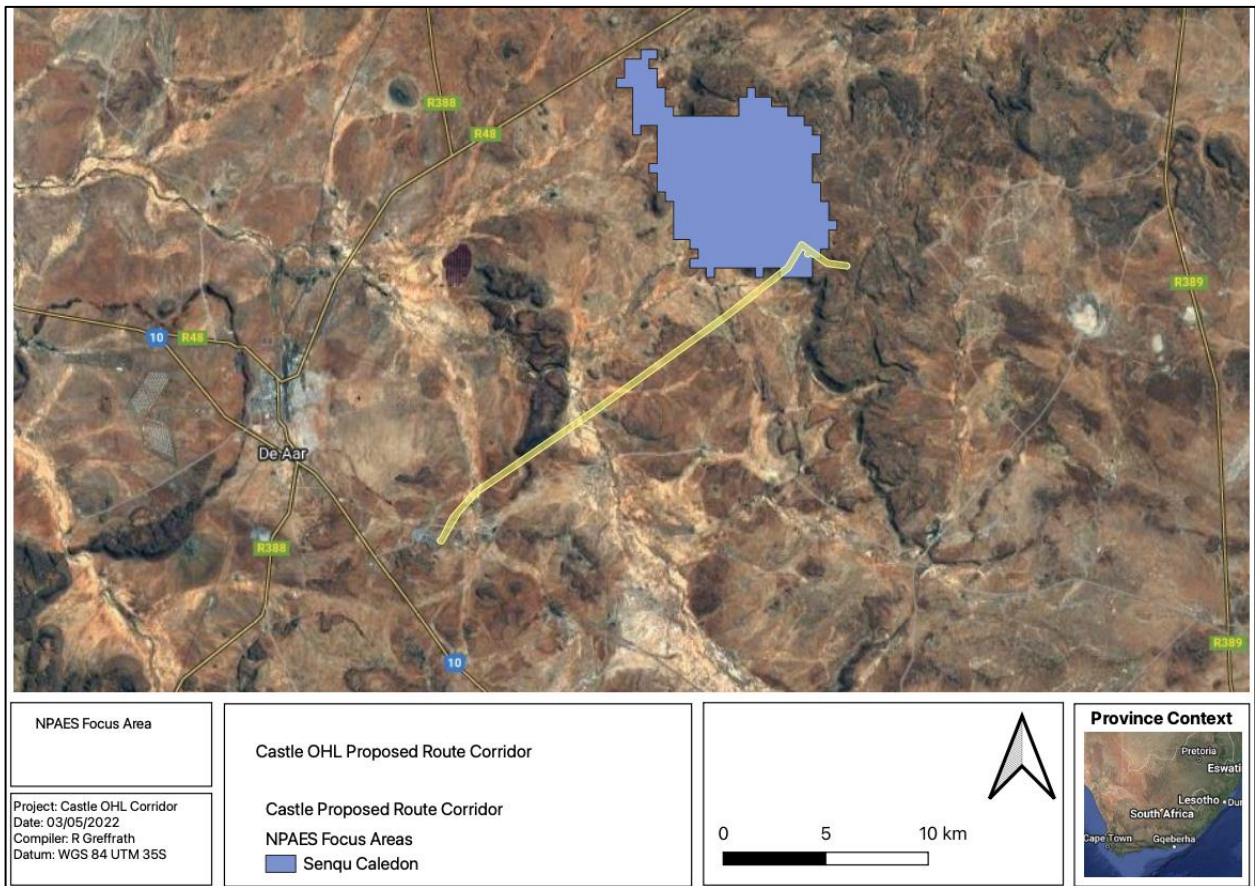
is included within one or more protected areas. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems. The proposed project overlaps with PP and NP ecosystems (Figure 5-2).



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

### 5.1.1.3 National Protected Area Expansion Strategy (NPAES)

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 fine scale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities (NPAES, 2010). The project area's northern section overlaps with the Senqu NPAES area as can be seen below.



**Figure 5-3 NPAES focus area**

**5.1.1.4 Critical Biodiversity Areas and Ecological Support Areas**

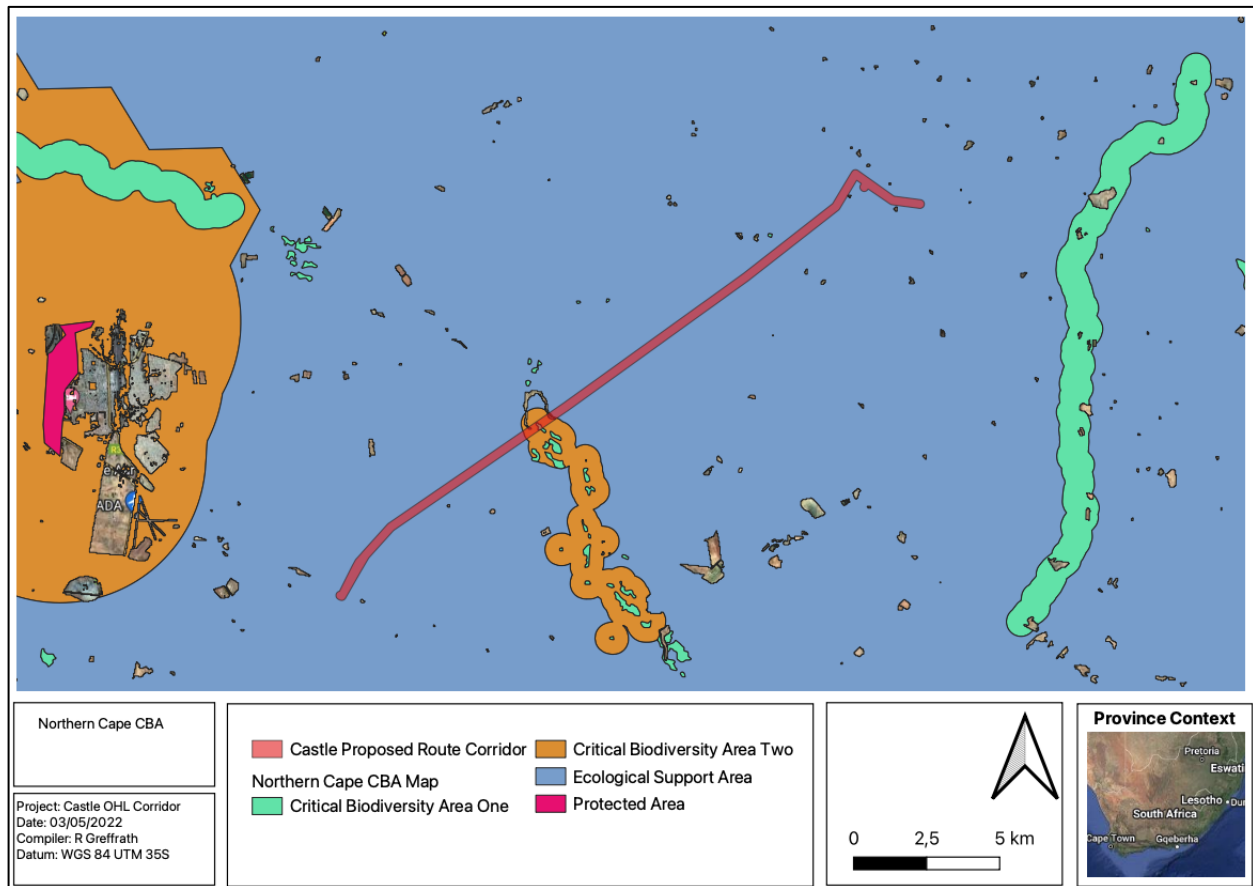
The key output of a systematic biodiversity plan is a map of biodiversity priority areas. The CBA map delineates Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs), Other Natural Areas (ONAs), Protected Areas (PAs), and areas that have been irreversibly modified from their natural state.

**CBAs** are terrestrial and aquatic areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. CBAs are areas of high biodiversity value and need to be kept in a natural state, with no further loss of habitat or species. Thus, if these areas are not maintained in a natural or near natural state then biodiversity targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses (SANBI-BGIS, 2017).

**ESAs** are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services. Critical Biodiversity Areas and Ecological Support Areas may be terrestrial or aquatic (SANBI-BGIS, 2017).

**ONAs** consist of all those areas in good or fair ecological condition that fall outside the protected area network and have not been identified as CBAs or ESAs. A biodiversity sector plan or bioregional plan must not specify the desired state/management objectives for ONAs or provide land-use guidelines for ONAs (SANBI-BGIS, 2017).

Figure 5-4 shows the project area superimposed on the Terrestrial CBA map. The project area overlaps with a CBA1 area.



**Figure 5-4** Map illustrating the locations of CBAs in the project area

### 5.1.1.5 Important Bird & Biodiversity Areas

Important Bird & Biodiversity Areas (IBAs) are the sites of international significance for the conservation of the world's birds and other conservation significant species as identified by BirdLife International. These sites are also all Key Biodiversity Areas; sites that contribute significantly to the global persistence of biodiversity (Birdlife, 2017).

According to Birdlife International (2017), the selection of IBAs is achieved through the application of quantitative ornithological criteria, grounded in up-to-date knowledge of the sizes and trends of bird populations. The criteria ensure that the sites selected as IBAs have true significance for the international conservation of bird populations and provide a common currency that all IBAs adhere to, thus creating consistency among, and enabling comparability between, sites at national, continental and global levels. Figure 5-5 shows the project area overlaps with the Platberg-Karoo Conservancy IBA.

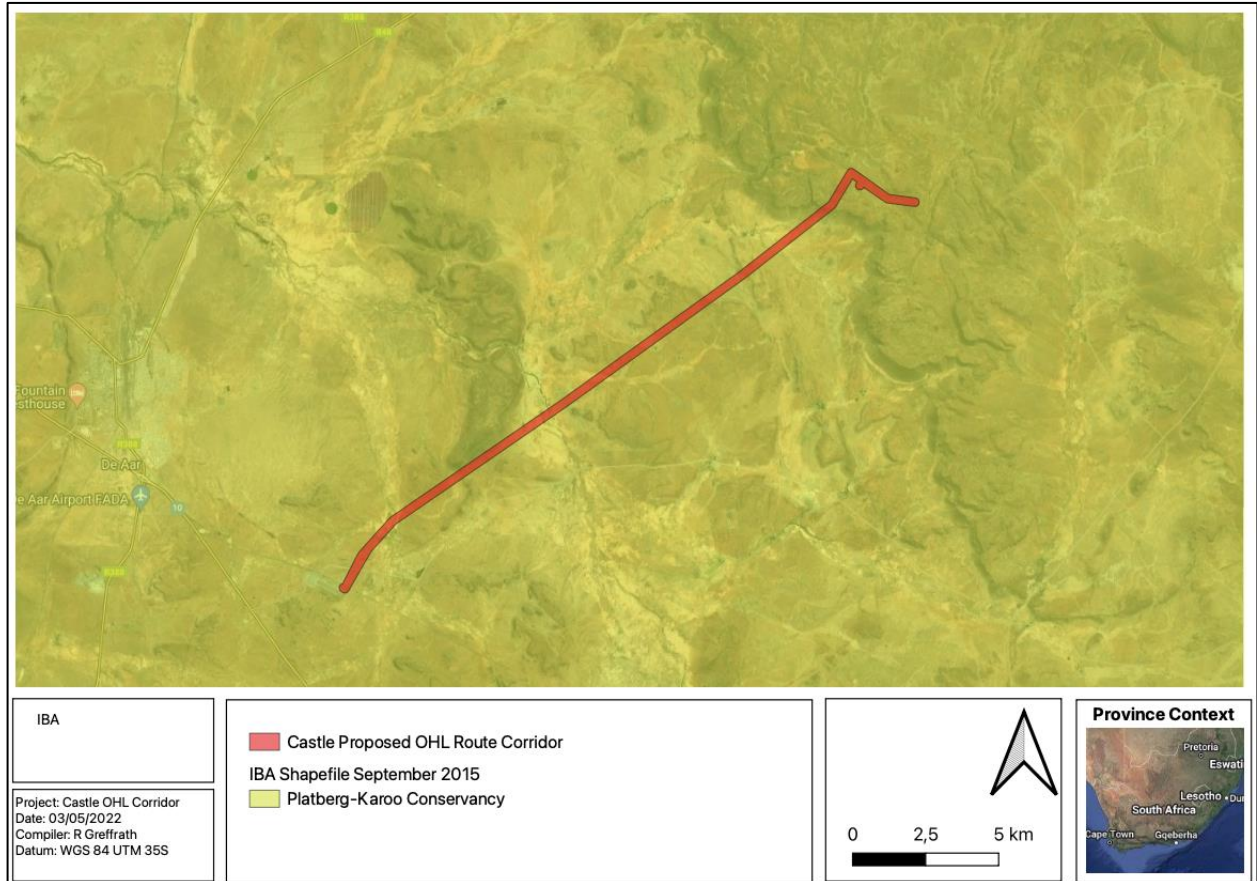
Platberg–Karoo Conservancy IBA can be found in the districts of De Aar, Philipstown and Hanover. This IBA falls across two biomes, the Nama Karroo and the Grassland Biome, which contributes to its diversity of species. In total 289 bird species have been recorded here. Threats in this IBA include overgrazing, erosion and encroachment by Karoo shrubs, all of which result in the loss of habitat and a decrease in available food for large terrestrial birds.

Large terrestrial birds and raptors found here includes: Blue Crane (*Anthropoides paradiseus*), Ludwig's Bustard (*Neotis ludwigii*), Kori Bustard (*Ardeotis kori*), Blue Korhaan (*Eupodotis caerulescens*), Black Stork (*Ciconia nigra*), Secretarybird (*Sagittarius serpentarius*), Martial Eagle (*Polemaetus bellicosus*), Verreaux's Eagle (*Aquila verreauxii*) and Tawny Eagle (*A. rapax*).

Biome-restricted species found here include Karoo Lark (*Calendulauda albescens*), Karoo Long-billed Lark (*Certhilauda subcoronata*), Karoo Chat (*Cercomela schlegelii*), Tractrac Chat (*C. tractrac*), Sickle-winged Chat (*C. sinuata*), Namaqua Warbler (*Phragmacia substriata*), Layard's Tit-Babbler (*Sylvia layardi*), Pale-

winged Starling (*Onychognathus nabouroup*) and Black-headed (*Canary Serinus alario*). Two congregatory species found here are the Lesser Kestrel and the Amur Falcon.

Other biodiversity species of importance found here include Aardwolf (*Proteles cristatus*), Aardvark (*Orycteropus afer*), Bat-eared Fox (*Otocyon megalotis*) and Black-footed Cat (*Felis nigripes*) (Vulnerable) (Birdlife, 2015).



**Figure 5-5** Map illustrating the locations of IBAs in 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

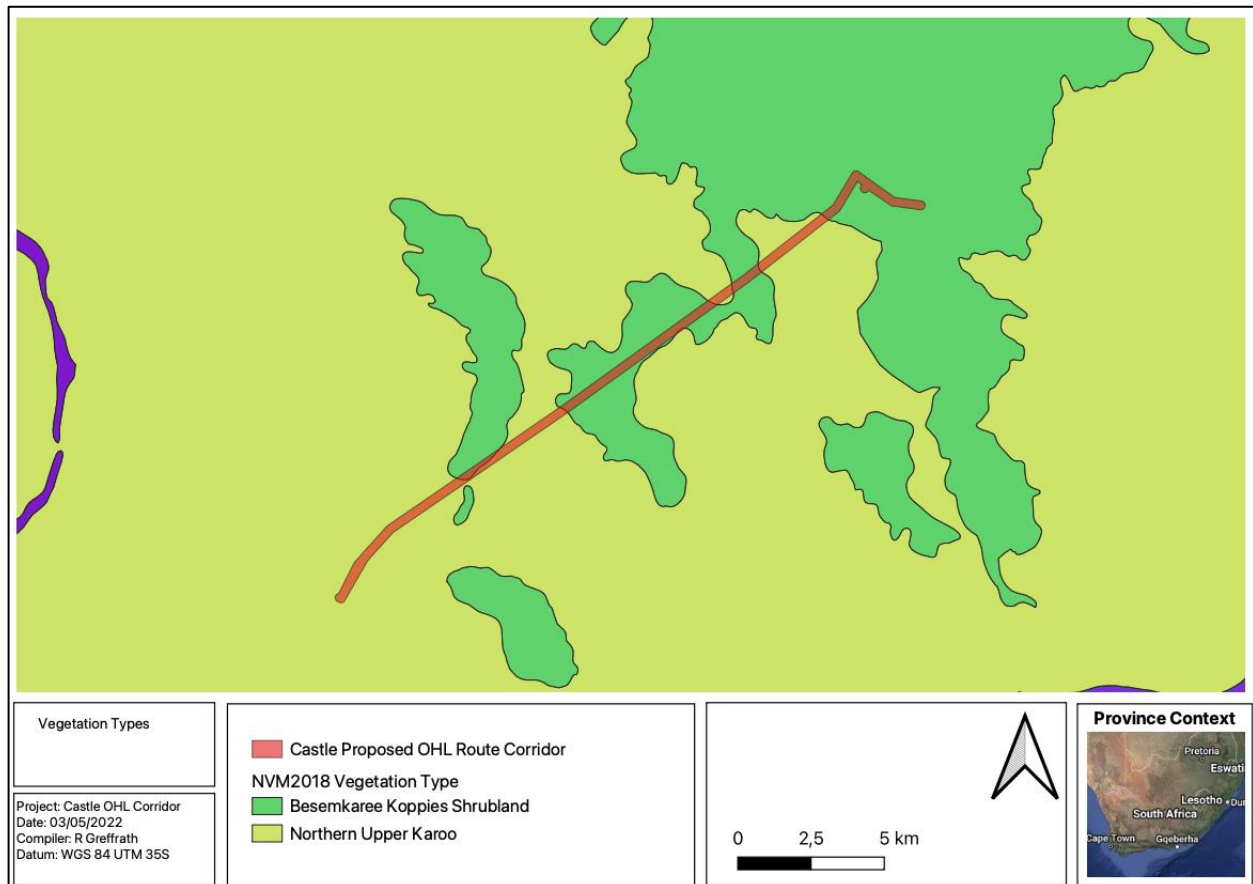
The project area is situated within the Nama Karoo biome.

#### **Nama Karoo 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 one vegetation type: Northern Upper Karoo (Figure 5-6).



**Figure 5-6** Map illustrating the vegetation type associated with the project area

#### 5.1.2.1.1 Northern Upper Karoo

This vegetation type is found in the Northern Cape, Eastern Cape and Western Cape Provinces. This vegetation type consists of alluvial shrubland dominated by dwarf microphyllous shrubs, with 'white' grasses of the genera *Aristida* and *Eragrostis* (Mucina & Rutherford, 2006).

#### Important Plant 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:

**Tall Shrubs:** *Lycium cinereum* (d), *L. horridum*, *L. oxycarpum*. **Low Shrubs:** *Chrysocoma ciliata* (d), *Eriocephalus ericoides* subsp. *ericoides* (d), *E. spinescens* (d), *Pentzia globosa* (d), *P. incana* (d), *Phymaspermum parvifolium* (d), *Salsola calluna* (d), *Aptosimum procumbens*, *Felicia muricata*, *Gnidia polycephala*, *Helichrysum dregeanum*, *H. lucilioides*, *Limeum aethiopicum*, *Nenax microphylla*, *Osteospermum leptolobum*, *Plinthus karooicus*, *Pteronia glauca*, *Rosenia humilis*, *Selago geniculata*, *S. saxatilis*.

**Succulent Shrubs:** *Euphorbia hypogaea*, *Ruschia intricata*.

**Herbs:** *Indigofera alternans*, *Pelargonium minimum*, *Tribulus terrestris*.

**Geophytic Herbs:** *Moraea pallida* (d), *Moraea polystachya*, *Syringodea bifucata*, *S. concolor*.

**Succulent Herbs:** *Psilocaulon coriarium*, *Tridentea jucunda*, *T. virescens*.



**Graminoids:** *Aristida congesta* (d), *A. diffusa* (d), *Cynodon incompletus* (d), *Eragrostis bergiana* (d), *E. bicolor* (d), *E. lehmanniana* (d), *E. obtusa* (d), *Sporobolus fimbriatus* (d), *Stipagrostis ciliata* (d), *Tragus koelerioides* (d), *Aristida adscensionis*, *Chloris virgata*, *Cyperus usitatus*, *Digitaria eriantha*, *Enneapogon desvauxii*, *E. scoparius*, *Eragrostis curvula*, *Fingerhuthia africana*, *Heteropogon contortus*, *Sporobolus ludwigii*, *S. tenellus*, *Stipagrostis obtusa*, *Themeda triandra*, *Tragus berteronianus*.

#### Endemic Taxa

**Succulent Shrubs:** *Chasmatophyllum rouxii*, *Hertia cluytiifolia*, *Rabiea albinota*, *Salsola tetrandra*.

**Tall Shrub:** *Phymaspermum scoparium*.

**Low Shrubs:** *Aspalathus acicularis* subsp. *planifolia*, *Selago persimilis*, *S. walpersii*.

#### Conservation Status of the Vegetation Type

The vegetation type is listed as Least Threatened (SANBI, 2018). Conservation Target 21%. Statutorily conserved in Mountain Zebra and Karoo National Parks as well as in Oviston, Commando Drift, Rolfontein and Gariiep Dam Nature Reserves. About 2% of the unit has been transformed, largely due to building of dams (Gariiep, Grassridge, Killowen, Kommandodrift, Kriegerspoort, Lake Arthur, Modderpoort, Schuil Hoek, Vanderkloof, Victoria West, Wonderboom and Zoetvlei).

#### 5.1.2.1.2 Besemkaree Koppies Shrubland

This vegetation type occurs in the Northern Cape, Free State and Eastern Cape Provinces, more specifically on plains of Eastern Upper Karoo (between Richmond and Middelburg in the south and the Orange River) and within dry grasslands of the southern and central Free State. Extensive dolerite-dominated landscapes along the upper Orange River belong to this unit as well. Extends northwards to around Fauresmith in the northwest and to the Wepener District in the northeast. Altitude 1 120–1 680 m.

#### Important Plant taxa

**Small Trees:** *Cussonia paniculata*, *Ziziphus mucronata*. **Tall Shrubs:** *Diospyros austro-africana* (d), *Euclea crispa* subsp. *ovata* (d), *Olea europaea* subsp. *africana* (d), *Rhus burchellii* (d), *R. ciliata* (d), *R. erosa* (d), *Buddleja saligna*, *Diospyros lycioides* subsp. *lycioides*, *Ehretia rigida*, *Grewia occidentalis*, *Gymnosporia polyacantha*, *Tarchonanthus minor*.

**Low Shrubs:** *Asparagus suaveolens* (d), *Chrysocoma ciliata* (d), *Amphiglossa triflora*, *Aptosimum elongatum*, *Asparagus striatus*, *Diospyros pallens*, *Eriocephalus ericoides*, *E. spinescens*, *Euryops empetrifolius*, *Felicia filifolia* subsp. *filifolia*, *F. muricata*, *Helichrysum dregeanum*, *H. lucilioides*, *Hermannia multiflora*, *H. vestita*, *Lantana rugosa*, *Limeum aethiopicum*, *Lycium cinereum*, *Melolobium candicans*, *M. microphyllum*, *Nenax microphylla*, *Pegolettia retro-fracta*, *Pentzia globosa*, *Rhigozum obovatum*, *Selago saxatilis*, *Stachys linearis*, *S. rugosa*, *Sutera halimifolia*, *Wahlenbergia albens*.

**Succulent Shrubs:** *Aloe broomii*, *Chasmatophyllum musculinum*, *C. verdoorniae*, *Cotyledon orbiculata* var. *dactyloopsis*, *Pachypodium succulentum*.

**Graminoids:** *Aristida adscensionis* (d), *A. congesta* (d), *A. diffusa* (d), *Cenchrus ciliaris* (d), *Cymbopogon caesius* (d), *Cynodon incompletus* (d), *Digitaria eriantha* (d), *Eragrostis curvula* (d), *E. lehmanniana* (d), *Heteropogon contortus* (d), *Setaria lindenberiana* (d), *Themeda triandra* (d), *Tragus koelerioides* (d), *Cymbopogon pospischilii*, *Enneapogon scoparius*, *Eragrostis chloromelas*, *E. obtusa*, *Eustachys paspaloides*, *Fingerhuthia africana*, *Hyparrhenia hirta*, *Sporobolus fimbriatus*.

**Herbs:** *Convolvulus sagittatus*, *Dianthus caespitosus* subsp. *caespitosus*, *Gazania krebsiana* subsp. *krebsiana*, *Hibiscus pusillus*, *Indigofera alternans*, *I. rhytidocarpa*, *Lepidium africanum* subsp. *africanum*, *Pollichia campestris*.

**Herbaceous Climber:** *Argyrolobium lanceolatum*.

**Geophytic Herbs:** *Albuca setosa*, *Asplenium cordatum*, *Cheilanthes bergiana*, *C. eckloniana*, *Freesia andersoniae*, *Haemanthus humilis* subsp. *humilis*, *Oxalis depressa*, *Pellaea calomelanos*. **Succulent Herbs:** *Aloe grandidentata*, *Crassula nudicaulis*, *Duvalia caespitosa*, *Euphorbia pulvinata*, *Huernia piersii*, *Stapelia grandiflora*, *S. olivacea*, *Tridentea gemmiflora*.

**Endemic Taxa Small Tree:** *Cussonia* sp. nov. (P.J. du Preez 3666 BLFU). **Succulent Shrubs:** *Euphorbia crassipes*, *Neohenricia sibbettii*, *N. spiculata*.

### Conservation Status of the Vegetation Type

Least threatened because largely excluded from intensive agricultural activities. Target 28%. About 5% statutorily conserved in the Rolfontein, Tussen Die Riviere, Oviston, Gariep Dam, Caledon and Kalkfontein Dam Nature Reserves. In addition, a small patch is also protected in the private Vulture Conservation Area. About 3% of the area has been lost through building of dams (Bethulie, Egmont, Gariep, Kalkfontein, Vanderkloof and Welbedacht Dams). Erosion moderate (68%), high (20%) and low (10%).

#### 5.1.2.2 Expected Flora Species

The POSA database indicates that 217 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 (1) SCC based on their conservation status could be expected to occur within the project area and are provided in Table 5-2 below.

**Table 5-2 Threatened flora species that may occur within the project area.**

Family	Taxon	Author	IUCN	Ecology
Euphorbiaceae	<i>Euphorbia flanaganii</i>	N.E.Br.	VU	Indigenous; Endemic

*Euphorbia flanaganii* dwarf succulent plant with a swollen underground stem. The specie is known to occur in Coastal grasslands and low dune bush, mainly on sandstones, 40-800 m. Most of the known recordings for this species, are in a high density within the Kwa-Zulu Natal province, with sparse observations in the Eastern Cape. The like hood of occurrence is rated low as it is unlikely to occur so far out of its known range.

### 5.1.3 Faunal Assessment

#### 5.1.3.1 Amphibians

Based on the IUCN Red List Spatial Data and AmphibianMap, 13 amphibian species are expected to occur within the area (Appendix B). One (1) is regarded as threatened (Table 5-3).

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

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
<i>Pyxicephalus adspersus</i>	Giant Bullfrog	NT	LC	Low

#### 5.1.3.2 Reptiles

Based on the IUCN Red List Spatial Data and the ReptileMAP database, 35 reptile species are expected to occur within the area (Appendix C). None are regarded as threatened.

#### 5.1.3.3 Mammals

The IUCN Red List Spatial Data lists 58 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. Seven (7) of these expected species are regarded as threatened (Table 5-4), one 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	Moderate
<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>Poecilogale albinucha</i>	African Striped Weasel	NT	LC	Moderate

*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 sub-optimal for the species and the likelihood of occurrence is rated as moderate.

*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. Due to the presence of suitable habitat in the project area, the likelihood of occurrence for this species is rated as moderate.

*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 was rated as moderate.

*Poecilogale albinucha* (African Striped Weasel) is usually associated with savanna habitats, although it probably has a wider habitat tolerance (IUCN, 2017). Due to its secretive nature, it is often overlooked in many areas where it does occur. There is sufficient habitat for this species in the project area and the likelihood of occurrence of this species is therefore considered to be moderate.

### 5.1.3.4 Avifauna

The SABAP2 Data lists 174 avifauna species that could be expected to occur within the area (Appendix E). Fourteen (14) of these expected species are regarded as threatened (Table 5-5), the Blue Crane was confirmed to occur on site.

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

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
<i>Anthropoides paradisea</i>	Crane, Blue	NT	VU	Confirmed
<i>Anthus crenatus</i>	Pipit, African Rock	NT	NT	Moderate
<i>Aquila rapax</i>	Eagle, Tawny	EN	VU	Low-Moderate
<i>Aquila verreauxii</i>	Eagle, Verreaux's	VU	LC	Moderate
<i>Ardeotis kori</i>	Bustard, Kori	NT	NT	High
<i>Calidris ferruginea</i>	Sandpiper, Curlew	LC	NT	Low
<i>Ciconia nigra</i>	Stork, Black	VU	LC	Moderate
<i>Eupodotis caerulea</i>	Korhaan, Blue	LC	NT	High
<i>Eupodotis vigorsii</i>	Korhaan, Karoo	NT	LC	High
<i>Falco biarmicus</i>	Falcon, Lanner	VU	LC	Moderate
<i>Neotis ludwigii</i>	Bustard, Ludwig's	EN	EN	Confirmed
<i>Phoenicopterus roseus</i>	Flamingo, Greater	NT	LC	Low
<i>Polemaetus bellicosus</i>	Eagle, Martial	EN	EN	Moderate
<i>Sagittarius serpentarius</i>	Secretarybird	VU	EN	Moderate

*Anthropoides 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. The species was confirmed present within the area during the field survey.

*Anthus crenatus* (African Rock Pipit) is endemic to South Africa and Lesotho (IUCN, 2021). They are classed as near threatened after undergoing a decline in habitat of 34% in the last 10 years (IUCN, 2017). The species is associated with rocky habitats that has abundant shrub and grassy areas. The lack of suitable rocky areas decreases the likelihood of finding this species in the project area, however, can be found more to the west.

*Aquila rapax* (Tawny Eagle) is listed as EN on a regional scale and occupies dry open habitats from sea level to 3000 m. It will occupy both woodland and wooded savannah (IUCN, 2017). Due to its large distributional range the likelihood of occurrence of this species is rated as moderate, however the presence of suitable prey items is low and therefore the likelihood that it will be resident in the area also low.

*Aquila verreauxii* (Verreaux's Eagle) is listed as VU on a regional scale and LC on a global scale. This species is locally persecuted in southern Africa where it coincides with livestock farms, but because the species does not take carrion, is little threatened by poisoned carcasses. Where hyraxes are hunted for food and skins, eagle populations have declined (IUCN, 2021). Based on the expected habitat, the likelihood of occurrence of this species at the project site is rated as moderate.

*Ardeotis kori* (Kori Bustard) is listed as NT both on a regional and global scale. It occurs in flat, arid, mostly open country such as grassland, karoo, bushveld, thornveld, scrubland and savanna but also including modified habitats such as wheat fields and firebreaks. Collisions with high voltage power lines are a major

threat to this species in the Karoo of South Africa (IUCN, 2007). The habitat at the project area, is the typical habitat of this species, and the species is known to occur in the IBA and therefore it's likelihood of occurrence is rated as 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, 2021). 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 open grasslands and drainage areas, and as such the likelihood of occurrence is rated as moderate.

*Eupodotis caerulescens* (Blue Korhaan) is listed as NT according to the IUCN (2021). Their moderately rapid decline is accredited to habitat loss that is a result of intensive agriculture. They are found in high grassveld in close proximity to water, usually above an altitude of 1 500m (del Hoyo *et al.* 1996). The species nests in bare open ground, situated in thick grass or cropland. Based on the required habitat the likelihood of occurrence of this species is rated as high.

*Eupodotis vigorsii* (Karoo Korhaan) is listed as NT on a regional scale and as LC on a global scale. This species has a very large range, and hence does not approach the thresholds for Vulnerable under the range size criterion (Extent of Occurrence <20,000 km<sup>2</sup> combined with a declining or fluctuating range size, habitat extent/quality, or population size and a small number of locations or severe fragmentation). The likelihood of the species occurring in the project area is rated as high.

*Falco biarmicus* (Lanner Falcon) is native to South Africa and inhabits a wide variety of habitats, from lowland deserts to forested mountains (IUCN, 2017). They may occur in groups up to 20 individuals but have also been observed solitary. Their diet is mainly composed of small birds such as pigeons and francolins. The likelihood of records of this species in the project area is rated as moderate due to the natural veld condition and the presence of many bird species on which Lanner Falcons may predate.

*Neotis ludwigii* (Ludwig's Bustard) is listed as EN both locally and internationally. This species is found in the desert, grassland and shrubland specifically in rocky areas such as mountains and cliffs. The main reason for the decline in the numbers are ascribed to the collisions with power lines. The species was confirmed present within the area during the field survey.

*Polemaetus bellicosus* (Martial Eagle) is listed as EN on a regional scale and on a global scale. This species has an extensive range across much of sub-Saharan Africa, but populations are declining due to deliberate and incidental poisoning, habitat loss, reduction in available prey, pollution and collisions with power lines (IUCN, 2021). It inhabits open woodland, wooded savanna, bushy grassland, thorn-bush and, in southern Africa, more open country and even sub-desert (IUCN, 2021). With the presence of good grassland habitat in the project area but an absence of large trees for roosting and nesting this species may only use the site for foraging and thus there is a moderate chance of this species occurring.

*Sagittarius serpentarius* (Secretarybird) occurs in sub-Saharan Africa and inhabits grasslands, open plains, and lightly wooded savanna. It is also found in agricultural areas and sub-desert (IUCN, 2021). The likelihood of occurrence is rated as moderate due to the extensive grasslands areas present in the project area, in which this species may forage.

## 5.2 Field Assessment

The following sections provide the results from the field survey for the proposed development that was undertaken during the 9<sup>th</sup> to the 11<sup>th</sup> of May 2022.

### 5.2.1 Flora Assessment

This section is divided into two sections:

- Indigenous flora; and

- Invasive Alien Plants (IAPs).

### 5.2.1.1 Indigenous Flora

The species composition of the assessment area was consistent with typical Northern Upper Karoo and Besemkaree Koppies Shrubland vegetation types. Distinctive vegetation communities were observed within these vegetation types and can be classified into degraded shrubland, degraded grassland, rocky areas and drainage lines and washes (alluvial shrubland). The plant species recorded is by no means comprehensive, and repeated surveys during different phenological periods not covered, may likely yield up to 30% additional flora species for the project area. However, floristic analysis conducted to date is however regarded as a sound representation of the local flora for the project area.

The degraded Northern Upper Karoo Shrubland floral community was found in the **lowland areas** and is characterised by dominant dwarf karoo shrubs scattered grasses and occasional large shrubs typical of the Northern Upper Karoo vegetation type. *The floral species most commonly associated with this vegetation type included Three-awn (Aristida) and Lovegrasses (Eragrostis) grasses, with low Sheepbush (Pentzia) shrubs and the occasional tall shrub Lycium cinereum scattered in clumps, and was typically dominated by karoo dwarf shrubs and grasses such as Pentzia incana, Eriocephalus spinescens, Eriocephalus ericoides subsp. ericoides, Osteospermum leptolobum, Hertia pallens, Lycium cinereum, Salsola calluna, Ruschia spinosa, Rosenia humilis, Pteronia erythrochaeta, Aristida adscensionis, Eragrostis lehmanniana var. lehmanniana, Eragrostis bergiana, Cynodon incompletus and Aristida congesta subsp. congesta.*

**Plateau vegetation** was typical of Besemkaree Koppies Shrubland vegetation was found on the slopes and flat areas at higher elevations on the project site, and is dominated by abundant grasses, dwarf small-leaved shrubs and taller shrubs. The increased structure provided by woody species such as Searsia and Euclea bush clumps as well as scattered rocks offer habitats for a different suite of animal species to those in the lowland plains. Typical species encountered included, *Searia burchellii, Felicia filifolia, Chrysocoma ciliate, Gazania krebsiana subsp. krebsiana, Euclea crispa, Olea europaea, Ehretia rigida, Grewia occidentalis, graminoids such as Aristida adscensionis, Aristida congesta congesta, Heteropogon contortus, Tragus koelerioides, Eragrostis chloromelas, Geigeria filifolia, Sporobolus fimbriatus and Enneapogon scoparius.*

The **drainage areas and washes areas** are areas where intermittent streams and drains sporadically flow and exists as well as the plains connected to these areas. This habitat generally consisted of species such as *Artemisia afra, Asparagus suaveolens, Pteronia erythrochaeta, Atriplex vestita, Lycium pumilum, Melianthus comosus and Salsola aphylla* and grasses such as *Cynodon incompletus, Aristida adscensionis, Sporobolus fimbriatus* and *Scirpoides dioecus*. An abundant geophyte within the habitat was *Ammocharis coranica* as well as *Ruschia spinosa* in the washes, both protected in the NC.

Succulents were ubiquitous throughout the assessment area and occurred within all the communities described above. Geophytes were present and occurred within the lowland areas. It is important to note that these growth forms, and their non-succulent relatives, are protected under the Northern Cape Legislation.



**Figure 5-7** Photographs illustrating some of the flora recorded within the assessment area. Clockwise from the top left. *Geigeria filifolia*, *Ammocharis coranica* (Protected), *Chrysocoma ciliate*, *Salsola calluna* (Endemic)

### 5.2.1.2 Invasive Alien Plants

Invasive Alien Plants (IAPs) tend to dominate or replace indigenous flora, thereby transforming the structure, composition and functioning of ecosystems. Therefore, it is important that these plants are controlled by means of an eradication and monitoring programme. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species.

NEMBA is the most recent legislation pertaining to alien invasive plant species. In August 2014, the list of Alien Invasive Species was published in terms of the NEMBA. The Alien and Invasive Species Regulations were published in the Government Gazette No. 44182, 24th of February 2021. The legislation calls for the removal and / or control of IAP species (Category 1 species). In addition, unless authorised thereto in terms of the NWA, no land user shall allow Category 2 plants to occur within 30 meters of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland. Category 3 plants are also prohibited from occurring within proximity to a watercourse. Below is a brief explanation of the three categories in terms of the NEMBA:

- *Category 1a:* Invasive species requiring compulsory control. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
- *Category 1b:* Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
- *Category 2:* Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
- *Category 3:* Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

Note that according to the Alien and Invasive Species Regulations, a person who has under his or her control a category 1b listed invasive species must immediately:

- Notify the competent authority in writing
- Take steps to manage the listed invasive species in compliance with:
  - Section 75 of the NEMBA;
  - The relevant invasive species management programme developed in terms of regulation 4; and
  - Any directive issued in terms of section 73(3) of the NEMBA.

No species were recorded within the project area, however, their absence could not be completely discounted. Any species are listed under the Alien and Invasive Species List 2020, Government Gazette No. GN1003 as Category 1b. Category 1b species must be controlled by implementing an IAP Management Programme, in compliance of section 75 of the NEMBA, as stated above.

### 5.2.2 Faunal Assessment

Herpetofauna, avifauna and mammal observations and recordings are discussed in the information below.



### 5.2.2.1 Amphibians and Reptiles

One species of reptiles was recorded in the project area during survey period, the Karoo girdled lizard. There is the possibility of more species being present, as certain reptile species are secretive and require long-term surveys to ensure capture. One amphibian species was recorded during the survey period, this was largely due to the season in which the field survey was carried out as well as the fact that no pitfall trapping was done, surveys relied on opportunistic sightings. The only other method utilised was refuge examinations using visual scanning of terrains to record smaller herpetofauna species that often conceal themselves under rocks, in fallen logs, rotten tree stumps, in leaf litter, rodent burrows, ponds, old termite mounds, this method was also not intensively applied in the field.



**Figure 5-8 Karoo Girdled Lizard (*Karusasaurus polyzonus*)**

**Table 5-6 Summary of herpetofauna species recorded within the project area.**

Species	Common Name	Conservation Status		NC Nature Conservation Act No. 9 Of 2009
		Regional (SANBI, 2016)	IUCN (2021)	
<i>Cacosternum boettgeri</i>	Common Caco	LC	LC	Not Protected
<b><i>Karusasaurus polyzonus</i></b>	<b>Karoo Girdled Lizard</b>	LC	LC	Not Protected

### 5.2.2.2 Mammals

Five (5) mammal species were observed during the survey of the project area (Table 5-7) based on either direct observation or the presence of visual tracks and signs (Table 5-7)(Figure 5-9, Figure 5-10, Figure 5-11). None of the species recorded are regarded as SCCs from an international or national perspective but three are protected provincially.

**Table 5-7 Summary of mammal species recorded within the project area**

Species	Common Name	Conservation Status		NC Nature Conservation Act No. 9 Of 2009
		Regional (SANBI, 2016)	IUCN (2021)	
<i>Lepus saxatilis</i>	Scrub Hare	LC	LC	Schedule 2
<i>Antidorcas marsupialis</i>	Springbuck	LC	LC	-
<i>Raphicerus campestris</i>	Steenbok	LC	LC	Schedule 2

<i>Canis mesomelas</i>	Black-backed Jackal	LC	LC	Schedule 4
<i>Xerus inauris</i>	Ground Squirrel	LC	LC	-



**Figure 5-9** *Springbuck observed in the project area.*



**Figure 5-10** *Steenbok observed in the project area*



**Figure 5-11** Ground Squirrel observed in the project area

### 5.2.2.3 Avifauna

Eighteen (18) species were recorded in the project area during the survey based on either direct observation, vocalisations, or the presence of visual tracks & signs, (Table 5-8). All species were listed as protected provincially, and two are considered as SCC, Blue crane is shown in Figure 5-12. The number of SCC is expected due to the project being within the Platberg–Karoo Conservancy IBA.

**Table 5-8** A list of avifaunal species recorded for the project area

Species	Common Name	Conservation Status		NC Nature Conservation Act No. 9 Of 2009
		Regional (SANBI, 2016)	IUCN (2021)	
<i>Afrotis afraoides</i>	Korhaan, Northern Black	Unlisted	LC	Schedule 2
<i>Alopochen aegyptiaca</i>	Goose, Egyptian	Unlisted	LC	Schedule 2
<i>Cercotrichas coryphoeus</i>	Scrub-robin, Karoo	Unlisted	LC	Schedule 2
<i>Corvus albus</i>	Crow, Pied	Unlisted	LC	Schedule 3
<i>Coturnix coturnix</i>	Quail, Common	Unlisted		Schedule 2
<i>Cossypha caffra</i>	Robin-chat, Cape	Unlisted	LC	Schedule 2
<i>Eupodotis vigorsii</i>	Korhaan, Karoo	NT	LC	Schedule 2
<i>Falco rupicolus</i>	Kestrel, Rock	Unlisted	LC	Schedule 1
<i>Grus paradisea</i>	Crane, Blue	NT	VU	-
<i>Lanius collaris</i>	Fiscal, Common (Southern)	Unlisted	LC	Schedule 2
<i>Melierax canorus</i>	Goshawk, Southern Pale Chanting	Unlisted	LC	Schedule 1
<i>Merops apiaster</i>	Bee-eater, European	Unlisted	LC	Schedule 2
<i>Myrmecocichla formicivora</i>	Chat, Anteating	Unlisted	LC	Schedule 2
<i>Oena capensis</i>	Dove, Namaqua	Unlisted	LC	Schedule 2

<i>Spilopelia senegalensis</i>	Dove, Laughing	Unlisted	LC	Schedule 2
<i>Streptopelia capicola</i>	Turtle-dove, Cape	Unlisted	LC	Schedule 2
<i>Streptopelia semitorquata</i>	Dove, Red-eyed	Unlisted	LC	Schedule 2
<i>Sylvietta rufescens</i>	Crombec, Long-billed	Unlisted	LC	Schedule 2



**Figure 5-12** Blue Cranes recorded on site

## 6 Habitat Assessment and Site Ecological Importance

### 6.1 Habitat Assessment

The main habitat types identified across the project area were initially identified largely based on aerial imagery. These main habitat types were refined based on the field coverage and data collected during the survey; the delineated habitats can be seen in Figure 6-1. Emphasis was placed on limiting timed meander searches along the proposed project area within the natural habitats and therefore habitats with a higher potential of hosting SCC. The habitats observed, coincide with the vegetation types as described by Mucina & Rutherford in 2006 and SANBI (2019) due to the lack of large-scale transformation, these are discussed in detail in the sections that follow. A summary of habitat types delineated within the project area can be seen in Table 6-1

**Table 6-1 Summary of habitat types delineated within the project area**

Habitat Type	Description	Ecosystem Processes and Services	Habitat Sensitivity
<b>Lowland Northern Upper Karoo Shrubland</b>	Semi-natural shrubland, but slightly disturbed due to the grazing by livestock, mismanagement and also human infringement.	Provides grazing for livestock. Assists in filtration of water permeating through the soil into drainage lines. Acts as corridor for fauna dispersion within the landscape. Acts as buffer for high sensitivity areas. The unit acts as a refuge which supports viable plant species populations and is also used for foraging by fauna.	Medium-High
<b>Plateau Besemkaree Koppies Shrubland</b>	Semi-natural shrubland, but slightly disturbed due to the grazing by livestock, mismanagement and also human infringement.	Provides grazing for livestock. Assists in filtration of water permeating through the soil into lower lying and drainage lines. Acts as refuge for fauna away from more accessible areas the landscape. Acts as buffer for high sensitivity areas. The unit acts as a refuge which supports viable plant species populations and is also used for foraging by fauna.	Medium
<b>Rocky Outcrops</b>	Rocky outcrops ridges occurring from higher lying areas, creating inselburgs in the landscape	Refuge area for fauna and flora species and not easily accessible, also bot suitable for development, and is a refuge from fire.	High
<b>Drainage features and washes (Alluvial Shrubland)</b>	Low to no slope with alluvial soils. Channel through which surface water naturally collates and flows. Ephemeral systems were both considered for this habitat type.	Water Paths, functions as important Water resources. Provides refuge and grazing areas, especially during the dry seasons Provides surface water within the landscape. Aids in trapping sediment and nutrients derived from land runoff.	Deep channels (High) Washes (Medium)

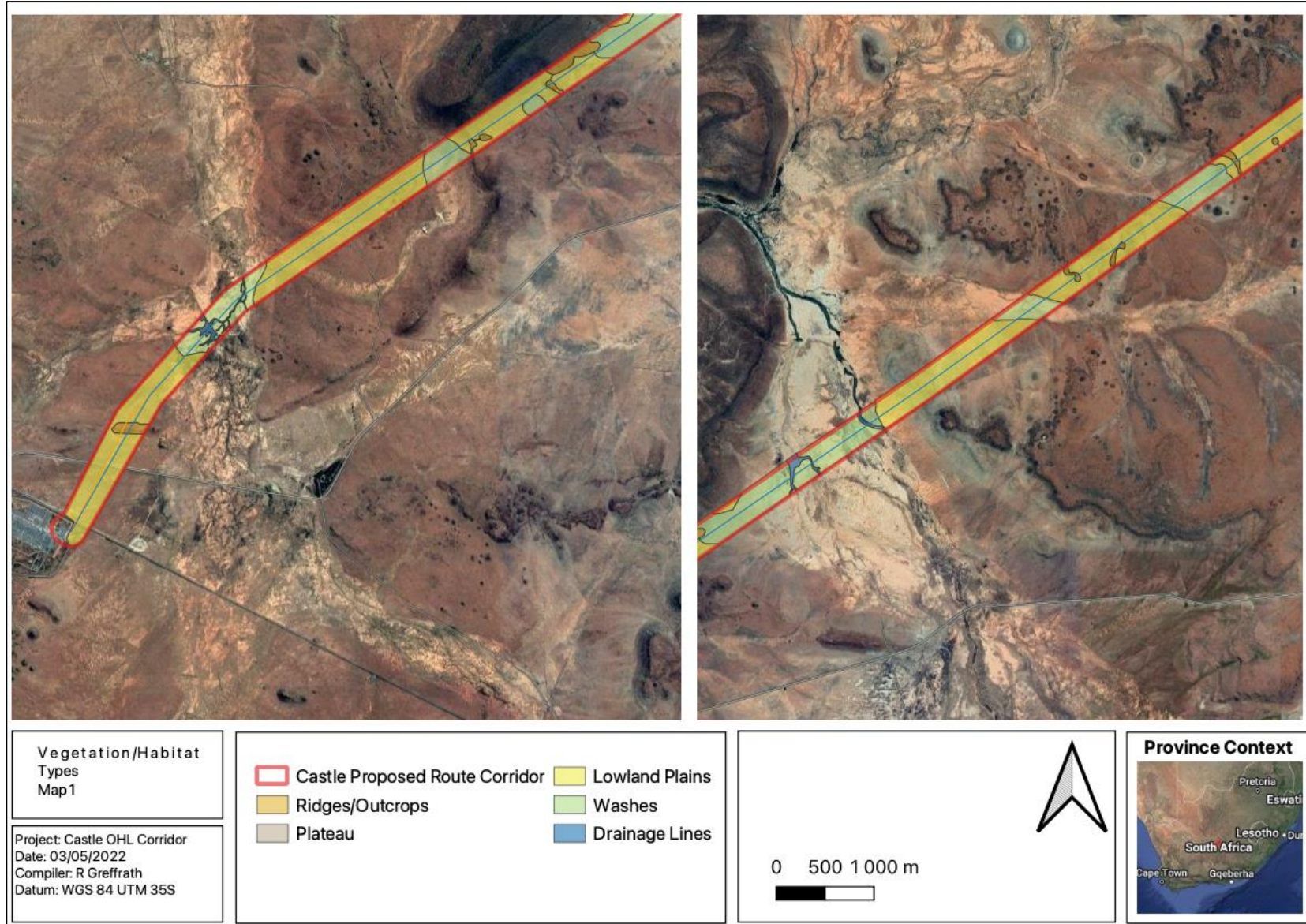


Figure 6-1 Habitats identified in the project area.

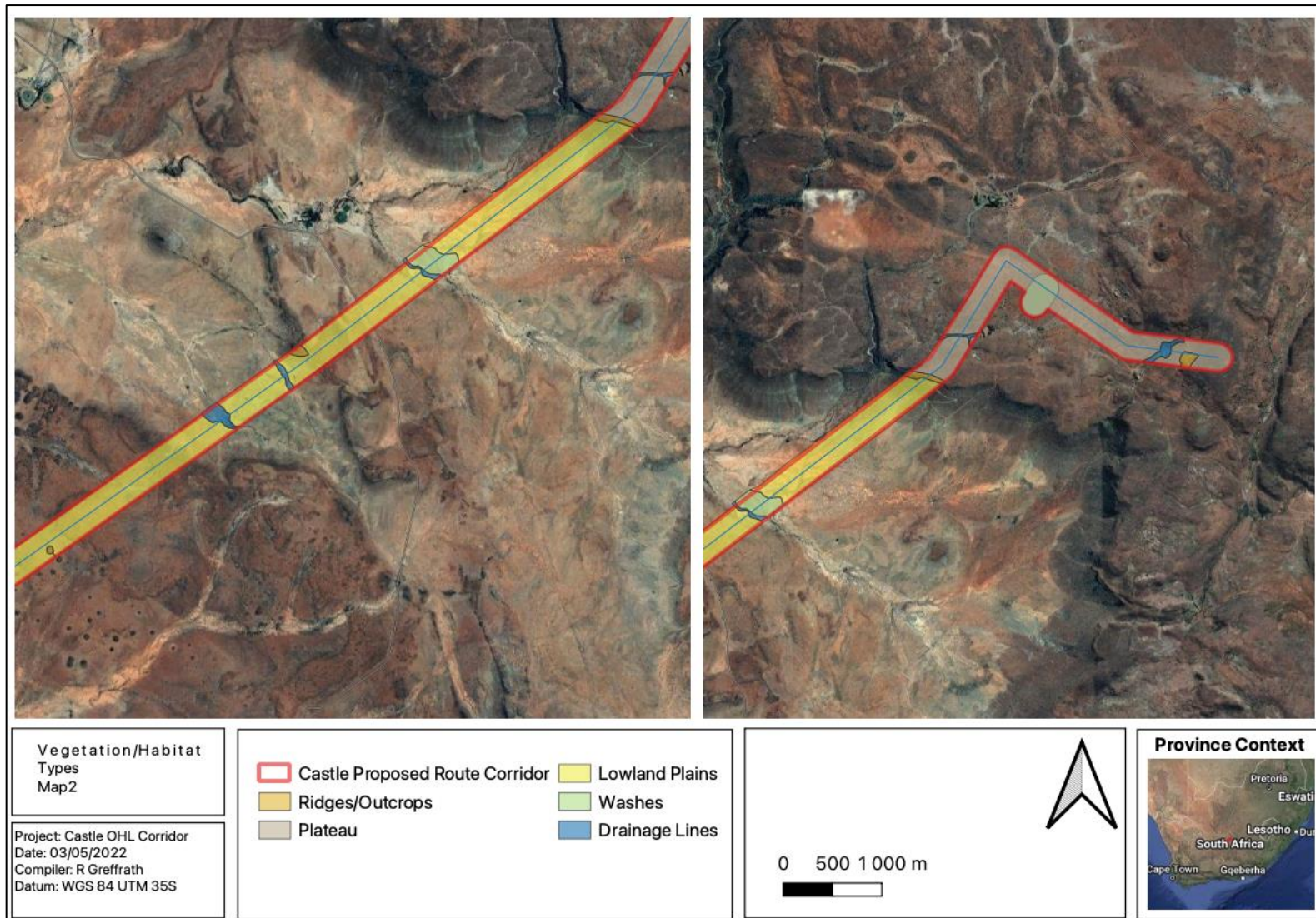


Figure 6-2: Habitats identified in the project area

### 6.1.1 Lowland Degraded Northern Upper Karoo Shrubland

The lowland areas are dominated by dwarf karoo shrubs scattered grasses and occasional large and was the most widespread and was fairly uniform across the project site, occurring on all the flat plain areas. This habitat type is regarded as semi-natural shrubland, but slightly disturbed due to the grazing by livestock, mismanagement and also human infringement.

Even though this habitat is partly disturbed, it supports largely intact vegetation and has a rehabilitation potential. This habitat type acts as a corridor for fauna dispersion within the landscape as well as a buffer for high sensitivity areas. Its current state is degraded CBA 1, it will however recover if left undisturbed. The unit acts as a refuge which supports viable plant species populations and is also used for foraging by fauna.

Several small wetlands, depressions, temporary pools, vleis and dams are scattered throughout the lowland plains and act as important habitat for numerous species, particularly during the wet season. Most of the amphibian species listed in Appendix VII could potentially utilise seasonally inundated areas in these areas. These habitats and microhabitats are widespread in the area and the localised impact associated with the footprint would be negligible if mitigation measures are adhered to.



**Figure 6-3** Lowland Degraded Northern Upper Karoo Shrubland, with temporary pool.

### 6.1.2 Plateau Besemkaree Koppies Shrubland

At higher elevations in the northern section of the project area, slopes and flat areas are dominated by abundant grasses, dwarf small-leaved shrubs and taller shrubs typical of Besemkaree Koppies Shrubland (Figure 10). An increase in topological complexity introduces variation in slope and aspect and therefore the available microhabitats for different species. Species such as Grey Rheebuck (Near Threatened) and Greater Kudu show preference for these areas, and the scattered rocks provide refuge



for many of the species. These habitats and microhabitats are widespread in the area and the localised impact associated with the footprint would be negligible if mitigation measures are adhered to.



**Figure 6-4** *Plateau Besemkaree Koppies Shrubland*

### 6.1.3 Rocky Outcrops

Cliffs and rocky outcrops are associated areas where bedrock is exposed or where high lying cliffs are not as easily weathered as the surrounding areas (Figure 11). They are characterised by the presence of boulders and loose rocks with an open canopy of medium to tall woody shrubs above a sparse layer of grasses. These features provide potential habitat for animals such as Cape Elephant Shrew, Eastern Rock Elephant Shrew, Round-Eared Elephant Shrew, Spectacled Dormouse, Hewitt's Red Rock Hare, Western Rock Elephant Shrew, Cape Dassie, Southern Rock Agama, Western Rock Skink, Karoo Girdled Lizard and Common Banded Gecko amongst others. These habitats and microhabitats are widespread in the area and the localised impact associated with the footprint would be negligible if mitigation measures are adhered to.



**Figure 6-5**      **Rocky Outcrops/Ridges**

#### **6.1.4**    **Drainage features and washes (Alluvial Shrubland)**

The project site includes several drainage areas where water is channelled during rainfall events and includes areas with woody shrubs, grass cover, bare areas and erosion gully's. The drainage lines provide habitat for many animals in such an arid landscape as they provide refuge, shelter, and food for extended periods. This habitat is found in areas where intermittent rivers sporadically flow and exists as well as the drainage flats/floodplains connected to these areas. This habitat is shrubland that has been disturbed mainly by the historic and current grazing (Figure 6-7 and Figure 6-6). This habitat type is regarded as semi-natural shrubland, but slightly disturbed due to the grazing by livestock the associated human infringement and use (roads). Current human infringement still occurs throughout, especially in areas close to roads. The current ecological condition of this habitat with regard to the main driving forces, are intact, which is evident in the amount of the species recorded in the flora and faunal assessment.

Drainage lines with deeper, looser soils are considered to have a higher sensitivity than those on shallow soils. The areas in and adjacent to drainage lines is particularly important for important species listed above such as Springhare, Black-footed Cat, Giant Bullfrog and potentially Riverine Rabbit. Small farm dams are scattered around the project site and together with various erosion control berms provide additional habitat for species. These habitats are susceptible to impacts associated with erosion and the invasion of alien plant species.

The drainage lines and within the project area can be regarded as non-perennial and possess surface flow only briefly during and following a period of rainfall (ephemeral), which is a feature of semi-arid/arid regions. These seasonal streams create an ecological link between the stream and its surrounding terrestrial landscape and has the same function albeit on a smaller scale than a river. These habitats, jointly, is important as a movement corridor as it creates a link between the system and its surrounding

terrestrial landscape for several faunal species, especially birds and mammals, and plays a vital role as a water resource not only for the biodiversity but also the local community.



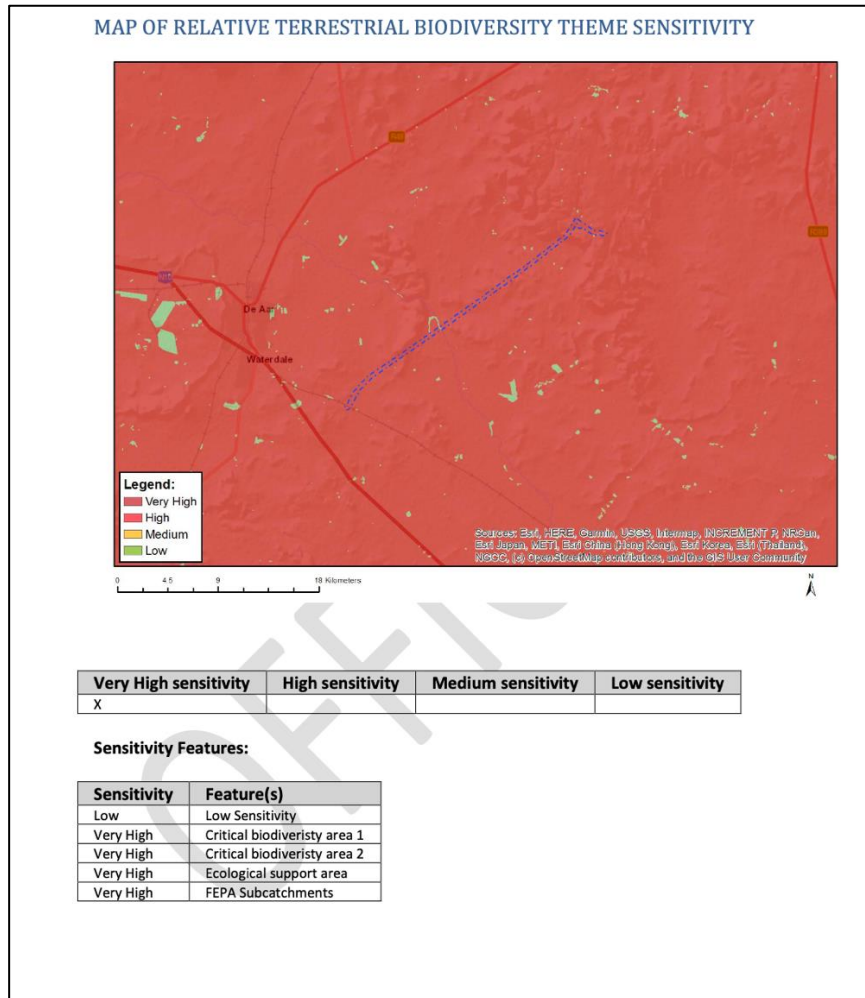
**Figure 6-6**     *Stream/drainage feature.*



**Figure 6-7**      *Washes (Alluvial shrubland)*

## **6.2 Site Ecological Importance**

The biodiversity theme sensitivity, as indicated in the screening report, was derived to be Very High, mainly due to the project area being within an CBA 1, ESA and a FEPA sub-catchment (Figure 6-8).



**Figure 6-8 Terrestrial Biodiversity Theme Sensitivity, National Web based Environmental Screening Tool.**

The location and extent of these habitats are illustrated in Figure 6-1. Based on the criteria provided in Section 3.4 of this report, all habitats within the assessment area of the proposed project were allocated a sensitivity category (Table 6-2). The sensitivities of the habitat types delineated are illustrated in Figure 6-9. 'Very High-High Sensitivity' areas are due to the following and the guidelines can be seen in Table 6-3:

- CBA1;
- CBA2
- FEPA sub catchment;
- Ecological Support Area
- Threatened/Protected flora and fauna species were abundant and ubiquitous within the assessment area; and
- A high richness of protected fauna species was present within the assessment area.

**Table 6-2 SEI Summary of habitat types delineated within field assessment area of project area**

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Lowland Northern Upper Karoo Shrubland	Low	Medium	Low	Medium	Low
Plateau Besemkaree Koppies Shrubland	Low	Medium	Low	Medium	Low
Rocky Outcrops	Medium	High	Medium	Low	High
Drainage washes features	Low	High	Medium	Medium	Medium
Drainage features deep channels	Medium	High	High	Low	High

**Table 6-3 Guidelines for interpreting Site Ecological Importance in the context of the proposed development activities**

Site Ecological Importance	Interpretation in relation to proposed development activities
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.

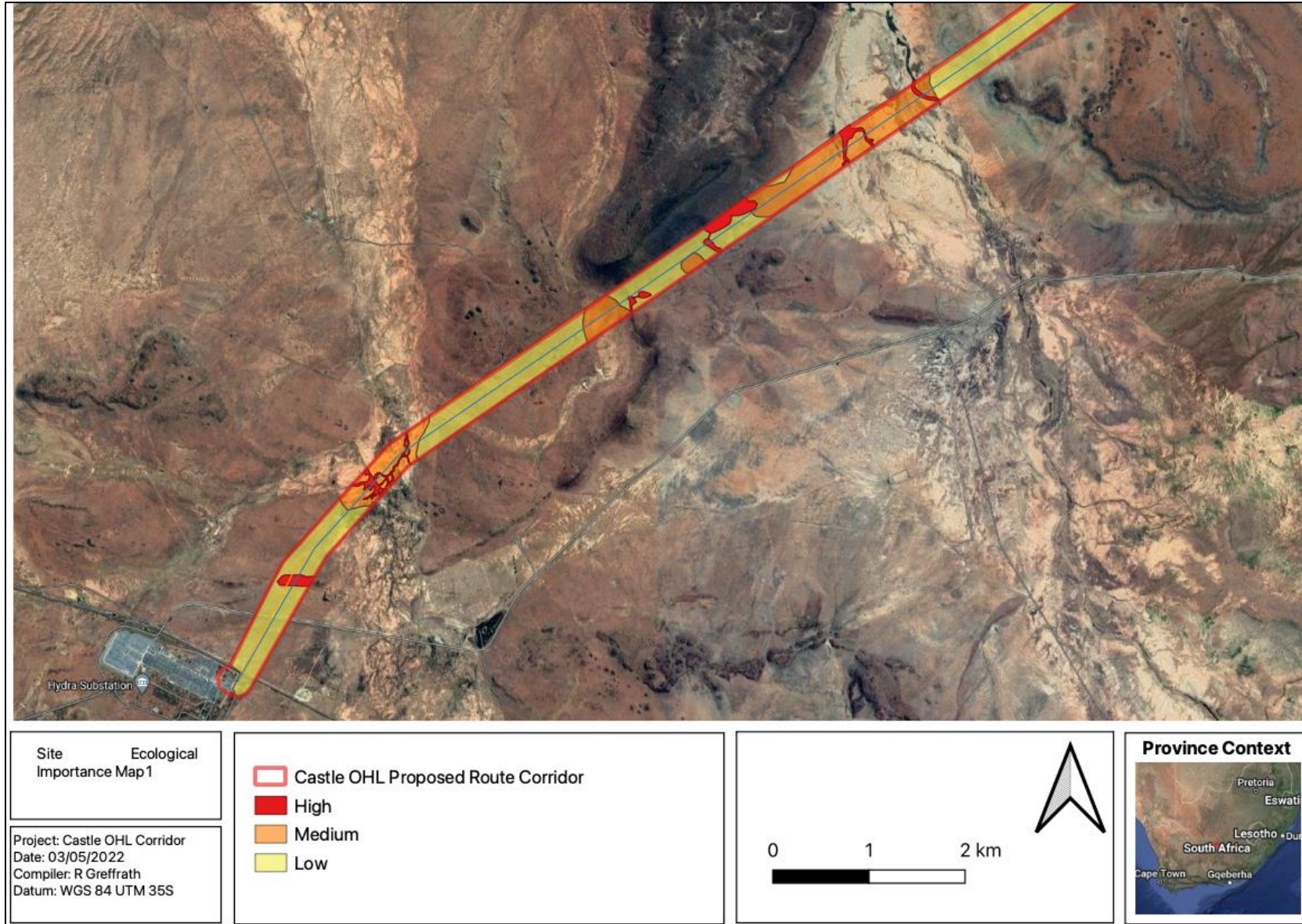


Figure 6-9 Project Area SEI

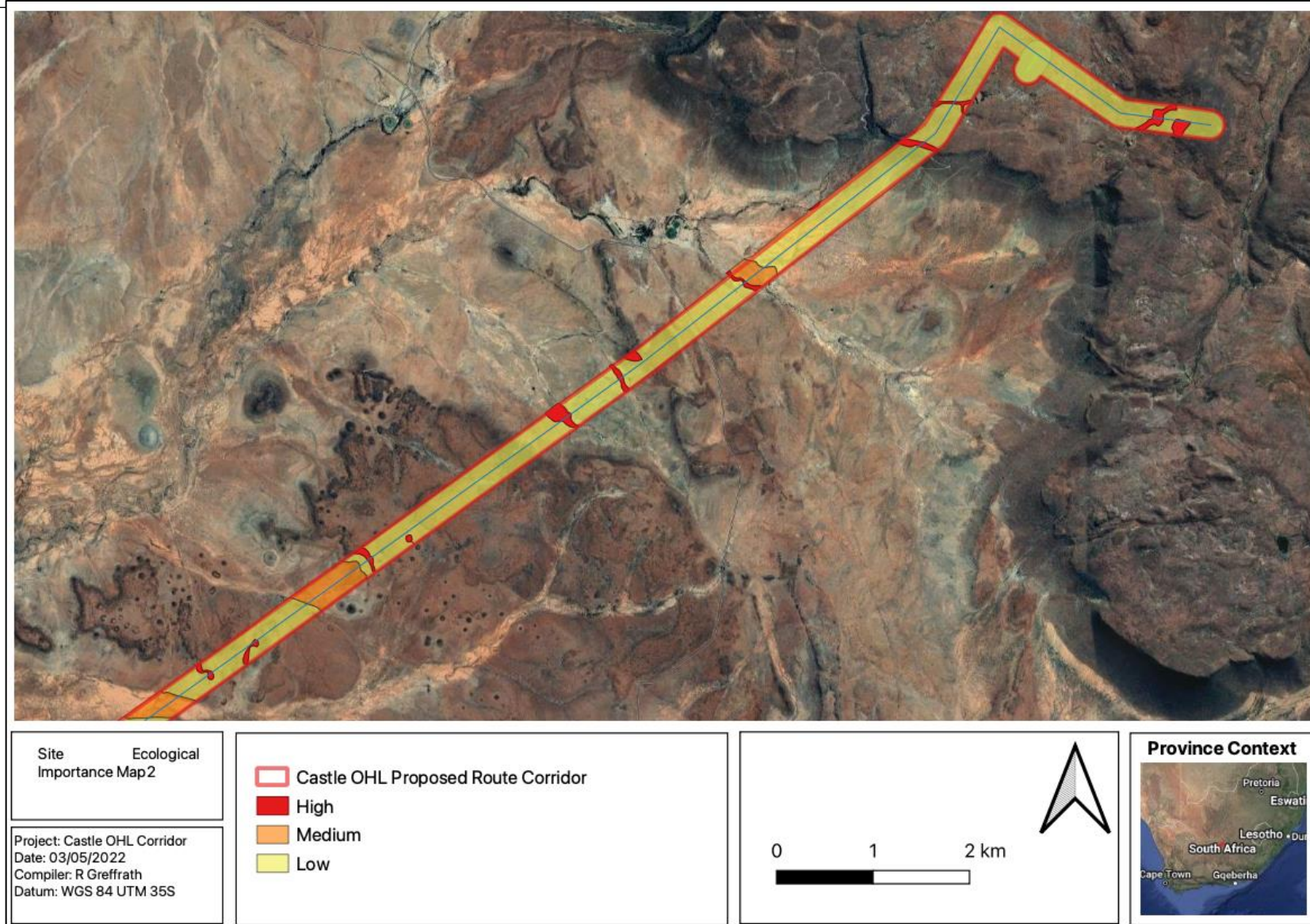


Figure 6-10 Project Area SEI



## **7 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. Potential impacts were evaluated against the data captured during the desktop and field assessment to identify relevance to the project area. The relevant impacts associated with the proposed construction of the development were then subjected to a prescribed impact assessment methodology which were provided by the client and is available on request.

### **7.1 Biodiversity Risk Assessment**

#### **7.1.1 Present Impacts to Biodiversity**

Considering the anthropogenic activities and influences within the landscape, several negative impacts to biodiversity were observed within the project area, however limited. These include:

- Historic land modification;
- Grazing and trampling of natural vegetation by livestock in certain areas;
- Alien and/or Invasive Plants (IAP);
- Erosion; and
- Fences and associated maintenance.

#### **7.1.2 Terrestrial Impact Assessment**

Potential impacts were evaluated against the data captured during the desktop and field assessments 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 was provided by EnviroAgri 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.

### 7.1.3 Loss of Irreplaceable Resources

- CBA 1 areas will be lost; and
- CBA 2 areas will be lost.

### 7.1.4 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 7-1).

**Table 7-1 Anticipated impacts for the proposed activities on terrestrial biodiversity**

Main Impact	Project activities that can cause loss/impacts to habitat	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	
Main Impact	Project activities that can cause direct mortality of fauna	Secondary impacts anticipated
<b>3. Direct mortality of fauna</b>	Clearing of vegetation	Loss of habitat
	Roadkill due to vehicle collision	Loss of ecosystem services
	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)	
Main Impact	Project activities that can cause reduced dispersal/migration of fauna	Secondary impacts anticipated
<b>4. Reduced dispersal/migration of fauna</b>	Loss of landscape used as corridor	Reduced dispersal/migration of fauna
	Compacted roads	Loss of ecosystem services
	Removal of vegetation	Reduced plant seed dispersal
Main Impact	Project activities that can cause pollution in watercourses and the surrounding environment	Secondary impacts anticipated
<b>5. Environmental pollution due to water runoff, spills from vehicles and erosion</b>	Chemical (organic/inorganic) spills	Pollution in watercourses and the surrounding environment
	Erosion	Faunal mortality (direct and indirectly)
		Groundwater pollution

Main Impact	Project activities that can cause disruption/alteration of ecological life cycles due to sensory disturbance.	Secondary impacts anticipated
6. Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, dust and light pollution.	Operation of machinery (Large earth moving machinery, vehicles)	Loss of ecosystem services Disruption/alteration of ecological life cycles due to noise
	Project activities that can cause disruption/alteration of ecological life cycles due to dust	Loss of ecosystem services Secondary impacts associated with disruption/alteration of ecological life cycles due to dust
	Vehicles	Loss of ecosystem services
Main Impact	Project activities that can cause staff to interact directly with potentially dangerous fauna	Secondary impacts anticipated
8. Staff and others interacting directly with fauna (potentially dangerous) or poaching of animals	All unregulated/supervised activities outdoors	Loss of SCCs

### 7.1.5 Unplanned Events

The planned activities will have anticipated impacts as discussed; however, unplanned events may occur on any project and may have potential impacts which will need management.

Table 7-2 is a summary of the findings of an unplanned event assessment from a terrestrial ecology perspective. Note, not all potential unplanned events may be captured herein, and this must therefore be managed throughout all phases according to recorded events.

**Table 7-2 Summary of unplanned events for terrestrial biodiversity**

Unplanned Event	Potential Impact	Mitigation
Spills into the surrounding environment	Contamination of habitat as well as water resources associated with a spillage.	A spill response kit must be available at all times. The incident must be reported on and if necessary, a biodiversity specialist must investigate the extent of the impact and provide rehabilitation recommendations.
Fire	Uncontrolled/unmanaged fire that spreads to the surrounding natural Bushveld and ridge.	Appropriate/Adequate fire management plan need to be implemented.
Erosion caused by water runoff from the surface	Erosion on the side of the road	Storm water management plan must be compiled and implemented.

### 7.1.6 Identification of Additional Potential Impacts

#### 7.1.6.1 Assessment of Impact Significance

The assessment of impact significance considers pre-mitigation as well as implemented of post-mitigation scenarios. The mitigation actions required to lower the risk of the impact are provided in Section 8.1.8 of this report.

#### 7.1.6.2 Construction Phase

The following potential main impacts on the biodiversity (based on the framework above) 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:

- Destruction, further loss and fragmentation of the of habitats, ecosystems and vegetation community (Table 7-3);
- Introduction of alien species, especially plants (

No.	1			
Project phase	Construction			
Impact title	Habitat and Vegetation destruction			
Impact description	Destruction, loss and fragmentation of the of habitats, ecosystems and vegetation community			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Local	Extending across the site and to nearby settlements.	Limited	Limited to the surroundings.
Duration	Long term	Impact will last between 6 and 25 years.	Short term	Impact will last
Intensity	High	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	Low	Impacts affect such a way that social functions slightly affected
Magnitude	High - negative		Low - negative	
Probability	Very likely (>90%)	There are sound reasons that the impact will occur.	Unlikely (>33%)	The impacts on happened before
Significance	Major - negative		Minimal - negative	
Importance	Moderate	Moderate	Moderate	Moderate
Consequence	Moderately-detrimental		Very slightly-detrimental	
Confidence	Well established		Established, but incomplete	
Reversibility	Medium	The affected environment may only recover from the impact with significant intervention time period.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	See BMP			
Comment on ratings				

- Table 7-4);
- Destruction of protected plant species (Table 7-5); and
- Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, vibration and poaching) (Table 7-6).

**Table 7-3 Impacts to biodiversity associated with the proposed construction phase.**

No.	1			
Project phase	Construction			
Impact title	Habitat and Vegetation destruction			
Impact description	Destruction, loss and fragmentation of the of habitats, ecosystems and vegetation community			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Local	Extending across the site and to nearby settlements.	Limited	Limited to the site and its immediate surroundings.
Duration	Long term	Impact will last between 6 and 25 years.	Short term	Impact will last less than 1 year.
Intensity	High	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.
Magnitude	High - negative		Low - negative	
Probability	Very likely (>90%)	There are sound reasons that the impact will occur.	Unlikely (>33%)	The impacts occurrence is rare but has happened before.
Significance	Major - negative		Minimal - negative	
Importance	Moderate	Moderate	Moderate	Moderate
Consequence	Moderately-detrimental		Very slightly-detrimental	
Confidence	Well established		Established, but incomplete	
Reversibility	Medium	The affected environment may only recover from the impact with significant intervention or over long time period.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	See BMP			
Comment on ratings				

**Table 7-4 Impacts to biodiversity associated with the proposed construction phase.**

No.	2			
Project phase	Construction			
Impact title	AIP Introduction			
Impact description	Introduction of alien species, especially plants			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Regional	Impacts manifest at a regional / municipal level.	Limited	Limited to the site and its immediate surroundings.
Duration	Permanent	Impact may be permanent, or in excess of 25 years.	Temporary	Impact will last less than 1 month.
Intensity	High	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	Very low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are not affected.
Magnitude	High - negative		Very low - negative	
Probability	Likely (>66%)	The impact may occur, but not necessarily proof that it will.	Unlikely (>33%)	The impacts occurrence is rare but has happened before.
Significance	Major - negative		Minimal - negative	
Importance	High	High	High	High
Consequence	Highly-detrimental		Very slightly-detrimental	
Confidence	Well established		Inconclusive	
Reversibility	Medium	The affected environment may only recover from the impact with significant intervention or over long time period.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	See BMP			
Comment on ratings				

**Table 7-5 Impacts to biodiversity associated with the proposed construction phase.**

<b>No.</b>	<b>3</b>			
<b>Project phase</b>	<b>Construction</b>			
<b>Impact title</b>	SCC destruction			
<b>Impact description</b>	Destruction of protected plant species			
<b>Impact Assessment</b>	<b>Impact not mitigated</b>		<b>Impact mitigated</b>	
<b>Nature</b>	<b>Negative</b>		<b>Negative</b>	
<b>Extent</b>	<b>Regional</b>	Impacts manifest at a regional / municipal level.	<b>Limited</b>	Limited to the site and its immediate surroundings.
<b>Duration</b>	<b>Long term</b>	Impact will last between 6 and 25 years.	<b>Short term</b>	Impact will last less than 1 year.
<b>Intensity</b>	<b>Medium</b>	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are moderately altered.	<b>Low</b>	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.
<b>Magnitude</b>	<b>High - negative</b>		<b>Low - negative</b>	
<b>Probability</b>	<b>Very likely (&gt;90%)</b>	There are sound reasons that the impact will occur.	<b>Very unlikely (&gt;10%)</b>	There are reasons that make the impact conceivable, yet improbable.
<b>Significance</b>	<b>Major - negative</b>		<b>Minimal - negative</b>	
<b>Importance</b>	<b>High</b>	High	<b>Low</b>	Low
<b>Consequence</b>	<b>Highly-detrimental</b>		<b>Very slightly-detrimental</b>	
<b>Confidence</b>	<b>Well established</b>		<b>Deficient</b>	
<b>Reversibility</b>	<b>Low</b>	The affected environment may not be able to recover from the impact - permanently modified.		
<b>Mitigatability</b>	<b>High</b>	Mitigation exists and will considerably reduce the significance of impacts.		
<b>Potential mitigation</b>	See BMP			
<b>Comment on ratings</b>				

**Table 7-6 Impacts to biodiversity associated with the proposed construction phase.**

<b>No.</b>	4			
<b>Project phase</b>	Construction			
<b>Impact title</b>	Fauna species			
<b>Impact description</b>	Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, vibration and poaching)			
<b>Impact Assessment</b>	Impact not mitigated		Impact mitigated	
<b>Nature</b>	Negative		Negative	
<b>Extent</b>	Regional	Impacts manifest at a regional / municipal level.	Limited	Limited to the site and its immediate surroundings.
<b>Duration</b>	Long term	Impact will last between 6 and 25 years.	Temporary	Impact will last less than 1 month.
<b>Intensity</b>	High	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.
<b>Magnitude</b>	High - negative		Low - negative	
<b>Probability</b>	Likely (>66%)	The impact may occur, but not necessarily proof that it will.	Very unlikely (>10%)	There are reasons that make the impact conceivable, yet improbable.
<b>Significance</b>	Moderate - negative		Minimal - negative	
<b>Importance</b>	Moderate	Moderate	Low	Low
<b>Consequence</b>	Slightly-detrimental		Very slightly-detrimental	
<b>Confidence</b>	Well established		Inconclusive	
<b>Reversibility</b>	Low	The affected environment may not be able to recover from the impact - permanently modified.		
<b>Mitigatability</b>	High	Mitigation exists and will considerably reduce the significance of impacts.		
<b>Potential mitigation</b>	See BMP			
<b>Comment on ratings</b>				



### 7.1.6.3 Operation Phase

The operational phase of the impact of daily activities is anticipated to further spread the IAP, as well as the deterioration of the habitats due to the increase of dust and edge effect impacts. Dust reduces the ability of plants to photosynthesize and thus leads to degradation/retrogression of the veld. Moving vehicles do not only cause sensory disturbances to fauna, affecting their life cycles and movement, but will lead to direct mortalities due to collisions. The following potential impacts were considered:

- Continued fragmentation and degradation of habitats and ecosystems (Table 7-7);
- Spread of alien and/or invasive species (Table 7-8);
- Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, collisions with substation, noise, light, dust, vibration) (Table 7-9);
- Avifaunal SCC mortality.

**Table 7-7 Impacts to biodiversity associated with the proposed operational phase**

No.	5			
Project phase	<b>Operation</b>			
Impact title	Habitat and Vegetation destruction			
Impact description	Continued fragmentation and degradation of habitats and ecosystems			
Impact Assessment	<b>Impact not mitigated</b>		<b>Impact mitigated</b>	
Nature	<b>Negative</b>		<b>Negative</b>	
Extent	<b>Regional</b>	Impacts manifest at a regional / municipal level.	<b>Limited</b>	Limited to the site and its immediate surroundings.
Duration	<b>Permanent</b>	Impact may be permanent, or in excess of 25 years.	<b>Short term</b>	Impact will last less than 1 year.
Intensity	<b>High</b>	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	<b>Low</b>	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.
Magnitude	<b>High - negative</b>		<b>Low - negative</b>	
Probability	<b>Very likely (&gt;90%)</b>	There are sound reasons that the impact will occur.	<b>Unlikely (&gt;33%)</b>	The impacts occurrence is rare but has happened before.
Significance	<b>Major - negative</b>		<b>Minimal - negative</b>	
Importance	<b>Moderate</b>	Moderate	<b>Moderate</b>	Moderate
Consequence	<b>Moderately-detrimental</b>		<b>Very slightly-detrimental</b>	
Confidence	<b>Well established</b>		<b>Established, but incomplete</b>	
Reversibility	<b>Medium</b>	The affected environment may only recover from the impact with significant intervention or over long time period.		
Mitigatability	<b>High</b>	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	See BMP			
Comment on ratings				

**Table 7-8 Impacts to biodiversity associated with the proposed operational phase.**

No.	6			
Project phase	<b>Operation</b>			
Impact title	AIP infestation			
Impact description	Spread of alien and/or invasive species			
Impact Assessment	<b>Impact not mitigated</b>		<b>Impact mitigated</b>	
Nature	<b>Negative</b>		<b>Negative</b>	
Extent	<b>Regional</b>	Impacts manifest at a regional / municipal level.	<b>Limited</b>	Limited to the site and its immediate surroundings.
Duration	<b>Permanent</b>	Impact may be permanent, or in excess of 25 years.	<b>Temporary</b>	Impact will last less than 1 month.
Intensity	<b>High</b>	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	<b>Very low</b>	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are not affected.
Magnitude	<b>High - negative</b>		<b>Very low - negative</b>	
Probability	<b>Likely (&gt;66%)</b>	The impact may occur, but not necessarily proof that it will.	<b>Unlikely (&gt;33%)</b>	The impacts occurrence is rare but has happened before.
Significance	<b>Major - negative</b>		<b>Minimal - negative</b>	
Importance	<b>High</b>	High	<b>High</b>	High
Consequence	<b>Highly-detrimental</b>		<b>Very slightly-detrimental</b>	
Confidence	<b>Well established</b>		<b>Inconclusive</b>	
Reversibility	<b>Medium</b>	The affected environment may only recover from the impact with significant intervention or over long time period.		
Mitigatability	<b>High</b>	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	See BMP			
Comment on ratings				

**Table 7-9 Impacts to biodiversity associated with the proposed operational phase**

No.	7			
Project phase	Operation			
Impact title	Fauna Communities			
Impact description	Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, collisions with substation, noise, light, dust, vibration)			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Regional	Impacts manifest at a regional / municipal level.	Limited	Limited to the site and its immediate surroundings.
Duration	Long term	Impact will last between 6 and 25 years.	Short term	Impact will last less than 1 year.
Intensity	Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are moderately altered.	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.
Magnitude	High - negative		Low - negative	
Probability	Very likely (>90%)	There are sound reasons that the impact will occur.	Very unlikely (>10%)	There are reasons that make the impact conceivable, yet improbable.
Significance	Major - negative		Minimal - negative	
Importance	High	High	Low	Low
Consequence	Highly-detrimental		Very slightly-detrimental	
Confidence	Well established		Deficient	
Reversibility	Low	The affected environment may not be able to recover from the impact - permanently modified.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	See BMP			
Comment on ratings				

**Table 7-10 Impacts to biodiversity associated with the proposed operational phase**

<b>No.</b>	8			
<b>Project phase</b>	Operation			
<b>Impact title</b>	Avifaunal SCC			
<b>Impact description</b>	Avifaunal SCC Mortality			
<b>Impact Assessment</b>	Impact not mitigated		Impact mitigated	
<b>Nature</b>	Negative		Negative	
<b>Extent</b>	National	Impacts manifest at a national level / provincial.	National	Impacts manifest at a national level / provincial.
<b>Duration</b>	Permanent	Impact may be permanent, or in excess of 25 years.	Permanent	Impact may be permanent, or in excess of 25 years.
<b>Intensity</b>	High	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	High	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.
<b>Magnitude</b>	Very high - negative		Very high - negative	
<b>Probability</b>	Very likely (>90%)	There are sound reasons that the impact will occur.	Very likely (>90%)	There are sound reasons that the impact will occur.
<b>Significance</b>	Severe - negative		Severe - negative	
<b>Importance</b>	High	High	High	High
<b>Consequence</b>	Highly-detrimental		Highly-detrimental	
<b>Confidence</b>	Virtually certain		Virtually certain	
<b>Reversibility</b>	Low	The affected environment may not be able to recover from the impact - permanently modified.		
<b>Mitigatability</b>	Low	Mitigation does not exist; or mitigation may only slightly reduce the significance of impacts.		
<b>Potential mitigation</b>	See BMP			
<b>Comment on ratings</b>	Avifaunal SCC impacts cannot be mitigated and mortalities will occur			

#### **7.1.6.4 Cumulative Impacts**

Cumulative impacts are assessed in context of the extent of the proposed project area; other developments in the area; and general habitat loss and transformation resulting from other activities in the area.

The impacts of projects are often assessed by comparing the post-project situation to a pre-existing baseline. Where projects can be considered in isolation this provides a good method of assessing a project's impact. However, in areas where baselines have already been affected, or where future development will continue to add to the impacts in an area or region, it is appropriate to consider the cumulative effects of development. This is similar to the concept of shifting baselines, which describes how the environmental baseline at a point in time may represent a significant change from the original state of the system. This section describes the potential impacts of the project that are cumulative for fauna and flora.

Localised cumulative impacts include the cumulative effects from operations that are close enough to potentially cause additive effects on the environment or sensitive receivers (such as nearby wind farm with associated roads within the area). These include dust deposition, noise and vibration, disruption of corridors or habitat, groundwater drawdown, groundwater and surface water quality, and transport.

Long-term cumulative impacts due to extensive powerline corridors already established as well as the OHL corridor footprint and associated roads can lead to the loss of endemic species and threatened species, loss of habitat and vegetation types and even degradation of sensitive areas (Table 7-1).

**Table 7-11 Cumulative Impacts to biodiversity associated with the proposed project.**

<b>No.</b>	<b>10</b>			
<b>Project phase</b>	<b>Construction &amp; Decommissioning</b>			
<b>Impact title</b>	Cumulative Impacts			
<b>Impact description</b>	Cumulative impacts on Biodiversity			
<b>Impact Assessment</b>	<b>Impact not mitigated</b>		<b>Impact mitigated</b>	
<b>Nature</b>	<b>Negative</b>		<b>Negative</b>	
<b>Extent</b>	<b>Regional</b>	Impacts manifest at a regional / municipal level.	<b>Local</b>	Extending across the site and to nearby settlements.
<b>Duration</b>	<b>Long term</b>	Impact will last between 6 and 25 years.	<b>Long term</b>	Impact will last between 6 and 25 years.
<b>Intensity</b>	<b>High</b>	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	<b>High</b>	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.
<b>Magnitude</b>	<b>High - negative</b>		<b>High - negative</b>	
<b>Probability</b>	<b>Likely (&gt;66%)</b>	The impact may occur, but not necessarily proof that it will.	<b>Likely (&gt;66%)</b>	The impact may occur, but not necessarily proof that it will.
<b>Significance</b>	<b>Moderate - negative</b>		<b>Moderate - negative</b>	
<b>Importance</b>	<b>High</b>	High	<b>High</b>	High
<b>Consequence</b>	<b>Moderately-detrimental</b>		<b>Moderately-detrimental</b>	
<b>Confidence</b>	<b>Virtually certain</b>		<b>Virtually certain</b>	
<b>Reversibility</b>	<b>Medium</b>	The affected environment may only recover from the impact with significant intervention or over long time period.		
<b>Mitigatability</b>	<b>Medium</b>	Mitigation exists and may notably reduce significance of impacts.		
<b>Potential mitigation</b>	See BMP			
<b>Comment on ratings</b>				

### 7.1.7 Biodiversity Management Plan

The aim of the management outcomes is to present the mitigations in such a way that they can be incorporated into the Environmental Management Programme (EMPr), allowing for more successful implementation and auditing of the mitigations and monitoring guidelines. Table 7-12 presents the recommended mitigation measures and the respective timeframes, targets and performance indicators for the terrestrial study.

The focus of mitigation measures is to reduce the significance of potential impacts associated with the development and thereby to:

- Prevent the further loss and fragmentation of vegetation communities and the CBA areas in the vicinity of the project area;
- As far as possible, reduce the negative fragmentation effects of the development and enable safe movement of faunal species;
- Prevent the direct and indirect loss and disturbance of faunal species and community (including occurring and potentially occurring species of conservation concern); and
- Follow the guidelines for interpreting Site Ecological Importance (SEI).



**Table 7-12 Mitigation measures including requirements for timeframes, roles and responsibilities for the terrestrial study**

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
<b>Management outcome: Vegetation and Habitats</b>				
Areas rated as High sensitivity outside of the direct project development areas should be declared as 'no-go' areas during the life of the project, and all efforts must be made to prevent access to these areas from construction workers and machinery. The infrastructure should be realigned to prioritise development within medium sensitivity areas. Mitigated development in High sensitivity areas is permissible. The OHL can span these High sensitivity areas.	Construction Phase	Project manager, Environmental Officer	Development footprint	Ongoing
Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible. All activities must be restricted to within the low/medium sensitivity areas. No further loss of high sensitivity areas should be permitted. It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon.	Life of operation	Project manager, Environmental Officer	Areas of indigenous vegetation	Ongoing
Existing access routes, especially roads must be made use of.	Construction/Operational Phase	Environmental Officer & Design Engineer	Roads and paths used	Ongoing
All laydown, chemical toilets etc. should be restricted to medium sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction phase has been concluded. No permanent construction phase structures should be permitted. Construction buildings should preferably be prefabricated or constructed of re-usable/recyclable materials. No storage of vehicles or equipment will be allowed outside of the designated project areas.	Construction/Operational Phase	Environmental Officer & Design Engineer	Laydown areas	Ongoing
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species. All livestock must always be kept out of the project area, especially areas that have been recently re-planted	Operational phase	Environmental Officer & Contractor	Assess the state of rehabilitation and encroachment of alien vegetation	Quarterly for up to two years after the closure
A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary. All contaminated soil / yard stone shall	Life of operation	Environmental Officer & Contractor	Spill events, Vehicles dripping.	Ongoing

<p>be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment. Construction activities and vehicles could cause spillages of lubricants, fuels and waste material potentially negatively affecting the functioning of the ecosystem. All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the project area.</p>				
<p>It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.</p>	Life of operation	Project manager, Environmental Officer	Any instances	Ongoing
<p>A fire management plan needs to be compiled and implemented to restrict the impact fire might have on the surrounding areas.</p>	Life of operation	Environmental Officer & Contractor	Fire Management	During Phase
<p>Any individual of the protected plants that are present needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development. Hi visibility flags must be placed near any threatened/protected plants in order to avoid any damage or destruction of the species. If left undisturbed the sensitivity and importance of these species needs to be part of the environmental awareness program. Infrastructure, development areas and routes where protected plants cannot be avoided, these plants many being geophytes or small succulents should be removed from the soil and relocated/ re-planted in similar habitats where they should be able to resprout and flourish again. All protected and red-data plants should be relocated, and as many other geophytic species as possible.</p>	Life of operation	Project manager, Environmental Officer	Protected Tree/Plant species	Ongoing
<p>A pre-construction survey in the flowering season (July-September) should be conducted in order to ensure that a more comprehensive floral presence confirmation. For the threatened species that may not be destroyed, it is recommended that professional service providers that deal with plant search and rescue be used to remove such plants and use them either for later rehabilitation work or other conservation projects.</p>	Planning Phase, Pre-Construction	Project manager, Environmental Officer & Contractor	Flora species	During Phase
<b>Management outcome: Fauna</b>				
<p><b>Impact Management Actions</b></p> <p>A qualified environmental control officer must be on site when construction begins. A site walk through is recommended by a suitably qualified ecologist prior to any construction activities, preferably during the wet season and any SSC should be noted. In situations where the threatened and protected plants must be removed, the proponent may only do so after the required</p>	<b>Implementation</b>		<b>Monitoring</b>	
	Phase	Responsible Party	Aspect	Frequency
	Construction Phase	Environmental Officer, Contractor	Presence of any floral or faunal species.	During phase

<p>permission/permits have been obtained in accordance with national and provincial legislation. In the abovementioned situation the development of a search, rescue and recovery program is suggested for the protection of these species. Should animals not move out of the area on their own relevant specialists must be contacted to advise on how the species can be relocated</p> <p>The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments,</p> <ul style="list-style-type: none"> <li>Signs must be put up to enforce this.</li> </ul>	Construction/Operational Phase	Project manager, Environmental Officer	Infringement into these areas	Ongoing
<p>The duration of the construction should be minimized to as short term as possible, to reduce the period of disturbance on fauna.</p>	Construction	Project manager, Environmental Officer & Design Engineer	Construction/Closure Phase	Ongoing
<p>Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian species and nocturnal mammals</p>	Construction/Operational Phase	Environmental Officer	Noise levels	Ongoing
<p>No trapping, killing, or poisoning of any wildlife is to be allowed</p> <ul style="list-style-type: none"> <li>Signs must be put up to enforce this;</li> </ul>	Life of operation	Environmental Officer	Evidence of trapping etc	Ongoing
<p>Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (green/red) lights should be used wherever possible.</p>	Construction/Operational Phase	Project manager, Environmental Officer & Design Engineer	Light pollution and period of light.	Ongoing
<p>All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.</p>	Life of operation	Health and Safety Officer	Compliance to the training.	Ongoing
<p>Schedule activities and operations during least sensitive periods, to avoid migration, nesting and breeding seasons.</p>	Life of operation	Project manager, Environmental Officer & Design Engineer	Activities should take place during the day in the case.	Ongoing
<p>As far as possible power cables within the project area should be thoroughly insulated.</p>	Planning and construction	Environmental Officer & Contractor, Engineer	Exposed cables	During phase
<p>Eskom guidelines on impacts to avifaunal mitigation measures must be followed</p>	Construction and Operational phase	Environmental Officer & Contractor, Engineer	Avifaunal SCC	Ongoing
<p>Any exposed parts must be covered (insulated) to reduce electrocution risk</p>	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of electrocuted birds	During phase
<p>All areas to be developed must be walked through prior to any activity to ensure no nests or fauna species are found in the area. Should any Species of Conservation Concern not move out of the area or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken.</p>	Construction and Operational phase	Project manager, Environmental Officer	Presence of Nests and faunal species	Planning, Construction and Rehabilitation
<p>Any holes/deep excavations must be dug and planted in a progressive manner and should not be left open overnight;</p> <ul style="list-style-type: none"> <li>Should the holes overnight they must be covered temporarily to ensure no small fauna species fall in.</li> </ul>	Planning and Construction	Environmental Officer & Contractor, Engineer	Presence of trapped animals and open holes	Ongoing
<b>Management outcome: Alien species</b>				

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Compilation of and implementation of an alien vegetation management plan.	Life of operation	Project manager, Environmental Officer & Contractor	Assess presence and encroachment of alien vegetation	Twice a year
The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprint of the roads must be kept to prescribed widths.	Construction/Operational Phase	Project manager, Environmental Officer & Contractor	Footprint Area	Life of operation
Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site	Life of operation	Environmental Officer & Health and Safety Officer	Presence of waste	Life of operation
A pest control plan must be put in place and implemented; it is imperative that poisons not be used due to the likely presence of SCCs	Life of operation	Environmental Officer & Health and Safety Officer	Evidence or presence of pests	Life of operation
<b>Management outcome: Dust</b>				
Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces. <ul style="list-style-type: none"> <li>No non environmentally friendly suppressants may be used as this could result in pollution of water sources</li> </ul>	Life of operation	Contractor	Dustfall	Dust monitoring program.
<b>Management outcome: Waste management</b>				
Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Waste management must be a priority and all waste must be collected and stored effectively.	Life of operation	Environmental Officer & Contractor	Waste Removal	Weekly
Litter, spills, fuels, chemicals and human waste in and around the project area.	Construction/Closure Phase	Environmental Officer & Health and Safety Officer	Presence of Waste	Daily
A minimum of one toilet must be provided per 10 persons. Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area.	Life of operation	Environmental Officer & Health and Safety Officer	Number of toilets per staff member. Waste levels	Daily
The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility	Life of operation	Environmental Officer & Health and Safety Officer	Availability of bins and the collection of the waste.	Ongoing
Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regard to waste	Life of operation	Environmental Officer, Contractor & Health and Safety Officer	Collection/handling of the waste.	Ongoing

management. Under no circumstances may domestic waste be burned on site				
Refuse bins will be emptied and secured Temporary storage of domestic waste shall be in covered waste skips. Maximum domestic waste storage period will be 10 days.	Life of operation	Environmental Officer, Contractor & Health and Safety Officer	Management of bins and collection of waste	Ongoing, every 10 days
<b>Management outcome: Environmental awareness training</b>				
<b>Impact Management Actions</b>	<b>Implementation</b>		<b>Monitoring</b>	
	Phase	Responsible Party	Aspect	Frequency
All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of Red / Orange List species, their identification, conservation status and importance, biology, habitat requirements and management requirements the Environmental Authorisation and within the EMP. The avoidance and protection of the wetland areas must be included into a site induction. Contractors and employees must all undergo the induction and made aware of the "no-go" to be avoided.	Life of operation	Health and Safety Officer	Compliance to the training.	Ongoing
<b>Management outcome: Erosion</b>				
<b>Impact Management Actions</b>	<b>Implementation</b>		<b>Monitoring</b>	
	Phase	Responsible Party	Aspect	Frequency
Speed limits must be put in place to reduce erosion. <ul style="list-style-type: none"> <li>Reducing the dust generated by the listed activities above, especially the earth moving machinery, through wetting the soil surface and putting up signs to enforce speed limit as well as speed bumps built to force slow speeds;</li> <li>Signs must be put up to enforce this.</li> </ul>	Life of operation	Project manager, Environmental Officer	Water Runoff from road surfaces	Ongoing
Where possible, existing access routes and walking paths must be made use of.	Life of operation	Project manager, Environmental Officer	Routes used within the area	Ongoing
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events and strong winds.	Life of operation	Project manager, Environmental Officer	Re-establishment of indigenous vegetation	Progressively
A stormwater management plan must be compiled and implemented, especially for where the road crosses the drainage feature.	Life of operation	Project manager, Environmental Officer	Management plan	Before construction phase: Ongoing

## 8 Conclusion and Impact Statement

### 8.1 Terrestrial Ecology

The completion of a comprehensive desktop study, in conjunction with the results from the field survey, suggest there is a good confidence in the information provided. The survey ensured that there was a suitable groundtruth coverage of the assessment area and most habitats and ecosystems were assessed to obtain a general species (fauna and flora) overview and the major current impacts were observed. The conservation status is classified as Least Concern albeit the protection level is regarded as 'Not Protected' Ecosystem. Moreover, the proposed activity overlaps with an CBA 1, CBA2, IBA and an ecological support area.

The current layout overlaps within sensitive habitats and other areas of high biodiversity potential. Portions of the current expected corridor of the development would be considered to have a significant and high negative impact as it would directly affect the habitat of threatened/protected plant species and expected listed faunal species that use these ecosystems;

- The assessment area possesses a high diversity and density of protected flora species. Moreover, protected fauna are ubiquitous within the assessment area and surrounding landscape.

The developer is urged to alter the layout or design within the general corridor, which represents a compromise between the needs of the development and the environmental concerns at the site, especially in regard to the high sensitivity areas.

Historically, overgrazing from livestock (Sheep and cattle) and mismanagement has led to the deterioration these habits. However, the high sensitivity areas can be regarded as important, not only within the local landscape, but also regionally; as they are used for habitat, foraging, water resource and movement corridors for fauna within the landscape.

The habitat existence and importance of these habitats is regarded as crucial, due to the species recorded as well as the role of this intact unique habitat to biodiversity within the local landscape, not to mention the sensitivity according to various ecological datasets.

Development within confirmed CBA areas is not considered favourably by the regulating authorities, and implementation of the mitigation hierarchy must be demonstrated. This must include concerted efforts to avoid these high sensitive areas. Development of the corridor is not considered a destructive development and may be permitted within High sensitivity area, if pylons are placed with care. Development in High sensitivity areas must demonstrate avoidance mitigation, and offset mitigation may be further required. Development of the corridor and associated infrastructure must avoid the High sensitivity area, and disturbances to the medium sensitivity area must be kept to a minimum. The high sensitivity terrestrial areas still:

- Serve as and represent CBA1 and CBA2 as per the Conservation Plan;
- Supports and protects fauna and flora (including protected and threatened species); and
- Support various organisms and may play a more important role in the ecosystem if left to recover from the superficial impacts.

The ecological integrity, importance and functioning of these terrestrial biodiversity areas provide a variety of ecological services considered beneficial, with one key service being the maintenance of biodiversity. The preservation of these systems is the most important aspect to consider for the proposed project.

Any development on the High sensitivity areas will lead the direct destruction and loss of portions of functional CBA1 and CBA2, and the floral and faunal species that are expected to utilise this habitat.

Thus, if these areas are not maintained in a natural or near natural state, destroyed or fragmented, then meeting targets for biodiversity features will not be achieved. The mitigations, management and associated monitoring regarding these operational impacts will be the most important factor of this project and must be considered by the issuing authority.

It's the specialist opinion that existing corridors should be used instead of establishing new ones. This will not only result in a less significant environmental and cumulative impact but will most likely save money due to already existing roads.

## 8.2 Recommendations

The following recommendations should be considered for the authorisation:

- The High sensitivity area should be avoided as much is feasible, but the OHL can span these systems.

## 8.3 Impact Statement

The main expected impacts of the proposed OHL corridor infrastructure will include the following:

- Habitat loss and fragmentation;
- Degradation of surrounding habitat;
- Direct loss of drainage areas; and
- Mortality, disturbance and displacement caused during the construction and operational phases.

Mitigation measures as described in this report can be implemented to reduce the significance of the risk but there is still a possibility of impacts. Considering that this area has been identified as being of significance for biodiversity maintenance and ecological processes (CBAs), development may proceed but with caution and only with the implementation of mitigation measures.

Development within the High sensitivity is not regarded as a fatal flaw for the project, however, should not be considered for the pylon placements, avifaunal collision and electrocution mitigation measures must be followed. It is the opinion of the specialists that the project may be favourably considered, on condition all prescribed mitigation measures and supporting recommendations be implemented correctly and timeously.

## 9 References

- Bates, M.F., Branch, W.R., Bauer, A.M., Burger, M., Marais, J., Alexander, G.J & de Villiers, M.S. (Eds). 2014. Atlas and Red List of Reptiles of South Africa, Lesotho and Swaziland. Suricata 1. South African Biodiversity Institute, Pretoria.
- Birdlife (2015). Platberg–Karoo Conservancy IBA. <https://www.birdlife.org.za/iba-directory/platberg-karoo-conservancy/>
- BirdLife South Africa. (2017). Important Bird Areas Factsheet. <http://www.birdlife.org>
- BGIS (Biodiversity GIS). (2017). <http://bgis.sanbi.org/>
- BODATSA-POSA. (2021). Plants of South Africa - an online checklist. POSA ver. 3.0. <http://newposa.sanbi.org/>. (Accessed: April 2021).
- Boycott, R. and Bourquin, R. 2000. The Southern African Tortoise Book – A Guide to Southern African Tortoises, Terrapins and Turtles. Revised Edition. Hilton. 228 pages.
- Branch, W.R. (1998). Field Guide to Snakes and Other Reptiles of Southern Africa. Struik, Cape Town.
- Du Preez, L. & Carruthers, V. (2009) A Complete Guide to the Frogs of Southern Africa. Struik Nature, Cape Town.
- EWT. (2016). Mammal Red List 2016. [www.ewt.org.za](http://www.ewt.org.za)
- Fish, L., Mashau, A.C., Moeaha, M.J. & Nembudani, M.T. (2015). Identification Guide to Southern African Grasses: An Identification Manual with Keys, Descriptions, and Distributions. SANBI, Pretoria.
- IUCN. (2021). The IUCN Red List of Threatened Species. [www.iucnredlist.org](http://www.iucnredlist.org)
- Johnson, S. & Bytebier, B. (2015). Orchids of South Africa: A Field Guide. Struik publishers, Cape Town.
- Mucina, L. & Rutherford, M.C. (Eds.). 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelizia 19. South African National Biodiversity Institute, Pretoria, South African.
- Mucina, L., Rutherford, M.C. & Powrie, L.W. (Eds.). 2007. Vegetation map of South Africa, Lesotho and Swaziland. 1:1 000 000 scale sheet maps. 2nd ed. South African National Biodiversity Institute, Pretoria.
- Nel JL, Murray KM, Maherry AM, Petersen CP, Roux DJ, Driver A, Hill L, Van Deventer H, Funke N, Swartz ER, Smith-Adao LB, Mbona N, Downsborough L and Nienaber S. 2011. Technical Report for the National Freshwater Ecosystem Priority Areas project. WRC Report No. K5/1801.
- Ollis DJ, Snaddon CD, Job NM, and Mbona N. 2013. Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland Systems. SANBI Biodiversity Series 22. South African Biodiversity Institute, Pretoria.
- Raimonde, D. (2009). Red list of South African Plants. SANBI, Pretoria.
- SADAP (South Africa Protected Areas Database) and SACAD (South Africa Conservation Areas Database) (2021). <http://egis.environment.gov.za>
- SANBI-BGIS. 2017. Technical guidelines for CBA Maps: Guidelines for developing a map of Critical Biodiversity Areas & Ecological Support Areas using systematic biodiversity planning.
- Skowno, A.L., Raimondo, D.C., Poole, C.J., Fizzotti, B. & Slingsby, J.A. (eds.). 2019. South African National Biodiversity Assessment 2018 Technical Report Volume 1: Terrestrial Realm. South African National Biodiversity Institute, Pretoria.



Van Deventer, H., Smith-Adao, L., Collins, N.B., Grenfell, M., Grundling, A., Grundling, P-L., Impson, D., Job, N., Lötter, M., Ollis, D., Petersen, C., Scherman, P., Sieben, E., Snaddon, K., Tererai, F. and Van der Colff D. 2019. *South African National Biodiversity Assessment 2018: Technical Report*. Volume 2b: Inland Aquatic (Freshwater) Realm. CSIR report number CSIR/NRE/ECOS/IR/2019/0004/A. South African National Biodiversity Institute, Pretoria. <http://hdl.handle.net/20.500.12143/6230>.

Van Deventer, H., Smith-Adao, L., Mbona, N., Petersen, C., Skowno, A., Collins, N.B., Grenfell, M., Job, N., Lötter, M., Ollis, D., Scherman, P., Sieben, E. & Snaddon, K. 2018. *South African National Biodiversity Assessment 2018: Technical Report*. Volume 2a: South African Inventory of Inland Aquatic Ecosystems (SAIIAE). Version 3, final released on 3 October 2019. Council for Scientific and Industrial Research (CSIR) and South African National Biodiversity Institute (SANBI): Pretoria, South Africa.

## 10 Appendix Items

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

Family	Taxon	IUCN
Poaceae	<i>Oropetium capense</i>	LC
Hyacinthaceae	<i>Lachenalia ensifolia</i>	LC
Asteraceae	<i>Chrysocoma ciliata</i>	LC
Poaceae	<i>Eragrostis curvula</i>	LC
Thymelaeaceae	<i>Lasiosiphon polycephalus</i>	LC
Poaceae	<i>Stipagrostis obtusa</i>	LC
Hyacinthaceae	<i>Daubenya comata</i>	LC
Scrophulariaceae	<i>Selago albida</i>	LC
Scrophulariaceae	<i>Nemesia sp.</i>	
Poaceae	<i>Tragus racemosus</i>	LC
Poaceae	<i>Eragrostis truncata</i>	LC
Asteraceae	<i>Phymaspermum aciculare</i>	LC
Scrophulariaceae	<i>Nemesia linearis</i>	LC
Asparagaceae	<i>Asparagus striatus</i>	LC
Poaceae	<i>Eragrostis procumbens</i>	LC
Crassulaceae	<i>Crassula corallina subsp. corallina</i>	LC
Asteraceae	<i>Pentzia calcarea</i>	LC
Ricciaceae	<i>Riccia albornata</i>	
Asteraceae	<i>Phymaspermum parvifolium</i>	LC
Poaceae	<i>Tragus berteronianus</i>	LC
Pteridaceae	<i>Cheilanthes hirta var. hirta</i>	LC
Poaceae	<i>Eragrostis procumbens</i>	LC
Scrophulariaceae	<i>Manulea fragrans</i>	LC
Poaceae	<i>Eragrostis tef</i>	NE
Hyacinthaceae	<i>Lachenalia ensifolia</i>	LC
Pteridaceae	<i>Cheilanthes eckloniana</i>	LC
Poaceae	<i>Eragrostis truncata</i>	LC
Melanthaceae	<i>Melianthus dregeanus subsp. dregeanus</i>	LC
Geraniaceae	<i>Monsonia salmoniflora</i>	LC
Amaranthaceae	<i>Salsola humifusa</i>	LC
Scrophulariaceae	<i>Jamesbrittenia filicaulis</i>	LC
Aizoaceae	<i>Oscularia deltooides</i>	LC
Amaranthaceae	<i>Bassia salsoloides</i>	LC
Asteraceae	<i>Pentzia incana</i>	LC
Malvaceae	<i>Hermannia burkei</i>	LC
Poaceae	<i>Eragrostis lehmanniana var. lehmanniana</i>	LC
Scrophulariaceae	<i>Limosella africana var. africana</i>	LC
Asteraceae	<i>Pentzia globosa</i>	LC

<b>Scrophulariaceae</b>	<i>Jamesbrittenia tysonii</i>	LC
<b>Anacardiaceae</b>	<i>Searsia ciliata</i>	LC
<b>Colchicaceae</b>	<i>Colchicum asteroides</i>	LC
<b>Poaceae</b>	<i>Enneapogon desvauxii</i>	LC
<b>Iridaceae</b>	<i>Syringodea concolor</i>	LC
<b>Solanaceae</b>	<i>Solanum retroflexum</i>	LC
<b>Gentianaceae</b>	<i>Sebaea pentandra var. pentandra</i>	LC
<b>Scrophulariaceae</b>	<i>Selago albida</i>	LC
<b>Asteraceae</b>	<i>Hertia kraussii</i>	LC
<b>Hypericaceae</b>	<i>Hypericum lalandii</i>	LC
<b>Campanulaceae</b>	<i>Wahlenbergia nodosa</i>	LC
<b>Amaranthaceae</b>	<i>Alternanthera pungens</i>	
<b>Scrophulariaceae</b>	<i>Jamesbrittenia tysonii</i>	LC
<b>Asteraceae</b>	<i>Chrysocoma ciliata</i>	LC
<b>Poaceae</b>	<i>Tragus koelerioides</i>	LC
<b>Orchidaceae</b>	<i>Satyrium longicauda var. longicauda</i>	NE
<b>Euphorbiaceae</b>	<i>Euphorbia arida</i>	LC
<b>Oxalidaceae</b>	<i>Oxalis depressa</i>	LC
<b>Limeaceae</b>	<i>Limeum sp.</i>	
<b>Scrophulariaceae</b>	<i>Chaenostoma rotundifolium</i>	LC
<b>Poaceae</b>	<i>Aristida vestita</i>	LC
<b>Poaceae</b>	<i>Eragrostis bicolor</i>	LC
<b>Asteraceae</b>	<i>Hertia kraussii</i>	LC
<b>Asphodelaceae</b>	<i>Haworthiopsis tessellata var. tessellata</i>	
<b>Scrophulariaceae</b>	<i>Chaenostoma halimifolium</i>	LC
<b>Poaceae</b>	<i>Digitaria eriantha</i>	LC
<b>Scrophulariaceae</b>	<i>Peliostomum leucorrhizum</i>	LC
<b>Ruscaceae</b>	<i>Sansevieria aethiopica</i>	LC
<b>Scrophulariaceae</b>	<i>Peliostomum organoides</i>	LC
<b>Apocynaceae</b>	<i>Microloma armatum var. armatum</i>	LC
<b>Asteraceae</b>	<i>Arctotis leiocarpa</i>	LC
<b>Poaceae</b>	<i>Fingerhuthia africana</i>	LC
<b>Lamiaceae</b>	<i>Salvia verbenaca</i>	LC
<b>Caryophyllaceae</b>	<i>Dianthus micropetalus</i>	LC
<b>Asteraceae</b>	<i>Geigeria ornativa subsp. ornativa</i>	LC
<b>Acanthaceae</b>	<i>Barleria rigida var. rigida</i>	
<b>Zygophyllaceae</b>	<i>Roepera lichtensteiniana</i>	
<b>Solanaceae</b>	<i>Lycium horridum</i>	LC
<b>Apocynaceae</b>	<i>Stapelia grandiflora var. grandiflora</i>	LC
<b>Apocynaceae</b>	<i>Asclepias gibba var. gibba</i>	LC
<b>Cucurbitaceae</b>	<i>Cucumis africanus</i>	LC
<b>Asteraceae</b>	<i>Pentzia globosa</i>	LC

<b>Amaranthaceae</b>	<i>Bassia salsoloides</i>	LC
<b>Scrophulariaceae</b>	<i>Selago albida</i>	LC
<b>Asteraceae</b>	<i>Hertia kraussii</i>	LC
<b>Asteraceae</b>	<i>Lepidostephium denticulatum</i>	LC
<b>Amaranthaceae</b>	<i>Chenopodiastrum murale</i>	
<b>Malvaceae</b>	<i>Hermannia burkei</i>	LC
<b>Poaceae</b>	<i>Puccinellia acroxantha</i>	LC
<b>Cyperaceae</b>	<i>Bulbostylis humilis</i>	LC
<b>Asteraceae</b>	<i>Helichrysum asperum var. asperum</i>	LC
<b>Asteraceae</b>	<i>Pentzia sp.</i>	
<b>Cucurbitaceae</b>	<i>Cucumis heptadactylus</i>	LC
<b>Asteraceae</b>	<i>Pentzia lanata</i>	LC
<b>Aizoaceae</b>	<i>Mesembryanthemum coriarium</i>	
<b>Iridaceae</b>	<i>Moraea sp.</i>	
<b>Pteridaceae</b>	<i>Cheilanthes eckloniana</i>	LC
<b>Scrophulariaceae</b>	<i>Zaluzianskya karrooica</i>	LC
<b>Poaceae</b>	<i>Eragrostis pilosa</i>	LC
<b>Boraginaceae</b>	<i>Heliotropium lineare</i>	LC
<b>Asphodelaceae</b>	<i>Kniphofia ensifolia subsp. ensifolia</i>	LC
<b>Poaceae</b>	<i>Stipagrostis ciliata var. capensis</i>	LC
<b>Scrophulariaceae</b>	<i>Hebenstretia dura</i>	LC
<b>Iridaceae</b>	<i>Syringodea concolor</i>	LC
<b>Asteraceae</b>	<i>Pentzia spinescens</i>	LC
<b>Poaceae</b>	<i>Pentameris setifolia</i>	LC
<b>Scrophulariaceae</b>	<i>Selago albida</i>	LC
<b>Asteraceae</b>	<i>Felicia muricata subsp. muricata</i>	LC
<b>Hyacinthaceae</b>	<i>Dipcadi viride</i>	LC
<b>Santalaceae</b>	<i>Osyris lanceolata</i>	LC
<b>Asteraceae</b>	<i>Hertia pallens</i>	LC
<b>Asteraceae</b>	<i>Oedera humilis</i>	
<b>Poaceae</b>	<i>Sorghum halepense</i>	NE
<b>Orchidaceae</b>	<i>Disa pulchra</i>	LC
<b>Aizoaceae</b>	<i>Ruschia sp.</i>	
<b>Aizoaceae</b>	<i>Galenia pubescens</i>	LC
<b>Dryopteridaceae</b>	<i>Arachniodes webbiana subsp. foliosa</i>	LC
<b>Caryophyllaceae</b>	<i>Dianthus micropetalus</i>	LC
<b>Asphodelaceae</b>	<i>Haworthiopsis tessellata</i>	
<b>Amaranthaceae</b>	<i>Salsola dealata</i>	LC
<b>Asteraceae</b>	<i>Gazania jurineifolia subsp. jurineifolia</i>	LC
<b>Poaceae</b>	<i>Chloris virgata</i>	LC
<b>Scrophulariaceae</b>	<i>Selago albida</i>	LC
<b>Poaceae</b>	<i>Eragrostis homomalla</i>	LC

<b>Asteraceae</b>	<i>Senecio isatideus</i>	LC
<b>Poaceae</b>	<i>Eragrostis obtusa</i>	LC
<b>Cucurbitaceae</b>	<i>Cucumis myriocarpus subsp. leptodermis</i>	LC
<b>Asteraceae</b>	<i>Osteospermum leptolobum</i>	LC
<b>Pottiaceae</b>	<i>Tortula atrovirens</i>	
<b>Malvaceae</b>	<i>Hermannia pulchella</i>	LC
<b>Asteraceae</b>	<i>Osteospermum scariosum var. scariosum</i>	NE
<b>Poaceae</b>	<i>Tragus berteronianus</i>	LC
<b>Pottiaceae</b>	<i>Pseudocrossidium crinitum</i>	
<b>Aizoaceae</b>	<i>Ruschia sp.</i>	
<b>Malvaceae</b>	<i>Hermannia pulchella</i>	LC
<b>Asteraceae</b>	<i>Oedera humilis</i>	
<b>Asteraceae</b>	<i>Oedera humilis</i>	
<b>Poaceae</b>	<i>Heteropogon contortus</i>	LC
<b>Leucobryaceae</b>	<i>Campylopus robillardei</i>	
<b>Asteraceae</b>	<i>Felicia filifolia subsp. filifolia</i>	LC
<b>Poaceae</b>	<i>Sporobolus ioclados</i>	LC
<b>Lobeliaceae</b>	<i>Monopsis scabra</i>	LC
<b>Poaceae</b>	<i>Sporobolus discosporus</i>	LC
<b>Poaceae</b>	<i>Enneapogon desvauxii</i>	LC
<b>Aizoaceae</b>	<i>Ruschia sp.</i>	
<b>Poaceae</b>	<i>Cynodon incompletus</i>	LC
<b>Scrophulariaceae</b>	<i>Aptosimum spinescens</i>	LC
<b>Amaranthaceae</b>	<i>Salsola calluna</i>	LC
<b>Poaceae</b>	<i>Stipagrostis obtusa</i>	LC
<b>Asteraceae</b>	<i>Pteronia glaucescens</i>	LC
<b>Malvaceae</b>	<i>Hermannia erodioides</i>	LC
<b>Poaceae</b>	<i>Puccinellia acroxantha</i>	LC
<b>Poaceae</b>	<i>Aristida congesta subsp. barbicollis</i>	LC
<b>Brassicaceae</b>	<i>Erucastrum strigosum</i>	LC
<b>Poaceae</b>	<i>Eragrostis curvula</i>	LC
<b>Aizoaceae</b>	<i>Mesembryanthemum coriarium</i>	
<b>Asparagaceae</b>	<i>Asparagus suaveolens</i>	LC
<b>Cucurbitaceae</b>	<i>Cucumis myriocarpus subsp. leptodermis</i>	LC
<b>Asteraceae</b>	<i>Osteospermum leptolobum</i>	LC
<b>Poaceae</b>	<i>Themeda triandra</i>	LC
<b>Asteraceae</b>	<i>Dimorphotheca cuneata</i>	LC
<b>Aizoaceae</b>	<i>Delosperma sp.</i>	
<b>Aizoaceae</b>	<i>Mesembryanthemum coriarium</i>	
<b>Kewaceae</b>	<i>Kewa salsoloides</i>	LC
<b>Fabaceae</b>	<i>Lessertia annularis</i>	LC
<b>Poaceae</b>	<i>Enneapogon scaber</i>	LC

<b>Poaceae</b>	<i>Eragrostis barrelieri</i>	NE
<b>Poaceae</b>	<i>Eragrostis curvula</i>	LC
<b>Asteraceae</b>	<i>Pentzia globosa</i>	LC
<b>Asteraceae</b>	<i>Dimorphotheca zeyheri</i>	LC
<b>Poaceae</b>	<i>Puccinellia distans</i>	NE
<b>Asteraceae</b>	<i>Helichrysum micropoides</i>	LC
<b>Amaranthaceae</b>	<i>Salsola glabrescens</i>	LC
<b>Asteraceae</b>	<i>Osteospermum leptolobum</i>	LC
<b>Asteraceae</b>	<i>Osteospermum leptolobum</i>	LC
<b>Geraniaceae</b>	<i>Pelargonium minimum</i>	LC
<b>Poaceae</b>	<i>Aristida adscensionis</i>	LC
<b>Poaceae</b>	<i>Sporobolus ioclados</i>	LC
<b>Hyacinthaceae</b>	<i>Daubenya comata</i>	LC
<b>Poaceae</b>	<i>Cenchrus longisetus</i>	NE
<b>Poaceae</b>	<i>Oropetium capense</i>	LC
<b>Polygalaceae</b>	<i>Polygala asbestina</i>	LC
<b>Scrophulariaceae</b>	<i>Aptosimum spinescens</i>	LC
<b>Asteraceae</b>	<i>Helichrysum zeyheri</i>	LC
<b>Asteraceae</b>	<i>Osteospermum spinescens</i>	LC
<b>Acanthaceae</b>	<i>Dicliptera clinopodia</i>	LC
<b>Poaceae</b>	<i>Enneapogon scaber</i>	LC
<b>Poaceae</b>	<i>Tragus racemosus</i>	LC
<b>Caryophyllaceae</b>	<i>Dianthus micropetalus</i>	LC
<b>Scrophulariaceae</b>	<i>Aptosimum spinescens</i>	LC
<b>Amaryllidaceae</b>	<i>Cyrtanthus huttonii</i>	LC
<b>Scrophulariaceae</b>	<i>Aptosimum procumbens</i>	LC
<b>Asteraceae</b>	<i>Pentzia lanata</i>	LC
<b>Hyacinthaceae</b>	<i>Ornithogalum nanodes</i>	LC
<b>Aizoaceae</b>	<i>Mesembryanthemum coriarium</i>	
<b>Gisekiaceae</b>	<i>Gisekia pharnaceoides var. pharnaceoides</i>	LC
<b>Poaceae</b>	<i>Eragrostis mexicana subsp. virescens</i>	NE
<b>Asteraceae</b>	<i>Osteospermum leptolobum</i>	LC
<b>Poaceae</b>	<i>Eragrostis bergiana</i>	LC
<b>Pottiaceae</b>	<i>Trichostomum brachydontium</i>	
<b>Asteraceae</b>	<i>Dimorphotheca sp.</i>	
<b>Solanaceae</b>	<i>Lycium pumilum</i>	LC
<b>Poaceae</b>	<i>Eragrostis homomalla</i>	LC
<b>Asteraceae</b>	<i>Othonna pavonia</i>	LC
<b>Asteraceae</b>	<i>Oedera humilis</i>	
<b>Asteraceae</b>	<i>Lepidostephium denticulatum</i>	LC
<b>Poaceae</b>	<i>Eragrostis chloromelas</i>	LC
<b>Geraniaceae</b>	<i>Pelargonium aestivale</i>	LC

<b>Aizoaceae</b>	<i>Ruschia sp.</i>	
<b>Poaceae</b>	<i>Panicum impeditum</i>	LC
<b>Colchicaceae</b>	<i>Ornithoglossum vulgare</i>	LC
<b>Poaceae</b>	<i>Cenchrus ciliaris</i>	LC
<b>Fabaceae</b>	<i>Leobordea platycarpa</i>	LC
<b>Orchidaceae</b>	<i>Orthochilus foliosus</i>	LC
<b>Asteraceae</b>	<i>Oedera oppositifolia</i>	
<b>Aizoaceae</b>	<i>Mesembryanthemum coriarium</i>	
<b>Iridaceae</b>	<i>Syringodea concolor</i>	LC
<b>Asteraceae</b>	<i>Pentzia globosa</i>	LC
<b>Poaceae</b>	<i>Enneapogon scoparius</i>	LC
<b>Scrophulariaceae</b>	<i>Selago albida</i>	LC
<b>Aizoaceae</b>	<i>Tetragonia fruticosa</i>	LC
<b>Iridaceae</b>	<i>Gladiolus ecklonii</i>	LC
<b>Sapindaceae</b>	<i>Allophylus decipiens</i>	LC
<b>Hyacinthaceae</b>	<i>Lachenalia sp.</i>	
<b>Iridaceae</b>	<i>Syringodea concolor</i>	LC
<b>Amaranthaceae</b>	<i>Atriplex vestita var. appendiculata</i>	LC
<b>Iridaceae</b>	<i>Gladiolus permeabilis subsp. edulis</i>	LC
<b>Cucurbitaceae</b>	<i>Cucumis myriocarpus subsp. leptodermis</i>	LC
<b>Poaceae</b>	<i>Eragrostis bicolor</i>	LC
<b>Poaceae</b>	<i>Tragus racemosus</i>	LC
<b>Polygonaceae</b>	<i>Rumex lanceolatus</i>	LC
<b>Malvaceae</b>	<i>Hermannia cuneifolia var. cuneifolia</i>	LC
<b>Scrophulariaceae</b>	<i>Aptosimum spinescens</i>	LC
<b>Asteraceae</b>	<i>Oedera humilis</i>	
<b>Iridaceae</b>	<i>Gladiolus dalenii subsp. dalenii</i>	LC
<b>Lamiaceae</b>	<i>Stachys cuneata</i>	LC
<b>Poaceae</b>	<i>Eragrostis curvula</i>	LC
<b>Fabaceae</b>	<i>Melolobium candicans</i>	LC
<b>Aizoaceae</b>	<i>Mesembryanthemum coriarium</i>	
<b>Asteraceae</b>	<i>Pentzia incana</i>	LC
<b>Asteraceae</b>	<i>Pteronia glauca</i>	LC
<b>Pteridaceae</b>	<i>Cheilanthes eckloniana</i>	LC
<b>Hyacinthaceae</b>	<i>Ledebouria apertiflora</i>	LC
<b>Asteraceae</b>	<i>Osteospermum leptolobum</i>	LC
<b>Solanaceae</b>	<i>Lycium horridum</i>	LC
<b>Fabaceae</b>	<i>Cullen tomentosum</i>	LC
<b>Asparagaceae</b>	<i>Asparagus striatus</i>	LC
<b>Poaceae</b>	<i>Cenchrus ciliaris</i>	LC
<b>Asteraceae</b>	<i>Athanasia minuta subsp. minuta</i>	LC
<b>Aspleniaceae</b>	<i>Asplenium cordatum</i>	LC

<b>Asteraceae</b>	<i>Pentzia elegans</i>	LC
<b>Poaceae</b>	<i>Eragrostis curvula</i>	LC
<b>Asphodelaceae</b>	<i>Haworthiopsis tessellata</i>	
<b>Solanaceae</b>	<i>Lycium horridum</i>	LC
<b>Asteraceae</b>	<i>Printzia huttoni</i>	LC
<b>Apocynaceae</b>	<i>Ceropegia rubella</i>	
<b>Solanaceae</b>	<i>Lycium horridum</i>	LC
<b>Cucurbitaceae</b>	<i>Cucumis africanus</i>	LC
<b>Hypoxidaceae</b>	<i>Empodium elongatum</i>	LC
<b>Amaranthaceae</b>	<i>Salsola dealata</i>	LC
<b>Aizoaceae</b>	<i>Ruschia sp.</i>	
<b>Asteraceae</b>	<i>Phymaspermum parvifolium</i>	LC
<b>Lamiaceae</b>	<i>Stachys linearis</i>	LC
<b>Asteraceae</b>	<i>Geigeria filifolia</i>	LC
<b>Gisekiaceae</b>	<i>Gisekia pharnaceoides var. pharnaceoides</i>	LC
<b>Lamiaceae</b>	<i>Salvia verbenaca</i>	LC
<b>Asteraceae</b>	<i>Felicia burkei</i>	LC
<b>Poaceae</b>	<i>Sporobolus albicans</i>	LC
<b>Asteraceae</b>	<i>Oedera humilis</i>	
<b>Malvaceae</b>	<i>Hermannia pulchella</i>	LC
<b>Zygophyllaceae</b>	<i>Tetraena microcarpa</i>	
<b>Malvaceae</b>	<i>Hermannia erodioides</i>	LC
<b>Pottiaceae</b>	<i>Trichostomum brachydontium</i>	
<b>Iridaceae</b>	<i>Moraea falcifolia</i>	LC
<b>Poaceae</b>	<i>Aristida adscensionis</i>	LC
<b>Amaryllidaceae</b>	<i>Brunsvigia radulosa</i>	LC
<b>Pottiaceae</b>	<i>Pseudocrossidium crinitum</i>	
<b>Malvaceae</b>	<i>Grewia flava</i>	LC
<b>Malvaceae</b>	<i>Radyera urens</i>	LC
<b>Poaceae</b>	<i>Tragus berteronianus</i>	LC
<b>Asteraceae</b>	<i>Helichrysum dregeanum</i>	LC
<b>Scrophulariaceae</b>	<i>Zaluzianskya karrooica</i>	LC
<b>Hyacinthaceae</b>	<i>Daubenya comata</i>	LC
<b>Santalaceae</b>	<i>Thesium congestum</i>	LC
<b>Asteraceae</b>	<i>Gazania krebsiana subsp. arctotoides</i>	LC
<b>Poaceae</b>	<i>Puccinellia distans</i>	NE
<b>Euphorbiaceae</b>	<i>Euphorbia juttae</i>	LC
<b>Asteraceae</b>	<i>Pteronia sordida</i>	LC
<b>Asteraceae</b>	<i>Dimorphotheca cuneata</i>	LC
<b>Poaceae</b>	<i>Oropetium capense</i>	LC
<b>Asteraceae</b>	<i>Pentzia spinescens</i>	LC
<b>Iridaceae</b>	<i>Moraea falcifolia</i>	LC



<b>Scrophulariaceae</b>	<i>Selago paniculata</i>	LC
<b>Poaceae</b>	<i>Eragrostis curvula</i>	LC
<b>Asphodelaceae</b>	<i>Haworthiopsis tessellata</i>	
<b>Asphodelaceae</b>	<i>Haworthia bolusii</i> var. <i>blackbeardiana</i>	NE
<b>Poaceae</b>	<i>Chloris virgata</i>	LC
<b>Asteraceae</b>	<i>Oedera humilis</i>	
<b>Asteraceae</b>	<i>Schistostephium flabelliforme</i>	LC
<b>Lobeliaceae</b>	<i>Monopsis scabra</i>	LC
<b>Fabaceae</b>	<i>Calobota spinescens</i>	LC
<b>Orchidaceae</b>	<i>Satyrium membranaceum</i>	LC
<b>Melianthaceae</b>	<i>Melianthus dregeanus</i> subsp. <i>dregeanus</i>	LC
<b>Poaceae</b>	<i>Eragrostis procumbens</i>	LC
<b>Scrophulariaceae</b>	<i>Peliostomum leucorrhizum</i>	LC
<b>Apocynaceae</b>	<i>Pachypodium succulentum</i>	LC
<b>Lobeliaceae</b>	<i>Lobelia flaccida</i> subsp. <i>flaccida</i>	LC
<b>Malvaceae</b>	<i>Hermannia pulchella</i>	LC
<b>Asteraceae</b>	<i>Felicia muricata</i> subsp. <i>muricata</i>	LC
<b>Asteraceae</b>	<i>Felicia muricata</i> subsp. <i>muricata</i>	LC
<b>Asteraceae</b>	<i>Hertia pallens</i>	LC
<b>Cucurbitaceae</b>	<i>Cucumis myriocarpus</i> subsp. <i>leptodermis</i>	LC
<b>Asteraceae</b>	<i>Berkheya</i> sp.	
<b>Poaceae</b>	<i>Stipagrostis namaquensis</i>	LC
<b>Pteridaceae</b>	<i>Cheilanthes eckloniana</i>	LC
<b>Asteraceae</b>	<i>Oedera humilis</i>	
<b>Apocynaceae</b>	<i>Microloma armatum</i> var. <i>armatum</i>	LC
<b>Scrophulariaceae</b>	<i>Manulea fragrans</i>	LC
<b>Asteraceae</b>	<i>Hertia pallens</i>	LC
<b>Asteraceae</b>	<i>Senecio niveus</i>	LC
<b>Poaceae</b>	<i>Tragus koelerioides</i>	LC
<b>Poaceae</b>	<i>Eragrostis curvula</i>	LC
<b>Polygalaceae</b>	<i>Polygala ephedroides</i>	LC
<b>Asteraceae</b>	<i>Berkheya eriobasis</i>	LC
<b>Geraniaceae</b>	<i>Pelargonium tragacanthoides</i>	LC
<b>Malvaceae</b>	<i>Hermannia pulchella</i>	LC
<b>Asphodelaceae</b>	<i>Kniphofia ensifolia</i> subsp. <i>ensifolia</i>	LC
<b>Asteraceae</b>	<i>Leysera tenella</i>	LC
<b>Euphorbiaceae</b>	<i>Euphorbia flanaganii</i>	VU
<b>Poaceae</b>	<i>Eragrostis nindensis</i>	LC
<b>Tecophilaeaceae</b>	<i>Cyanella lutea</i>	
<b>Poaceae</b>	<i>Oropetium capense</i>	LC



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

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
<i>Amietia delalandii</i>	Delalande's River Frog	LC	Unlisted
<i>Amietia fuscigula</i>	Cape River Frog	LC	LC
<i>Amietia poyntoni</i>	Poynton's River Frog	LC	LC
<i>Breviceps adspersus</i>	Bushveld Rain Frog	LC	LC
<i>Cacosternum boettgeri</i>	Common Caco	LC	LC
<i>Kassina senegalensis</i>	Bubbling Kassina	LC	LC
<i>Poyntonophrynus vertebralis</i>	Southern Pygmy Toad	LC	LC
<i>Pyxicephalus adspersus</i>	Giant Bullfrog	NT	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>Vandijkophrynus gariepensis</i>	Karoo Toad	Not listed	Not listed
<i>Xenopus laevis</i>	Common Platanna	LC	LC

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

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2017)
<i>Afrotyphlops schlegelii</i>	Schlegel's Beaked Blind Snake	LC	Unlisted
<i>Agama aculeata</i>	Western Ground Agama	LC	Unlisted
<i>Agama atra</i>	Southern Rock Agama	LC	LC
<i>Aspidelaps lubricus</i>	Coral Shield Snake	LC	LC
<i>Bitis arietans</i>	Puff Adder	LC	Unlisted
<i>Boaedon capensis</i>	Brown House Snake	LC	LC
<i>Chondrodactylus bibronii</i>	Bibron's Gecko	LC	Unlisted
<i>Dasypeltis scabra</i>	Rhombic Egg-eater	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>Leptotyphlops scutifrons</i>	Peters' Thread Snake	LC	Unlisted
<i>Lycophidion capense</i>	Cape Wolf Snake	LC	Unlisted
<i>Monopeltis capensis</i>	Cape Worm Lizard	LC	LC
<i>Naja nivea</i>	Cape Cobra	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</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>Psammobates tentorius</i>	Tent Tortoise	LC	LC
<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</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 sulcata sulcata</i>	Western Rock Skink	LC	Unlisted
<i>Trachylepis variegata</i>	Variiegated Skink	LC	Unlisted
<i>Varanus albigularis albigularis</i>	Southern Rock Monitor	LC	Unlisted
<i>Varanus niloticus</i>	Water Monitor	LC	Unlisted

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

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
<i>Aethomys namaquensis</i>	Namaqua rock rat	LC	LC
<i>Antidorcas marsupialis</i>	Sclater's Shrew	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>Cryptomys hottentotus</i>	Common Mole-rat	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 edwardii</i>	Cape Rock Sengi	LC	LC
<i>Elephantulus myurus</i>	Eastern Rock Sengi	LC	LC
<i>Elephantulus rufescens</i>	Western 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>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>Macroscelides proboscideus</i>	Round Eared Elephant Shrew	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>Neoromicia zuluensis</i>	Aloe Bat	LC	LC
<i>Orycteropus afer</i>	Aardvark	LC	LC
<i>Otocyon megalotis</i>	Bat-eared Fox	LC	LC
<i>Otomys unisulcatus</i>	Karoo Bush Rat	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>Phacochoerus africanus</i>	Common Warthog	LC	LC
<i>Poecilogale albinucha</i>	African Striped Weasel	NT	LC
<i>Procavia capensis</i>	Rock Hyrax	LC	LC
<i>Pronolagus saundersiae</i>	Hewitt's Red Rock Rabbit	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>Rhodomys pumilio</i>	Xeric Four-striped Mouse	LC	LC
<i>Rhinolophus darlingi</i>	Darling's Horseshoe Bat	LC	LC
<i>Rousettus aegyptiacus</i>	Egyptian Fruit Bat	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

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

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
<i>Acrocephalus baeticatus</i>	Reed-warbler, African	Unlisted	Unlisted
<i>Acrocephalus gracilirostris</i>	Swamp-warbler, Lesser	Unlisted	LC
<i>Actitis hypoleucos</i>	Sandpiper, Common	Unlisted	LC
<i>Afrotis afraoides</i>	Korhaan, Northern Black	Unlisted	LC
<i>Alopochen aegyptiaca</i>	Goose, Egyptian	Unlisted	LC
<i>Amadina erythrocephala</i>	Finch, Red-headed	Unlisted	LC
<i>Anas capensis</i>	Teal, Cape	Unlisted	LC
<i>Anas erythrorhyncha</i>	Teal, Red-billed	Unlisted	LC
<i>Anas sparsa</i>	Duck, African Black	Unlisted	LC
<i>Anas undulata</i>	Duck, Yellow-billed	Unlisted	LC
<i>Anthoscopus minutus</i>	Penduline-tit, Cape	Unlisted	LC
<i>Anthus cinnamomeus</i>	Pipit, African	Unlisted	LC
<i>Anthus crenatus</i>	Pipit, African Rock	NT	NT
<i>Anthus nicholsoni</i>	Nicholson's pipit	Unlisted	LC
<i>Anthus similis</i>	Pipit, Long-billed	Unlisted	LC
<i>Anthus vaalensis</i>	Pipit, Buffy	Unlisted	LC
<i>Apus affinis</i>	Swift, Little	Unlisted	LC
<i>Apus apus</i>	Swift, Common	Unlisted	LC
<i>Apus barbatus</i>	Swift, African Black	Unlisted	LC
<i>Apus bradfieldi</i>	Swift, Bradfield's	Unlisted	LC
<i>Apus caffer</i>	Swift, White-rumped	Unlisted	LC
<i>Aquila rapax</i>	Eagle, Tawny	EN	VU
<i>Aquila verreauxii</i>	Eagle, Verreaux's	VU	LC
<i>Ardea cinerea</i>	Heron, Grey	Unlisted	LC
<i>Ardea melanocephala</i>	Heron, Black-headed	Unlisted	LC
<i>Ardeotis kori</i>	Bustard, Kori	NT	NT
<i>Batis pririt</i>	Batis, Pririt	Unlisted	LC
<i>Bostrychia hagedash</i>	Ibis, Hageda	Unlisted	LC
<i>Bubo africanus</i>	Eagle-owl, Spotted	Unlisted	LC
<i>Bubulcus ibis</i>	Egret, Cattle	Unlisted	LC
<i>Burhinus capensis</i>	Thick-knee, Spotted	Unlisted	LC
<i>Buteo buteo</i>	Buzzard, Common (Steppe)	Unlisted	LC
<i>Buteo rufofuscus</i>	Buzzard, Jackal	Unlisted	LC
<i>Calendulauda albescens</i>	Lark, Karoo	Unlisted	LC
<i>Calendulauda sabota</i>	Lark, Sabota	Unlisted	LC
<i>Calidris ferruginea</i>	Sandpiper, Curlew	LC	NT

<i>Calidris minuta</i>	Stint, Little	LC	LC
<i>Calidris pugnax</i>	Ruff	Unlisted	LC
<i>Cecropis cucullata</i>	Swallow, Greater Striped	Unlisted	LC
<i>Cercotrichas coryphoeus</i>	Scrub-robin, Karoo	Unlisted	LC
<i>Certhilauda subcoronata</i>	Lark, Karoo Long-billed	Unlisted	LC
<i>Charadrius hiaticula</i>	Plover, Common Ringed	Unlisted	LC
<i>Charadrius pecuarius</i>	Plover, Kittlitz's	Unlisted	LC
<i>Charadrius tricollaris</i>	Plover, Three-banded	Unlisted	LC
<i>Chersomanes albofasciata</i>	Lark, Spike-heeled	Unlisted	LC
<i>Chroicocephalus cirrocephalus</i>	Gull, Grey-headed	Unlisted	LC
<i>Chrysococcyx caprius</i>	Cuckoo, Diderick	Unlisted	LC
<i>Ciconia ciconia</i>	Stork, White	Unlisted	LC
<i>Ciconia nigra</i>	Stork, Black	VU	LC
<i>Cinnyris fuscus</i>	Sunbird, Dusky	Unlisted	LC
<i>Cisticola aridulus</i>	Cisticola, Desert	Unlisted	LC
<i>Cisticola juncidis</i>	Cisticola, Zitting	Unlisted	LC
<i>Cisticola subruficapilla</i>	Cisticola, Grey-backed	Unlisted	LC
<i>Cisticola tinniens</i>	Cisticola, Levaillant's	Unlisted	LC
<i>Colius colius</i>	Mousebird, White-backed	Unlisted	LC
<i>Columba guinea</i>	Pigeon, Speckled	Unlisted	LC
<i>Columba livia</i>	Dove, Rock	Unlisted	LC
<i>Corvus albicollis</i>	Raven, White-necked	Unlisted	LC
<i>Corvus albus</i>	Crow, Pied	Unlisted	LC
<i>Corvus capensis</i>	Crow, Cape	Unlisted	LC
<i>Corythornis cristatus</i>	Kingfisher, Malachite	Unlisted	Unlisted
<i>Cossypha caffra</i>	Robin-chat, Cape	Unlisted	LC
<i>Coturnix coturnix</i>	Quail, Common	Unlisted	LC
<i>Creatophora cinerea</i>	Starling, Wattled	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 layardi</i>	Tit-Babbler, Layard's	Unlisted	LC
<i>Curruca subcoerulea</i>	Tit-babbler, Chestnut-vented	Unlisted	Unlisted
<i>Dendrocygna viduata</i>	Duck, White-faced Whistling	Unlisted	LC
<i>Egretta garzetta</i>	Egret, Little	Unlisted	LC
<i>Elanus caeruleus</i>	Kite, Black-shouldered	Unlisted	LC
<i>Emarginata schlegelii</i>	Chat, Karoo	Unlisted	LC
<i>Emarginata sinuata</i>	Chat, Sickle-winged	Unlisted	LC
<i>Emberiza capensis</i>	Bunting, Cape	Unlisted	LC



<i>Emberiza impetuani</i>	Bunting, Lark-like	Unlisted	LC
<i>Emberiza tahapisi</i>	Bunting, Cinnamon-breasted	Unlisted	LC
<i>Eremomela icteropygialis</i>	Eremomela, Yellow-bellied	Unlisted	LC
<i>Eremopterix verticalis</i>	Sparrowlark, Grey-backed	Unlisted	LC
<i>Estrilda astrild</i>	Waxbill, Common	Unlisted	LC
<i>Euplectes orix</i>	Bishop, Southern Red	Unlisted	LC
<i>Eupodotis caerulescens</i>	Korhaan, Blue	LC	NT
<i>Eupodotis vigorsii</i>	Korhaan, Karoo	NT	LC
<i>Euryptila subcinnamomea</i>	Warbler, Cinnamon-breasted	Unlisted	LC
<i>Falco amurensis</i>	Falcon, Amur	Unlisted	LC
<i>Falco biarmicus</i>	Falcon, Lanner	VU	LC
<i>Falco naumanni</i>	Kestrel, Lesser	Unlisted	LC
<i>Falco rupicoloides</i>	Kestrel, Greater	Unlisted	LC
<i>Falco rupicolus</i>	Kestrel, Rock	Unlisted	LC
<i>Fulica cristata</i>	Coot, Red-knobbed	Unlisted	LC
<i>Galerida magnirostris</i>	Lark, Large-billed	Unlisted	LC
<i>Gallinula chloropus</i>	Moorhen, Common	Unlisted	LC
<i>Grus paradisea</i>	Crane, Blue	NT	VU
<i>Hieraaetus pennatus</i>	Eagle, Booted	Unlisted	LC
<i>Himantopus himantopus</i>	Stilt, Black-winged	Unlisted	LC
<i>Hirundo albigularis</i>	Swallow, White-throated	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 infuscatus</i>	Flycatcher, Chat	Unlisted	LC
<i>Melaenornis silens</i>	Flycatcher, Fiscal	Unlisted	LC
<i>Melaniparus afer</i>	Tit, Grey	Unlisted	Unlisted
<i>Melierax canorus</i>	Goshawk, Southern Pale Chanting	Unlisted	LC
<i>Merops apiaster</i>	Bee-eater, European	Unlisted	LC
<i>Micronisus gabar</i>	Goshawk, Gabar	Unlisted	LC
<i>Mirafra fasciolata</i>	Lark, Eastern Clapper	Unlisted	LC
<i>Monticola brevipes</i>	Rock-thrush, Short-toed	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>Neotis ludwigii</i>	Bustard, Ludwig's	EN	EN

<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>Oenanthe pileata</i>	Wheatear, Capped	Unlisted	LC
<i>Onychognathus morio</i>	Starling, Red-winged	Unlisted	LC
<i>Onychognathus nabouroup</i>	Starling, Pale-winged	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>Phalacrocorax lucidus</i>	Cormorant, White-breasted	Unlisted	LC
<i>Phoenicopterus roseus</i>	Flamingo, Greater	NT	LC
<i>Platalea alba</i>	Spoonbill, African	Unlisted	LC
<i>Plectropterus gambensis</i>	Goose, Spur-winged	Unlisted	LC
<i>Plegadis falcinellus</i>	Ibis, Glossy	Unlisted	LC
<i>Plocepasser mahali</i>	Sparrow-weaver, White-browed	Unlisted	LC
<i>Ploceus capensis</i>	Weaver, Cape	Unlisted	LC
<i>Ploceus velatus</i>	Masked-weaver, Southern	Unlisted	LC
<i>Polemaetus bellicosus</i>	Eagle, Martial	EN	EN
<i>Polyboroides typus</i>	Harrier-Hawk, African	Unlisted	LC
<i>Prinia flavicans</i>	Prinia, Black-chested	Unlisted	LC
<i>Prinia maculosa</i>	Prinia, Karoo	Unlisted	LC
<i>Pterocles namaqua</i>	Sandgrouse, Namaqua	Unlisted	LC
<i>Ptyonoprogne fuligula</i>	Martin, Rock	Unlisted	Unlisted
<i>Pycnonotus nigricans</i>	Bulbul, African Red-eyed	Unlisted	LC
<i>Quelea quelea</i>	Quelea, Red-billed	Unlisted	LC
<i>Recurvirostra avosetta</i>	Avocet, Pied	Unlisted	LC
<i>Rhinoptilus africanus</i>	Courser, Double-banded	Unlisted	LC
<i>Riparia paludicola</i>	Martin, Brown-throated	Unlisted	LC
<i>Sagittarius serpentarius</i>	Secretarybird	VU	EN
<i>Saxicola torquatus</i>	Stonechat, African	Unlisted	LC
<i>Scleroptila afra</i>	Francolin, Grey-winged	Unlisted	LC
<i>Scopus umbretta</i>	Hamerkop, Hamerkop	Unlisted	LC
<i>Serinus alario</i>	Canary, Black-headed	Unlisted	LC
<i>Spatula smithii</i>	Shoveler, Cape	Unlisted	LC
<i>Spilopelia senegalensis</i>	Dove, Laughing	Unlisted	LC
<i>Stenostira scita</i>	Flycatcher, Fairy	Unlisted	LC
<i>Streptopelia capicola</i>	Turtle-dove, Cape	Unlisted	LC

<i>Streptopelia semitorquata</i>	Dove, Red-eyed	Unlisted	LC
<i>Struthio camelus</i>	Ostrich, Common	Unlisted	LC
<i>Sturnus vulgaris</i>	Starling, Common	Unlisted	LC
<i>Sylvietta rufescens</i>	Crombec, Long-billed	Unlisted	LC
<i>Tachybaptus ruficollis</i>	Grebe, Little	Unlisted	LC
<i>Tachymartitis melba</i>	Swift, Alpine	Unlisted	LC
<i>Tadorna cana</i>	Shelduck, South African	Unlisted	LC
<i>Telophorus zeylonus</i>	Bokmakierie, Bokmakierie	Unlisted	LC
<i>Threskiornis aethiopicus</i>	Ibis, African Sacred	Unlisted	LC
<i>Tricholaema leucomelas</i>	Barbet, Acacia Pied	Unlisted	LC
<i>Tringa glareola</i>	Sandpiper, Wood	Unlisted	LC
<i>Tringa nebularia</i>	Greenshank, Common	Unlisted	LC
<i>Turdus smithi</i>	Thrush, Karoo	Unlisted	LC
<i>Upupa africana</i>	Hoopoe, African	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>Vidua macroura</i>	Whydah, Pin-tailed	Unlisted	LC
<i>Zapornia flavirostra</i>	Crake, Black	Unlisted	LC
<i>Zosterops pallidus</i>	White-eye, Orange River	Unlisted	LC
<i>Zosterops virens</i>	White-eye, Cape	Unlisted	LC