THE TERRESTRIAL ECOLOGY BASELINE & IMPACT ASSESSMENTS FOR THE PROPOSED SOL INVICTUS OVERHEAD POWERLINE

Aggeneys, Northern Cape Province

August 2021

CLIENT

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1 Introduction

1.1 Background

The Biodiversity Company was appointed to undertake a fauna and flora baseline assessment for the establishment of a new 132KV Overhead Powerline (OHPL) as part of the Sol Invictus photovoltaic (PV) solar power generation facility, near Aggeneys, in the Northern Cape Province (Figure 1-1). The project infrastructure consists of the following:

- OHPL (blue line as indicated in layout);
- Collector substation at PV site; and
- Extension of substation at Aggeneys.

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 power line as “Very High”, the animal sensitivity is rated as “High” and the plant sensitivity as “Medium”.

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.

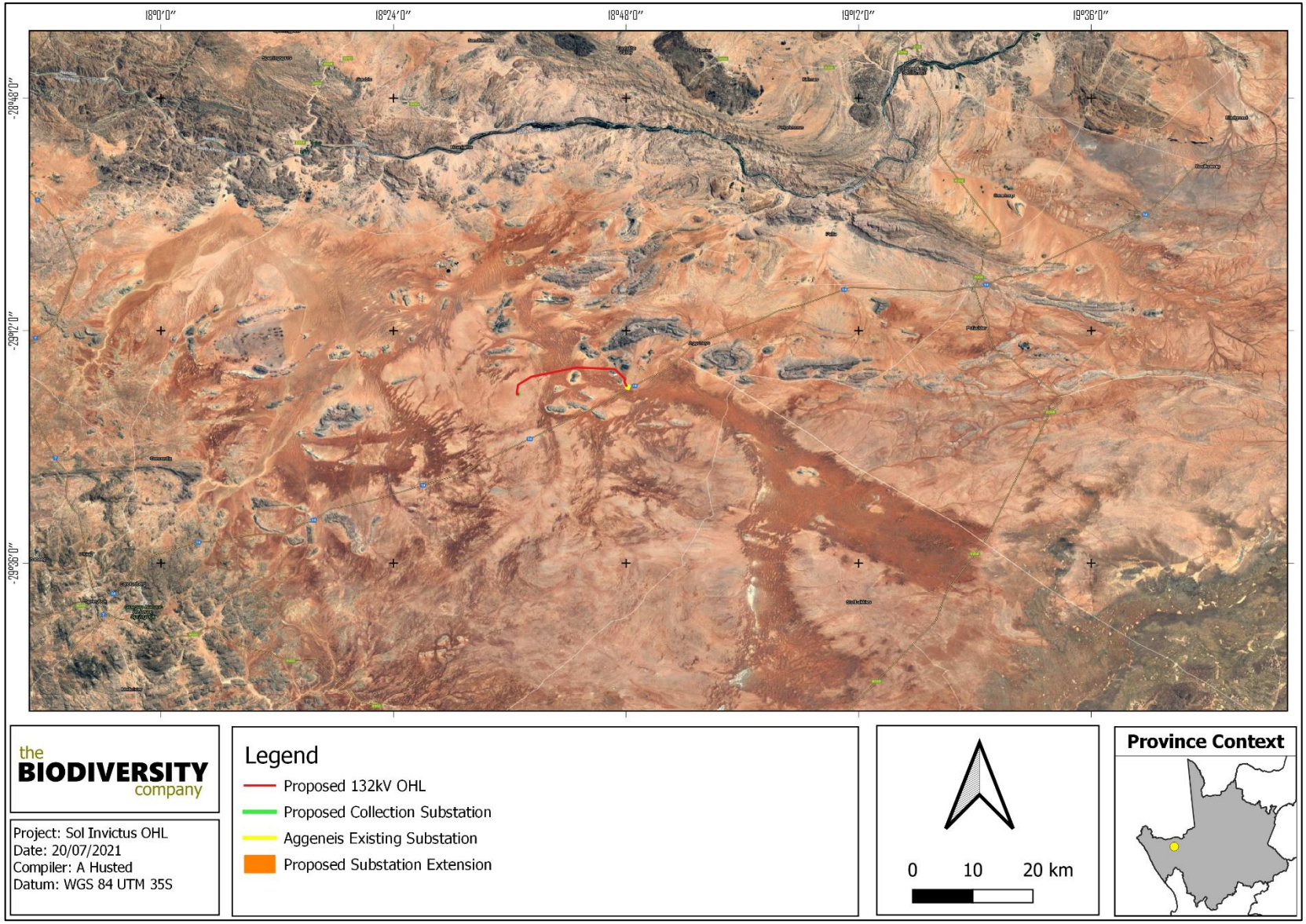


Figure 1-1 The location of the Sol Invictus powerline and substation in relation to the greater area

1.2 Specialist Details

Report Name	**THE TERRESTRIAL ECOLOGY BASELINE & IMPACT ASSESSMENTS FOR THE PROPOSED SOL INVICTUS OVERHEAD POWERLINE**
Reference	**Sol Invictus Powerline**
Submitted to	
Report Writer	**Martinus Erasmus**  Martinus Erasmus obtained his B-Tech degree in Nature Conservation in 2016 at the Tshwane University of Technology. Martinus has been conducting EIAs, basic assessments and assisting specialists in field during his studies since 2015. Martinus is a specialist terrestrial ecologist and botanist which conducts floral surveys faunal surveys which include mammals, birds, amphibians and reptiles.
Reviewer	**Andrew Husted**  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 13 years' experience in the environmental consulting field.
Declaration	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.

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;
- 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
International	Convention on Biological Diversity (CBD, 1993)
	The Convention on Wetlands (RAMSAR Convention, 1971)
	The United Nations Framework Convention on Climate Change (UNFCC,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)
National	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 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
Provincial	Northern Cape Nature Conservation act no. 9 of 2009
	Northern Cape Planning and Development Act no. 7 of 1998

3 Methods

3.1 Project Area

The project area is situated within the Nama Khoi Local Municipality, in the Namaqua District Municipality in the Northern Cape Province. Presently, the project area is surrounded by natural veld, the N14 road and the Aggeneys Airport.

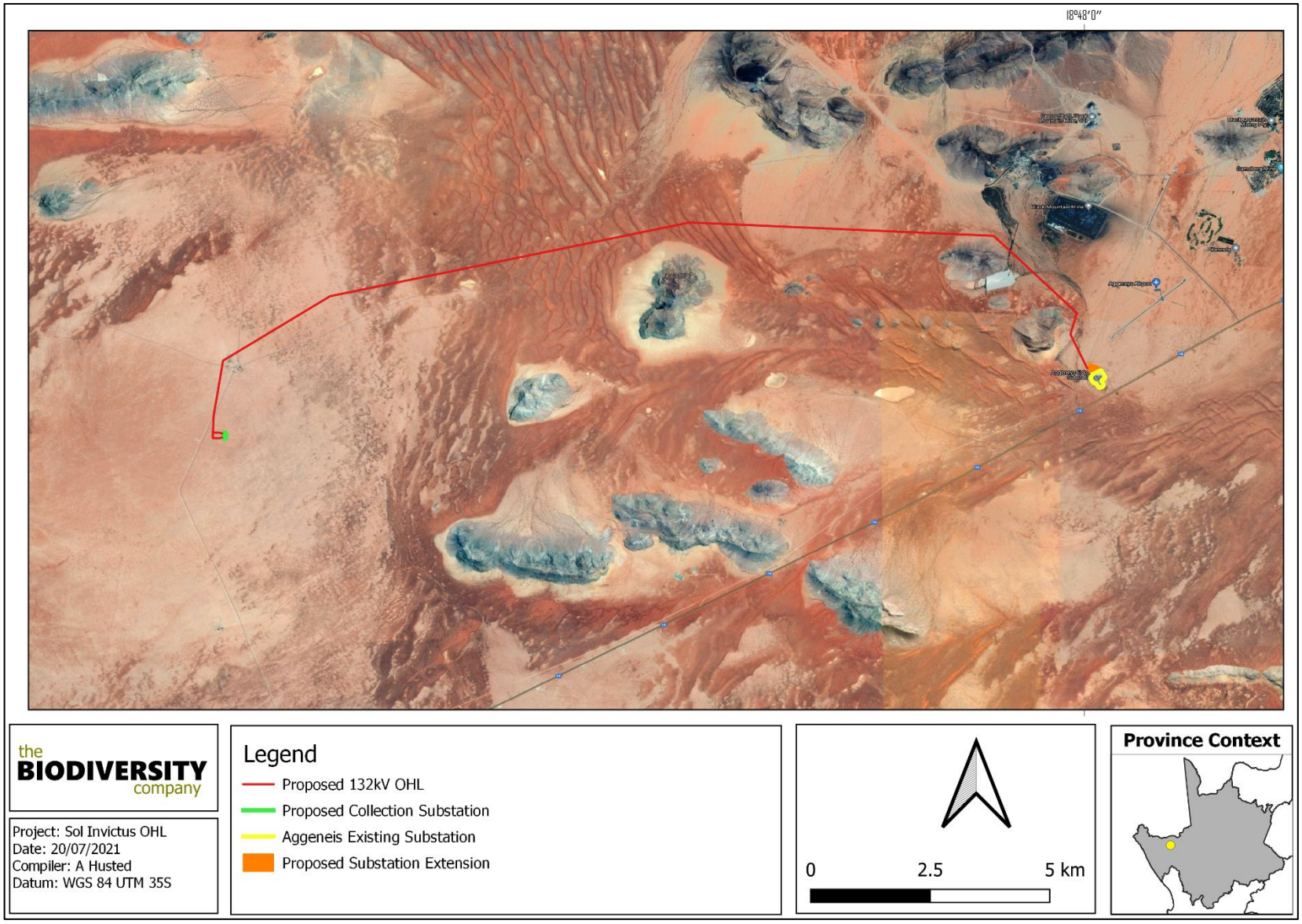


Figure 3-1 Map illustrating the location of the proposed project area

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, 2021)* – The (SAPAD) Database contains spatial data for the conservation of South Africa. It includes spatial and attribute information for both formally protected areas and areas that have less formal protection. SAPAD is updated on a continuous basis and forms the basis for the Register of Protected Areas, which is a legislative requirement under the National Environmental Management: Protected Areas Act, Act 57 of 2003.
    - *National Protected Areas Expansion Strategy (NPAES) (SANBI, 2010)* – The NPAES provides spatial information on areas that are suitable for terrestrial ecosystem protection. These focus areas are large, intact and unfragmented and therefore, of high importance for biodiversity, climate resilience and freshwater protection.
- Northern Cape Critical Biodiversity Area 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 process, and covering terrestrial and inland aquatic realms), their condition, current Protected Areas and Conservation Areas, and opportunities and constraints for effective conservation were collated.

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

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

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.

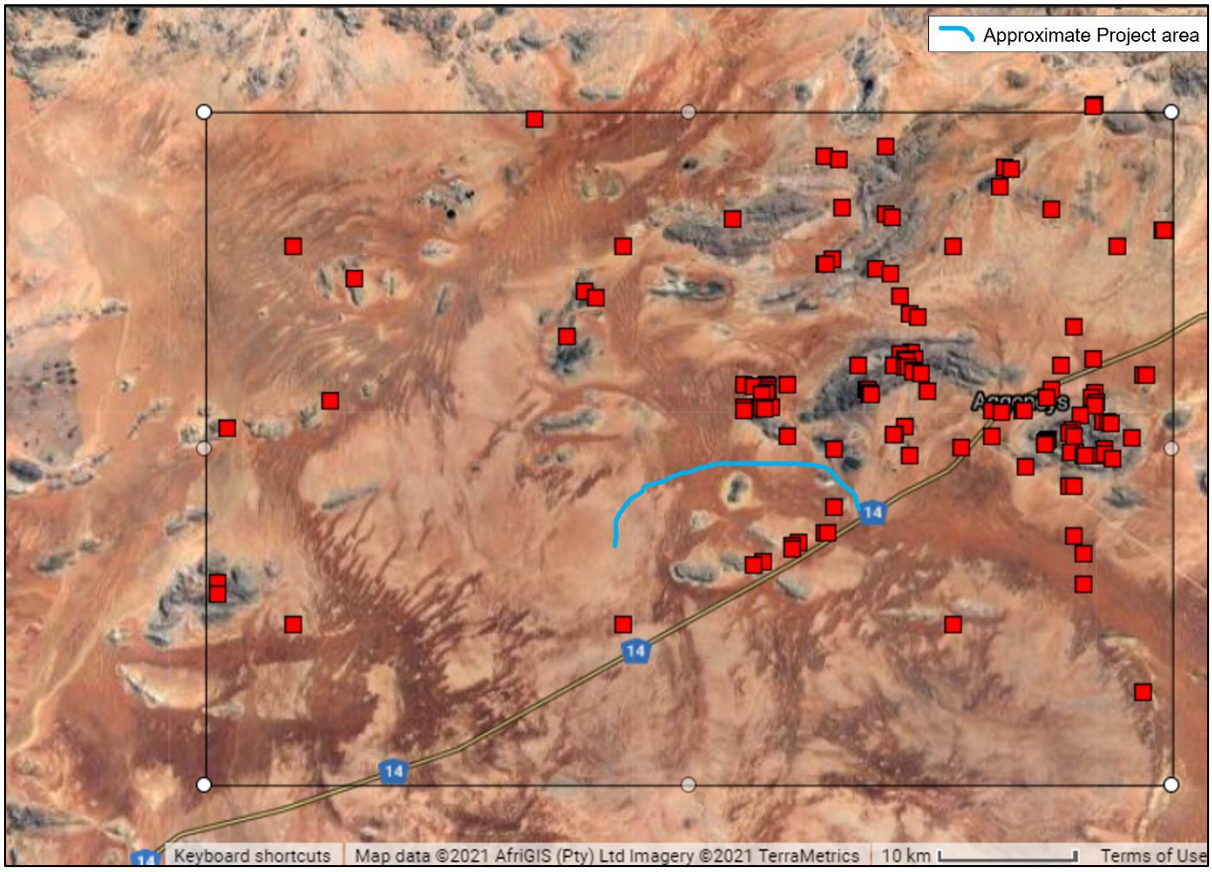


Figure 3-2 ***Map illustrating extent of area used to obtain the expected flora species list from the Plants of South Africa (POSA) database. Blue line indicates approximate location of the project area. The red squares are cluster markers of botanical records as per POSA data.***

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 2918 quarter degree square;
- Reptile list, generated from the IUCN spatial dataset (2017) and AmphibianMap database (Fitzpatrick Institute of African Ornithology, 2021b), using the 2918 quarter degree square;
- Avifauna list, generated from the Southern African Bird Atlas Project 2 (2915_1855; 2915_1850; 2915_1845; 2910_1850; 2910_1845; 2910_1840) and
- Mammal list from the IUCN spatial dataset (2017).

3.3 Biodiversity Field Assessment

A single field survey was undertaken in August 2021, 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. The powerline as well as the associated 100 m each side of the OHL corridor was covered.

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.

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^2. Any area of natural habitat of a CR ecosystem type or large area (> 0.1% of the total ecosystem type extent) of natural habitat of an EN ecosystem type. 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^2. 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.

Functional Integrity	Fulfilling Criteria
	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.
Low	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.
Very Low	Very small (< 1 ha) area. No habitat connectivity except for flying species or flora with wind-dispersed seeds. Several major current negative ecological impacts.

BI 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
Very High	Habitat that can recover rapidly (~ less than 5 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of: (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.
High	Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of: (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.
Medium	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.
Low	Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of: (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.
Very Low	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
	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.

3.5 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 site visit and therefore, this assessment does not consider temporal trends. In order to address this limitation is would be recommended that a site walkover be undertaken during the wet season for the placement of structures. This walkover would aim to identify and sensitive aspects to either be relocated or avoided (if feasible);

- Only a single season survey will be conducted for the respective studies, this would constitute a dry (cold) season survey with its limitations;
    - Flora identification is limited due to the lack of aboveground plant parts used to determine species, especially in regard to bulbous plants, the vegetation was dry and most plants had already lost the green flush;
    - It must be noted that during the walkthrough survey, only a fraction of the expected geophytes/annuals were visible due to their variable emergence patterns.
    - This is especially true for cold blooded animals, such as reptiles and amphibians, which are less active during these times.
- 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;
- The GPS used in the assessment has an accuracy of 5 m and consequently any spatial features may be offset by 5 m; and
- Avifauna:
    - Seasonal variance reduced species normally found in the area by 14% because the survey was conducted in mid-winter. Several other species are also nomadic and dependant on food and water sources characteristically sparse in winter.

4 Results & Discussion

4.1 Desktop Assessment

4.1.1 Ecologically Important Landscape Features

The GIS analysis pertaining to the relevance of the proposed project to ecologically important landscape features are summarised in Table 4-1.

Table 4-1 Summary of relevance of the proposed project to ecologically important landscape features.

Desktop Information Considered	Relevant/Irrelevant	Section
Ecosystem Threat Status	Relevant – Overlaps with a Least Concern ecosystem	5.1.1.1
Ecosystem Protection Level	Relevant – Overlaps with a Not Protected Ecosystem	5.1.1.2
Protected Areas	Irrelevant – the Karaas Nature Reserve is 16.8 km from the project area, which means the project area is outside the protected areas 5 km buffer.	5.1.1.6
Renewable Energy Development Zones	Relevant - The project area falls within the Springbok Wind REDZ	5.1.1.3
Critical Biodiversity Area	Relevant – The powerline project area overlaps with a CBA2 and an ESA area.	5.1.1.4
National Protected Areas Expansion Strategy (NPAES)	Relevant – The project area crosses a NPAES	5.1.1.5
Succulent Karoo Ecosystem Programme	Relevant - the project area overlaps with a unique bird habitat and is 3.8 km from a unique avifauna habitat	5.1.1.7
Important Bird and Biodiversity Areas	Relevant – The project area overlaps with portions of the Haramoep and Black Mountain Mine IBA	5.1.1.8

South African Inventory of Inland Aquatic Ecosystems	Relevant - The project area does not overlap with NBA rivers, it does however come in close proximity (280m) to Critically Endangered (CR) wetlands	5.1.1.9
National Freshwater Priority Area	Relevant – Project area overlaps with three unclassified FEPA rivers, and numerous river lines	5.1.1.10
Strategic Water Source Areas	Irrelevant - The project area is 302 km from the closest SWSA	-
Renewable Energy Database	Relevant – Numerous approved and planned projects can be found in the nearby vicinity	5.1.1.11

4.1.1.1 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 4-1).

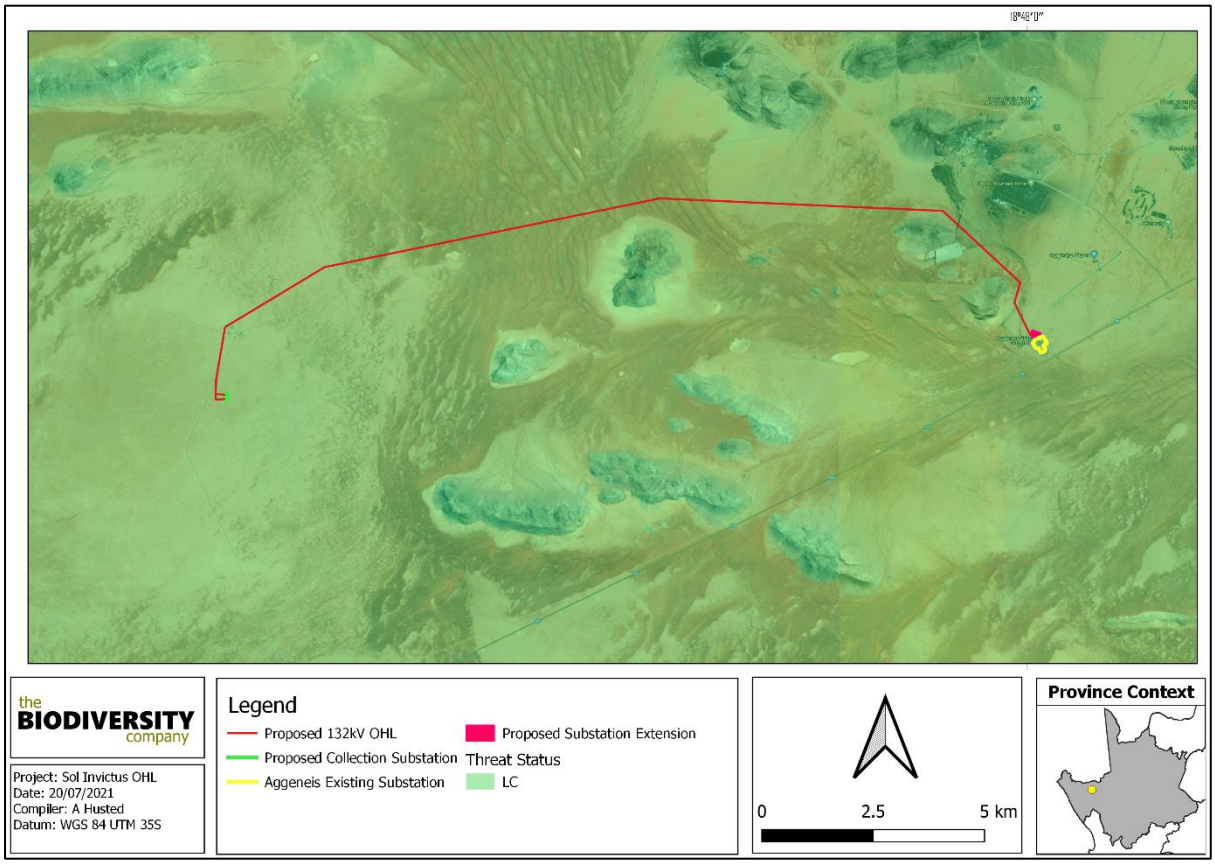


Figure 4-1 Map illustrating the ecosystem threat status associated with the project area.

4.1.1.2 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 powerline project overlaps with a NP ecosystem (Figure 4-2).

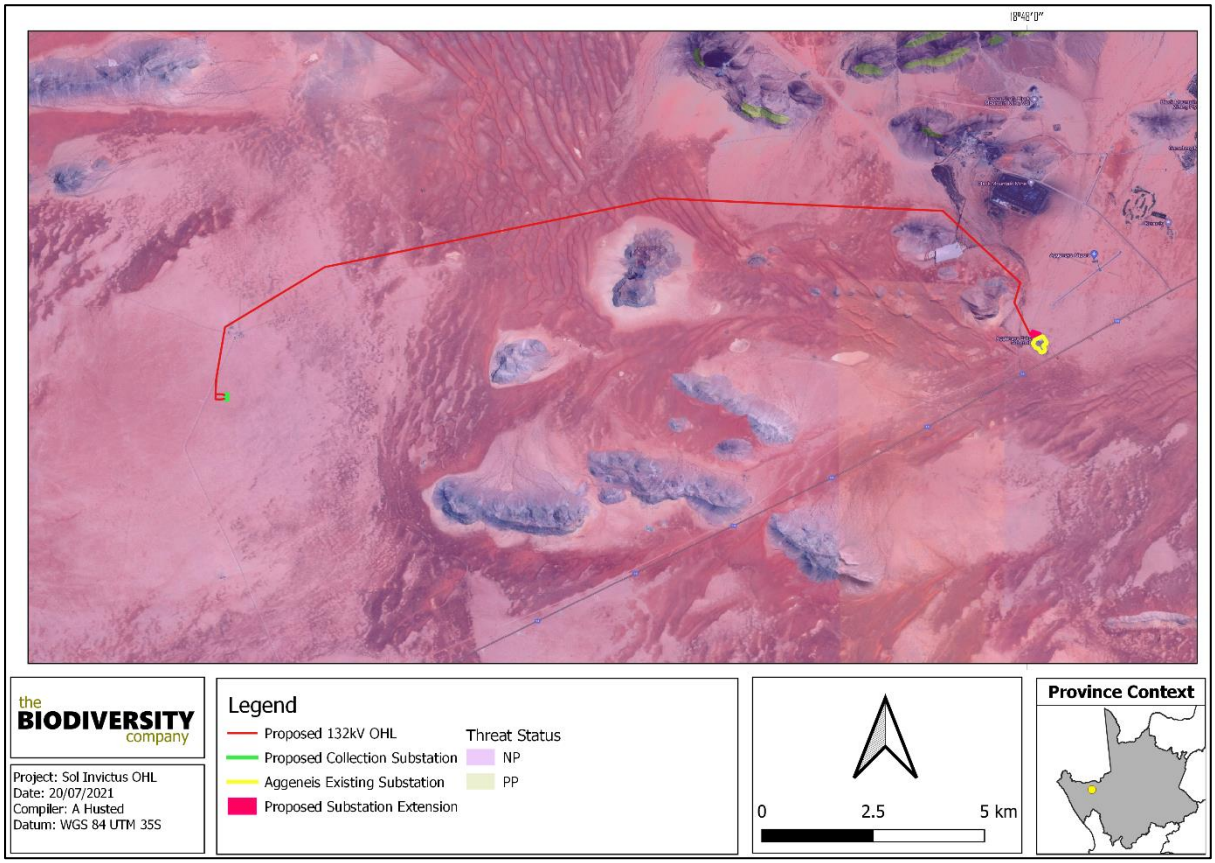


Figure 4-2 Map illustrating the ecosystem protection level associated with the project area

4.1.1.3 Renewable Energy Development Zones (REDZ)

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

More detailed information can be obtained from https://egis.environment.gov.za/redz. Information here includes the Government Notice No. 142, 144 and 145 in Government Gazette No. 44191 that specifies the procedures to be followed when applying for environmental authorisation for electricity transmission or distribution infrastructure or large scale wind and solar photovoltaic energy facilities in these REDZs. The project area falls within the Springbok Wind REDZ (Figure 4-3).

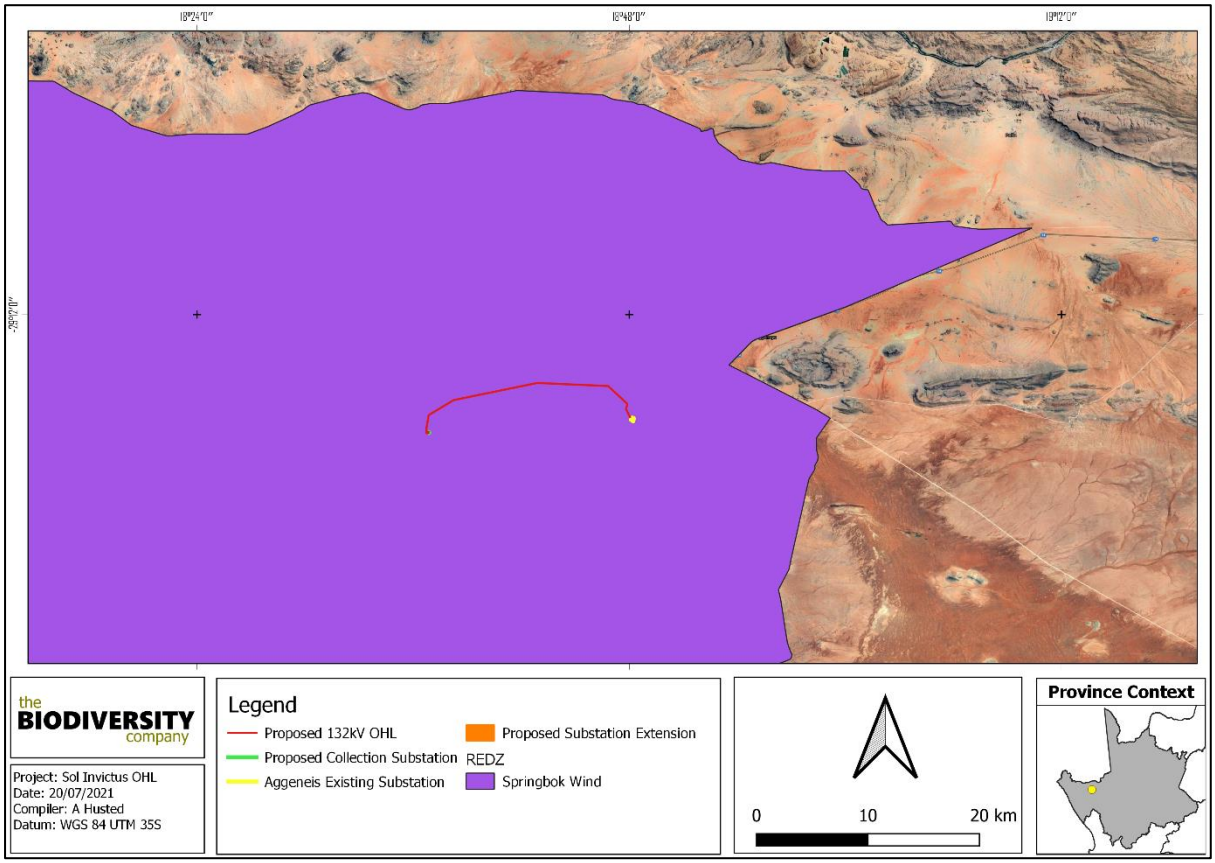


Figure 4-3 The project area in relation to the Renewable Energy Development Zone spatial data.

4.1.1.4 Critical Biodiversity Areas and Ecological Support Areas

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

Figure 4-4 shows the project area superimposed on the Terrestrial CBA map. The powerline project area overlaps with a CBA2 and an ESA area, and a limited portion of CBA1.

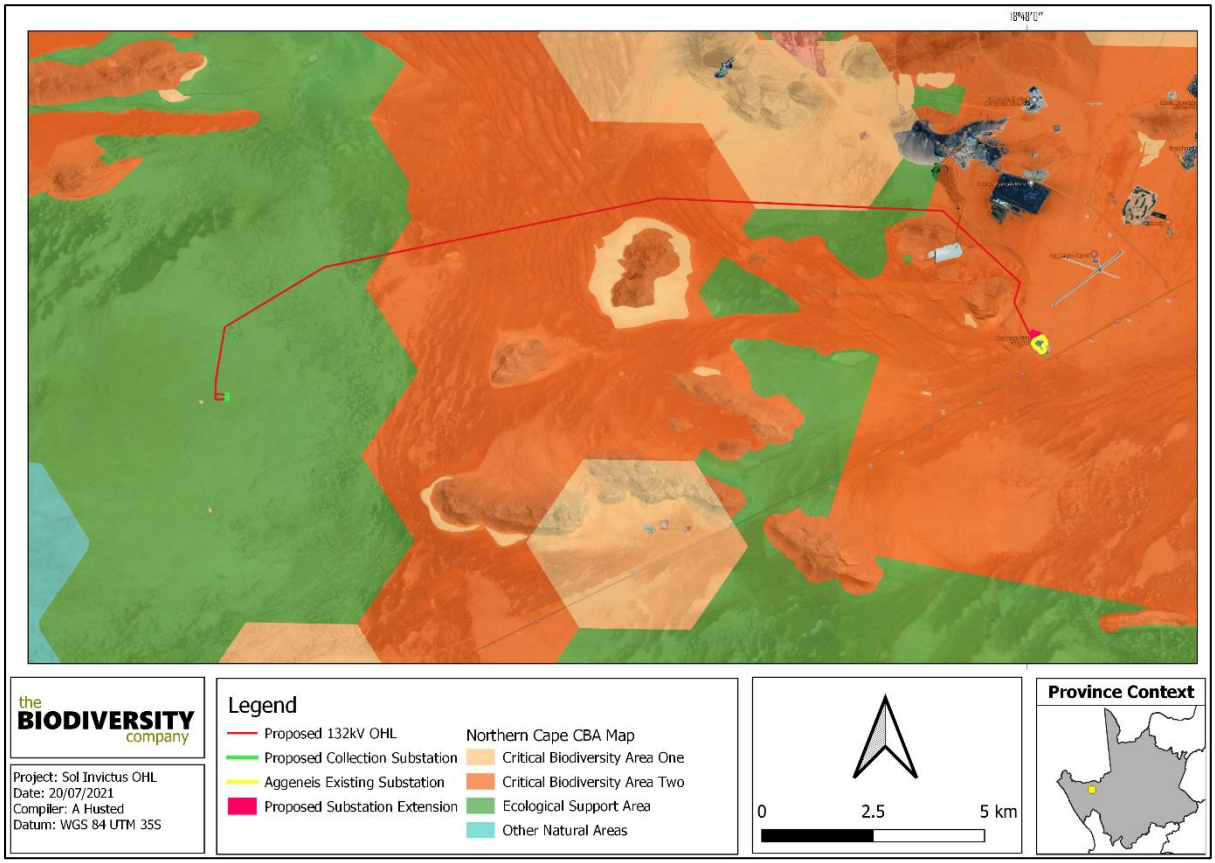


Figure 4-4 Map illustrating the locations of CBAs in the project area

4.1.1.5 National Protected Area Expansion Strategy

National Protected Area Expansion Strategy 2010 (NPAES) were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for fine scale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities (NPAES, 2010). The project area crosses a NPAES focus area as can be seen in Figure 4-5.

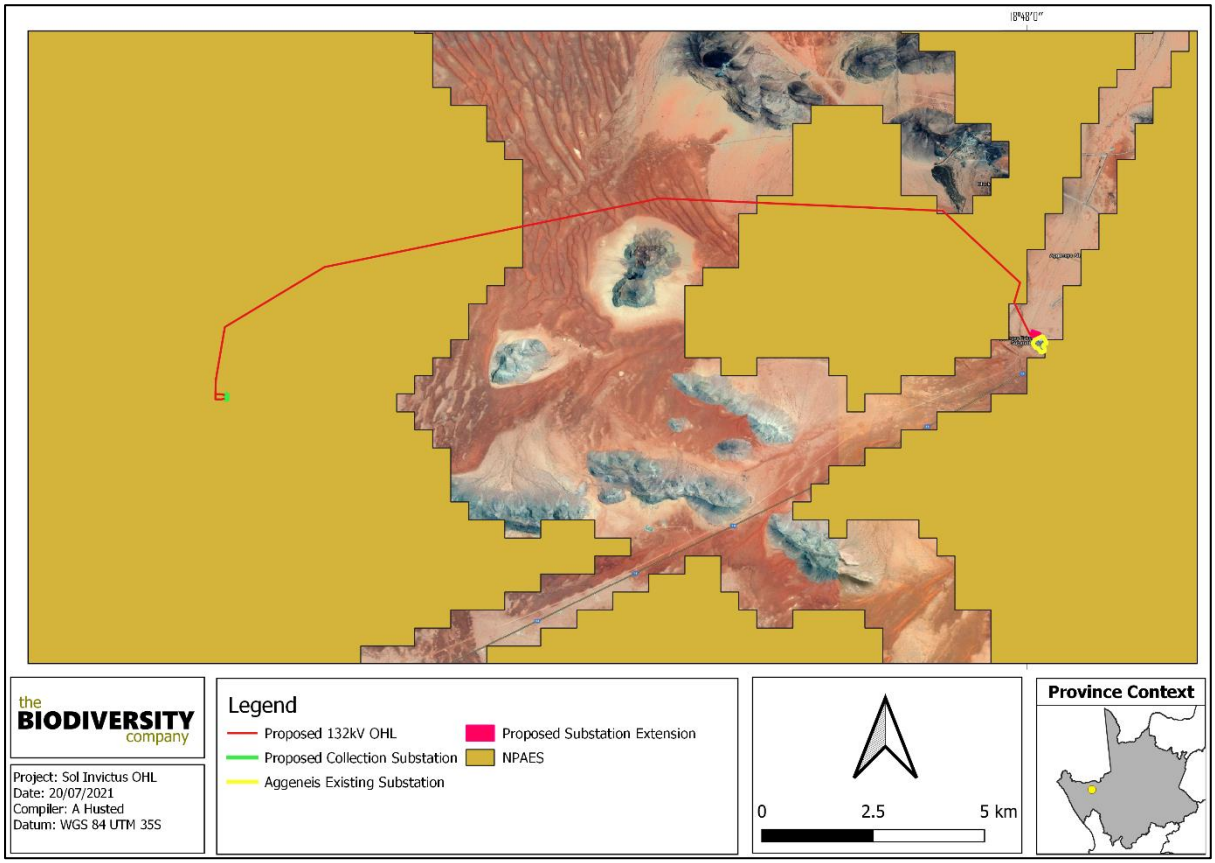


Figure 4-5 The project area in relation to the National Protected Area Expansion Strategy

4.1.1.6 Protected and Conservation Areas

The Department of Environmental Affairs maintains a spatial database on Protected Areas and Conservation Areas. The Protected Areas and Conservation Areas (PACA) Database scheme that is used for classifying protected areas (South Africa Protected Areas Database-SAPAD) and conservation areas (South Africa Conservation Areas Database-SACAD) into types and sub-types in South Africa has been considered for this component of the project.

The definition of protected areas used in these documents follows the definition of a protected area as defined in the National Environmental Management: Protected Areas Act, (Act 57 of 2003). Chapter 2 of the National Environmental Management: Protected Areas Act, 2003 sets out the "System of Protected Areas", which consists of the following kinds of protected areas:

- Special nature reserves;
- National parks;
- Nature reserves;
- Protected environments (1-4 declared in terms of the National Environmental Management: Protected Areas Act, 2003);
- World heritage sites declared in terms of the World Heritage Convention Act;
- Marine protected areas declared in terms of the Marine Living Resources Act;
- Specially protected forest areas, forest nature reserves, and forest wilderness areas declared in terms of the National Forests Act, 1998 (Act No. 84 of 1998); and

- Mountain catchment areas declared in terms of the Mountain Catchment Areas Act, 1970 (Act No. 63 of 1970).

The types of conservation areas that are currently included in the database are the following:

- Biosphere reserves;
- Ramsar sites;
- Stewardship agreements (other than nature reserves and protected environments);
- Botanical gardens;
- Transfrontier conservation areas;
- Transfrontier parks;
- Military conservation areas; and
- Conservancies.

Figure 4-6 shows that the Karaas Nature Reserve is 16.8 km from the project area, which means the project area is outside the protected areas 5 km buffer.

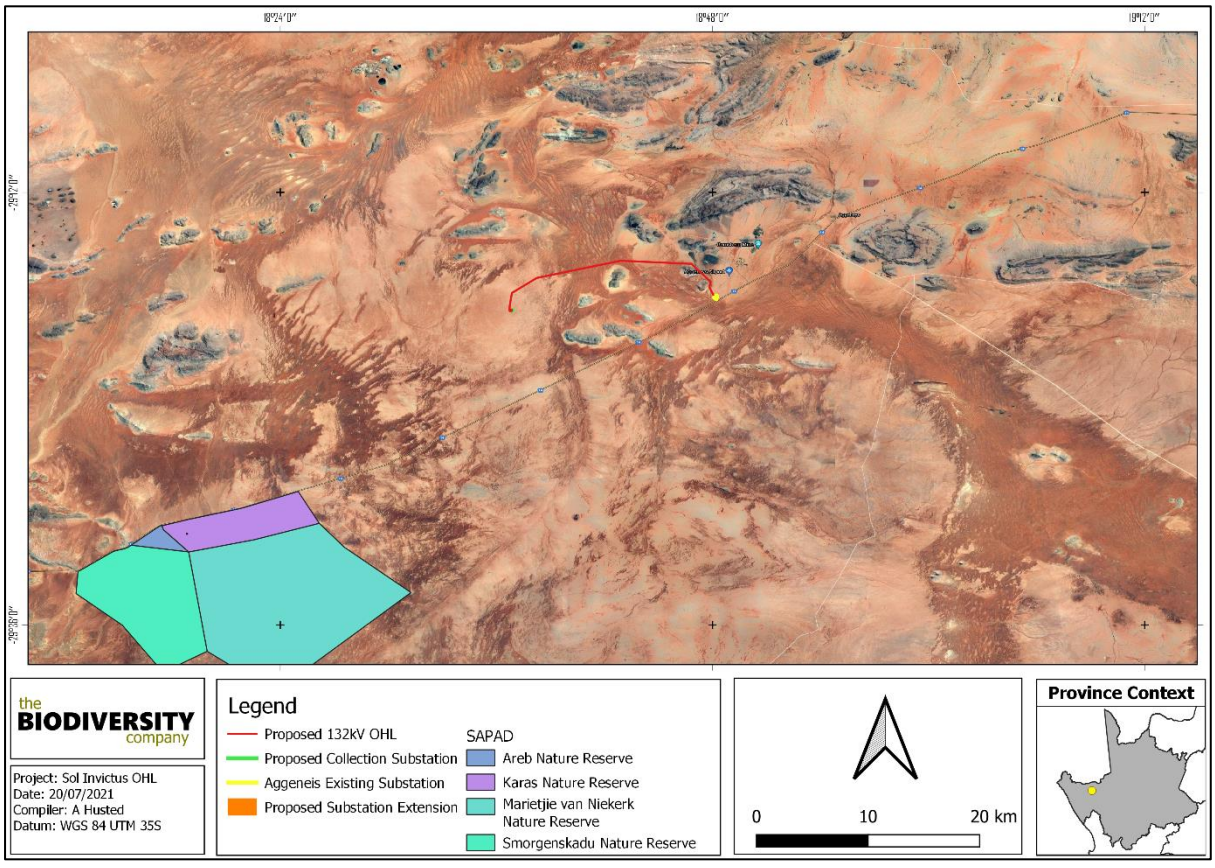


Figure 4-6 The project area in relation to the nearby protected areas

4.1.1.7 Succulent Karoo Ecosystem Programme

Succulent Karoo Ecosystem Programme (SKEP) is a long-term bioregional conservation programme, with the aim to conserve ecosystems and to develop conservation as a land-use rather than instead of land-use (SANBI, 2021). Their focal areas are:

- Increasing local, national and international awareness of the unique biodiversity of the Succulent Karoo;
- Expanding protected areas and improving conservation management, particularly through the expansion of public-private-communal-corporate partnerships;
- Support the creation of a matrix of harmonious land uses; and
- Improve institutional co-ordination to generate momentum and focus on priorities, maximise opportunities for partnerships, and ensure sustainability.

The areas of SKEP endemism for mammals, amphibians, reptiles and birds were assessed in relation to the project area, it was found that the project area overlaps with a unique bird habitat (Figure 4-7).

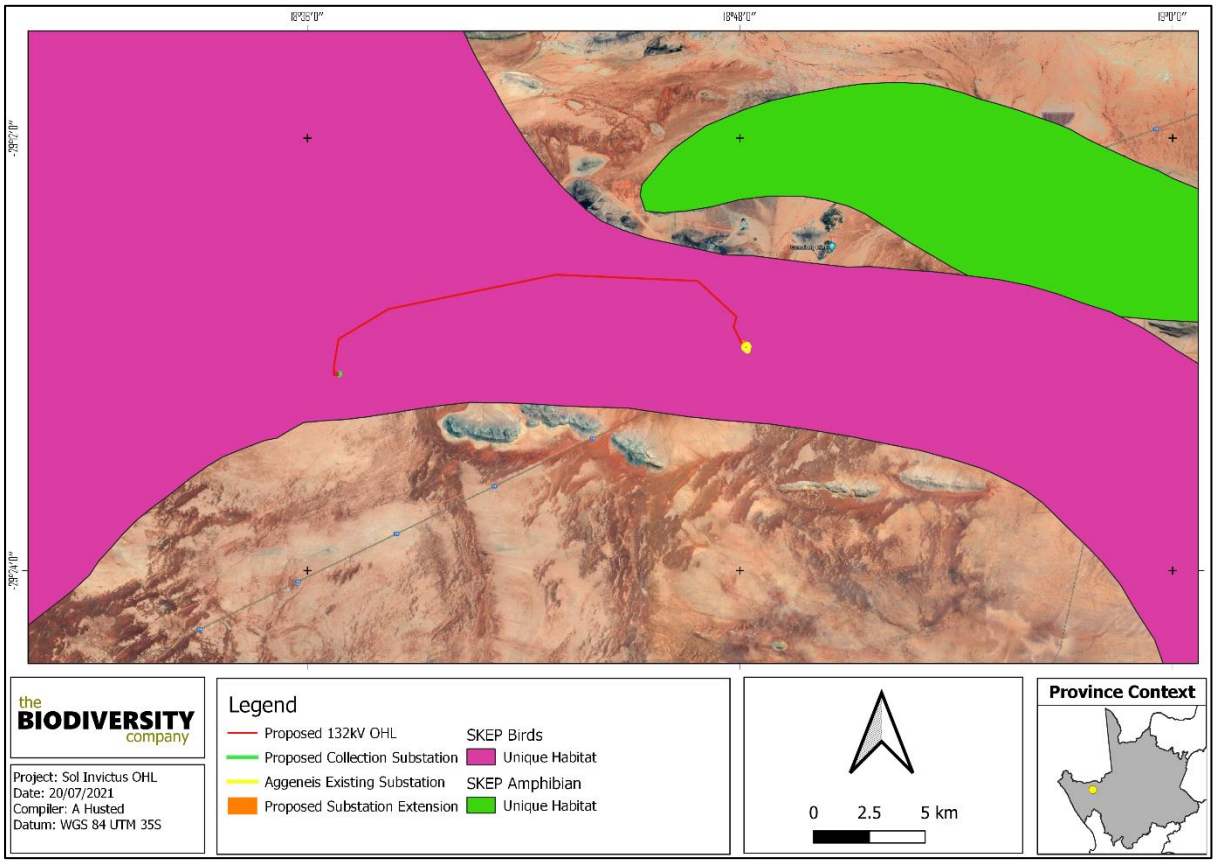


Figure 4-7 The project area in relation to the Succulent Karoo Ecosystem Programme

4.1.1.8 Important Bird and Biodiversity Area

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.

The project area overlaps with portions of the Haramoep and Black Mountain Mine IBA (Figure 4-8). This IBA is one of the few sites where the globally threatened Red Lark *Calendulauda burra* and near-threatened *Sclater's Lark Spizocorys sclateri* can be found. A total of 198 species has been recorded in this IBA. Some important species include: Ludwig's Bustard *Neotis ludwigii*, Kori Bustard *Ardeotis kori*, Martial Eagle *Polemaetus bellicosus*, Secretarybird *Sagittarius serpentarius*, Verreauxs' Eagle *Aquila verreauxii*, Booted Eagle *Hieraaetus pennatus*, Cape Eagle-Owl *Bubo capensis*, Spotted Eagle-Owl *B. africanus,* and Hooded Vulture *Necrosyrtes monachus*. Restricted-range and biome-restricted birds species found here are: Stark's Lark, Karoo *Spizocorys starki*, Long-billed Lark *Certhilauda subcoronata*, Black-eared Sparrow-lark *Eremopterix australis*, Tractrac Chat *Cercomela tractrac,* Sickle-winged Chat *C. sinuata*, Karoo Chat *C. schlegelii*, Layard's Tit-Babbler *Sylvia layardi*, Karoo Eremomela *Eremomela gregalis*, Cinnamon-breasted Warbler *Euryptila subcinnamomea*, Namaqua Warbler *Phragmacia substriata*, Sociable Weaver *Philetairus socius*, Pale-winged Starling *Onychognathus nabouroup* and Black-headed Canary *Serinus alario*.

This IBA is also home to approximately 35 threatened, rare and endemic plant species (IBA, 2018).

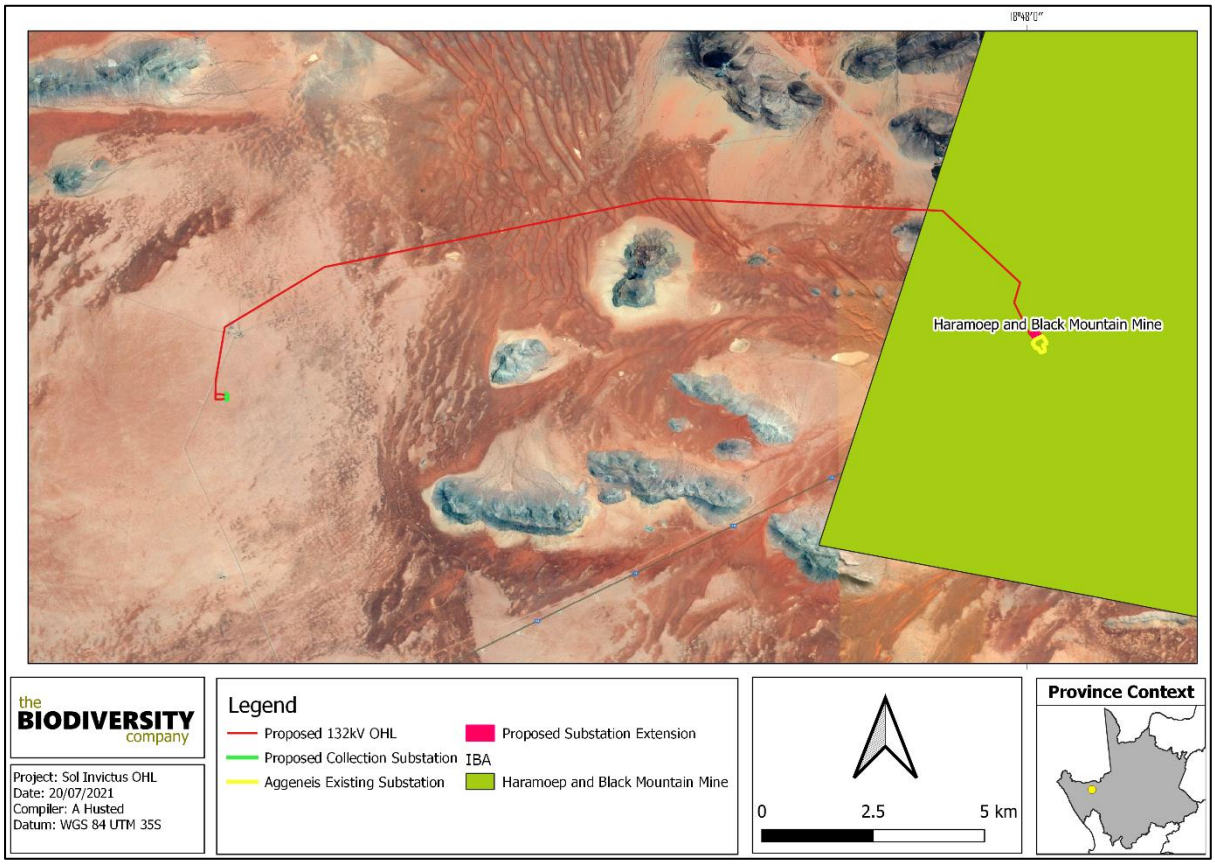


Figure 4-8 The project area in relation to the Haramoep and Black Mountain Mine IBA

4.1.1.9 Hydrological Setting

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was released with the NBA 2018. Ecosystem threat status (ETS) of river and wetland ecosystem types are based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised

as CR, EN, VU or LT, with CR, EN and VU ecosystem types collectively referred to as 'threatened' (Van Deventer *et al.,* 2019; Skowno *et al.,* 2019). The project area des not overlap with NBA rivers, it does however come in close proximity (+/- 280 m) to CR wetlands.

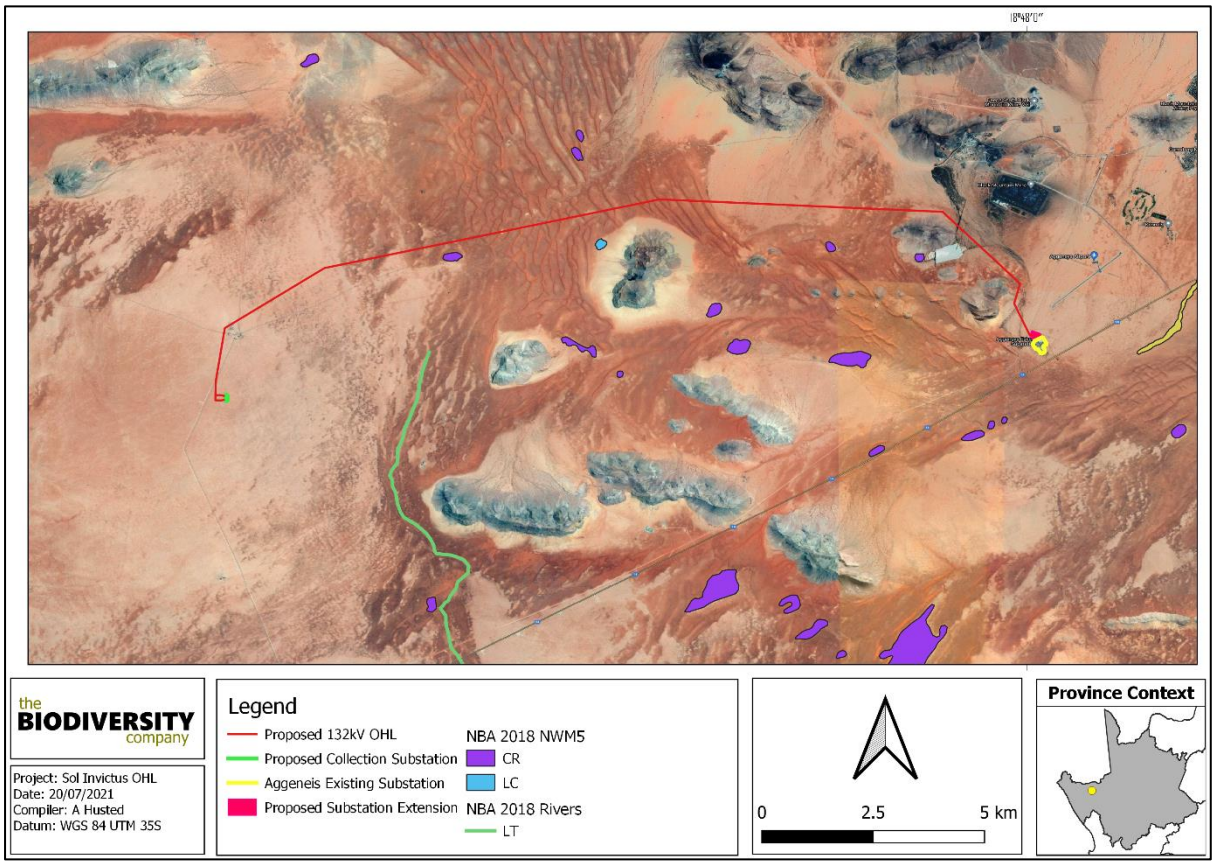


Figure 4-9 Map illustrating ecosystem threat status of rivers and protection level of wetland ecosystems in the project area

4.1.1.10 National Freshwater Ecosystem Priority Area Status

In an attempt to better conserve aquatic ecosystems, South Africa has categorised its river systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs) (Driver *et al.,* 2011). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's (NEM:BA) biodiversity goals (Nel *et al.,* 2011).

Figure 4-10 shows the location of the project area in relation to wetland and river FEPAs. From the figure it can be seen that the project area does not overlap with a FEPA river, it does however come in close proximity (+/-280 m) to an unclassified wetland.

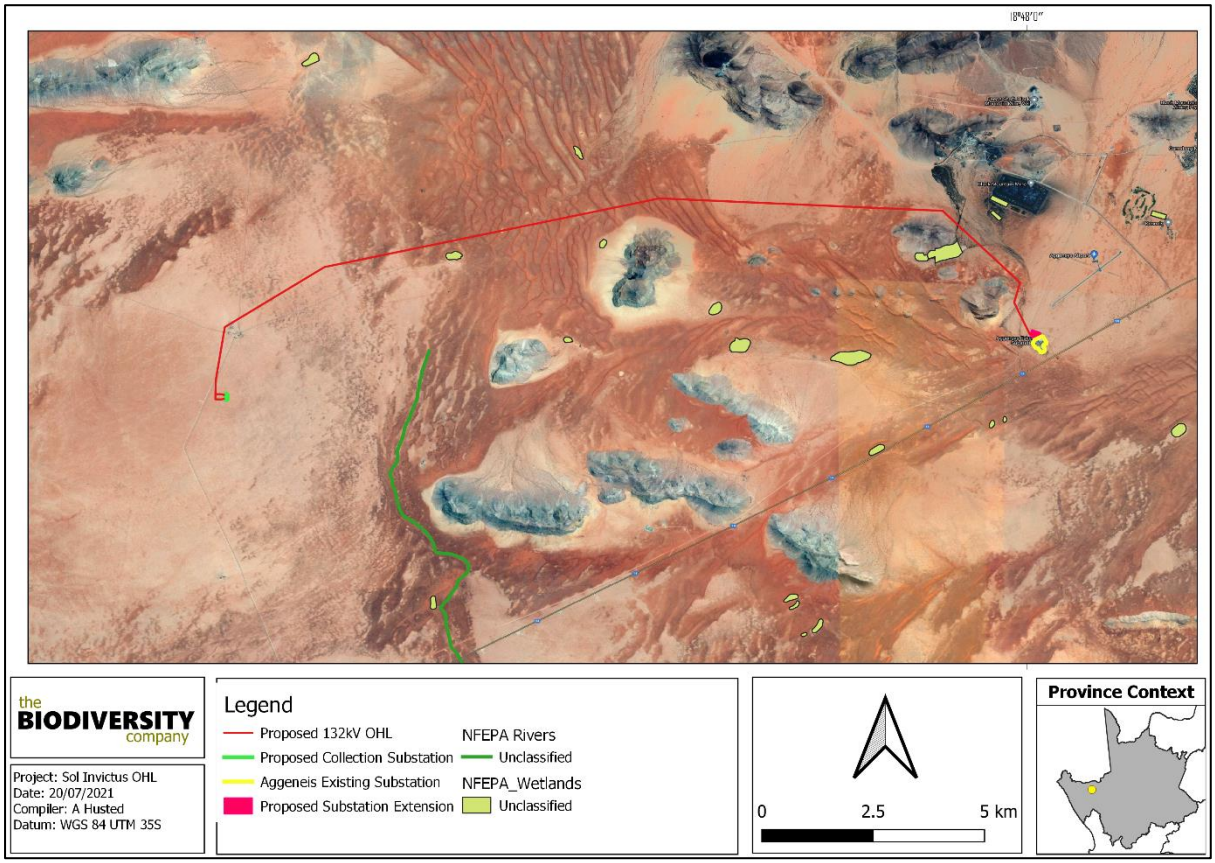


Figure 4-10 The project area in relation to the National Freshwater Ecosystem Priority Areas, River lines and Inland water areas

4.1.1.11 Renewable Energy Applications

The Renewable Energy Database (http://egis.environment.gov.za/), shows that there are a number of approved and retracted applications for renewable energy projects in the nearby vicinity (Figure 4-11). The dataset does not distinguish been approved and retracted applications, but it does provide insight into the interest for renewable energy in the larger area. The high number of developments in the area will have an impact on the cumulative effect on the fauna and flora.

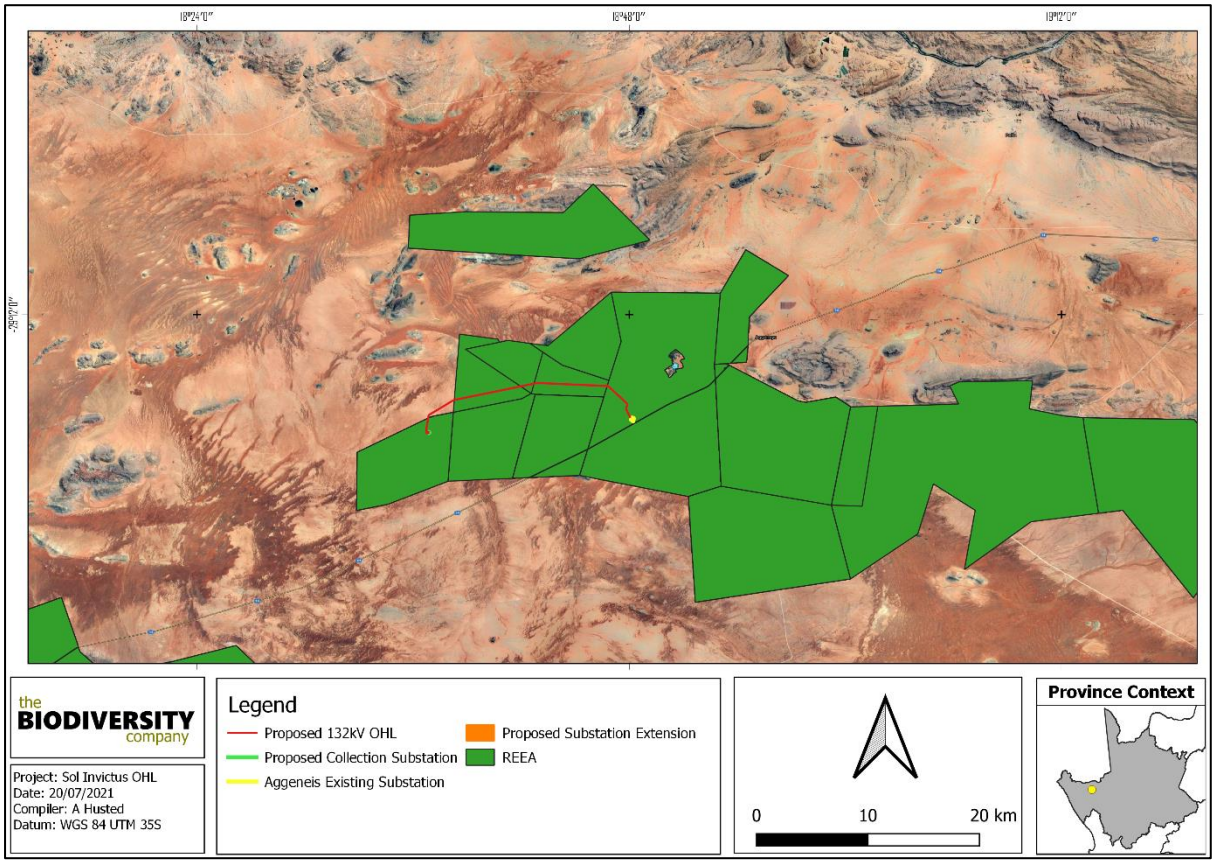


Figure 4-11 The project area in relation to nearby renewable energy projects

4.1.2 Flora Assessment

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

4.1.2.1 Vegetation Type

The project area is situated within the Nama Karoo Biome and borders on the Succulent Karoo Biome. The Nama Karroo 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 three vegetation type: the Bushmanland Arid Grassland, Bushmanland Sandy Grassland and Aggeneys Gravel Vygieveld (Figure 4-12). For the purpose of this study only the two dominant vegetation types, Bushmanland Arid Grassland, Bushmanland Sandy Grassland will be discussed in detail.

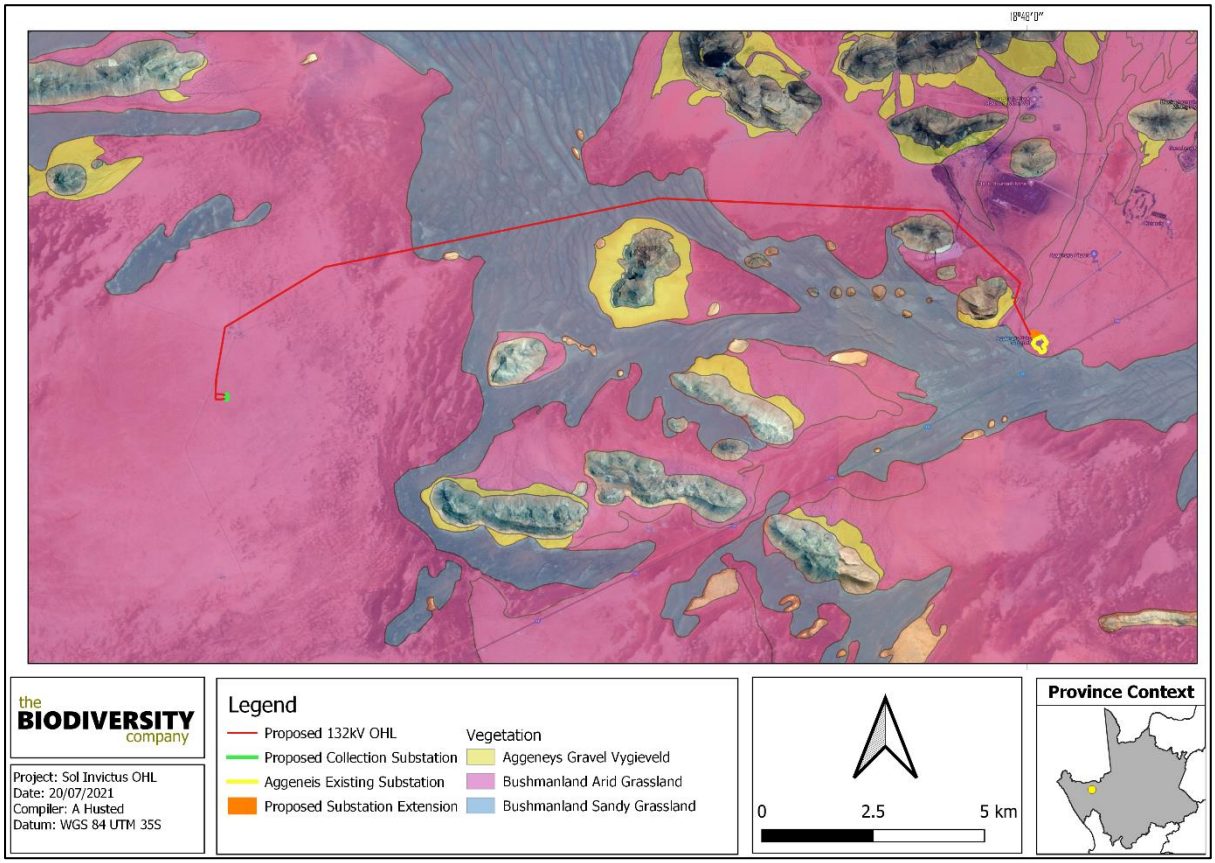


Figure 4-12 Map illustrating the vegetation type associated with the project area

4.1.2.1.1 Bushmanland Sandy Grassland

This vegetation type occurs in the Northern Cape, where it is characterized by dense sandy grasslands that is dominated by white grasses (*Stipagrostis, Schmidtia*) and abundant drought-resistant shrubs. This vegetation type occurs in altitudes that varies from 500–1 200 m.

Important Taxa

Graminoids: *Schmidtia kalahariensis*, *Stipagrostis brevifolia*, *S. ciliata*, *S. obtusa*, *Aristida adscensionis*, *A. congesta*, *Centropodia glauca*, *Enneapogon desvauxii*, *Stipagrostis anomala*.

Herbs: *Gazania lichtensteinii*, *Grielum humifusum*, *Tribulus zeyheri*, *Dicoma capensis*, *Hirpicium echinus*, *Manulea nervosa*, *Requienia sphaerosperma*, *Sesamum capense*.

Succulent Herb: *Crassula muscosa*.

Tall Shrubs: *Rhigozum trichotomum*, *Sisyndite spartea*.

Low Shrubs: *Zygophyllum microphyllum*, *Barleria rigida*, *Berkheya spinosissima* subsp. *namaensis*, *Eriocephalus microphyllus* var. *pubescens*, *E. pauperrimus*, *Galenia fruticosa*, *Hermannia spinosa*, *Monechma incanum*, *Peliostomum leucorrhizum*, *Pentzia spinescens*, *Plinthus karooicus*, *Pteronia mucronata*, *P. sordida*, *Rosenia humilis*, *Tetragonia arbuscula*.

Succulent Shrubs: *Aridaria noctiflora* subsp. *straminea*, *Lycium bosciifolium*, *Ruschia robusta*, *Salsola tuberculata*, *Senecio cotyledonis*, *Zygophyllum flexuosum*, *Z. foetidum*.

Woody Succulent Climber: *Sarcostemma viminale*.

Conservation Status

This vegetation type is classified as Least Threatened. The national target for conservation protection for this vegetation types is 21%. None of the unit is conserved in statutory conservation areas.

4.1.2.1.2 Bushmanland Arid Grassland

The Bushmanland Arid Grassland consists of extensive to irregular plains on a slightly sloping plateau. It is sparsely vegetated by grasslands, mainly dominated by white grasses (*Stipagrostis* species) giving this vegetation type the character of semidesert 'steppe'. In places low shrubs of *Salsola* change the vegetation structure. In years of abundant rainfall rich displays of annual herbs can be expected.

Important Taxa ([W]Western and [E]Eastern regions of the unit only)

Graminoids: *Aristida adscensionis* (d), *A. congesta* (d), *Enneapogon desvauxii* (d), *Eragrostis nindensis* (d), *Schmidtia kalahariensis* (d), *Stipagrostis ciliata* (d), *S. obtusa* (d), *Cenchrus ciliaris*, *Enneapogon scaber*, *Eragrostis annulata*[E], *E. porosa*[E], *E. procumbens*, *Panicum lanipes*[E], *Setaria verticillata*[E], *Sporobolus nervosus*, *Stipagrostis brevifolia*[W], *S. uniplumis*, *Tragus berteronianus*, *T. racemosus*[E].

Small Trees: *Senegalia mellifera* subsp. *detinens*[E], *Boscia foetida* subsp. *foetida*.

Tall Shrubs: *Lycium cinereum* (d), *Rhigozum trichotomum* (d), *Cadaba aphylla*, *Parkinsonia africana*.

Low Shrubs: *Aptosimum spinescens* (d), *Hermannia spinosa* (d), *Pentzia spinescens* (d), *Aizoon asbestinum*[E], *A. schellenbergii*[E], *Aptosimum elongatum*, *A. lineare*[E], *A. marlothii*[E], *Barleria rigida*, *Berkheya annectens*, *Blepharis mitrata*, *Eriocephalus ambiguus*, *E. spinescens*, *Limeum aethiopicum*, *Lophiocarpus polystachyus*, *Monechma incanum*, *M. spartioides*, *Pentzia pinnatisecta*, *Phaeoptilum spinosum*[E], *Polygala seminuda*, *Pteronia leucoclada*, *P. mucronata*, *P. sordida*, *Rosenia humilis*, *Senecio niveus*, *Sericocoma avolans*, *Solanum capense*, *Talinum arnotii*[E], *Tetragonia arbuscula*, *Zygophyllum microphyllum*.

Succulent Shrubs: *Kleinia longiflora*, *Lycium bosciifolium*, *Salsola tuberculata*, *S. glabrescens*.

Herbs: *Acanthopsis hoffmannseggiana*, *Aizoon canariense*, *Amaranthus praetermissus*, *Barleria lichtensteiniana*[E], *Chamaesyce inaequilatera*, *Dicoma capensis*, *Indigastrum argyraeum*, *Lotononis platycarpa*, *Sesamum capense*, *Tribulus pterophorus*, *T. terrestris*, *Vahlia capensis*.

Succulent Herbs: *Gisekia pharnacioides*[E], *Psilocaulon coriarium*, *Trianthema parvifolia*.

Geophytic Herb: *Moraea venenata*.

Biogeographically Important Taxon (Bushmanland endemic)

Succulent Herb: *Tridentea dwequensis*.

Endemic Taxa

Succulent Shrubs: *Dinteranthus pole-evansii*, *Larryleachia dinteri*, *L. marlothii*, *Ruschia kenhardtensis*.

Herbs: *Lotononis oligocephala*, *Nemesia maxii.*

Conservation Status

According to SANBI (2019), this vegetation type is classified as Least Threatened. The national target for conservation protection for this vegetation types is 21%, with only small patches statutorily conserved in Augrabies Falls National Park and Goegab Nature Reserve. Very little of the area has been transformed. The risk of erosion in this vegetation type is very low (60%) and low (33%).

4.1.2.2 Expected Flora Species

The POSA database indicates that 472 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. Five (5) SCC based on their conservation status could be expected to occur within the project area and are provided in Table 4-2 below.

Table 4-2 Threatened flora species that may occur within the project area.

Family	Taxon	Author	IUCN	Ecology
Asphodelaceae	*Bulbine ophiophylla*	G.Will.	EN	Indigenous
Aizoaceae	*Conophytum limpidum*	S.A.Hammer	NT	Indigenous; Endemic
Fabaceae	*Crotalaria pearsonii*	Baker f.	VU	Indigenous; Endemic
Asteraceae	*Helichrysum marmarolepis*	S.Moore	NT	Indigenous; Endemic
Aizoaceae	*Lithops olivacea*	L.Bolus	VU	Indigenous; Endemic

4.1.3 Faunal Assessment

4.1.3.1 Amphibians

Based on the IUCN Red List Spatial Data and AmphibianMap, 9 amphibian species are expected to occur within the area (Appendix B). One (1) is regarded as threatened (Figure 4-3).

Table 4-3 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)	
Strongylopus springbokensis	Namaqua Stream Frog	VU	LC	High

Strongylopus springbokensis (Namaqua stream frog) is listed as VU on a regional scale. It lives in springs and streams in rocky hills and mountains in the Succulent Karoo and Fynbos biomes. It breeds in springs and streams, small permanent and temporary ponds, as well as small artificial dams. The likelihood of occurrence is rated as high based on available wetlands and rocky areas.

4.1.3.2 Reptiles

Based on the IUCN Red List Spatial Data and the ReptileMAP database, 59 reptile species are expected to occur within the area (Appendix C). Two (2) are regarded as threatened (Table 4-4). Based on the absence of suitable habitat one specie was given a low likelihood of occurrence.

Table 4-4 Threatened reptile species that are expected to occur within the project area

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Chersobius signatus	Speckled Dwarf Tortoise	EN	EN	Low
Psammobates tentorius verroxii	Tent Tortoise	NT	NT	High

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

4.1.3.3 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. Five (5) of these expected species are regarded as threatened (Table 4-5), two of these have a low likelihood of occurrence based on the lack of suitable habitat and food sources in the project area. This report must be read in conjunction to the bat survey assessment that assessed these mammals in detail.

Table 4-5 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)	
Eidolon helvum	African Straw-colored Fruit Bat	LC	NT	Low
Felis nigripes	Black-footed Cat	VU	VU	High
Graphiurus ocularis	Spectacular Dormouse	NT	LC	Moderate
Panthera pardus	Leopard	VU	VU	Moderate
Parotomys littledalei	Littledale's Whistling Rat	NT	LC	Low

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

Graphiurus ocularis (Spectacular Dormouse) is categorised as NT on a regional scale. This species is endemic to South Africa, where it occurs widely in Northern Cape, Eastern Cape, and Western Cape provinces, with a single record from the North West province. The species is associated with the sandstone formations of the Cape, which have many vertical and horizontal cracks and crevices in which to shelter and nest. Some areas of suitable habitat can be found in the project area; therefore the likelihood of occurrence 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). Prey species can be found in the project area, and as the area is mostly uninhabited by humans this species has a moderate likelihood of occurrence.

4.1.3.4 Avifauna

Based on the South African Bird Atlas Project, Version 2 (SABAP2) database, 122 bird species are expected to occur in the vicinity of the project area, it is expected that this list is not fully comprehensive based on the limited sampling that has been done in the area. In order to enhance this list the information in section 4.1.4 were included. The full list of potential bird species is provided in Appendix E. Of these species 8 are species of concentration concern, two of these have a low likelihood of occurrence based on the lack of suitable habitat.

Table 4-6 List of bird species of regional or global conservation importance that are expected to occur in the project area (SABAP2, 2021, ESKOM, 2015; IUCN, 2021)

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Aquila verreauxii	Eagle, Verreaux's	VU	LC	High

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Calendulauda burra	Lark, Red	VU	VU	High
Cursorius rufus	Courser, Burchell's	VU	LC	High
Eupodotis vigorsii	Korhaan, Karoo	NT	LC	High
Falco biarmicus	Falcon, Lanner	VU	LC	High
Neotis ludwigii	Bustard, Ludwig's	EN	EN	Confirmed
Oxyura maccoa	Duck, Maccoa	NT	NT	Low
Polemaetus bellicosus	Eagle, Martial	EN	VU	Confirmed

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, 2017). Based on the expected habitat, the close proximity to mountains and the availability of prey items, the likelihood of occurrence of this species at the project site is rated as high.

Calendulauda burra (Red Lark) is listed as VU both locally and internationally (IUCN, 2016). Their habitat consists of tropical dry shrubland to dry lowland grassland. This species is threatened by habitat destruction and loss. The likelihood of this species occurring in the project area is high due to the suitable habitat found in the project area.

Cursorius rufus (Burchell's Courser) is categorised as VU on a regional scale. It inhabits open short-sward grasslands, dry savannas, fallow fields, overgrazed or burnt grasslands and pastures, bare or sparsely vegetated sandy or gravelly deserts, stony areas dotted with small shrubs and saltpans (IUCN, 2017). The species is threatened in the south of its range by habitat degradation as a result of poor grazing practices and agricultural intensification. The likelihood of occurrence 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 high due to the nearby mountains/ridges where they could nest 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 presence was confirmed via a track during the 2021 survey.

Polemaetus bellicosus (Martial Eagle) is listed as EN on a regional scale and VU 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, 2017). It inhabits open woodland, wooded savanna, bushy grassland, thornbush and, in southern Africa, more open country and even sub-desert (IUCN, 2017). The presence was confirmed via direct observation during the 2021 survey.

4.1.4 Reviews of Previous Reports

The project area was originally part of a greater development for which a number of ecology and avifauna studies have been compiled. The following is a review of these studies. The studies that were looked at are:

- Simon Todd Consulting (2016a). Environmental Impact Assessment for the Sol Invictus 1 PV Facility and Associated Infrastructure near Aggeneys, Northern Cape. Fauna and Flora Ecological Impact Assessment;
- DJ Van Niekerk (2016a). Environmental Impact Assessment for the proposed 150 MW Sol Invictus 1 Photovoltaic Facility near Aggeneys in the Northern Cape Province: Avifauna;
- Simon Todd Consulting (2016b). Environmental Impact Assessment for the Sol Invictus 2 PV Facility and Associated Infrastructure near Aggeneys, Northern Cape. Fauna and Flora Ecological Impact Assessment;
- DJ Van Niekerk (2016b). Environmental Impact Assessment for the proposed 150 MW Sol Invictus 2 Photovoltaic Facility near Aggeneys in the Northern Cape Province: Avifauna;
- Simon Todd Consulting (2016c). Environmental Impact Assessment for the Sol Invictus 3 PV Facility and Associated Infrastructure near Aggeneys, Northern Cape. Fauna and Flora Ecological Impact Assessment;
- DJ Van Niekerk (2016c). Environmental Impact Assessment for the proposed 150 MW Sol Invictus 3 Photovoltaic Facility near Aggeneys in the Northern Cape Province: Avifauna;
- Simon Todd Consulting (2016d). Environmental Impact Assessment for the Sol Invictus 4 PV Facility and Associated Infrastructure near Aggeneys, Northern Cape. Fauna and Flora Ecological Impact Assessment; and
- DJ Van Niekerk (2016d). Environmental Impact Assessment for the proposed 150 MW Sol Invictus 4 Photovoltaic Facility near Aggeneys in the Northern Cape Province: Avifauna.

The Simon Todd Consulting (2016a-d) field work were conducted in April of 2016 after an initial visit in October 2015. He found the various project areas have a medium to medium-low sensitivity. In his reports the effect of the cumulative impact on the habitat and general ecology were highlighted, and it was expected that the developments, even though not in highly sensitive areas, would still contribute to the overall impact. The following species were recorded in all of the reports (Table 4-7).

Table 4-7 Species of Fauna and Flora recorded in the Simon Todd Consulting (2016a-d) reports

Flora findings, including SCCs	Listing	Fauna findings, including SCCs	Listing
Hoodia gordonii	Data Deficient - Taxonomically Problematic (DDT)	***Orycteropus afer (Aardvark)***	LC
Boscia albitrunca	Protected Tree	***Hysterix africaeaustralis (Cape porcupine)***	LC
Boscia foetida subsp foetida	Northern Cape Conservation act 2009	***Xerus inauris (Ground Squirrel)***	LC
Mesembryanthemaceae species	Northern Cape Conservation act 2009	***Suricata suricata (Meerkat)***	LC
Euphoribiaceae sp	Northern Cape Conservation act 2009	***Cynictis penicillata (Yellow Mongoose)***	LC
Oxalidaceae sp	Northern Cape Conservation act 2009	***Antidorcas marsupialis (Springbok)***	LC
Iridaceae sp	Northern Cape Conservation act 2009	***Raphicerus campestris (Steenbok)***	LC
Nemesia sp	Northern Cape Conservation act 2009		
Jamesbrittenia sp	Northern Cape Conservation act 2009		

Euphorbia braunsii	Northern Cape Conservation act 2009

The DJ Van Niekerk (2016a-d) studies were conducted in February/March of 2016. They surveyed the area and surrounds including the nearby wetland and riparian areas. Their study found a number of species that would be sensitive to powerline development. Table 4-8 is a summary of the species of conservation concern that were recorded during their study, while Table 4-9 is a summary of the species they recorded that would be at risk for disturbance by habitat loss or accident (electrocution or collisions).

Table 4-8 Avifauna SCCs recorded in the project area

Scientific name	Common Name	Notes
Polemaetus bellicosus	**Eagle, Martial**	Sol Invictus project area form part of the territory of various birds, including a breeding pair. A 1,5 km buffer is found in the southwest of Sol Invictus 1
Neotis ludwigii	**Bustard, Ludwig's**	A number of recordings were made of this species
Aquila verreauxii	**Eagle, Verreaux's**	Nests were confirmed in the nearby mountains
Falco biarmicus	**Falcon, Lanner**	Were recorded hunting in the project area, especially close to Aggeneys-Nama power line
Calendulauda burra	**Lark, Red**	A number of these birds were recorded in the Sol Invictus study area, a no go area were declared for their habitat and a 250m surrounding it
Eupodotis vigorsii	**Korhaan, Karoo**	Groups of this bird were recorded in various parts of the Sol Invictus project area

Table 4-9 Species recorded that would be at risk as a result of habitat loss and powerlines

Species	Disturbance	Accident
Martial Eagle	Low	Moderate
Ludwig's Bustard	Low	Moderate
Lanner Falcon,	Unlikely	Moderate
Karoo Korhaan	Low	Low
Spotted Thick knee	High	Unlikely
Spiked Heel Lark	Moderate	Unlikely
Starks Lark	Moderate	Unlikely
Grey Headed Sparrow Lark	Moderate	Unlikely
Black Eared Sparrow Lark	Moderate	Unlikely
Jackal Buzzard	Unlikely	Moderate

4.2 Field Assessment

The following sections provide the results from the field survey for the proposed development that was undertaken during the 2nd to the 4th of August 2021.

4.2.1 Flora Assessment

This section is divided into two sections:

- Indigenous flora; and
- Invasive Alien Plants (IAPs).

4.2.1.1 Indigenous Flora

The vegetation assessment was conducted throughout the extent of the survey area. A total of 36 tree, shrub, herbaceous and graminoid plant species were recorded in the project area during the field assessment (Table 4-10). Plants listed as Category 1 alien or invasive species under the NEMBA appear in green text. Plants listed in Category 2 or as 'not indigenous' or 'naturalised' according to NEMBA, appear in blue text. Some of the plant species recorded can be seen in Figure 4-13.

The list of plant species recorded to is by no means comprehensive, and repeated surveys during different phenological periods not covered, may likely yield up to 40% 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. Other protected tree species previously recorded in the vicinity of the project area, include *Vachellia erioloba*, *Euclea pseudebenus* and *Ozoroa namaquensis*, however, none of these trees were not recorded within the survey corridor.

The specially protected *Aloidendron dichotomum* (Quiver tree), which is also known to occur within the vicinity of the project area, currently has a Moratorium in place in the Northern Cape Province, prohibiting removal of Quiver trees from the wild. Even though the species was not recorded within the survey corridor, it must be noted that if any alterations to the OHL line are made, especially to intersect with ridges or hills, follow up studies need to be considered for the presence/absence of the species. For more information on the moratorium, consult with the Northern Cape Department of Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAERL), Environmental Research and Development Unit.

Table 4-10 Trees, shrub and herbaceous plant species recorded in the project area.

Family	*Scientific Name*	Threat Status (SANBI, 2017)	SA Endemic	Alien Category	Northern Cape Conservation act 2009
Acanthaceae	*Acanthopsis hoffmannseggiana*	DDT (Taxonomically Problematic)	No		
Aizoaceae	*Galenia fruticosa*	LC	No		
Aizoaceae	*Ruschia muricata*	LC	No		
Amaranthaceae	*Salsola rabieana*	LC	No		
Amaranthaceae	*Salsola kali*			NEMBA Category 1b	
Anacampserotaceae	*Anacampseros papyracea*	LC	Yes		
Apocynaceae	*Hoodia gordonii*	DDT (Insufficient Information)	No		Schedule 1
Asparagaceae	*Asparagus suaveolens*	LC	No		
Asparagaceae	*Asparagus capensis*	LC	No		
Asteraceae	*Hirpicium echinus*	LC	No		
Asteraceae	*Eriocephalus microphyllus*	LC	Yes		
Asteraceae	*Pentzia spinescens*	LC	No		
Asteraceae	*Pteronia mucronata*	LC	No		
Asteraceae	*Pteronia unguiculata*	LC	No		
Asteraceae	*Eriocephalus ambiguus*	LC	No		
Bignoniaceae	*Rhigozum trichotomum*	LC	No		
Capparaceae	*Boscia foetida subsp. foetida*	LC	No		Schedule 2
Fabaceae	*Parkinsonia africana*	LC	No		
Fabaceae	*Prosopis glandulosa*			NEMBA Category 3	
Hyacinthaceae	*Albuca spiralis*	LC	Yes		
Onagraceae	*Oenothera sp*	LC			
Oxalidaceae	*Oxalis cf annae*	LC	Yes		
Poaceae	*Schmidtia kalahariensis*	LC	No		
Poaceae	*Stipagrostis uniplumis var. uniplumis*	LC	No		

Family	*Scientific Name*	Threat Status (SANBI, 2017)	SA Endemic	Alien Category	Northern Cape Conservation act 2009
Poaceae	*Stipagrostis brevifolia*	LC	No		
Poaceae	*Stipagrostis ciliata var. capensis*	LC	No		
Poaceae	*Aristida adscensionis*	LC	No		
Poaceae	*Centropodia glauca*	LC	No		
Poaceae	*Enneapogon desvauxii*	LC	No		
Poaceae	*Cladoraphis spinosa*	LC	No		
Poaceae	*Phragmites australis*	LC	No		
Solanaceae	*Lycium pumilum*	LC	No		
Zygophyllaceae	*Sisyndite spartea*	LC	No		
Zygophyllaceae	*Zygophyllum retrofractum*	LC	No		
Zygophyllaceae	*Augea capensis*	LC	No		
Zygophyllaceae	*Tribulus pterophorus*	LC	No		

Figure 4-13 ***Photographs illustrating some of the flora recorded within the assessment area. A) Albuca spiralis, B) Anacampseros papyracea, C) Hoodia gordonii, D) Centropodia glauca , E) Augea capensis and F) Acanthopsis hoffmannseggiana.***

4.2.1.2 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 AIP 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; and
- 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.

One (1) IAP species (*Salsola kali*) was recorded within the project area. The species is 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.

4.2.1.3 Floral Species of Conservation Concern

During the infield assessment a total of 2 protected and SCC were recorded, these species are protected under the Northern Cape Nature Conservation act no. 9 of 2009. These species occurred numerously and naturally spaced throughout the area.

One (1) species (*Acanthopsis hoffmannseggiana*) is listed as DDT under the National Red List, one being potentially threatened. The specimens were found numerously and naturally spaced throughout the Arid Grassland habitats;

- No loss of specimens should be permitted as the species is likely to become more threatened in the near future. All remaining subpopulations have to be conserved if this species is to survive in the long term.

4.2.2 Faunal Assessment

Herpetofauna, mammal and avifaunal observations and recordings fall under this section.

4.2.2.1 Amphibians and Reptiles

One (1) species of reptile was recorded in the project area during survey period. However, there is the possibility of more species being present, as certain reptile species are secretive and require long-term surveys to ensure capture. No amphibian species were 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 Due to the seasonality of the survey, surveys relied on opportunistic sightings as opposed to intensive and appropriate sampling methods. 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. None of the herpetofauna species recorded are regarded as threatened, albeit all are protected under provincial legislation.

Table 4-11 Summary of herpetofauna species recorded within the project area

Species	Common Name	Regional (SANBI, 2016)	IUCN (2021)
Pedioplanis namaquensis	Namaqua Sand Lizard	LC	Unlisted

Figure 4-14 Photograph illustrating the reptile species recorded in the project area. A) Namaqua Sand Lizard (Pedioplanis namaquensis)

4.2.2.2 Mammals

Twelve (12) mammal species were observed during the survey of the project area (Table 4-12) based on either direct observation or the presence of visual tracks and signs (Figure 4-15). One of the species recorded are regarded as a SCC, namely Brown Hyaena (red text), 11 mammal species are additionally protected provincially.

Table 4-12 Summary of mammal species recorded within the project area

Species	Common Name	Conservation Status		Northern Cape Conservation act 2009
		Regional (SANBI, 2016)	IUCN (2021)	
Canis mesomelas	Black-backed Jackal	LC	LC	Schedule 4
Cynictis penicillata	Yellow Mongoose	LC	LC	Schedule 2
Hystrix africaeaustralis	Cape Porcupine	LC	LC	Schedule 2
Ictonyx striatus	Striped Polecat	LC	LC	Schedule 1
Lepus capensis	Cape Hare	LC	LC	Schedule 2
Macroscelididae	Elephantulus sp.			Schedule 2
Orycteropus afer	Aardvark	LC	LC	Schedule 1
Parahyaena brunnea	Brown Hyaena	NT	NT	Schedule 1
Pedetes capensis	Springhare	LC	LC	Schedule 2
Raphicerus campestris	Steenbok	LC	LC	
Sylvicapra grimmia	Common Duiker	LC	LC	Schedule 2
Vulpes chama	Cape Fox	LC	LC	Schedule 1

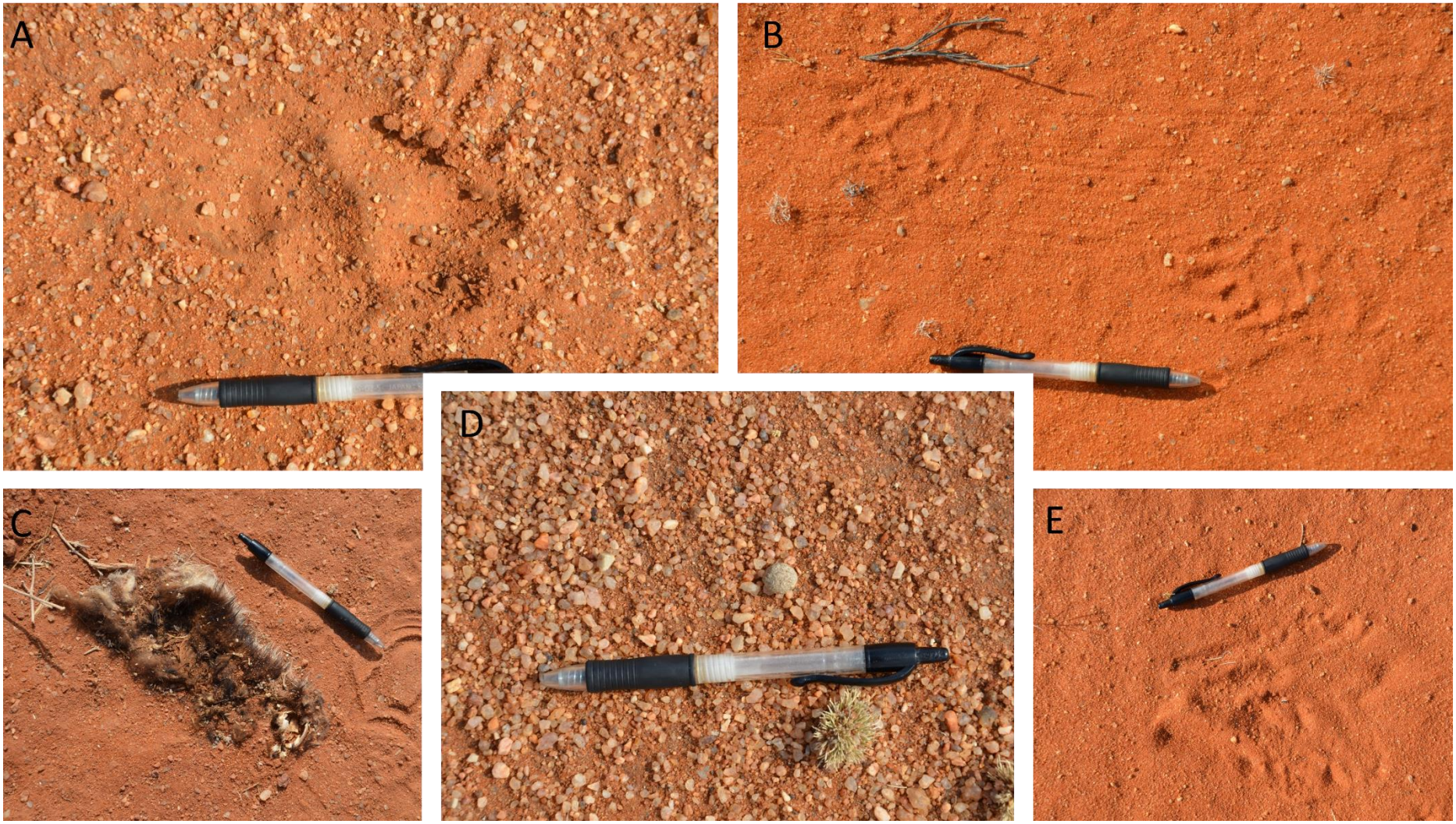


Figure 4-15 ***Photograph illustrating some of the mammal species recorded in the project area. A) Brown Hyaena (Parahyaena brunnea) spoor, B) Cape Porcupine (Hystrix africaeaustralis) spoor, C) Striped Polecat (Ictonyx striatus) dead individual, D) Cape Porcupine (Lepus capensis) scat, E) Springhare (Pedetes capensis) spoor.***

4.2.2.3 Avifauna

Twenty-four (24) (19.67 % of expected species) species were recorded in the project area during the survey based on either direct observation, vocalisations, or the presence of visual tracks & signs, (Table 4-13) (Figure 4-16). All of the species are also protected under the Northern Cape Nature Conservation act no. 9 of 2009. Two (2) species rated as threatened.

The report results by DJ Van Niekerk (2016) are considered to be crucially important in regard to longer term studies across seasons and should be considered alongside these results, and the mitigation measures strictly adhered to.

Neotis ludwigii (Ludwig's Bustard) has a large range centred on the dry biomes of the Karoo and Namib in southern Africa, being found in the extreme south-west of Angola, western Namibia and South Africa. This species inhabits open lowland and upland plains with grass and light thornbush, sandy open shrub-veld and semi-desert in the arid and semi-arid Namib and Karoo biomes. Ludwig's Bustard is nomadic and a partial migrant, moving to the western winter-rainfall part of its range in winter. The primary threat to the species is collisions with overhead power lines, irrespective of size, with potentially thousands of individuals involved in such collisions each year (Jenkins *et al*. 2011). Collision rates on high voltage transmission lines in the Karoo may exceed one Ludwig's Bustard per kilometre per year. Bustards have limited frontal vision so may not see power lines, even if they are marked (Martin and Shaw 2010). Ludwig's Bustard tracks were observed during the August 2021 survey within the 100 m survey corridor.

Polemaetus bellicosus (Eagle, Martial) 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, 2017). It inhabits open woodland, wooded savanna, bushy grassland, thornbush and, in southern Africa, more open country and even sub-desert (IUCN, 2017). In South Africa, 138 active Martial Eagle nests have been found along 1,750 km of power lines, potentially showing the pylons provide artificial nesting sites, although this species remains extremely vulnerable to power line related fatalities (G. Tate *in litt*. 2020). The Sol Invictus project area form part of the territory of various birds, including a breeding pair. A 1,5 km buffer is found in the southwest of Sol Invictus 1. The individual observed during the August 2021 survey was observed perched on a pylon next to the tar road.

Table 4-13 A list of avifaunal species recorded for the project area

Species	Common Name	Conservation Status		Northern Cape Conservation act 2009
		Regional (SANBI, 2016)	IUCN (2021)	
Anas capensis	Teal, Cape	Unlisted	LC	Schedule 2
Bostrychia hagedash	Ibis, Hadeda	Unlisted	LC	Schedule 2
Bradornis infuscatus	Flycatcher, Chat	Unlisted	LC	Schedule 2
Bubo africanus	Eagle-owl, Spotted	Unlisted	LC	Schedule 1
Cercomela tractrac	Chat, Tractrac	Unlisted	LC	Schedule 2
Columba livia	Dove, Rock	Unlisted	LC	Schedule 2
Corvus albus	Crow, Pied	Unlisted	LC	Schedule 3
Crithagra atrogularis	Canary, Black-throated	Unlisted	LC	Schedule 2
Emberiza impetuani	Bunting, Lark-like	Unlisted	LC	Schedule 2
Eremopterix verticalis	Sparrowlark, Grey-backed	Unlisted	LC	Schedule 2
Himantopus himantopus	Stilt, Black-winged	Unlisted	LC	Schedule 2
Lanius collaris	Fiscal, Common (Southern)	Unlisted	LC	Schedule 2
Motacilla capensis	Wagtail, Cape	Unlisted	LC	Schedule 2
Myrmecocichla formicivora	Chat, Anteating	Unlisted	LC	Schedule 2
Neotis ludwigii	Bustard, Ludwig's	EN	EN	Schedule 1
Oena capensis	Dove, Namaqua	Unlisted	LC	Schedule 3
Onychognathus nabouroup	Starling, Pale-winged	Unlisted	LC	Schedule 2
Passer domesticus	Sparrow, House	Unlisted	LC	Schedule 3
Passer melanurus	Sparrow, Cape	Unlisted	LC	Schedule 3
Philetairus socius	Weaver, Sociable	Unlisted	LC	Schedule 2
Ploceus capensis	Weaver, Cape	Unlisted	LC	Schedule 3
Polemaetus bellicosus	Eagle, Martial	EN	VU	Schedule 1
Spizocorys starki	Lark, Stark's	Unlisted	LC	Schedule 2
Tadorna cana	Shelduck, South African	Unlisted	LC	Schedule 2

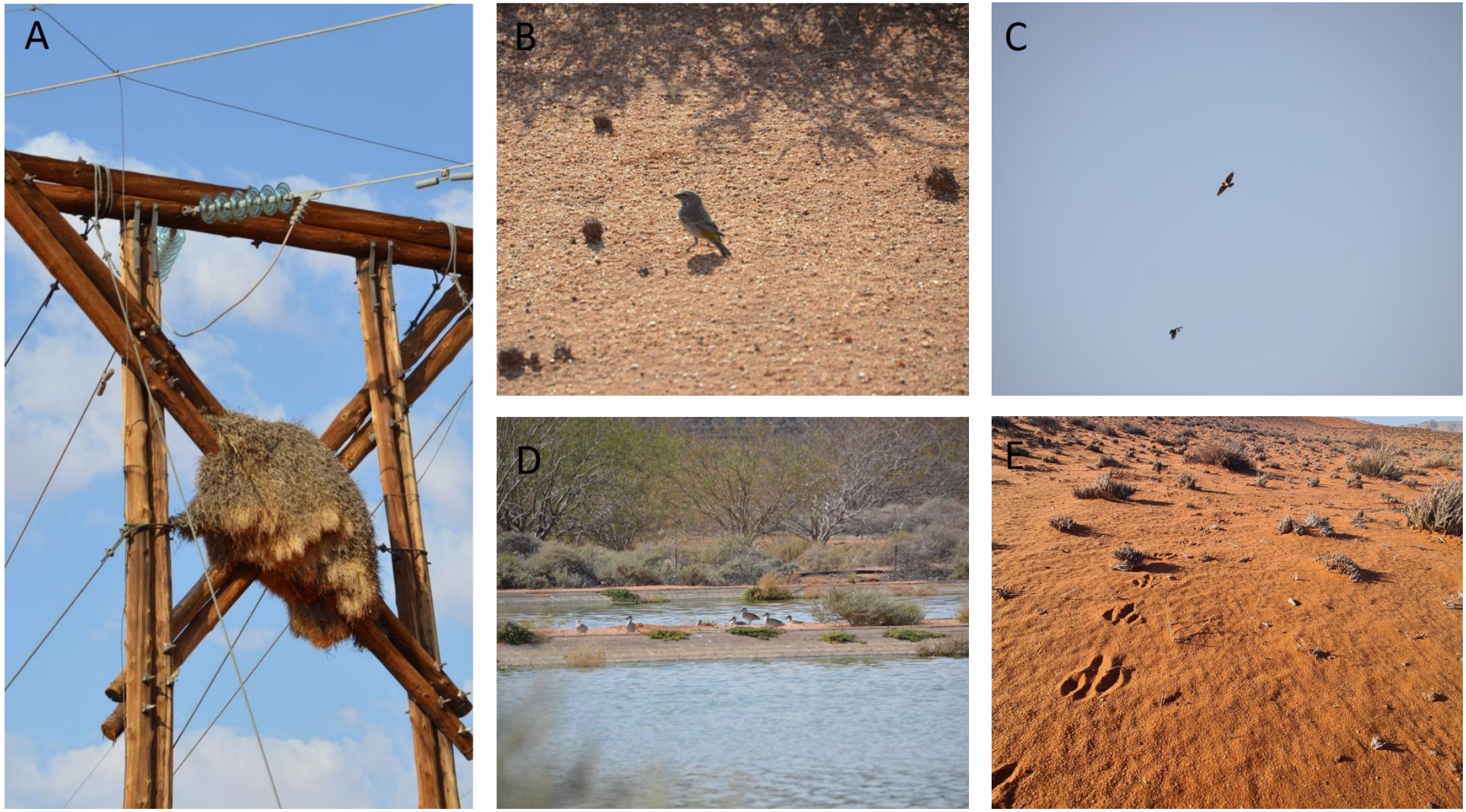


Figure 4-16 ***Some of the avifaunal species recorded; A) Weaver, Sociable (Philetairus socius) nest within a pylon, B) Canary, Black-throated (Crithagra atrogularis), C) Crow, Pied (Corvus albus), D) Teal, Cape (Anas capensis) and E) Bustard, Ludwig's (Neotis ludwigii) (VU)***

5 Habitat Assessment and Site Ecological Importance

5.1 Habitat Assessment

The main habitat types identified across the survey corridor 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 5-1. Emphasis was placed on limiting timed meander searches along the proposed route within the natural habitats and therefore habitats with a higher potential of hosting SCC.

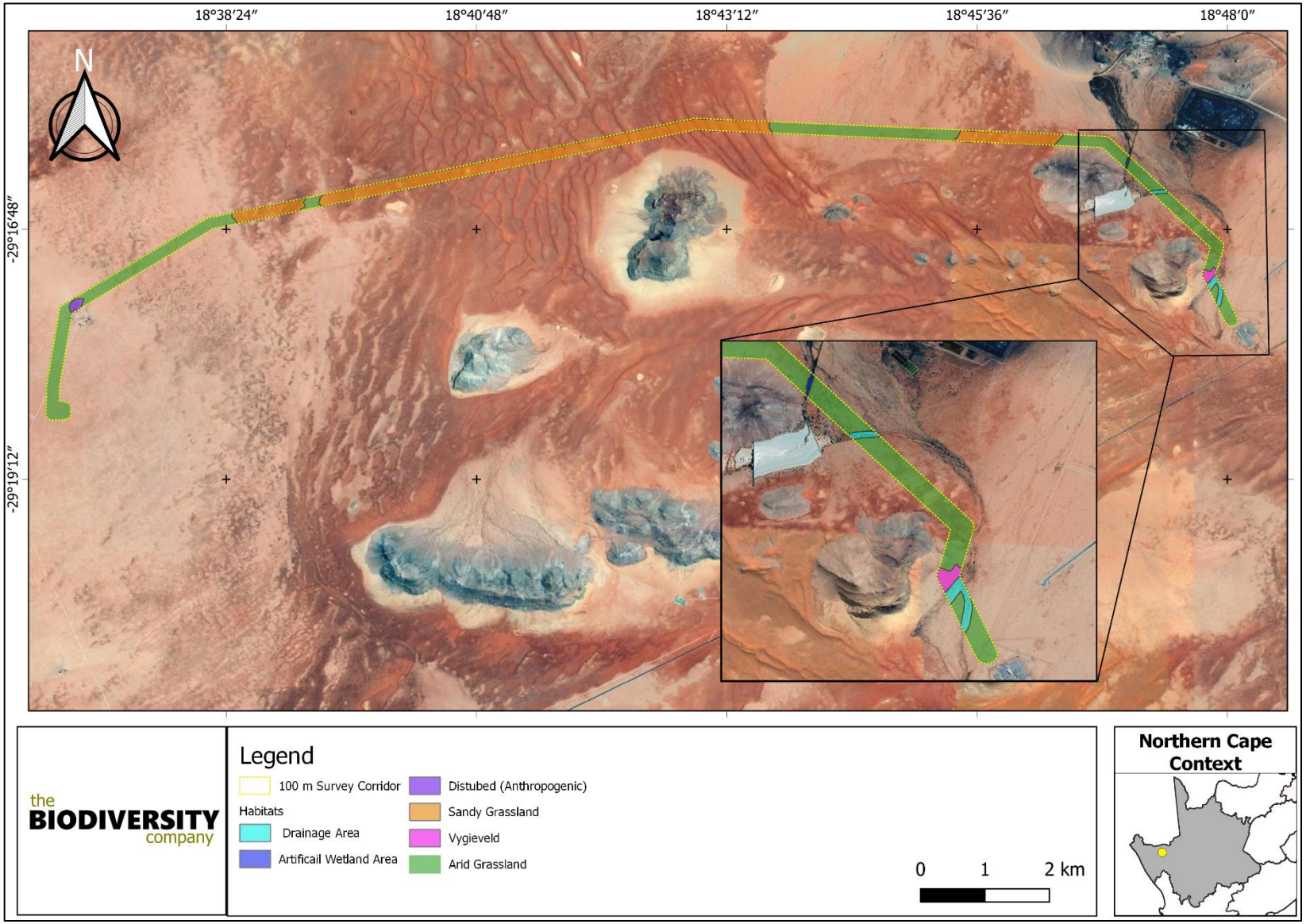


Figure 5-1 Habitats identified in the project area.

Arid Grassland

The arid grassland habitat is an open plain habitat that was occupied by bare ground in most areas, sparsely covered by some grass species in other areas. The areas that have been not overgrazed by livestock can be seen in Figure 5-2, whereas a comparison can be seen in Figure 5-3. These habitats are expected to change dramatically in terms of the amount and diversity of flora depended on the availability of moisture after rainfall events. The diversity during the studies was very low, mainly attributed to the seasonality of the survey, as well as the prolonged drought. *Hoodia gordonii* was found occurring sparsely within this habitat, with a larger concentration to the western portion of the powerline route.

Figure 5-2 An example of arid grassland from the project area.

Figure 5-3 Arid grassland overgrazed.

Sandy Grassland

The sandy grassland has not been as disturbed extensively by historic grazing or impacts(Figure 5-4 and Figure 5-5), mainly due the terrain being difficult to traverse and utilise due to the dunes. Generally, this unique habitat unit has high ecological function attributed to floral communities expected to be found in this habitat. The current ecological condition of this habitat regarding the main driving forces, are intact, which is evident in the lack of broad scale impacts as well as the importance of the species recorded in the faunal assessment.

This habitat unit can thus be regarded as important, not only within the local landscape, but also regionally; it acts as a greenland, used for habitat, foraging area and movement corridors for fauna (including SCC). The habitat sensitivity of the sandy grassland is regarded as medium-high, due to floral and faunal species recorded as well as the role of this intact habitat to biodiversity within a very unique local landscape, not to mention the various ecological datasets.

Figure 5-4 Examples of sandy grassland habitat from the project area

Figure 5-5 Examples of sandy grassland habitat from the project area

Gravel Vygieveld

A unique habitat that was observed near the foothills/peneplains of one of the inselbergs (Figure 5-6). This habitat usually appears as distinctly white surface quartz layers, that seems bare. These habitats usually support sparse, low-growing vegetation such as small to dwarf leaf-succulents, in this case, *Anacampseros papyracea* (Gansmis) was only recorded in this habitat unit.

Figure 5-6 Example of Vygieveld habitat from the project area

Drainage lines

The drainage lines within the project area can be regarded as non-perennial and possess surface flow only briefly during and following a period of rainfall, 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. (Figure 5-7). This habitat is important as a movement corridor as it creates an imperative 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. This habitat unit can be regarded as highly important, not only within the local landscape, but also regionally.

Figure 5-7 A typical example drainage habitat from the project area

Artificial Wetland Area

A habitat found overgrowing with *Phragmites australis* which shows the area being inundated with water for most periods of the year (Figure 5-8). It is assumed that the water source is anthropogenic from the nearby mine.

Figure 5-8 Example of artificial wetland habitat from the project area

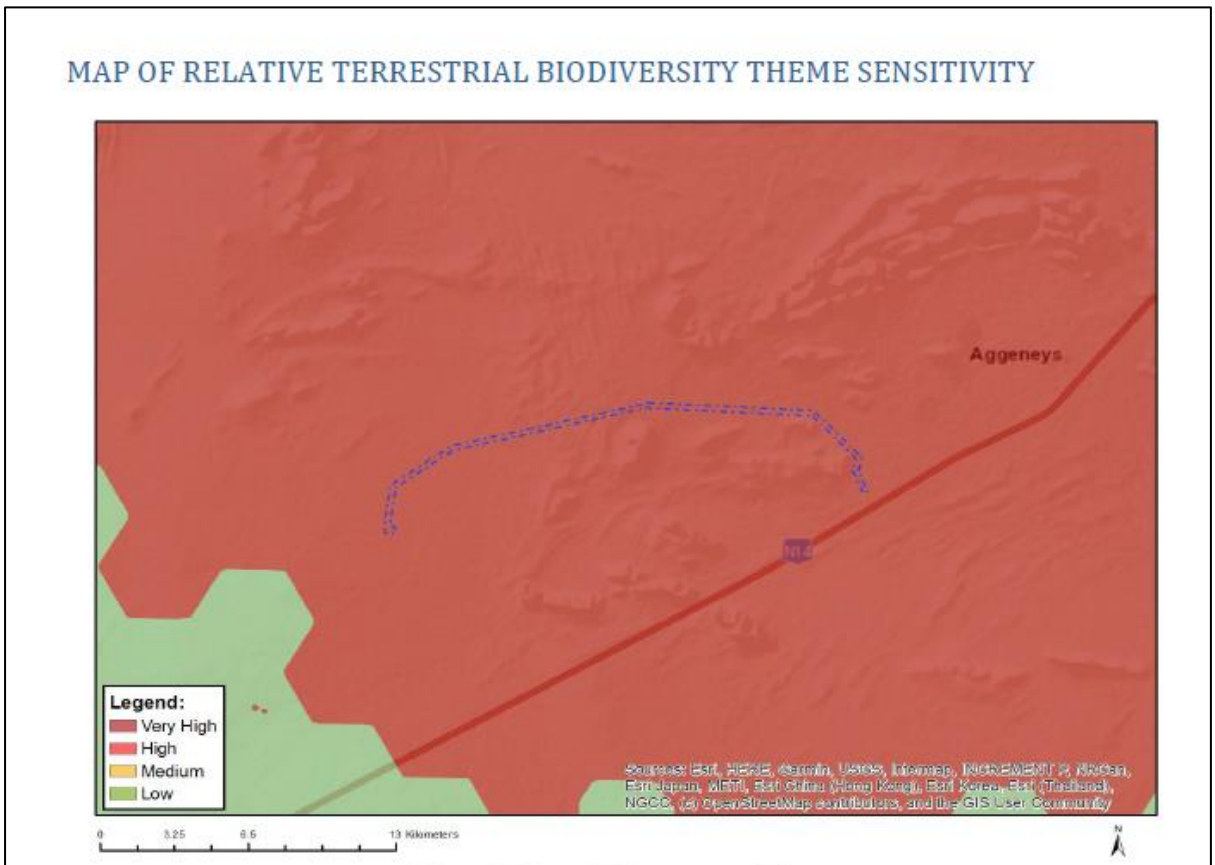
Disturbed

Areas that have been altered anthropogenically, and in this case include a homestead and the associated impacts (Figure 5-9). Some sections of this habitat are considered as transformed due to the nature of the modification of the area to an extent where it would not be able to return to its previous state. Other areas are considered not entirely transformed but in a constant disturbed state.

Figure 5-9 Example of disturbed habitat from the project area

5.2 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 with a CBA1, CBA2 and ESA (Figure 5-10).



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Very High	Critical biodiveristy area 1
Very High	Critical biodiveristy area 2
Very High	Ecological support area
Very High	FEPA Subcatchments
Very High	Protected Areas Expansion Strategy

Figure 5-10 Terrestrial Biodiversity Theme Sensitivity, National Web based Environmental Screening Tool.

The location and extent of these habitats are illustrated in Figure 5-1. 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 5-1). The sensitivities of the habitat types delineated are illustrated in Figure 5-11. The 'following criteria were used in assigning sensitivities ratings for the habitat units:

- All habitats within the assessment area were observed to be utilised by threatened species during the field survey, these species comprised of:

- One (1) EN avifauna species;

- Unique and low resilience habitats; and
- A high richness of protected fauna species was present within the assessment area.

Table 5-1 SEI Summary of habitat types delineated within field assessment area of project area

Habitat (Area)	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Drainage areas	High	High	High	Medium	High
Sandy Grassland	Medium	Medium	Medium	Medium	Medium
Artificial Wetland	Low	Medium	Medium	Low	Medium
Vygieveld	Medium	Medium	Medium	Medium	Medium
Arid Grassland	Medium	Low	Low	Medium	Low
Disturbed	Medium	Low	Low	Medium	Low

Table 5-2 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.

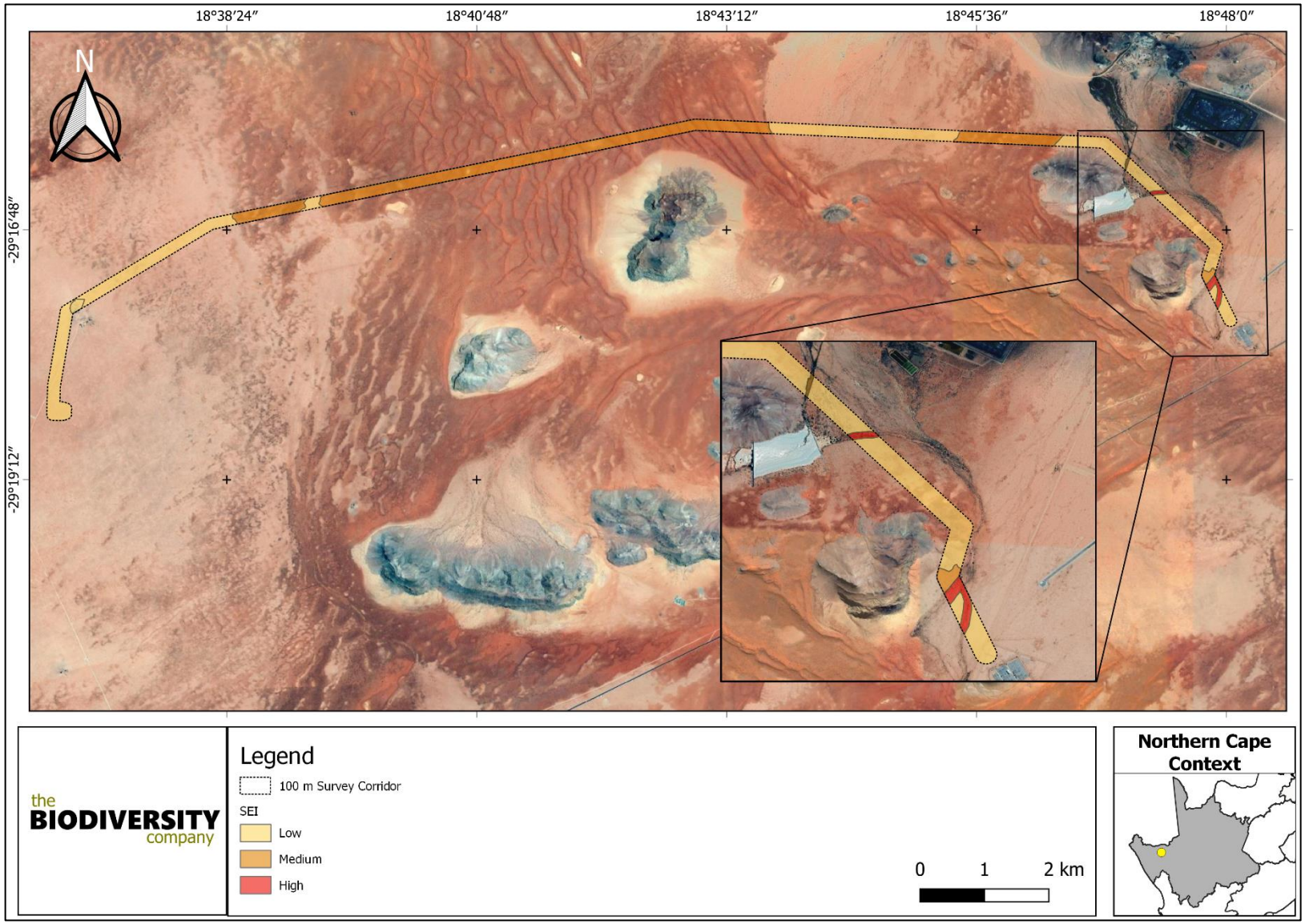


Figure 5-11 Sensitivity of the project area

6 Impact Assessment

6.1 Risk Assessment Methodology

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

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

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e., residual impact). The significance of environmental aspects is determined and ranked by considering the criteria[5] presented in Table 6-1.

Table 6-1 Impact Assessment Criteria and Scoring System

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
IMPACT SIGNIFICANCE RATING					
Total Score	0 – 30		31 to 60		61 – 100

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

Environmental Significance Rating (Negative (-))	**Low (-)**	**Moderate (-)**	**High (-)**
Environmental Significance Rating (Positive (+))	**Low (+)**	**Moderate (+)**	**High (+)**

6.1.1 Impact Mitigation

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

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan. The mitigation sequence/hierarchy is shown in Figure 6-1 below.

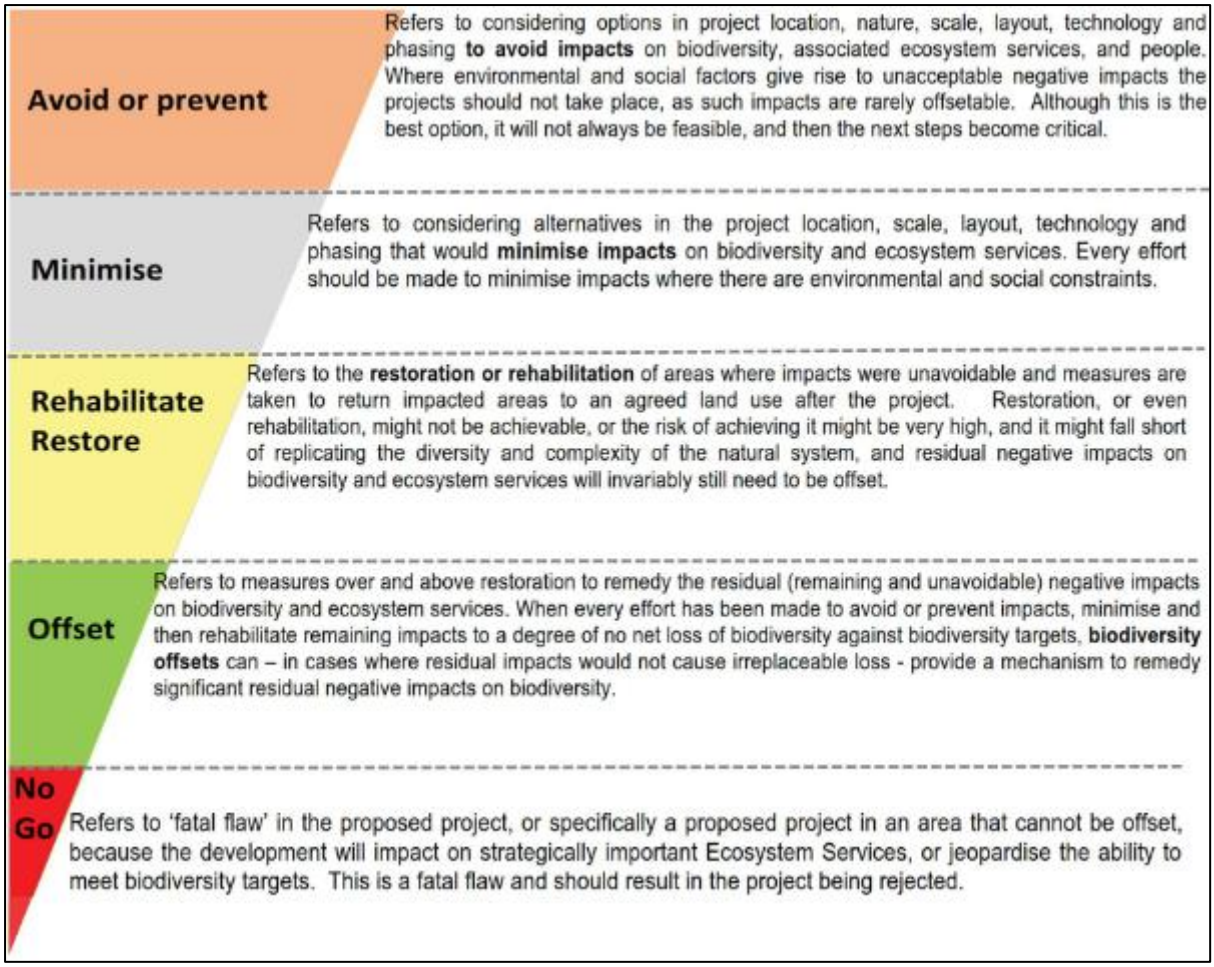


Figure 6-1 Mitigation Sequence/Hierarchy

6.2 Present Impacts to Biodiversity

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

- Present energy distribution infrastructure, including powerlines;
- Historical sheep grazing land-use;
- Invasive species;
- Roads and associated vehicle traffic and road kills; and
- Fences.

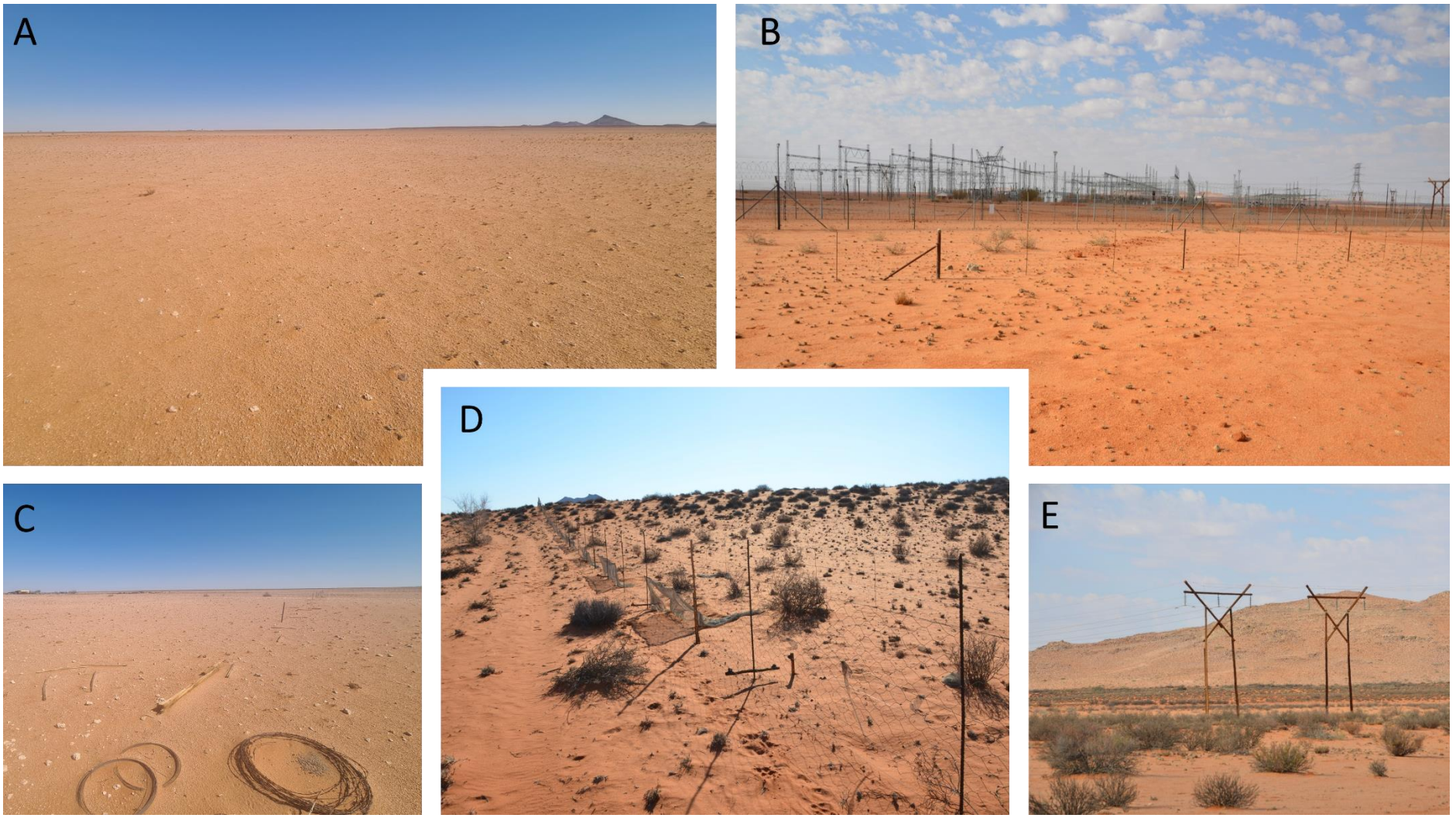


Figure 6-2 ***Photographs illustrating impacts to biodiversity A) Extensive overgrazing, B & E) Existing power station and associated powerlines, C) Farming infrastructure and D) Fencing.***

6.3 Initial Impact – No-go Scenario

It is the specialist's opinion that if none of the proposed activities be considered, that sensitive receptors will remain in intact in most of the areas if no unlawful anthropogenic development takes place. The current ecological state of the area holistically is intact, which will degrade taking into consideration the proposed activities.

The larger project area could improve naturally over time, especially with the reduction of sheep farming, and will improve significantly with rehabilitation, if managed. The reality of the area being managed is however, very unlikely. To summarise, the no-go option will result in zero additional impacts and could result in the improvement (by means of recovery) of the area, especially the water resource systems which in an environmental aspect, will be a suitable option.

6.4 Alternatives Considered

No alternatives were considered.

6.5 Identification of Additional Potential Impacts

The potential impacts during the construction and operation phases of the proposed development are presented in Table 6-2.

Table 6-2 Potential impacts to biodiversity associated with the proposed activity

Main Impact	**Project activities that can cause loss of habitat (especially with regard to the construction):**	**Secondary impacts anticipated**
1. Destruction, fragmentation and degradation of habitats and ecosystems	Physical removal of vegetation, including protected and threatened species (Expected DDT plants)	Displacement/loss of flora & fauna (including possible SCC) Increased potential for soil erosion Habitat fragmentation Increased potential for establishment of alien & invasive vegetation
	Access roads and servitudes	
	Soil dust precipitation	
	Water leakages	
	Dumping of waste products	
	Random events such as unnatural fire (cooking fires or cigarettes)	
Main Impact	**Project activities that can cause the spread and/or establishment of alien and/or invasive species**	**Secondary impacts anticipated**
2. Spread and/or establishment of alien and/or invasive species	Vegetation removal	Habitat loss for native flora & fauna (including potential SCC) Spreading of potentially dangerous diseases due to invasive and pest species Alteration of fauna assemblages due to habitat modification
	Vehicles potentially spreading seed	
	Unsanitary conditions surrounding infrastructure promoting the establishment of alien and/or invasive rodents	
	Creation of infrastructure suitable for breeding activities of alien and/or invasive birds	
Main Impact	**Project activities that can cause the Direct mortality of fauna**	**Secondary impacts anticipated**
3. Direct mortality of fauna	Clearing of vegetation	Loss of ecosystem services Increase in rodent populations and associated disease risk
	Roadkill due to vehicle collision	
	Pollution of water resources due to dust effects, chemical spills, etc.	
	Intentional killing of fauna for food (hunting) Bird collisions with powerlines	
Main Impact	**Project activities that can cause reduced dispersal/migration of fauna**	**Secondary impacts anticipated**
	Loss of landscape used as corridor	Loss of ecosystem services

4.Reduced dispersal/migration of fauna	Compacted roads	Reduced plant seed dispersal
	Removal of vegetation	
	Light, noise and dust disturbance	
	Powerlines	
Main Impact	**Project activities that can cause pollution in water courses and the surrounding environment**	**Secondary impacts anticipated**
5. Environmental pollution due to water/ mine drainage runoff	Chemical (organic/inorganic) spills	Faunal mortality (direct and indirectly) Groundwater pollution Loss of ecosystem services
	Erosion	
Main Impact	**Project activities that can cause disruption/alteration of ecological life cycles due to sensory disturbance and dust.**	**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, generators)	Loss of ecosystem services
	Vehicles	
	Outside lighting	
Main Impact	**Project activities that can cause staff to interact directly with potentially dangerous fauna**	**Secondary impacts anticipated**
7. Staff and others interacting directly with fauna (potentially dangerous) or poaching of animals	All unregulated/supervised activities outdoors	Harm to fauna and/or staff

6.6 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 6.6.6 of this report.

Due to the nature of the project, the actual footprint of the pole/pylon infrastructure has a small localised, impact. It is the creation of access and service roads that is a more important aspect to assess and will be considered in relation to the powerline as no road layout has been received. The method of connection and spanning of the powerlines between poles have also not been received and thus no impact regarding that can be considered with certainty. The fact that the project area occurs within a Renewable Energy Development Zone reduced the significance of impacts, especially in regard to habitats.

6.6.1 Construction Phase

The following potential impacts were considered on terrestrial communities. This phase refers to the period when construction of the proposed infrastructure is built/installed. This phase usually has the largest direct impact on biodiversity:

6.6.1.1 Destruction, further loss and fragmentation of the of habitats, ecosystems and vegetation community

The proposed vegetation clearance for the pylon footprint and the associated access roads; clearing new roads/servitudes as well as potential widening of existing roads/servitudes will physically remove vegetation as well as remove and fragment communities/ ecosystems for terrestrial plant species. This will result in direct and indirect erosion due to the loss of vegetation cover. The disruption in natural areas of phytomass, disturbance of soil and introduction of alien vegetation by humans will increase the potential and likelihood of establishment of alien and invasive vegetation. These will likely results in the destruction, further loss and fragmentation of the vegetation community/ ecosystems.

The impact of the construction phase on the impact on flora is shown in Table 6-3 below.

Table 6-3 Assessment of significance of potential impacts on the terrestrial flora associated with the construction phase of the project.

Potential Impact: Destruction, further loss and fragmentation of the of habitats, ecosystems and vegetation community	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	2	4	5	4	**60**	**Moderate**	(-)	High
With Mitigation	2	2	3	2	3	**27**	**Low**	(-)	High
Mitigation and Management Measures See sections 6.6.6									

6.6.1.2 Introduction of alien species, especially plants

Clearance of vegetation and movement between areas will increase the potential for the establishment of alien and invasive vegetation. The proposed vegetation clearance for the pylon footprint and the associated access roads; clearing new roads/servitudes as well as potential widening of existing roads/servitudes will physically remove indigenous vegetation and potentially create an environment where alien species can be introduced.

The impact of the construction phase on the impact on fauna is shown in Table 6-4 below.

Table 6-4 Assessment of significance of potential impacts on the terrestrial biodiversity associated with the construction phase of the project.

Potential Impact: Introduction of alien species, especially plants	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	3	3	3	4	**52**	**Moderate**	(-)	High
With Mitigation	3	2	2	2	2	**18**	**Low**	(-)	High
Mitigation and Management Measures See sections 6.6.6									

6.6.1.3 Destruction of potentially threatened and protected plant species

The proposed vegetation clearance for the pylon footprint and the associated access roads; clearing new roads/servitudes as well as potential widening of existing roads/servitudes will physically remove vegetation This will result in direct and indirect erosion due to the loss of vegetation cover. The disruption in natural areas of phytomass, disturbance of soil and introduction of alien vegetation by humans will increase the potential and likelihood of establishment of alien and invasive vegetation. Destruction, further loss and fragmentation of the vegetation community/ ecosystems, including potential SCC individuals. This impact is considered not only due to the threatened plant recorded, as well as the protected species. The impact of the construction phase on the impact on fauna is shown in Table 6-5 below.

Table 6-5 Assessment of significance of potential impacts on the terrestrial flora associated with the construction phase of the project

Potential Impact: Destruction of potentially threatened plant species.	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	2	4	5	4	60	Moderate	(-)	High
With Mitigation	2	2	3	2	3	27	Low	(-)	High
Mitigation and Management Measures See sections 6.6.6									

6.6.1.4 Displacement and fragmentation of the faunal community due to habitat loss, direct mortalities and disturbance (noise, dust and vibration)

The removal of vegetation will result in the direct loss of habitat, forcing fauna species (including potential IUCN listed species) to move into new areas where more challenges may be present. Disruption of faunal populations by interfering with their movements and/or breeding activities. Direct mortalities from earth moving or transport vehicles and increased traffic due to construction work and the transportation of staff/materials. The unregulated movement of local people will also increase the likelihood of poaching of species in what was previously seen as secluded habitat for fauna species. The unregulated movement of local people could lead to the introduction of diseases and feral species such as cats and dogs. The impact of the construction phase on the impact on fauna is shown in Table 6-6 below.

Table 6-6 Assessment of significance of potential impacts on the terrestrial fauna associated with the construction phase of the project

Potential Impact: Displacement and fragmentation of the faunal community due to habitat loss, direct mortalities and disturbance (noise, dust and vibration)	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	3	3	4	4	56	Moderate	(-)	High
With Mitigation	3	2	3	2	2	20	Low	(-)	High
Mitigation and Management Measures See sections 6.6.6									

6.6.2 Operational Phase

The following potential impacts were considered on biodiversity (fauna and flora) during the operational phase. This phase refers to when construction has been completed and the proposed infrastructure has been built and is functional:

6.6.2.1 Continued disturbance of vegetation communities, especially threatened species, and encroachment by alien invasive plant species

Due to the vegetation communities that were cleared within the footprint area during the construction phase, being entirely transformed, indirect impacts to the surrounding vegetation communities and ecosystems are the main impact considered. The edges of the access and service roads will likely be degraded by impacts such as dust (reduces the effectiveness of photosynthesis and pollination), livestock and alien vegetation will become a concern in these disturbed areas. The unregulated movement of local people into the areas surrounding the footprint will likely result in plant poaching.

The impact of the operation phase on the impact on flora is shown in Table 6-7 below.

Table 6-7 Assessment of significance of potential impacts on the terrestrial flora associated with the operational phase of the project

Potential Impact: Continued disturbance of vegetation communities, especially threatened species, and encroachment by alien invasive plant species	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	2	3	2	4	**44**	**Moderate**	(-)	High
With Mitigation	3	1	2	1	2	**14**	**Low**	(-)	High
Mitigation and Management Measures **See sections 6.6.6**									

6.6.2.2 Ongoing displacement, direct mortalities and disturbance of faunal community due to habitat loss and disturbances (such as dust and noise mainly through the maintenance of the system).

Ongoing displacement due to sensory disturbance during operation (noise, light, dust, pollution and vibrations) from the service vehicles. The footprint area will likely be impacted by poaching, litter, roadkill and most importantly electrocutions due to the presence of the powerline and the increase in human presence as the operations continue.

The powerline is anticipated to have a noteworthy impact during operation as during this time the powerline will pose a threat to avifauna, especially sensitive species which are known to occur in the area. If mitigation measures are followed this impact can be reduced as depicted in the table below.

The impact of the operation phase on the impact on fauna is shown in Table 6-8 below.

Table 6-8 Assessment of significance of potential impacts on the terrestrial fauna associated with the operational phase of the project.

Potential Impact: Ongoing displacement, direct mortalities and disturbance of faunal community due to habitat loss and disturbances (such as dust and noise mainly through the maintenance of the system).	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	2	3	2	4	**44**	**Moderate**	(-)	High
With Mitigation	3	2	2	1	3	**24**	**Low**	(-)	High
Mitigation and Management Measures **See sections 6.6.6**									

6.6.3 Cumulative Impacts

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 terrestrial fauna and flora.

These are the assumed cumulative impacts that may result from the activities in the immediate vicinity of the project area. 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 other powerlines and the associated roads and within the area). These include dust deposition, noise and vibration, disruption of wildlife corridors or habitat, groundwater drawdown, groundwater and surface water quality, and transport. In the light of all above, the expected cumulative impact is expected to be low to moderately detrimental.

6.6.4 Irreplaceable Loss

The current proposed layout of the surface infrastructure and the associated impacts will result in the irreplaceable loss of, albeit it limited;

- Threatened avifaunal SCC populations; and
- CBA1 & 2 and ESA.

6.6.5 Unplanned Events

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

Table 6-9 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 6-9 Summary of unplanned events for terrestrial biodiversity

Unplanned Event	Potential Impact	Mitigation
Hydrocarbon spills into the surrounding environment	Contamination of habitat as well as water resources associated with 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 grassland and wetlands	Appropriate/Adequate fire management plan need to be implemented.

6.6.6 Biodiversity Management Outcomes

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 6-10 presents the recommended mitigation measures and the respective timeframes, targets and performance indicators for the biodiversity 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 CBA1 and CBA2 areas in the vicinity of the project area (including water resource areas);
- As far as possible, reduce the negative fragmentation effects of the development and enable safe movement of faunal species;
- Follow the guidelines for interpreting SEI; and
- Prevent the direct and indirect loss and disturbance of faunal species and community, especially avifauna (including occurring and potentially occurring species of conservation concern).

Table 6-10 Mitigation measures including requirements for timeframes, roles and responsibilities for this report

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Management outcome: Vegetation and Habitats				
The placement of pylons and support structures within High sensitivity areas must be avoided (as much is feasible). An ECO can advise should placement or access within a High sensitivity area be essential, applicable mitigation measures should be prescribed. The support structures associated with the proposed powerline must be located outside the episodic drainage line. The areas to be developed must be specifically demarcated to prevent movement into highly sensitive surrounding environments. The infrastructure outlines must be realigned within very low/ low and medium sensitivity areas. • Pylon placement within the Sandy Grassland need to be planned specifically in order to avoid placing structures footprints on the unstable dunes. This will not only avoid the loss of the unique habitat, but also provide a solid foundation for the infrastructure.	Life of operation	Project manager, Environmental Officer	Infrastructure Footprint	From design to installation
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.	Life of operation	Project manager, Environmental Officer	Areas of indigenous vegetation (All High sensitivity areas)	From design to installation
Existing access routes and walking paths must be made use of, and the development of new routes avoided as much is feasible. Unless realigned within low sensitivity areas.	Construction/Operational Phase	Environmental Officer & Design Engineer	Roads and paths used	Where applicable
All laydown, chemical toilets etc. should be restricted to low sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded. No storage of vehicles or equipment will be allowed outside of the designated project areas. The storage of the transmission towers to be installed are not to be stored for extended periods of time and storage areas must be placed in low sensitivity areas.	Construction/Operational Phase	Environmental Officer & Design Engineer	Laydown areas and material storage & placement.	Where applicable

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.	Construction Phase	Environmental Officer & Contractor	Assess the state of rehabilitation and encroachment of alien vegetation	During Phase, with one wet season follow-up inspection
All structure footprints to be rehabilitated and landscaped after installation is complete. Rehabilitation of the disturbed areas existing in the project area must be made a priority.	Construction Phase	Environmental Officer & Contractor	Footprint rehabilitation	During Phase
Progressive rehabilitation will enable topsoil to be returned more rapidly, thus ensuring more recruitment from the existing seedbank. Any woody material removed can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent further erosion.	Construction Phase	Environmental Officer & Contractor	Footprint rehabilitation	During Phase
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 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.	Life of operation	Environmental Officer & Contractor	Spill events, Vehicles dripping.	Where applicable
Leaking equipment and vehicles must be repaired immediately or be removed from project area to facilitate repair.	Life of operation	Environmental Officer & Contractor	Leaks and spills	Where applicable
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.	Life of operation	Project manager, Environmental Officer	Any instances	Where applicable
All removed soil and material must not be stockpiled within the drainage areas. Stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.	Construction/Operational Phase	Project manager, Environmental Officer	Topsoil removal and storage	Where applicable

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Enforcing of speed limits. Reducing the dust generated by the listed activities above, putting up signs to enforce speed limit in access roads.	Life of operation	Project manager, Environmental Officer	Speed limit of vehicles	Ongoing
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. Pylon 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. • If protected trees are causing an obstruction, the whole servitude width may not be cleared of protected trees. For linear infrastructure, protected tree removal is restricted to pylon footprints, trees directly underneath the OHPL infrastructure and 8 m clearance width (4m on either side) of the line.	Life of operation	Project manager, Environmental Officer	Protected Tree/Plant species	Ongoing
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 other conservation projects.	Planning Phase, Pre-Construction	Project manager, Environmental Officer & Contractor	Protected Tree/Plant species	During Phase
Management outcome: Fauna				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into high sensitive areas and the surrounding environments.	Construction/Operational Phase	Project manager, Environmental Officer	Infringement into these areas	Ongoing

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Any holes/deep excavations must be dug and planted in a progressive manner and shouldn't be left open overnight Should the holes be left overnight they must be covered temporarily to ensure no small fauna species fall in.	Planning and Construction	Environmental Officer & Contractor, Engineer	Presence of trapped animals and open holes	Ongoing
No trapping, killing, or poisoning of any wildlife is to be allowed.	Life of operation	Environmental Officer	Evidence of trapping etc	Ongoing
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.	Life of operation	Health and Safety Officer	Compliance to the training.	Ongoing
Schedule activities and operations during least sensitive periods, to avoid migration, nesting and breeding seasons. • Driving on access roads close to highly and medium sensitive areas at night should be prevented in order to reduce; or prevent wildlife road mortalities which occur more frequently during this period.	Life of operation	Project manager, Environmental Officer & Design Engineer	Activities should take place during the day in the case.	Ongoing
All areas to be developed must be walked through prior to any activity to ensure no nests or birds area 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.	Planning and Construction	Project manager, Environmental Officer	Presence of Nests	From design to installation
For transmission towers in high sensitivity locations, it is recommended to install bird guard/spike structures (close to or along drainage features) to prevent birds from landing on and/or nesting on the towers. This has been linked with increases in corvid populations which can impact local reptile and avifauna species. Poles: The poles should be fitted with bird perches on top of the poles to draw birds, particularly vultures, away from the potentially risky insulators.	Construction Phase	Project manager, Environmental Officer	Installation of bird mitigation	From design to installation
Appropriate bird mitigation measures should be put in place to avoid bird collisions and direct impacts to the infrastructure, as the likelihood of SCC being present in the area is confirmed. These mitigation measures should entail the installation of 'bird-flappers' and bird-friendly powerline structures.	Construction Phase	Project manager, Environmental Officer	Installation of bird mitigation	From design to installation

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
This is particularly relevant to the portions of the proposed powerline which crosses the drainage feature areas as well as the Sandy Grassland areas. Powerline: The span that crosses major drainage lines should be marked with Bird Flight Diverters on the earth wire of the line, five metres apart, alternating black and white.				
Ensure that cables and connections are insulated successfully to reduce electrocution risk.	Life of project	Environmental Officer & Contractor, Engineer	Presence of electrocuted fauna	Ongoing
Any exposed parts must be covered (insulated) to reduce electrocution risk.	Life of project	Environmental Officer & Contractor, Engineer	Presence of electrocuted fauna	Ongoing
Monitoring of the OHL route must be undertaken to detect bird carcasses, to enable the identification of any potential areas of high impact to be marked with bird flappers if not already done so. Monitoring should be undertaken at least once a month for the first year of operation.	Life of project	Environmental Officer & Contractor,	Monitoring of the OHL route. Presence and condition of mitigation structures	Ongoing
Heat generated from the substations must be monitored to ensure it does not negatively affect the local fauna.	Life of operation	Environmental Officer & Contractor	Heat generated by substations	Ongoing
Management outcome: Alien species				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
Compilation of and implementation of an alien vegetation management plan.	Construction Phase	Project manager, Environmental Officer & Contractor	Assess presence and encroachment of alien vegetation	Where applicable
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.	Construction Phase	Project manager, Environmental Officer & Contractor	Footprint Area	From design to installation
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 immediately to prevent rodents and pests entering the site.	Construction Phase	Environmental Officer & Health and Safety Officer	Presence of waste	Where applicable
Management outcome: Dust				
Impact Management Actions	**Implementation**		**Monitoring**	

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
	Phase	Responsible Party	Aspect	Frequency
Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes not conducting activities on windy days which will increase the likelihood of dust being generated.	Construction Phase	Contractor	Dustfall	As per the air quality report and the dust monitoring program.
Management outcome: Waste management				
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.	Construction Phase	Environmental Officer & Contractor	Waste Removal	Where applicable
Litter, spills, fuels, chemicals and human waste in and around the project area.	Construction Phase	Environmental Officer & Health and Safety Officer	Presence of Waste	Where applicable
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.	Construction Phase	Environmental Officer & Health and Safety Officer	Number of toilets per staff member. Waste levels	Where applicable
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	Construction Phase	Environmental Officer & Health and Safety Officer	Availability of bins and the collection of the waste.	Where applicable
Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regard to waste management. Under no circumstances may domestic waste be burned on site	Construction Phase	Environmental Officer, Contractor & Health and Safety Officer	Collection/handling of the waste.	Where applicable
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.	Construction Phase	Environmental Officer, Contractor & Health and Safety Officer	Management of bins and collection of waste	Where applicable
Management outcome: Environmental awareness training				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency

Impact Management Actions	Implementation		Monitoring	
	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 EMPr. 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
Management outcome: Erosion				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
Enforcing of speed limits, if this does not already exist; • Reducing the dust generated by the listed activities above, putting up signs to enforce speed limit.	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, and the development of new routes limited.	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 or high wind events.	Life of operation	Project manager, Environmental Officer	Re-establishment of indigenous vegetation	Where applicable

6.7 Recommendations

The following further recommendations are provided:

- The infrastructure layout for the proposed access roads or use of existing roads need to be provided in order to assess the impact more accurately;
- A survey in the correct season to confirm the presence/absence of the red data plants expected. This may be undertaken as a walkdown of the line prior to placement of the poles;
- A vegetation alien invasive management plan should be implemented from the onset of the construction phase of the project;
- A rehabilitation plan needs to be implemented in the disturbed areas. This is in accordance with the mitigation hierarchy; and
- Due to the overall low post-mitigation risks, it is evident that minimisation (as per the mitigation hierarchy) of impact significance can be achieved. Further to this, rehabilitation of disturbed areas, resulting from the project activities and from historical land use can also be rehabilitated. Based on this, a biodiversity offset is not likely because of the measures taken to address any residual, adverse impacts.

7 Conclusion and Impact Statement

7.1 Conclusion

The completion of a comprehensive desktop study, literature review in conjunction with the results from the field survey, suggest there is a high confidence in the information provided. The survey ensured that there was a suitable groundtruth coverage of the assessment area and major habitats and ecosystems were assessed to obtain a general species (fauna and flora) overview and the major current impacts were observed. The conservation status of the ecosystem is classified as Least Concern albeit the protection level is regarded as Not Protected. Moreover, the proposed activity overlaps with ESA and CBA1 & 2 (screening tool), a NPAES, Succulent Karoo Ecosystem Programme unique bird habitat as well as with Haramoep and Black Mountain Mine Important Bird and Biodiversity Area.

The current layout falls within sensitive habitats and other areas of high biodiversity potential. The current layout as well as the expected access and service road of the development would be considered to have a negative impact as it would directly affect the habitat of threatened plant species and expected listed avifaunal species that use these ecosystems:

- The assessment area possesses a high diversity and abundance of threatened (One DDT flora species) / protected flora species. Moreover, protected flora and fauna are ubiquitous within the assessment area and surrounding landscape was ubiquitous within the assessment area and surrounding landscape; and
- Two threatened species of avifauna were observed to occur and utilise the habitats within the assessment area during the survey period and comprised of three avifauna species and one mammal species. *Neotis ludwigii* (Ludwigs Bustard) and *Polemaetus bellicosus* (Eagle, Martial), possess high priority scores indicating that they are particularly susceptible to collisions with powerlines. Excessive noise will lead to displacement of the species and the vehicle traffic potentially will lead to direct mortality.

Historically, overgrazing from sheep 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 important, due to the species recorded as well as the role of this intact unique habitat to biodiversity within a very fragmented disturbed local landscape, not to mention the sensitivity according to various ecological datasets.

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/medium sensitivity areas will lead the direct destruction and loss of portions of functional CBA/ESA, and also the floral and faunal species that are expected to utilise this habitat, however these are expected to be minimal. 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 and management regarding these impacts will be the most important factor of this project and must be considered by the issuing authority.

The majority of the proposed infrastructure does occur within low sensitivity areas and is not expected to have a significant post-mitigation impact. Special consideration needs to be taken regarding the construction and operational phase impacts of the access and service road infrastructure, as they could result in large scale detrimental impacts if not planned, managed and monitored appropriately.

7.2 Impact Statement

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

- Habitat loss and fragmentation, including the loss of floral SCC;
- Degradation of surrounding habitat;
- Disturbance and displacement caused during the construction and maintenance phases; and
- Direct mortality of avifauna colliding with the power lines, as well as possible electrocutions with power line infrastructure.

Mitigation measures as described in this report can be implemented to reduce the significance of the risk to an overall acceptable level of risk. Considering that this area that has been identified as being of significance for biodiversity maintenance and ecological processes (CBAs and ESAs), development may proceed with caution. All mitigations measures prescribed herein must be considered by the issuing authority for authorisation. No fatal flaws are evident for the proposed project, especially if the high sensitivity areas are avoided.

Due to the overall low post-mitigation risks, and the potential for rehabilitation of disturbed areas, a biodiversity offset is not likely to be required because of the measures taken to address any residual, adverse impacts.

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9 Appendix Items

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

Family	Taxon	Author	IUCN	Ecology
Lamiaceae	*Acrotome pallescens*	Benth.	LC	Indigenous
Molluginaceae	*Adenogramma glomerata*	(L.f.) Druce	LC	Indigenous
Crassulaceae	*Adromischus nanus*	(N.E.Br.) Poelln.	LC	Indigenous; Endemic
Aizoaceae	*Aizoon asbestinum*	Schltr.	LC	Indigenous
Aizoaceae	*Aizoon burchellii*	N.E.Br.		Indigenous
Hyacinthaceae	*Albuca glandulifera*	J.C.Manning & Goldblatt	LC	Indigenous
Hyacinthaceae	*Albuca namaquensis*	Baker	LC	Indigenous
Hyacinthaceae	*Albuca setosa*	Jacq.	LC	Indigenous
Hyacinthaceae	*Albuca spiralis*	L.f.	LC	Indigenous; Endemic
Asphodelaceae	*Aloe microstigma*	Salm-Dyck	LC	Indigenous
Asteraceae	*Amphiglossa tomentosa*	(Thunb.) Harv.	LC	Indigenous
Anacampserotaceae	*Anacampseros albissima*	Marloth	LC	Indigenous
Anacampserotaceae	*Anacampseros baeseckei*	Dinter ex Poelln.	LC	Indigenous
Anacampserotaceae	*Anacampseros filamentosa subsp. namaquensis*	(Haw.) Sims		Indigenous
Anacampserotaceae	*Anacampseros papyracea subsp. namaensis*	E.Mey. ex Fenzl	LC	Indigenous
Anacampserotaceae	*Anacampseros papyracea subsp. papyracea*	E.Mey. ex Fenzl	LC	Indigenous
Anacampserotaceae	*Anacampseros quinaria*	E.Mey. ex Fenzl	LC	Indigenous
Anacampserotaceae	*Anacampseros recurvata subsp. minuta*	Schonland	DD	Indigenous; Endemic
Anacampserotaceae	*Anacampseros recurvata subsp. recurvata*	Schonland	LC	Indigenous; Endemic
Rubiaceae	*Anthospermum spathulatum subsp. spathulatum*	Spreng.	LC	Indigenous
Aizoaceae	*Antimima tuberculosa*	(L.Bolus) H.E.K.Hartmann	LC	Indigenous; Endemic
Aizoaceae	*Antimima vanzylii*	(L.Bolus) H.E.K.Hartmann	LC	Indigenous; Endemic
Menispermaceae	*Antizoma miersiana*	Harv.	LC	Indigenous
Scrophulariaceae	*Aptosimum albomarginatum*	Marloth & Engl.	LC	Indigenous
Scrophulariaceae	*Aptosimum procumbens*	(Lehm.) Steud.	LC	Indigenous
Scrophulariaceae	*Aptosimum spinescens*	(Thunb.) Emil Weber	LC	Indigenous
Scrophulariaceae	*Aptosimum tragacanthoides*	E.Mey. ex Benth.	LC	Indigenous
Asteraceae	*Arctotis dimorphocarpa*	R.J.Mckenzie	LC	Indigenous; Endemic

Family	Taxon	Author	IUCN	Ecology
Asteraceae	*Arctotis hirsuta*	(Harv.) Beauverd	LC	Indigenous; Endemic
Asteraceae	*Arctotis leiocarpa*	Harv.	LC	Indigenous
Poaceae	*Aristida adscensionis*	L.	LC	Indigenous
Poaceae	*Aristida congesta subsp. congesta*	Roem. & Schult.	LC	Indigenous
Poaceae	*Aristida engleri var. engleri*	Mez	LC	Indigenous
Poaceae	*Aristida sp.*			
Asparagaceae	*Asparagus exuvialis forma exuvialis*	Burch.	NE	Indigenous
Asparagaceae	*Asparagus suaveolens*	Burch.	LC	Indigenous
Zygophyllaceae	*Augea capensis*	Thunb.	LC	Indigenous
Salvadoraceae	*Azima tetracantha*	Lam.	LC	Indigenous
Acanthaceae	*Barleria lichtensteiniana*	Nees	LC	Indigenous
Acanthaceae	*Barleria rigida*	Nees	LC	Indigenous
Asteraceae	*Berkheya canescens*	DC.	LC	Indigenous
Asteraceae	*Berkheya spinosissima subsp. spinosissima*	(Thunb.) Willd.	LC	Indigenous
Acanthaceae	*Blepharis macra*	(Nees) Vollesen	LC	Indigenous
Acanthaceae	*Blepharis mitrata*	C.B.Clarke	LC	Indigenous
Acanthaceae	*Blepharis sp.*			
Capparaceae	*Boscia foetida subsp. foetida*	Schinz	LC	Indigenous
Poaceae	*Brachiaria glomerata*	(Hack.) A.Camus	LC	Indigenous
Amaryllidaceae	*Brunsvigia bosmaniae*	F.M.Leight.	LC	Indigenous
Amaryllidaceae	*Brunsvigia comptonii*	W.F.Barker	LC	Indigenous; Endemic
Amaryllidaceae	*Brunsvigia namaquana*	D.Mull.-Doblies & U.Mull.-Doblies	LC	Indigenous
Bryaceae	*Bryum argenteum*	Hedw.		Indigenous
Asphodelaceae	*Bulbine ophiophylla*	G.Will.	EN	Indigenous
Fabaceae	*Calobota angustifolia*	(E.Mey.) Boatwr. & B.-E.van Wyk	LC	Indigenous
Poaceae	*Cenchrus ciliaris*	L.	LC	Indigenous
Poaceae	*Centropodia glauca*	(Nees) Cope	LC	Indigenous
Aizoaceae	*Cephalophyllum fulleri*	L.Bolus	LC	Indigenous; Endemic
Aizoaceae	*Cephalophyllum parvibracteatum*	(L.Bolus) H.E.K.Hartmann	LC	Indigenous; Endemic
Aizoaceae	*Cephalophyllum staminodiosum*	L.Bolus	LC	Indigenous; Endemic
Gigaspermaceae	*Chamaebryum pottioides*	Ther. & Dixon		Indigenous
Verbenaceae	*Chascanum garipense*	E.Mey.	LC	Indigenous
Aizoaceae	*Cheiridopsis schlechteri*	Tischer	LC	Indigenous; Endemic
Asteraceae	*Chrysocoma microphylla*	Thunb.	LC	Indigenous
Asteraceae	*Chrysocoma puberula*	Merxm.	LC	Indigenous

Family	Taxon	Author	IUCN	Ecology
Asteraceae	*Chrysocoma sparsifolia*	Hutch.	LC	Indigenous; Endemic
Asteraceae	*Cineraria canescens var. canescens*	J.C.Wendl. ex Link	LC	Indigenous
Poaceae	*Cladoraphis spinosa*	(L.f.) S.M.Phillips	LC	Indigenous
Cleomaceae	*Cleome paxii*	(Schinz) Gilg & Gilg-Ben.	LC	Indigenous
Cucurbitaceae	*Coccinia rehmannii*	Cogn.	LC	Indigenous
Boraginaceae	*Codon royenii*	L.	LC	Indigenous
Colchicaceae	*Colchicum bellum*	(Schltr. & K.Krause) J.C.Manning & Vinn.		Indigenous
Colchicaceae	*Colchicum walteri*	(Pedrola, Membrives & J.M.Monts.) J.C.Manning & Vinn.	LC	Indigenous
Burseraceae	*Commiphora gracilifrondosa*	Dinter ex J.J.A.van der Walt	LC	Indigenous
Aizoaceae	*Conicosia elongata*	(Haw.) N.E.Br.	LC	Indigenous; Endemic
Aizoaceae	*Conophytum angelicae*	(Dinter & Schwantes) N.E.Br.		Indigenous
Aizoaceae	*Conophytum calculus subsp. vanzylii*	(A.Berger) N.E.Br.	LC	Indigenous; Endemic
Aizoaceae	*Conophytum friedrichiae*	(Dinter) Schwantes	LC	Indigenous
Aizoaceae	*Conophytum limpidum*	S.A.Hammer	NT	Indigenous; Endemic
Aizoaceae	*Conophytum marginatum subsp. haramoepense*	Lavis	LC	Indigenous; Endemic
Aizoaceae	*Conophytum maughanii subsp. maughanii*	N.E.Br.	LC	Indigenous
Aizoaceae	*Conophytum sp.*			
Cucurbitaceae	*Corallocarpus dissectus*	Cogn.	LC	Indigenous
Crassulaceae	*Cotyledon orbiculata var. orbiculata*	L.	LC	Indigenous
Asteraceae	*Crassothonna sedifolia*	(DC.) B.Nord.	LC	Indigenous
Crassulaceae	*Crassula brevifolia subsp. brevifolia*	Harv.	LC	Indigenous
Crassulaceae	*Crassula campestris*	(Eckl. & Zeyh.) Endl. ex Walp.	LC	Indigenous
Crassulaceae	*Crassula columnaris subsp. prolifera*	Thunb.	LC	Indigenous
Crassulaceae	*Crassula corallina subsp. macrorrhiza*	Thunb.	LC	Indigenous
Crassulaceae	*Crassula cotyledonis*	Thunb.	LC	Indigenous
Crassulaceae	*Crassula deltoidea*	Thunb.	LC	Indigenous
Crassulaceae	*Crassula elegans subsp. elegans*	Schonland & Baker f.	LC	Indigenous
Crassulaceae	*Crassula exilis subsp. exilis*	Harv.	LC	Indigenous; Endemic
Crassulaceae	*Crassula exilis subsp. sedifolia*	Harv.	LC	Indigenous
Crassulaceae	*Crassula garibina subsp. garibina*	Marloth & Schonland	LC	Indigenous
Crassulaceae	*Crassula macowaniana*	Schonland & Baker f.	LC	Indigenous
Crassulaceae	*Crassula muscosa var. muscosa*	L.	NE	Indigenous
Crassulaceae	*Crassula namaquensis subsp. namaquensis*	Schonland & Baker f.	LC	Indigenous
Crassulaceae	*Crassula sericea*	Schonland	LC	Indigenous

Family	Taxon	Author	IUCN	Ecology
Crassulaceae	*Crassula sericea var. hottentotta*	Schonland	NE	Indigenous
Crassulaceae	*Crassula sericea var. sericea*	Schonland	NE	Indigenous
Crassulaceae	*Crassula sericea var. velutina*	Schonland	NE	Indigenous
Crassulaceae	*Crassula sp.*			
Crassulaceae	*Crassula subaphylla var. subaphylla*	(Eckl. & Zeyh.) Harv.	LC	Indigenous
Crassulaceae	*Crassula tenuipedicellata*	Schonland & Baker f.	LC	Indigenous
Crassulaceae	*Crassula tomentosa var. glabrifolia*	Thunb.	LC	Indigenous
Fabaceae	*Crotalaria meyeriana*	Steud.	LC	Indigenous
Fabaceae	*Crotalaria pearsonii*	Baker f.	VU	Indigenous; Endemic
Fabaceae	*Crotalaria virgultalis*	Burch. ex DC.	LC	Indigenous
Cucurbitaceae	*Cucumis africanus*	L.f.	LC	Indigenous
Cucurbitaceae	*Cucumis rigidus*	E.Mey. ex Sond.	LC	Indigenous
Asteraceae	*Curio corymbifer*	(DC.) Eggli		Indigenous
Cyperaceae	*Cyperus indecorus var. namaquensis*	Kunth	NE	Indigenous
Apiaceae	*Dasispermum capense*	(Lam.) Magee & B.-E.van Wyk	LC	Indigenous; Endemic
Hyacinthaceae	*Daubenya namaquensis*	(Schltr.) J.C.Manning & Goldblatt	LC	Indigenous; Endemic
Caryophyllaceae	*Dianthus micropetalus*	Ser.	LC	Indigenous
Caryophyllaceae	*Dianthus namaensis*	Schinz		Indigenous
Caryophyllaceae	*Dianthus namaensis var. dinteri*	Schinz	LC	Indigenous
Asteraceae	*Dicoma capensis*	Less.	LC	Indigenous
Asteraceae	*Didelta carnosa var. carnosa*	(L.f.) Aiton	LC	Indigenous
Poaceae	*Digitaria eriantha*	Steud.	LC	Indigenous
Asteraceae	*Dimorphotheca pinnata var. pinnata*	(Thunb.) Harv.		Indigenous
Asteraceae	*Dimorphotheca polyptera*	DC.	LC	Indigenous
Asteraceae	*Dimorphotheca sinuata*	DC.	LC	Indigenous
Aizoaceae	*Dinteranthus puberulus*	N.E.Br.	LC	Indigenous; Endemic
Ebenaceae	*Diospyros ramulosa*	(E.Mey. ex A.DC.) De Winter	LC	Indigenous
Hyacinthaceae	*Dipcadi gracillimum*	Baker	LC	Indigenous
Hyacinthaceae	*Drimia intricata*	(Baker) J.C.Manning & Goldblatt	LC	Indigenous
Aizoaceae	*Drosanthemum albens*	L.Bolus	LC	Indigenous
Aizoaceae	*Drosanthemum hispidum*	(L.) Schwantes	LC	Indigenous
Aizoaceae	*Drosanthemum karrooense*	L.Bolus	LC	Indigenous; Endemic
Aizoaceae	*Drosanthemum luederitzii*	(Engl.) Schwantes	LC	Indigenous
Aizoaceae	*Drosanthemum sp.*			

Family	Taxon	Author	IUCN	Ecology
Aizoaceae	*Drosanthemum subcompressum*	(Haw.) Schwantes	LC	Indigenous; Endemic
Plumbaginaceae	*Dyerophytum africanum*	(Lam.) Kuntze	LC	Indigenous
Aizoaceae	*Ebracteola fulleri*	(L.Bolus) Glen	LC	Indigenous
Boraginaceae	*Ehretia sp.*			
Poaceae	*Ehrharta calycina*	Sm.	LC	Indigenous
Poaceae	*Ehrharta pusilla*	Nees ex Trin.	LC	Indigenous
Hypoxidaceae	*Empodium sp.*			
Poaceae	*Enneapogon cenchroides*	(Licht. ex Roem. & Schult.) C.E.Hubb.	LC	Indigenous
Poaceae	*Enneapogon desvauxii*	P.Beauv.	LC	Indigenous
Poaceae	*Enneapogon scaber*	Lehm.	LC	Indigenous
Poaceae	*Eragrostis nindensis*	Ficalho & Hiern	LC	Indigenous
Poaceae	*Eragrostis rotifer*	Rendle	LC	Indigenous
Poaceae	*Eragrostis sp.*			
Asteraceae	*Eriocephalus africanus var. paniculatus*	L.	LC	Indigenous; Endemic
Asteraceae	*Eriocephalus ambiguus*	(DC.) M.A.N.Mull.	LC	Indigenous
Asteraceae	*Eriocephalus microphyllus var. pubescens*	DC.	LC	Indigenous; Endemic
Asteraceae	*Eriocephalus scariosus*	DC.	LC	Indigenous
Asteraceae	*Eriocephalus sp.*			
Asteraceae	*Eriocephalus spinescens*	Burch.	LC	Indigenous; Endemic
Ruscaceae	*Eriospermum bakerianum subsp. bakerianum*	Schinz	LC	Indigenous
Ruscaceae	*Eriospermum pusillum*	P.L.Perry	LC	Indigenous; Endemic
Ruscaceae	*Eriospermum sp.*			
Ebenaceae	*Euclea undulata*	Thunb.	LC	Indigenous
Euphorbiaceae	*Euphorbia dregeana*	E.Mey. ex Boiss.	LC	Indigenous
Euphorbiaceae	*Euphorbia gariepina*	Boiss.		Indigenous
Euphorbiaceae	*Euphorbia gariepina subsp. gariepina*	Boiss.	LC	Indigenous
Euphorbiaceae	*Euphorbia gregaria*	Marloth	LC	Indigenous
Euphorbiaceae	*Euphorbia mauritanica*	L.	LC	Indigenous
Euphorbiaceae	*Euphorbia rhombifolia*	Boiss.	LC	Indigenous
Euphorbiaceae	*Euphorbia spinea*	N.E.Br.	LC	Indigenous
Asteraceae	*Euryops multifidus*	(Thunb.) DC.	LC	Indigenous; Endemic
Asteraceae	*Euryops subcarnosus subsp. vulgaris*	DC.	LC	Indigenous
Fabroniaceae	*Fabronia sp.*			

Family	Taxon	Author	IUCN	Ecology
Asteraceae	*Felicia clavipilosa*	Grau		Indigenous
Asteraceae	*Felicia hirsuta*	DC.	LC	Indigenous
Asteraceae	*Felicia muricata subsp. muricata*	(Thunb.) Nees	LC	Indigenous
Asteraceae	*Felicia namaquana*	(Harv.) Merxm.	LC	Indigenous
Iridaceae	*Ferraria variabilis*	Goldblatt & J.C.Manning	LC	Indigenous; Endemic
Moraceae	*Ficus cordata*	Thunb.		Indigenous
Moraceae	*Ficus cordata subsp. cordata*	Thunb.	LC	Indigenous
Moraceae	*Ficus ilicina*	(Sond.) Miq.	LC	Indigenous
Poaceae	*Fingerhuthia africana*	Lehm.	LC	Indigenous
Apocynaceae	*Fockea comaru*	(E.Mey.) N.E.Br.	LC	Indigenous
Urticaceae	*Forsskaolea candida*	L.f.	LC	Indigenous
Asteraceae	*Foveolina dichotoma*	(DC.) Kallersjo	LC	Indigenous
Aizoaceae	*Galenia africana*	L.	LC	Indigenous
Aizoaceae	*Galenia crystallina var. crystallina*	(Eckl. & Zeyh.) Fenzl ex Harv. & Sond.	LC	Indigenous
Aizoaceae	*Galenia fruticosa*	(L.f.) Sond.	LC	Indigenous
Aizoaceae	*Galenia papulosa*	(Eckl. & Zeyh.) Sond.	LC	Indigenous
Aizoaceae	*Galenia sarcophylla*	Fenzl	LC	Indigenous
Asteraceae	*Gazania jurineifolia subsp. jurineifolia*	DC.	LC	Indigenous; Endemic
Asteraceae	*Gazania lichtensteinii*	Less.	LC	Indigenous
Asteraceae	*Geigeria pectidea*	(DC.) Harv.	LC	Indigenous
Asteraceae	*Geigeria vigintisquamea*	O.Hoffm.	LC	Indigenous
Amaryllidaceae	*Gethyllis grandiflora*	L.Bolus	LC	Indigenous; Endemic
Gisekiaceae	*Gisekia africana var. africana*	(Lour.) Kuntze	LC	Indigenous
Iridaceae	*Gladiolus orchidiflorus*	Andrews	LC	Indigenous
Iridaceae	*Gladiolus saccatus*	(Klatt) Goldblatt & M.P.de Vos	LC	Indigenous
Apocynaceae	*Gomphocarpus filiformis*	(E.Mey.) D.Dietr.	LC	Indigenous
Funariaceae	*Goniomitrium africanum*	(Mull.Hal.) Broth.		Indigenous
Asteraceae	*Gorteria alienata*	(Thunb.) Stangb. & Anderb.		Indigenous; Endemic
Asteraceae	*Gorteria corymbosa*	DC.	LC	Indigenous
Asteraceae	*Gorteria integrifolia*	Thunb.		Indigenous; Endemic
Neuradaceae	*Grielum humifusum var. humifusum*	Thunb.	LC	Indigenous
Neuradaceae	*Grielum sinuatum*	Licht. ex Burch.	LC	Indigenous
Asteraceae	*Gymnodiscus linearifolia*	DC.	LC	Indigenous; Endemic
Asphodelaceae	*Haworthiopsis tessellata var. tessellata*	(Haw.) G.D.Rowley		Indigenous
Scrophulariaceae	*Hebenstretia parviflora*	E.Mey.	LC	Indigenous
Scrophulariaceae	*Hebenstretia sp.*			

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Asteraceae	*Helichrysum gariepinum*	DC.	LC	Indigenous
Asteraceae	*Helichrysum herniarioides*	DC.	LC	Indigenous
Asteraceae	*Helichrysum marmarolepis*	S.Moore	NT	Indigenous; Endemic
Asteraceae	*Helichrysum micropoides*	DC.	LC	Indigenous
Asteraceae	*Helichrysum pulchellum*	DC.	LC	Indigenous; Endemic
Asteraceae	*Helichrysum pumilio*	(O.Hoffm.) Hilliard & B.L.Burtt		Indigenous
Asteraceae	*Helichrysum pumilio subsp. pumilio*	(O.Hoffm.) Hilliard & B.L.Burtt	LC	Indigenous; Endemic
Asteraceae	*Helichrysum tomentosulum subsp. aromaticum*	(Klatt) Merxm.	LC	Indigenous
Asteraceae	*Helichrysum zeyheri*	Less.	LC	Indigenous
Brassicaceae	*Heliophila carnosa*	(Thunb.) Steud.	LC	Indigenous
Brassicaceae	*Heliophila deserticola var. deserticola*	Schltr.	LC	Indigenous
Brassicaceae	*Heliophila deserticola var. micrantha*	Schltr.	LC	Indigenous
Brassicaceae	*Heliophila lactea*	Schltr.	LC	Indigenous
Brassicaceae	*Heliophila trifurca*	Burch. ex DC.	LC	Indigenous
Boraginaceae	*Heliotropium ciliatum*	Kaplan	LC	Indigenous
Boraginaceae	*Heliotropium tubulosum*	E.Mey. ex A.DC.	LC	Indigenous
Aizoaceae	*Hereroa hesperantha*	(Dinter & A.Berger) Dinter & Schwantes	LC	Indigenous
Aizoaceae	*Hereroa pallens*	L.Bolus	LC	Indigenous; Endemic
Malvaceae	*Hermannia affinis*	K.Schum.	LC	Indigenous
Malvaceae	*Hermannia confusa*	T.M.Salter	LC	Indigenous; Endemic
Malvaceae	*Hermannia disermifolia*	Jacq.	LC	Indigenous
Malvaceae	*Hermannia gariepina*	Eckl. & Zeyh.	LC	Indigenous
Malvaceae	*Hermannia jacobeifolia*	(Turcz.) R.A.Dyer	LC	Indigenous
Malvaceae	*Hermannia minutiflora*	Engl.	LC	Indigenous
Malvaceae	*Hermannia sp.*			
Malvaceae	*Hermannia spinosa*	E.Mey. ex Harv.	LC	Indigenous
Malvaceae	*Hermannia stricta*	(E.Mey. ex Turcz.) Harv.	LC	Indigenous
Malvaceae	*Hermannia tomentosa*	(Turcz.) Schinz ex Engl.	LC	Indigenous
Amaranthaceae	*Hermbstaedtia glauca*	(J.C.Wendl.) Rchb. ex Steud.	LC	Indigenous
Iridaceae	*Hesperantha rupicola*	Goldblatt	LC	Indigenous; Endemic
Amaryllidaceae	*Hessea speciosa*	Snijman	LC	Indigenous
Malvaceae	*Hibiscus elliottiae*	Harv.	LC	Indigenous
Asteraceae	*Hirpicium echinus*	Less.	LC	Indigenous
Apocynaceae	*Hoodia alstonii*	(N.E.Br.) Plowes	LC	Indigenous
Hydnoraceae	*Hydnora africana*	Thunb.	LC	Indigenous
Asteraceae	*Ifloga molluginoides*	(DC.) Hilliard	LC	Indigenous

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Aizoaceae	*Ihlenfeldtia excavata*	(L.Bolus) H.E.K.Hartmann	LC	Indigenous; Endemic
Aizoaceae	*Ihlenfeldtia vanzylii*	(L.Bolus) H.E.K.Hartmann	LC	Indigenous; Endemic
Fabaceae	*Indigastrum argyroides*	(E.Mey.) Schrire	LC	Indigenous
Fabaceae	*Indigastrum niveum*	(Willd. ex Spreng.) Schrire & Callm.		Indigenous
Fabaceae	*Indigofera evansiana*	Burtt Davy	LC	Indigenous
Fabaceae	*Indigofera heterotricha*	DC.	LC	Indigenous
Fabaceae	*Indigofera heterotricha subsp. pechuelii*	DC.		Indigenous
Fabaceae	*Indigofera sp.*			
Cyperaceae	*Isolepis hemiuncialis*	(C.B.Clarke) J.Raynal	LC	Indigenous
Scrophulariaceae	*Jamesbrittenia aridicola*	Hilliard	LC	Indigenous
Scrophulariaceae	*Jamesbrittenia maxii*	(Hiern) Hilliard	LC	Indigenous
Scrophulariaceae	*Jamesbrittenia ramosissima*	(Hiern) Hilliard	LC	Indigenous
Scrophulariaceae	*Jamesbrittenia sp.*			
Acanthaceae	*Justicia spartioides*	T.Anderson		Indigenous
Acanthaceae	*Justicia thymifolia*	(Nees) C.B.Clarke	LC	Indigenous; Endemic
Kewaceae	*Kewa salsoloides*	(Burch.) Christenh.	LC	Indigenous
Asteraceae	*Kleinia cephalophora*	Compton	LC	Indigenous
Asteraceae	*Kleinia longiflora*	DC.	LC	Indigenous
Rubiaceae	*Kohautia caespitosa subsp. brachyloba*	Schnizl.	LC	Indigenous
Rubiaceae	*Kohautia sp.*			
Hyacinthaceae	*Lachenalia giessii*	W.F.Barker		Indigenous
Hyacinthaceae	*Lachenalia polypodantha*	Schltr. ex W.F.Barker		Indigenous; Endemic
Hyacinthaceae	*Lachenalia polypodantha subsp. eburnea*	Schltr. ex W.F.Barker	LC	Indigenous; Endemic
Hyacinthaceae	*Lachenalia sp.*			
Hyacinthaceae	*Lachenalia undulata*	Masson ex Baker	LC	Indigenous; Endemic
Hyacinthaceae	*Lachenalia xerophila*	Schltr. ex G.D.Duncan	LC	Indigenous; Endemic
Santalaceae	*Lacomucinaea lineata*	(L.f.) Nickrent & M.A.Garcia		Indigenous
Poaceae	*Lagurus sp.*			
Iridaceae	*Lapeirousia littoralis*	Baker		Indigenous
Iridaceae	*Lapeirousia littoralis subsp. littoralis*	Baker	LC	Indigenous
Iridaceae	*Lapeirousia plicata subsp. foliosa*	(Jacq.) Diels		Indigenous
Aizoaceae	*Lapidaria margaretae*	(Schwantes) Dinter & Schwantes	LC	Indigenous
Apocynaceae	*Larryleachia picta*	(N.E.Br.) Plowes	LC	Indigenous

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Apocynaceae	*Larryleachia sp.*			
Hyacinthaceae	*Ledebouria sp.*			
Aizoaceae	*Leipoldtia laxa*	L.Bolus	LC	Indigenous; Endemic
Aizoaceae	*Leipoldtia schultzei*	(Schltr. & Diels) Friedrich	LC	Indigenous; Endemic
Fabaceae	*Leobordea platycarpa*	(Viv.) B.-E.van Wyk & Boatwr.	LC	Indigenous
Brassicaceae	*Lepidium trifurcum*	Sond.	LC	Indigenous
Fabaceae	*Lessertia depressa*	Harv.	LC	Indigenous
Fabaceae	*Lessertia sp.*			
Poaceae	*Leucophrys mesocoma*	(Nees) Rendle	LC	Indigenous
Asteraceae	*Leysera tenella*	DC.	LC	Indigenous
Limeaceae	*Limeum aethiopicum var. intermedium*	Burm.f.	NE	Indigenous; Endemic
Limeaceae	*Limeum arenicolum*	G.Schellenb.	LC	Indigenous
Limeaceae	*Limeum myosotis var. myosotis*	H.Walter	LC	Indigenous
Aizoaceae	*Lithops olivacea*	L.Bolus	VU	Indigenous; Endemic
Aizoaceae	*Lithops sp.*			
Lophiocarpaceae	*Lophiocarpus polystachyus*	Turcz.	LC	Indigenous
Asteraceae	*Lopholaena cneorifolia*	(DC.) S.Moore	LC	Indigenous
Fabaceae	*Lotononis falcata*	(E.Mey.) Benth.	LC	Indigenous
Fabaceae	*Lotononis fruticoides*	B.-E.van Wyk	LC	Indigenous; Endemic
Fabaceae	*Lotononis rabenaviana*	Dinter & Harms	LC	Indigenous
Solanaceae	*Lycium pumilum*	Dammer	LC	Indigenous
Scrophulariaceae	*Lyperia tristis*	(L.f.) Benth.	LC	Indigenous
Scrophulariaceae	*Manulea gariepina*	Benth.	LC	Indigenous
Scrophulariaceae	*Manulea nervosa*	E.Mey. ex Benth.	LC	Indigenous; Endemic
Hyacinthaceae	*Massonia bifolia*	(Jacq.) J.C.Manning & Goldblatt	LC	Indigenous
Fabaceae	*Melolobium canescens*	Benth.	LC	Indigenous
Fabaceae	*Melolobium microphyllum*	(L.f.) Eckl. & Zeyh.	LC	Indigenous
Oleaceae	*Menodora juncea*	Harv.	LC	Indigenous; Endemic
Aizoaceae	*Mesembryanthemum amplectens*	L.Bolus		Indigenous; Endemic
Aizoaceae	*Mesembryanthemum arenosum*	Schinz		Indigenous
Aizoaceae	*Mesembryanthemum articulatum*	Thunb.		Indigenous
Aizoaceae	*Mesembryanthemum coriarium*	Burch. ex N.E.Br.		Indigenous
Aizoaceae	*Mesembryanthemum crystallinum*	L.	LC	Indigenous
Aizoaceae	*Mesembryanthemum guerichianum*	Pax	LC	Indigenous
Aizoaceae	*Mesembryanthemum latipetalum*	(L.Bolus) Klak		Indigenous; Endemic

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Aizoaceae	*Mesembryanthemum lignescens*	(L.Bolus) Klak		Indigenous
Aizoaceae	*Mesembryanthemum noctiflorum subsp. stramineum*	L.		Indigenous
Aizoaceae	*Mesembryanthemum nodiflorum*	L.	LC	Indigenous
Aizoaceae	*Mesembryanthemum nucifer*	(Ihlenf. & Bittrich) Klak		Indigenous
Aizoaceae	*Mesembryanthemum oculatum*	N.E.Br.		Indigenous
Aizoaceae	*Mesembryanthemum quartziticola*	Klak		Indigenous; Endemic
Aizoaceae	*Mesembryanthemum schenkii*	Schinz		Indigenous
Aizoaceae	*Mesembryanthemum subnodosum*	A.Berger		Indigenous
Aizoaceae	*Mesembryanthemum tetragonum*	Thunb.		Indigenous
Apocynaceae	*Microloma incanum*	Decne.	LC	Indigenous
Geraniaceae	*Monsonia crassicaulis*	(Rehm) F.Albers	LC	Indigenous
Geraniaceae	*Monsonia glauca*	R.Knuth	LC	Indigenous
Geraniaceae	*Monsonia parvifolia*	Schinz	LC	Indigenous
Montiniaceae	*Montinia caryophyllacea*	Thunb.	LC	Indigenous
Scrophulariaceae	*Nemesia maxii*	Hiern	LC	Indigenous; Endemic
Scrophulariaceae	*Nemesia sp.*			
Asteraceae	*Nidorella resedifolia subsp. resedifolia*	DC.	LC	Indigenous
Asteraceae	*Oncosiphon grandiflorus*	(Thunb.) Kallersjo	LC	Indigenous
Asteraceae	*Oncosiphon piluliferus*	(L.f.) Kallersjo	LC	Indigenous
Hyacinthaceae	*Ornithogalum bicornutum*	F.M.Leight.	LC	Indigenous; Endemic
Hyacinthaceae	*Ornithogalum deltoideum*	Baker	LC	Indigenous
Hyacinthaceae	*Ornithogalum dubium*	Houtt.	LC	Indigenous; Endemic
Hyacinthaceae	*Ornithogalum nanodes*	F.M.Leight.	LC	Indigenous
Hyacinthaceae	*Ornithogalum pruinosum*	F.M.Leight.	LC	Indigenous
Colchicaceae	*Ornithoglossum dinteri*	K.Krause	LC	Indigenous
Colchicaceae	*Ornithoglossum sp.*			
Colchicaceae	*Ornithoglossum vulgare*	B.Nord.	LC	Indigenous
Asteraceae	*Osteospermum armatum*	Norl.	LC	Indigenous
Asteraceae	*Osteospermum karrooicum*	(Bolus) Norl.	LC	Indigenous
Asteraceae	*Osteospermum microcarpum subsp. microcarpum*	(Harv.) Norl.	LC	Indigenous
Asteraceae	*Osteospermum muricatum subsp. muricatum*	E.Mey. ex DC.	LC	Indigenous
Asteraceae	*Osteospermum sinuatum var. sinuatum*	(DC.) Norl.	LC	Indigenous
Asteraceae	*Othonna cyclophylla*	Merxm.	LC	Indigenous

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Asteraceae	*Othonna daucifolia*	J.C.Manning & Goldblatt	LC	Indigenous; Endemic
Asteraceae	*Othonna euphorbioides*	Hutch.	LC	Indigenous; Endemic
Asteraceae	*Othonna furcata*	(Lindl.) Druce	LC	Indigenous
Asteraceae	*Othonna quercifolia*	DC.	LC	Indigenous; Endemic
Asteraceae	*Othonna sp.*			
Oxalidaceae	*Oxalis annae*	F.Bolus	LC	Indigenous; Endemic
Oxalidaceae	*Oxalis sp.*			
Anacardiaceae	*Ozoroa dispar*	(C.Presl) R.Fern. & A.Fern.	LC	Indigenous
Apocynaceae	*Pachypodium namaquanum*	(Wyley ex Harv.) Welw.	LC	Indigenous
Poaceae	*Panicum arbusculum*	Mez	LC	Indigenous
Sapindaceae	*Pappea capensis*	Eckl. & Zeyh.	LC	Indigenous
Fabaceae	*Parkinsonia africana*	Sond.	LC	Indigenous
Asteraceae	*Pegolettia retrofracta*	(Thunb.) Kies	LC	Indigenous
Asteraceae	*Pegolettia sp.*			
Geraniaceae	*Pelargonium carnosum subsp. carnosum*	(L.) L'Her.	LC	Indigenous
Geraniaceae	*Pelargonium crithmifolium*	Sm.	LC	Indigenous
Geraniaceae	*Pelargonium spinosum*	Willd.	LC	Indigenous
Geraniaceae	*Pelargonium xerophyton*	Schltr. ex R.Knuth	LC	Indigenous
Scrophulariaceae	*Peliostomum leucorrhizum*	E.Mey. ex Benth.	LC	Indigenous
Asteraceae	*Pentzia argentea*	Hutch.	LC	Indigenous
Asteraceae	*Pentzia globosa*	Less.	LC	Indigenous
Asteraceae	*Pentzia lanata*	Hutch.	LC	Indigenous
Asteraceae	*Pentzia sp.*			
Acanthaceae	*Petalidium setosum*	C.B.Clarke ex Schinz	LC	Indigenous
Molluginaceae	*Pharnaceum croceum*	E.Mey. ex Fenzl	LC	Indigenous
Molluginaceae	*Pharnaceum sp.*			
Molluginaceae	*Pharnaceum viride*	Adamson	LC	Indigenous; Endemic
Polygalaceae	*Polygala leptophylla var. armata*	Burch.	LC	Indigenous
Polygalaceae	*Polygala seminuda*	Harv.	LC	Indigenous
Poaceae	*Polypogon monspeliensis*	(L.) Desf.	NE	Not indigenous; Naturalised
Fabaceae	*Pomaria lactea*	(Schinz) B.B.Simpson & G.P.Lewis	LC	Indigenous
Portulacaceae	*Portulaca pilosa*	L.	LC	Not indigenous; Naturalised; Invasive
Didiereaceae	*Portulacaria fruticulosa*	(H.Pearson & Stephens) Bruyns & Klak	LC	Indigenous
Didiereaceae	*Portulacaria namaquensis*	Sond.	LC	Indigenous
Pottiaceae	*Pseudocrossidium crinitum*	(Schultz) R.H.Zander		Indigenous

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Asteraceae	*Pteronia glauca*	Thunb.	LC	Indigenous
Asteraceae	*Pteronia mucronata*	DC.	LC	Indigenous
Asteraceae	*Pteronia scariosa*	L.f.	LC	Indigenous
Asteraceae	*Pteronia sp.*			
Asteraceae	*Pteronia unguiculata*	S.Moore	LC	Indigenous
Ptychomitriaceae	*Ptychomitriopsis aloinoides*	Magill		Indigenous
Fabaceae	*Requienia sphaerosperma*	DC.	LC	Indigenous
Bignoniaceae	*Rhigozum trichotomum*	Burch.	LC	Indigenous
Aizoaceae	*Ruschia brakdamensis*	(L.Bolus) L.Bolus	LC	Indigenous; Endemic
Aizoaceae	*Ruschia centrocapsula*	H.E.K.Hartmann & Stuber	LC	Indigenous; Endemic
Aizoaceae	*Ruschia cradockensis*	(Kuntze) H.E.K.Hartmann & Stuber		Indigenous; Endemic
Aizoaceae	*Ruschia cradockensis subsp. triticiformis*	(Kuntze) H.E.K.Hartmann & Stuber	LC	Indigenous; Endemic
Aizoaceae	*Ruschia divaricata*	L.Bolus	LC	Indigenous
Aizoaceae	*Ruschia kenhardtensis*	L.Bolus	LC	Indigenous; Endemic
Aizoaceae	*Ruschia muricata*	L.Bolus	LC	Indigenous
Aizoaceae	*Ruschia robusta*	L.Bolus	LC	Indigenous; Endemic
Aizoaceae	*Ruschia sp.*			
Aizoaceae	*Ruschia uncinata*	(L.) Schwantes	LC	Indigenous; Endemic
Amaranthaceae	*Salsola barbata*	Aellen	LC	Indigenous
Amaranthaceae	*Salsola columnaris*	Botsch.	LC	Indigenous
Amaranthaceae	*Salsola kalaharica*	Botsch.	LC	Indigenous; Endemic
Amaranthaceae	*Salsola kali*	L.		Not indigenous; Naturalised; Invasive
Amaranthaceae	*Salsola rabieana*	I.Verd.	LC	Indigenous
Amaranthaceae	*Salsola sp.*			
Lamiaceae	*Salvia garipensis*	E.Mey. ex Benth.	LC	Indigenous
Poaceae	*Schismus barbatus*	(Loefl. ex L.) Thell.	LC	Indigenous
Aizoaceae	*Schlechteranthus stylosus*	(L.Bolus) R.F.Powell		Indigenous; Endemic
Poaceae	*Schmidtia kalahariensis*	Stent	LC	Indigenous
Aizoaceae	*Schwantesia marlothii*	L.Bolus	LC	Indigenous; Endemic
Aizoaceae	*Schwantesia ruedebuschii*	Dinter	LC	Indigenous
Aizoaceae	*Schwantesia sp.*			
Anacardiaceae	*Searsia burchellii*	(Sond. ex Engl.) Moffett	LC	Indigenous
Anacardiaceae	*Searsia populifolia*	(E.Mey. ex Sond.) Moffett	LC	Indigenous
Anacardiaceae	*Searsia undulata*	(Jacq.) T.S.Yi, A.J.Mill. & J.Wen	LC	Indigenous

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Scrophulariaceae	*Selago divaricata*	L.f.	LC	Indigenous
Asteraceae	*Senecio arenarius*	Thunb.	LC	Indigenous
Asteraceae	*Senecio bulbinifolius*	DC.	LC	Indigenous
Asteraceae	*Senecio eenii*	(S.Moore) Merxm.	LC	Indigenous
Asteraceae	*Senecio niveus*	(Thunb.) Willd.	LC	Indigenous
Asteraceae	*Senecio sisymbriifolius*	DC.	LC	Indigenous
Amaranthaceae	*Sericocoma avolans*	Fenzl	LC	Indigenous
Zygophyllaceae	*Sisyndite spartea*	E.Mey. ex Sond.	LC	Indigenous
Solanaceae	*Solanum burchellii*	Dunal	LC	Indigenous
Solanaceae	*Solanum capense*	L.	LC	Indigenous
Solanaceae	*Solanum humile*	Lam.		Indigenous
Lamiaceae	*Stachys flavescens*	Benth.	LC	Indigenous; Endemic
Lamiaceae	*Stachys rugosa*	Aiton	LC	Indigenous
Apocynaceae	*Stapelia similis*	N.E.Br.	LC	Indigenous
Apocynaceae	*Stapelia sp.*			
Poaceae	*Stipagrostis amabilis*	(Schweick.) De Winter	LC	Indigenous
Poaceae	*Stipagrostis anomala*	De Winter	LC	Indigenous
Poaceae	*Stipagrostis brevifolia*	(Nees) De Winter	LC	Indigenous
Poaceae	*Stipagrostis ciliata var. capensis*	(Desf.) De Winter	LC	Indigenous
Poaceae	*Stipagrostis obtusa*	(Delile) Nees	LC	Indigenous
Poaceae	*Stipagrostis uniplumis var. uniplumis*	(Licht.) De Winter	LC	Indigenous
Aizoaceae	*Stomatium fulleri*	L.Bolus	LC	Indigenous; Endemic
Molluginaceae	*Suessenguthiella scleranthoides*	(Sond.) Friedrich	LC	Indigenous
Fabaceae	*Tephrosia dregeana var. dregeana*	E.Mey.	LC	Indigenous
Fabaceae	*Tephrosia limpopoensis*	J.B.Gillett	LC	Indigenous
Zygophyllaceae	*Tetraena retrofracta*	(Thunb.) Beier & Thulin		Indigenous
Aizoaceae	*Tetragonia arbuscula*	Fenzl	LC	Indigenous
Aizoaceae	*Tetragonia reduplicata*	Welw. ex Oliv.	LC	Indigenous
Aizoaceae	*Tetragonia sp.*			
Pottiaceae	*Tortula atrovirens*	(Sm.) Lindb.		Indigenous
Asphodelaceae	*Trachyandra jacquiniana*	(Schult. & Schult.f.) Oberm.	LC	Indigenous; Endemic
Asphodelaceae	*Trachyandra laxa var. laxa*	(N.E.Br.) Oberm.	LC	Indigenous
Asphodelaceae	*Trachyandra sp.*			
Aizoaceae	*Trianthema parvifolia*	E.Mey. ex Sond.		Indigenous
Aizoaceae	*Trianthema parvifolia var. parvifolia*	E.Mey. ex Sond.	LC	Indigenous

Family	Taxon	Author	IUCN	Ecology
Zygophyllaceae	*Tribulus pterophorus*	C.Presl	LC	Indigenous
Zygophyllaceae	*Tribulus terrestris*	L.	LC	Indigenous
Boraginaceae	*Trichodesma africanum*	(L.) Lehm.	LC	Indigenous
Aizoaceae	*Trichodiadema littlewoodii*	L.Bolus	LC	Indigenous
Aizoaceae	*Trichodiadema setuliferum*	(N.E.Br.) Schwantes	LC	Indigenous; Endemic
Aizoaceae	*Trichodiadema sp.*			
Poaceae	*Tricholaena capensis subsp. capensis*	(Licht. ex Roem. & Schult.) Nees	LC	Indigenous
Poaceae	*Tricholaena monachne*	(Trin.) Stapf & C.E.Hubb.	LC	Indigenous
Pottiaceae	*Trichostomum brachydontium*	Bruch		Indigenous
Poaceae	*Triraphis ramosissima*	Hack.	LC	Indigenous
Iridaceae	*Tritonia karooica*	M.P.de Vos	LC	Indigenous; Endemic
Cucurbitaceae	*Trochomeria debilis*	(Sond.) Hook.f.	LC	Indigenous
Crassulaceae	*Tylecodon reticulatus*	(L.f.) Toelken		Indigenous
Crassulaceae	*Tylecodon reticulatus subsp. phyllopodium*	(L.f.) Toelken	LC	Indigenous
Crassulaceae	*Tylecodon reticulatus subsp. reticulatus*	(L.f.) Toelken	LC	Indigenous
Crassulaceae	*Tylecodon rubrovenosus*	(Dinter) Toelken	LC	Indigenous
Crassulaceae	*Tylecodon sp.*			
Crassulaceae	*Tylecodon sulphureus*	(Toelken) Toelken		Indigenous; Endemic
Crassulaceae	*Tylecodon sulphureus var. sulphureus*	(Toelken) Toelken	LC	Indigenous; Endemic
Asteraceae	*Ursinia cakilefolia*	DC.	LC	Indigenous; Endemic
Asteraceae	*Ursinia nana subsp. nana*	DC.	LC	Indigenous
Asteraceae	*Ursinia speciosa*	DC.	LC	Indigenous
Fabaceae	*Vachellia erioloba*	(E.Mey.) P.J.H.Hurter	LC	Indigenous
Santalaceae	*Viscum rotundifolium*	L.f.	LC	Indigenous
Campanulaceae	*Wahlenbergia annularis*	A.DC.	LC	Indigenous
Campanulaceae	*Wahlenbergia meyeri*	A.DC.	LC	Indigenous; Endemic
Campanulaceae	*Wahlenbergia prostrata*	A.DC.	LC	Indigenous
Campanulaceae	*Wahlenbergia sp.*			
Scrophulariaceae	*Zaluzianskya diandra*	Diels	LC	Indigenous
Scrophulariaceae	*Zaluzianskya sanorum*	Hilliard	LC	Indigenous; Endemic
Zygophyllaceae	*Zygophyllum sp.*			

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

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Amietia fuscigula	Common River Frog	LC	LC
Cacosternum namaquense	Namaqua Caco	LC	LC
Phrynomantis annectens	Marbled Rubber Frog	LC	LC
Strongylopus springbokensis	Namaqua Stream Frog	VU	LC
Tomopterna cryptotis	Tremelo Sand Frog	LC	LC
Tomopterna delalandii	Cape Sand Frog	LC	LC
Vandijkophrynus gariepensis	Karoo toad	LC	LC
Vandijkophrynus robinsoni	Paradise toad	LC	LC
Xenopus laevis	Common Platanna	LC	LC

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

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Acontias lineatus	Striped Dwarf Legless Skink	LC	LC
Acontias namaquensis	Namaqualand Legless Skink	LC	LC
Acontias tristis	Namaqualand Dwarf Legless Skink	LC	LC
Agama aculeata aculeata	Western Ground Agama	LC	Unlisted
Agama atra	Southern Rock Agama	LC	LC
Agama hispida	Southern Spiny Agama	LC	LC
Agama knobeli	Southern Rock Agama	Unlisted	LC
Aspidelaps lubricus lubricus	Cape coral snake	LC	LC
Bitis arietans arietans	Puff Adder	LC	Unlisted
Boaedon capensis	Brown House Snake	LC	LC
Boaedon mentalis	Bug-eyed House Snake	Unlisted	LC
Chamaeleo namaquensis	Namaqua Chameleon	LC	LC
Chersina angulata	Angulate Tortoise	LC	LC
Chersobius signatus	Speckled Dwarf Tortoise	EN	EN
Chondrodactylus angulifer	Common Giant Gecko	LC	LC
Chondrodactylus bibronii	Bibron's Gecko	LC	Unlisted
Chondrodactylus turneri	Turner's Gecko	LC	Unlisted
Cordylosaurus subtessellatus	Dwarf Plated Lizard	LC	LC
Dasypeltis scabra	Rhombic Egg-eater	LC	LC
Dipsina multimaculata	Dwarf Beaked Snake	LC	Unlisted
Goggia lineata	Striped Pygmy Gecko	LC	LC
Goggia rupicola	Namaqua Pygmy Gecko	LC	LC
Karusasaurus polyzonus	Southern Karusa Lizard	LC	LC
Lamprophis fiskii	Fisk's Snake	LC	LC
Lamprophis guttatus	Spotted Rock Snake	LC	LC
Meroles knoxii	Knox's Desert Lizard	LC	LC
Meroles suborbitalis	Spotted Desert Lizard	LC	Unlisted
Naja nigricincta woodi	Black Spitting Cobra	LC	Unlisted
Naja nivea	Cape Cobra	LC	Unlisted
Namazonurus peersi	Peer's Nama Lizard	LC	LC
Nucras tessellata	Western Sandveld Lizard	LC	Unlisted
Pachydactylus atorquatus	Augrabies gecko	Unlisted	LC
Pachydactylus capensis	Cape Gecko	LC	Unlisted
Pachydactylus labialis	Western Cape Gecko	LC	LC
Pachydactylus latirostris	Quartz Gecko	LC	Unlisted
Pachydactylus montanus	Namaqua Mountain Gecko	LC	LC

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Pachydactylus namaquensis	Namaqua Gecko	LC	LC
Pachydactylus rugosus	Common Rough Gecko	LC	Unlisted
Pachydactylus weberi	Weber's Gecko	LC	LC
Pedioplanis inornata	Plain Sand Lizard	LC	Unlisted
Pedioplanis lineoocellata lineoocellata	Spotted Sand Lizard	LC	Unlisted
Pedioplanis lineoocellata pulchella	Common sand lizard	LC	LC
Pedioplanis namaquensis	Namaqua Sand Lizard	LC	Unlisted
Philothamnus semivariegatus	Spotted Bush Snake	LC	Unlisted
Platysaurus capensis	Namaqua Flat Lizard	LC	LC
Prosymna bivittata	Two-Striped Shovel-Snout	LC	Unlisted
Prosymna frontalis	South-western Shovel-snout	LC	LC
Psammobates tentorius verroxii	Tent Tortoise	NT	NT
Psammophis namibensis	Namib Sand Snake	LC	Unlisted
Psammophis notostictus	Karoo Sand Snake	LC	Unlisted
Pseudaspis cana	Mole Snake	LC	Unlisted
Ptenopus garrulus maculatus	Spotted Barking Gecko	LC	Unlisted
Rhinotyphlops lalandei	Delalande's Beaked Blind Snake	LC	Unlisted
Rhinotyphlops schinzi	Schinz's Beaked Blind Snake	LC	Unlisted
Telescopus beetzii	Beetz's Tiger Snake	LC	Unlisted
Telescopus semiannulatus polystictus	Damara Tiger Snake	LC	Unlisted
Trachylepis occidentalis	Western Three-striped Skink	LC	Unlisted
Trachylepis sulcata sulcata	Westren Rock Skink	LC	Unlisted
Trachylepis variegata	Variegated Skink	LC	Unlisted

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

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Aethomys namaquensis	Namaqua rock rat	LC	LC
Antidorcas marsupialis	Springbok	LC	LC
Atilax paludinosus	Water Mongoose	LC	LC
Canis mesomelas	Black-backed Jackal	LC	LC
Caracal caracal	Caracal	LC	LC
Chlorocebus pygerythrus	Vervet Monkey	LC	LC
Crocidura cyanea	Reddish-grey Musk Shrew	LC	LC
Cynictis penicillata	Yellow Mongoose	LC	LC
Desmodillus auricularis	Short-tailed Gerbil	LC	LC
Eidolon helvum	African Straw-colored Fruit Bat	LC	NT
Elephantulus rupestris	Western rock sengi	LC	LC
Eptesicus hottentotus	Long-tailed Serotine Bat	LC	LC
Felis nigripes	Black-footed Cat	VU	VU
Felis silvestris	African Wildcat	LC	LC
Genetta genetta	Small-spotted Genet	LC	LC
Gerbilliscus brantsii	Highveld Gerbil	LC	LC
Gerbilliscus leucogaster	Bushveld Gerbil	LC	LC
Gerbillurus paeba	Hairy-footed Gerbil	LC	LC
Gerbillurus vallinus	Bushy-tailed Hairy-footed Gerbil	LC	LC
Graphiurus rupicola	Stone Dormouse	NT	LC
Herpestes pulverulentus	Cape Grey Mongoose	LC	LC
Hystrix africaeaustralis	Cape Porcupine	LC	LC
Ictonyx striatus	Striped Polecat	LC	LC
Lepus capensis	Cape Hare	LC	LC
Lepus saxatilis	Scrub Hare	LC	LC
Macroscelides proboscideus	Karoo Round-eared Sengi	LC	LC
Malacothrix typica	Gerbil Mouse	LC	LC
Mellivora capensis	Honey Badger	LC	LC
Mus musculus	House Mouse	Unlisted	LC
Neoromicia capensis	Cape Serotine Bat	LC	LC
Nycteris thebaica	Egyptian Slit-faced Bat	LC	LC
Oreotragus oreotragus	Klipspringer	LC	LC
Orycteropus afer	Aardvark	LC	LC
Otocyon megalotis	Bat-eared Fox	LC	LC
Otomys unisulcatus	Karoo Bush Rat	LC	LC
Panthera pardus	Leopard	VU	VU

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Papio ursinus	Chacma Baboon	LC	LC
Parotomys brantsii	Brants' Whistling Rat	LC	LC
Parotomys littledalei	Littledale's Whistling Rat	NT	LC
Pedetes capensis	Springhare	LC	LC
Petromus typicus	Dassie Rat	LC	LC
Petromyscus collinus	Pygmy Rock Mouse	LC	LC
Procavia capensis	Rock Hyrax	LC	LC
Pronolagus rupestris	Smith's Red Rock Hare	LC	LC
Proteles cristata	Aardwolf	LC	LC
Raphicerus campestris	Steenbok	LC	LC
Rhabdomys pumilio	Xeric Four-striped Mouse	LC	LC
Rhinolophus clivosus	Geoffroy's Horseshoe Bat	LC	LC
Rhinolophus darlingi	Darling's Horseshoe Bat	LC	LC
Sauromys petrophilus	Flat-headed Free-tail Bat	LC	LC
Suncus varilla	Lesser Dwarf Shrew	LC	LC
Suricata suricatta	Suricate	LC	LC
Sylvicapra grimmia	Common Duiker	LC	LC
Thallomys shortridgei	Shortridge's Rat	DD	DD
Vulpes chama	Cape Fox	LC	LC
Xerus inauris	Cape Ground Squirrel	LC	LC

9.5 Appendix E – Avifauna species expected to occur within the project area

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Actitis hypoleucos	Sandpiper, Common	Unlisted	LC
Afrotis afraoides	Korhaan, Northern Black	Unlisted	LC
Alopochen aegyptiaca	Goose, Egyptian	LC	LC
Amadina erythrocephala	Finch, Red-headed	Unlisted	LC
Anas capensis	Teal, Cape	Unlisted	LC
Anas erythrorhyncha	Teal, Red-billed	Unlisted	LC
Anas undulata	Duck, Yellow-billed	Unlisted	LC
Anthus nicholsoni	Nicholson's pipit	Unlisted	Unlisted
Apus affinis	Swift, Little	Unlisted	LC
Apus bradfieldi	Swift, Bradfield's	Unlisted	LC
Apus caffer	Swift, White-rumped	Unlisted	LC
Aquila verreauxii	Eagle, Verreaux's	VU	LC
Ardea melanocephala	Heron, Black-headed	Unlisted	LC
Batis pririt	Batis, Pririt	Unlisted	LC
Bostrychia hagedash	Ibis, Hadeda	Unlisted	LC
Bubo africanus	Eagle-owl, Spotted	Unlisted	LC
Bubulcus ibis	Egret, Cattle	Unlisted	LC
Burhinus capensis	Thick-knee, Spotted	Unlisted	LC
Buteo rufofuscus	Buzzard, Jackal	Unlisted	LC
Calandrella cinerea	Lark, Red-capped	Unlisted	LC
Calendulauda africanoides	Lark, Fawn-coloured	Unlisted	LC
Calendulauda burra	Lark, Red	VU	VU
Calendulauda sabota	Lark, Sabota	Unlisted	LC
Calidris minuta	Stint, Little	LC	LC
Calidris pugnax	Ruff	Unlisted	LC
Cercotrichas coryphoeus	Scrub-robin, Karoo	Unlisted	LC
Certhilauda subcoronata	Lark, Karoo Long-billed	Unlisted	LC
Charadrius tricollaris	Plover, Three-banded	Unlisted	LC
Chersomanes albofasciata	Lark, Spike-heeled	Unlisted	LC
Cinnyris chalybeus	Sunbird, Southern Double-collared	Unlisted	LC
Cinnyris fuscus	Sunbird, Dusky	Unlisted	LC
Circaetus pectoralis	Snake-eagle, Black-chested	Unlisted	LC
Cisticola aridulus	Cisticola, Desert	Unlisted	LC
Cisticola subruficapilla	Cisticola, Grey-backed	Unlisted	LC
Colius colius	Mousebird, White-backed	Unlisted	LC
Columba guinea	Pigeon, Speckled	Unlisted	LC

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Columba livia	Dove, Rock	Unlisted	LC
Corvus albus	Crow, Pied	Unlisted	LC
Corvus capensis	Crow, Cape	Unlisted	LC
Cossypha caffra	Robin-chat, Cape	Unlisted	LC
Coturnix coturnix	Quail, Common	Unlisted	LC
Crithagra albogularis	White-throated Canary	LC	LC
Crithagra atrogularis	Canary, Black-throated	Unlisted	LC
Crithagra flaviventris	Canary, Yellow	Unlisted	LC
Curruca layardi	Warbler, Layards	Unlisted	LC
Cursorius rufus	Courser, Burchell's	VU	LC
Cypsiurus parvus	Palm-swift, African	Unlisted	LC
Elanus caeruleus	Kite, Black-shouldered	Unlisted	LC
Emarginata schlegelii	Chat, Karoo	Unlisted	LC
Emarginata sinuata	Chat, Sickle-winged	Unlisted	LC
Emarginata tractrac	Chat, Tractrac	LC	LC
Emberiza capensis	Bunting, Cape	Unlisted	LC
Emberiza impetuani	Bunting, Lark-like	Unlisted	LC
Eremomela gregalis	Eremomela, Karoo	Unlisted	LC
Eremomela icteropygialis	Eremomela, Yellow-bellied	Unlisted	LC
Eremopterix australis	Sparrow-lark, Black-eared	Unlisted	LC
Eremopterix verticalis	Sparrowlark, Grey-backed	Unlisted	LC
Estrilda astrild	Waxbill, Common	Unlisted	LC
Eupodotis vigorsii	Korhaan, Karoo	NT	LC
Euryptila subcinnamomea	Warbler, Cinnamon-breasted	Unlisted	LC
Falco biarmicus	Falcon, Lanner	VU	LC
Falco rupicoloides	Kestrel, Greater	Unlisted	LC
Falco rupicolus	Kestrel, Rock	Unlisted	LC
Fulica cristata	Coot, Red-knobbed	Unlisted	LC
Galerida magnirostris	Lark, Large-billed	Unlisted	LC
Hieraaetus pennatus	Eagle, Booted	Unlisted	LC
Himantopus himantopus	Stilt, Black-winged	Unlisted	LC
Hirundo rustica	Swallow, Barn	Unlisted	LC
Lanius collaris	Fiscal, Common (Southern)	Unlisted	LC
Malcorus pectoralis	Warbler, Rufous-eared	Unlisted	LC
Melaenornis infuscatus	Flycatcher, Chat	Unlisted	LC
Melierax canorus	Goshawk, Southern Pale Chanting	Unlisted	LC
Merops apiaster	Bee-eater, European	Unlisted	LC

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Merops hirundineus	Bee-eater, Swallow-tailed	Unlisted	LC
Mirafra fasciolata	Lark, Eastern Clapper	Unlisted	LC
Motacilla capensis	Wagtail, Cape	Unlisted	LC
Muscicapa striata	Flycatcher, Spotted	Unlisted	LC
Myrmecocichla formicivora	Chat, Anteating	Unlisted	LC
Myrmecocichla monticola	Wheatear, Mountain	Unlisted	LC
Neotis ludwigii	Bustard, Ludwig's	EN	EN
Netta erythrophthalma	Pochard, Southern	Unlisted	LC
Oena capensis	Dove, Namaqua	Unlisted	LC
Oenanthe familiaris	Chat, Familiar	Unlisted	LC
Oenanthe pileata	Wheatear, Capped	Unlisted	LC
Onychognathus nabouroup	Starling, Pale-winged	Unlisted	LC
Oxyura maccoa	Duck, Maccoa	NT	NT
Passer domesticus	Sparrow, House	Unlisted	LC
Passer melanurus	Sparrow, Cape	Unlisted	LC
Philetairus socius	Weaver, Sociable	Unlisted	LC
Plocepasser mahali	Sparrow-weaver, White-browed	Unlisted	LC
Ploceus velatus	Masked-weaver, Southern	Unlisted	LC
Polemaetus bellicosus	Eagle, Martial	EN	VU
Polihierax semitorquatus	Falcon, Pygmy	Unlisted	LC
Prinia flavicans	Prinia, Black-chested	Unlisted	LC
Pterocles namaqua	Sandgrouse, Namaqua	Unlisted	LC
Ptyonoprogne fuligula	Martin, Rock	LC	LC
Pycnonotus nigricans	Bulbul, African Red-eyed	Unlisted	LC
Quelea quelea	Quelea, Red-billed	Unlisted	LC
Rhinoptilus africanus	Courser, Double-banded	Unlisted	LC
Riparia paludicola	Martin, Brown-throated	Unlisted	LC
Serinus alario	Canary, Black-headed	Unlisted	LC
Spatula smithii	Shoveler, Cape	LC	LC
Spilopelia senegalensis	Dove, Laughing	Unlisted	LC
Spizocorys starki	Lark, Stark's	Unlisted	LC
Sporopipes squamifrons	Finch, Scaly-feathered	Unlisted	LC
Stenostira scita	Flycatcher, Fairy	Unlisted	LC
Streptopelia capicola	Turtle-dove, Cape	Unlisted	LC
Streptopelia semitorquata	Dove, Red-eyed	Unlisted	LC
Sylvietta rufescens	Crombec, Long-billed	Unlisted	LC
Tachybaptus ruficollis	Grebe, Little	Unlisted	LC

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Tachymarptis melba	Swift, Alpine	Unlisted	LC
Tadorna cana	Shelduck, South African	Unlisted	LC
Telophorus zeylonus	Bokmakierie, Bokmakierie	Unlisted	LC
Tricholaema leucomelas	Barbet, Acacia Pied	Unlisted	LC
Tringa glareola	Sandpiper, Wood	Unlisted	LC
Tringa nebularia	Greenshank, Common	Unlisted	LC
Turdus smithi	Thrush, Karoo	Unlisted	LC
Upupa africana	Hoopoe, African	Unlisted	LC
Urocolius indicus	Mousebird, Red-faced	Unlisted	LC
Vanellus armatus	Lapwing, Blacksmith	Unlisted	LC
Vanellus coronatus	Lapwing, Crowned	Unlisted	LC
Zosterops pallidus	White-eye, Orange River	Unlisted	LC