Terrestrial Ecology Baseline & Impact Assessments for the proposed Becrux Solar Photovoltaic Energy Facility

Secunda, Mpumalanga

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CLIENT

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Table of Contents

List of Tables

List of Figures

1 Introduction

1.1 Background

Becrux Solar PV Project One (Pty) Ltd is proposing the development of the Becrux Solar Photovoltaic (PV) Facility and associated infrastructure on Portion 6 of the Farm Goedehoop No. 290, located ~7 km south-east of Secunda and 15 km east of Embalenhle. The project site falls within jurisdiction of the Govan Mbeki Local Municipality, which forms part of the Gert Sibande District Municipality in the Mpumalanga Province.

The Solar PV Facility will have a contracted capacity of up to 19.99MW$_{ac}$ and will use bi-facial panels with single axis tracking or fix tilt mounting structures to harness the solar resource on the project site. The purpose of the facility will be to generate electricity for exclusive use by Sasol's Secunda (coal-to-liquids) CTL Plant. The construction of the PV Facility aims to reduce Sasol's dependence on direct supply from Eskom's national grid for operation purposes and demonstrate Sasol's move towards a greener future through procurement of renewable energy from Independent Power Producers (IPPs).

To evacuate the generated power to Sasol's Secunda CTL Plant, a 11kV overhead power line will be established to connect the 11kV E-house containerized substation (with a development footprint of 32 m^2) to the existing Goedehoop Substation. The overhead power line will run ~400 m from the Solar PV Facility to the Goedehoop Substation. One 170m wide and 400m long grid connection corridor has been identified for the assessment and placement of the overhead power line. The assessment of a wider grid connection corridor allows for the avoidance of sensitive environmental features that may be present within the project site, and to ensure the suitable placement of the power line within the identified corridor. A development area of ~26.64 ha and a development footprint of ~19.95 ha have been identified within the preferred project site (~433 ha) by Becrux Solar PV Project One (Pty) Ltd for the development of the Becrux Solar PV Energy Facility. Infrastructure associated with the facility will include the following:

A development area of ~26.64 ha and a development footprint of ~19.95 ha have been identified within the preferred project site (~433 ha) by Becrux Solar PV Project One (Pty) Ltd for the development of the Becrux Solar PV Energy Facility. Infrastructure associated with the facility will include the following:

- Solar PV array comprising PV modules and mounting structures;
- Inverters and transformers;
- Cabling between the panels;
- E-house containerized substation;
- 11kV overhead power line for the distribution of the generated power, which will be connected to the existing Goedehoop Substation;
- Laydown area;
- Access gravel road (existing) and internal gravel roads; and
- Security booth, O&M building, workshop, storage area and site office.

The Biodiversity Company was appointed to undertake a fauna and flora baseline assessment for the establishment of the Becrux solar photovoltaic (PV) facility and its associated powerline.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020): "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation"

(Reporting Criteria). The National Web based Environmental Screening Tool has characterised the terrestrial sensitivity of the solar PV development area as “Very High”.

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

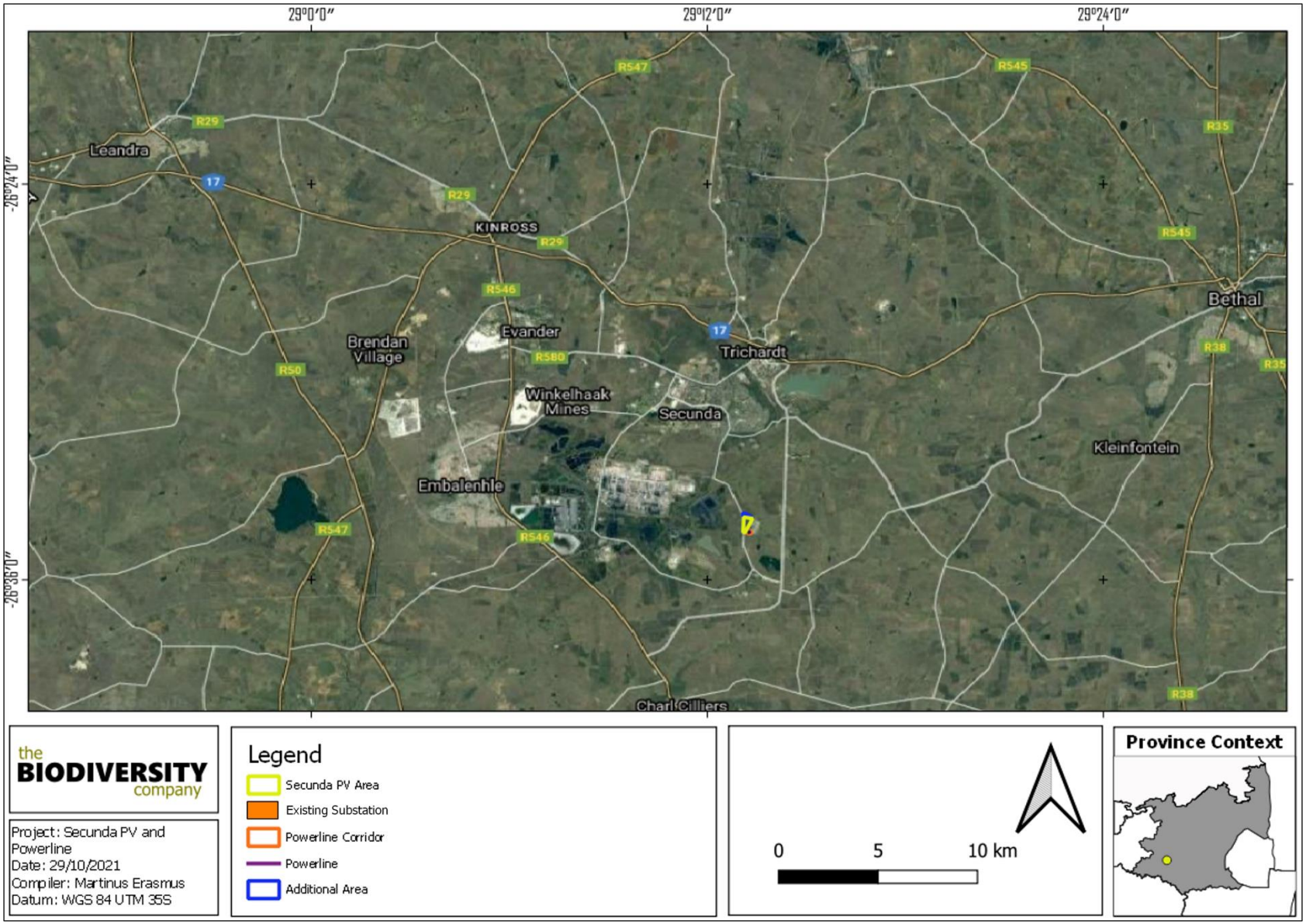


Figure 1-1 Proposed location of the project area in relation to the nearby towns.

1.2 Specialist Details

Report Name	**Terrestrial Ecology Baseline & Impact Assessments for the proposed Becrux Solar Photovoltaic Energy Facility**
Reference	**Becrux Solar Photovoltaic Energy Facility and Powerline**
Submitted to	savannah environmental
Report Writer (Desktop)	**Lindi Steyn** 
	Dr Lindi Steyn has completed her PhD in Biodiversity and Conservation from the University of Johannesburg. Lindi is a terrestrial ecologist with a special interest in ornithology. She has completed numerous studies ranging from basic Assessments to Environmental Impact Assessments following IFC standards.
Report Writer Desktop and Fieldwork (Fauna and Flora)	**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 Cand. Sci. Nat. registered (118630) 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 12 years' experience in the environmental consulting field. Andrew has completed numerous wetland training courses, and is an accredited wetland practitioner, recognised by the DWS, and also the Mondi Wetlands programme as a competent wetland consultant.
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.

2 Scope of Work

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

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

3 Key Legislative Requirements

The legislation, policies and guidelines listed below in Table 3-1 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 3-1 A list of key legislative requirements relevant to biodiversity and conservation in the Mpumalanga 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 20142020, 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
	Mpumalanga Parks Board Act 6 of 1995
	Mpumalanga Conservation Act, 1998 (Act 10 of 1998)
Provincial	Mpumalanga Tourism and Parks Agency Act, No 5 of 2005
	Mpumalanga Conservation Plan (C-plan 2)
	Mpumalanga Biodiversity Sector Plan 2014

4 Methods

4.1 Project Area

The project area is located approximately 6 km south-west of Secunda and 5 km east of SASOL Industrial Area, Mpumalanga. Presently, the project area is surrounded by industrial areas and agricultural fields (Figure 4-1).

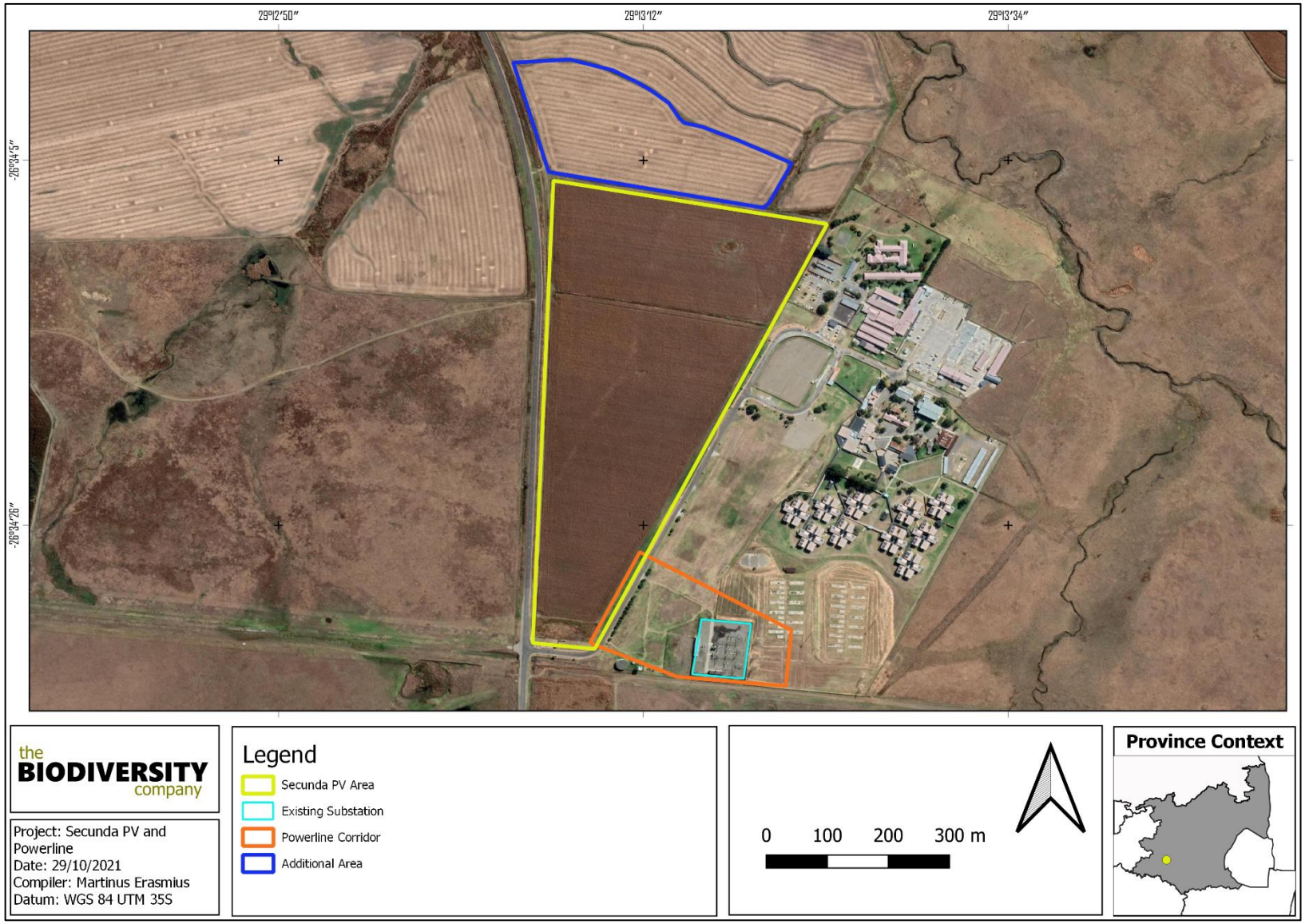


Figure 4-1 Map illustrating the location of the proposed project area

4.2 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.

4.2.1 Ecologically Important Landscape Features

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

- National Biodiversity Assessment 2018 (Skowno *et al,* 2019) (NBA)-
    - The purpose of the NBA is to assess the state of South Africa's biodiversity based on best available science, with a view to understanding trends over time and informing policy and decision-making across a range of sectors. The NBA deals with all three components of biodiversity: genes, species and ecosystems; and assesses biodiversity and ecosystems across terrestrial, freshwater, estuarine and marine environments. The two headline indicators assessed in the NBA are:
    - *Ecosystem Threat Status* – indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition.
    - *Ecosystem Protection Level* – indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems.
- Protected areas:
    - *South Africa Protected Areas Database (SAPAD) (DEA, 2020)* – The (SAPAD) Database contains spatial data for the conservation of South Africa. It includes spatial and attribute information for both formally protected areas and areas that have less formal protection. SAPAD is updated on a continuous basis and forms the basis for the Register of Protected Areas, which is a legislative requirement under the National Environmental Management: Protected Areas Act, Act 57 of 2003.
    - *National Protected Areas Expansion Strategy (NPAES) (SANBI, 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.
- Mpumalanga Biodiversity Sector Plan
    - The key output of this systematic biodiversity plan is a map of biodiversity priority areas (MTPA, 2014). The MBSP CBA map delineates Critical Biodiversity Areas (CBA), Ecological Support Areas (ESA), Other Natural Areas (ONA), Protected Areas, and areas that have been irreversibly modified from their natural state (MTPA, 2014).
    - **CBAs** are terrestrial and aquatic areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. CBAs are areas of high biodiversity value and need to be kept in a natural state, with no further loss of habitat or

species (MTPA, 2014). Thus, if these areas are not maintained in a natural or near natural state then biodiversity targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses (SANBI-BGIS, 2017).

- The Mpumalanga Biodiversity Sector Plan (MBSP) specifies two different CBA areas, **Irreplaceable CBA's and Optimal CBA's**. Irreplaceable CBA's include: (1) areas required to meet targets and with irreplaceability biodiversity values of more than 80%; (2) critical linkages or pinch-points in the landscape that must remain natural; or (3) critically Endangered ecosystems (MTPA, 2014).

- **ESAs** are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services. Critical Biodiversity Areas and Ecological Support Areas may be terrestrial or aquatic (SANBI-BGIS, 2017).
- **ONAs** consist of all those areas in good or fair ecological condition that fall outside the protected area network and have not been identified as CBAs or ESAs. A biodiversity sector plan or bioregional plan must not specify the desired state/management objectives for ONAs or provide land-use guidelines for ONAs (SANBI-BGIS, 2017).
- **Moderately or Heavily Modified Areas** (sometimes called 'transformed' areas) are areas that have been heavily modified by human activity so that they are by-and-large no longer natural, and do not contribute to biodiversity targets (MTPA, 2014). Some of these areas may still provide limited biodiversity and ecological infrastructural functions but, their biodiversity value has been significantly, and in many cases irreversibly, compromised.

- 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.
- The Mpumalanga Protected Area Expansion Strategy (MPAES, 2013), commissioned by the MTPA, serves to function as a provincial framework for an integrated, co-ordinated and uniform approach in the expansion and consolidation of the Provincial Protected Areas (PAs), in line with the requirements of the NPAES.
    - The priority areas for PA Expansion within Mpumalanga were spatially established based on the premise that the primary goal of these areas is to protect biodiversity targets. Several biodiversity data sources were used for the assessment, namely the: Threatened Ecosystems, MBCP Terrestrial Assessment, MBCP Aquatic Assessment, MBCP Irreplaceability, C-plan Irreplaceability, and the National Spatial Biodiversity Assessment Priority areas. A combination of all these were used, together with the spatial priorities established within the NPAES, to establish the spatial priority areas that will guide the NPAES over the next 20 years as reflected below
- Mpumalanga Highveld Grasslands Wetlands
    - The purpose of the Mpumalanga Highveld Grasslands Wetland project was to:
    - Ground-truth and refine the current data layers of the extent, distribution, condition and type of freshwater ecosystems in the Mpumalanga Highveld coal belt, to support

informed and consistent decision-making by regulators in relation to the water-biodiversity-energy nexus;

- To incorporate these revised data layers into the atlas of high-risk freshwater ecosystems and guidelines for wetland offsets, currently being developed by SANBI, to improve the scientific robustness of these tools; and
- To support the uptake, and development of the necessary capacity to apply the data, atlas and guidelines by regulators and the coal mining industry in their planning and decision-making processes''.

4.2.2 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 4-2). 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.

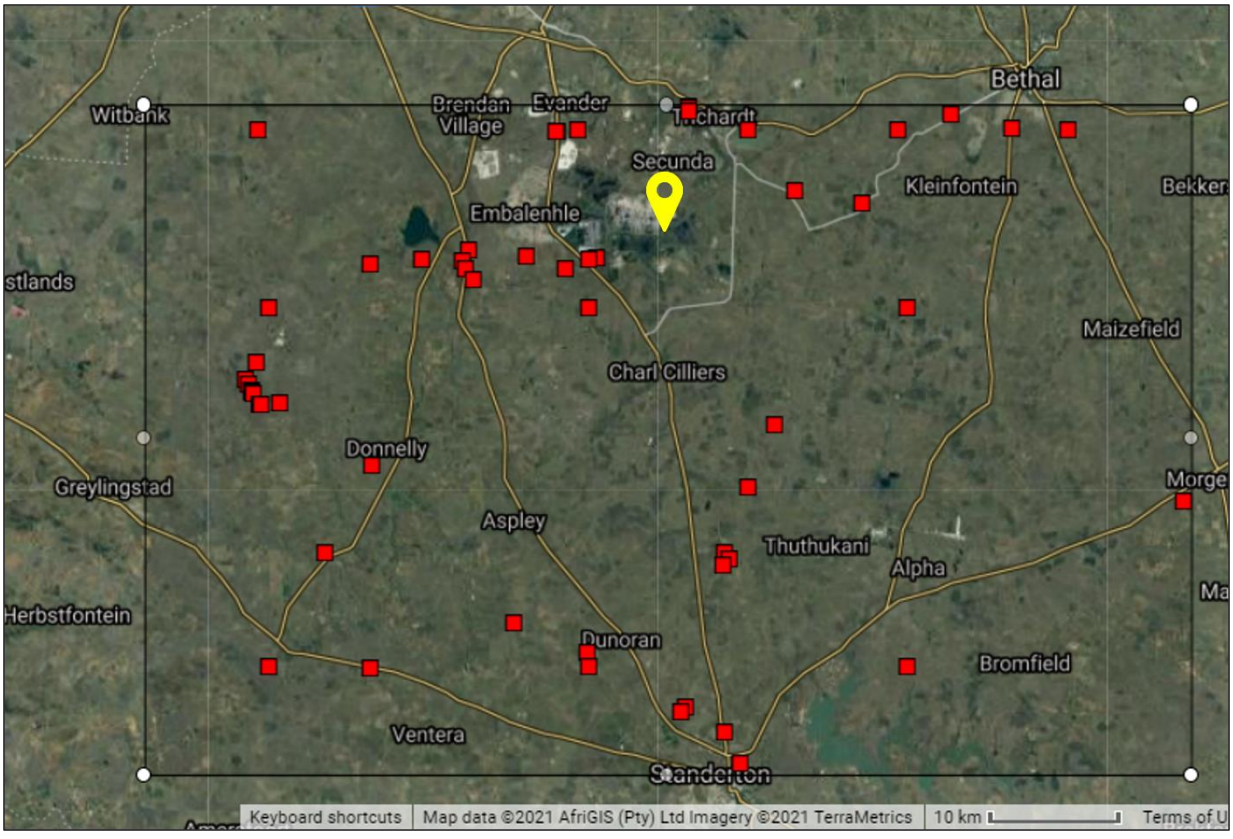


Figure 4-2 ***Map illustrating extent of area used to obtain the expected flora species list from the Plants of South Africa (POSA) database. Yellow icon indicates approximate location of the project area. The red squares are cluster markers of botanical records as per POSA data.***

4.2.3 Desktop Faunal Assessment

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

- Amphibian list, generated from the IUCN spatial dataset (2017) and AmphibiansMap database (Fitzpatrick Institute of African Ornithology, 2021a), using the 2629 quarter degree square;

- Reptile list, generated from the IUCN spatial dataset (2017) and ReptileMap database (Fitzpatrick Institute of African Ornithology, 2021b), using the 2629 quarter degree square;
- Avifauna list, generated for the SABAP2 dataset by looking at pentads 2630_2905; 2630_2910; 2630_2915; 2635_2905; 2635_2910; 2635_2915; 2640_2905; 2640_2910; 2640_2915; and
- Mammal list from the IUCN spatial dataset (2017).

4.3 Biodiversity Field Assessment

A single field survey was undertaken in November 2021, which is a wet-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.

4.3.1 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.

4.3.2 Fauna Survey

The faunal assessment within this report pertains to herpetofauna (amphibians and reptiles) 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).

4.4 Terrestrial Site Ecological Importance

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

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

BI is a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor as follows. The criteria for the CI and FI ratings are provided in Table 4-1 and Table 4-2, respectively.

Table 4-1 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 4-2 Summary of Functional Integrity (FI) criteria

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

	Only minor current negative ecological impacts, with no signs of major past disturbance and good rehabilitation potential.
Medium	Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types. Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches. Mostly minor current negative ecological impacts, with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential.
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 4-3.

Table 4-3 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 4-4.

Table 4-4 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 4-5.

Table 4-5 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 4-6.

Table 4-6 Guidelines for interpreting Site Ecological Importance in the context of the proposed development activities

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

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

4.5 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;
- Only a single season survey was conducted, this constitutes a wet season survey with its limitations;
- 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.

5 Results & Discussion

5.1 Desktop Assessment

5.1.1 Ecologically Important Landscape Features

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

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

Desktop Information Considered	Relevant/Irrelevant	Section
Ecosystem Threat Status	Relevant – Overlaps with a VU ecosystem	5.1.1.1
Ecosystem Protection Level	Relevant – Overlaps with a Not Protected Ecosystem	5.1.1.2
Critical Biodiversity Area	Relevant – The project area overlaps with a heavily modified area.	5.1.1.3
South African Inventory of Inland Aquatic Ecosystems	Relevant - The project area overlaps with both an unclassified NBA wetland and a LC river.	5.1.1.4
National Freshwater Priority Area	Irrelevant – The project area does not overlap with any FEPA wetlands or rivers. Unclassified wetlands and an Upstream Management Area River occur within 500 meters of the project area.	5.1.1.5
National Protected Areas Expansion Strategy	Relevant – The project area is adjacent to a Priority Focus NPAES area	5.1.1.6
Mpumalanga Protected Areas Expansion Strategies (MPEAS)	Irrelevant – The project area is just north of the MPAES area	5.1.1.7
Mpumalanga Highveld Wetlands (MPHG)	Relevant – The project area does not overlap with any MPHG wetlands. Wetlands do however occur within 500 meters of the project area.	5.1.1.8
Renewable Energy Development Zones	Irrelevant – The project area is 32 km from the nearest REDZ	-
Power Corridor	Irrelevant – The project area is 37 km from the closest power corridor	-
Important Bird and Biodiversity Areas	Irrelevant – Located 28 km from the Amersfoort-Bethal- Carolina IBA	-
Protected Areas (SAPAD & SACAD)	Irrelevant – 40km from the closest Protected Area, Devon Protected Environment	-
Strategic Water Source Areas	Irrelevant – The project area is 76 km from the closest SWSA	-

5.1.1.1 Ecosystem Threat Status

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

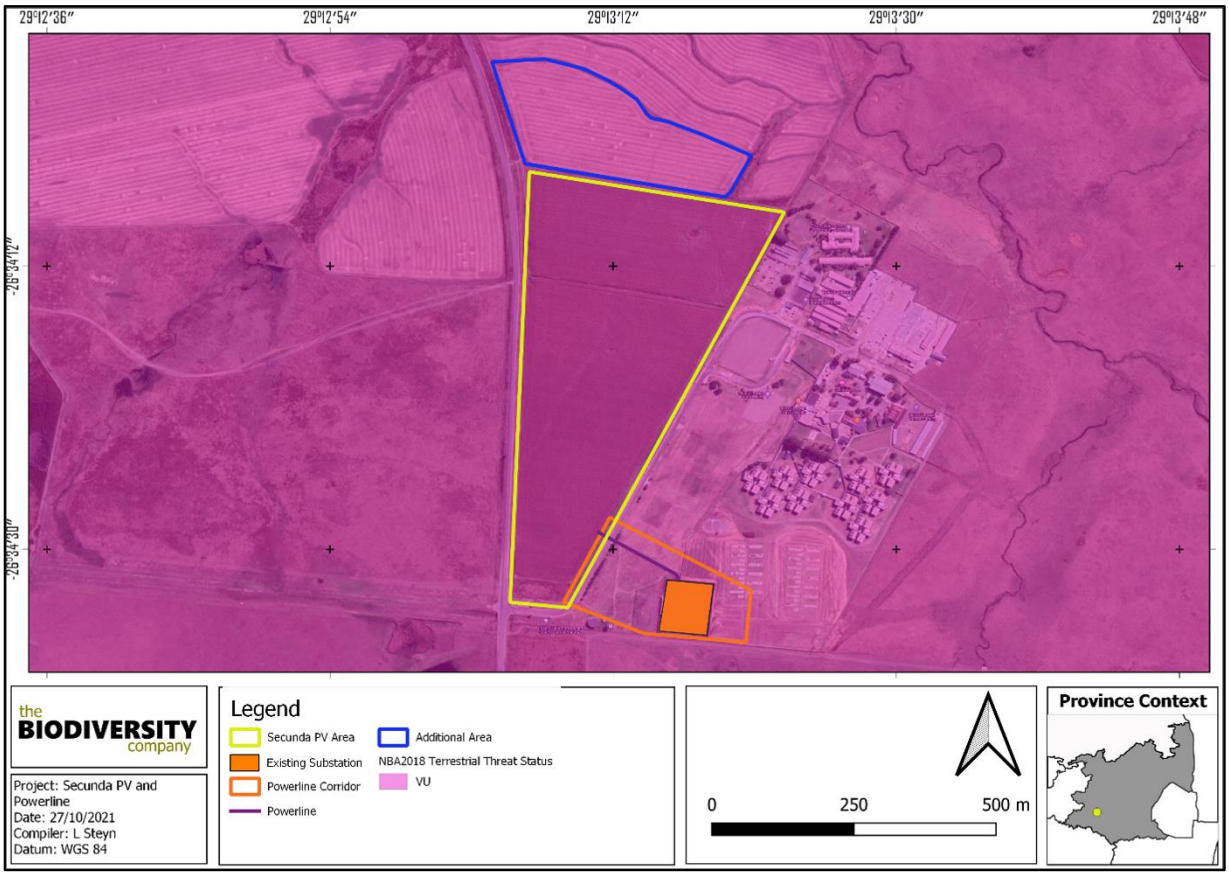


Figure 5-1 Map illustrating the ecosystem threat status associated with the project area.

5.1.1.2 Ecosystem Protection Level

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

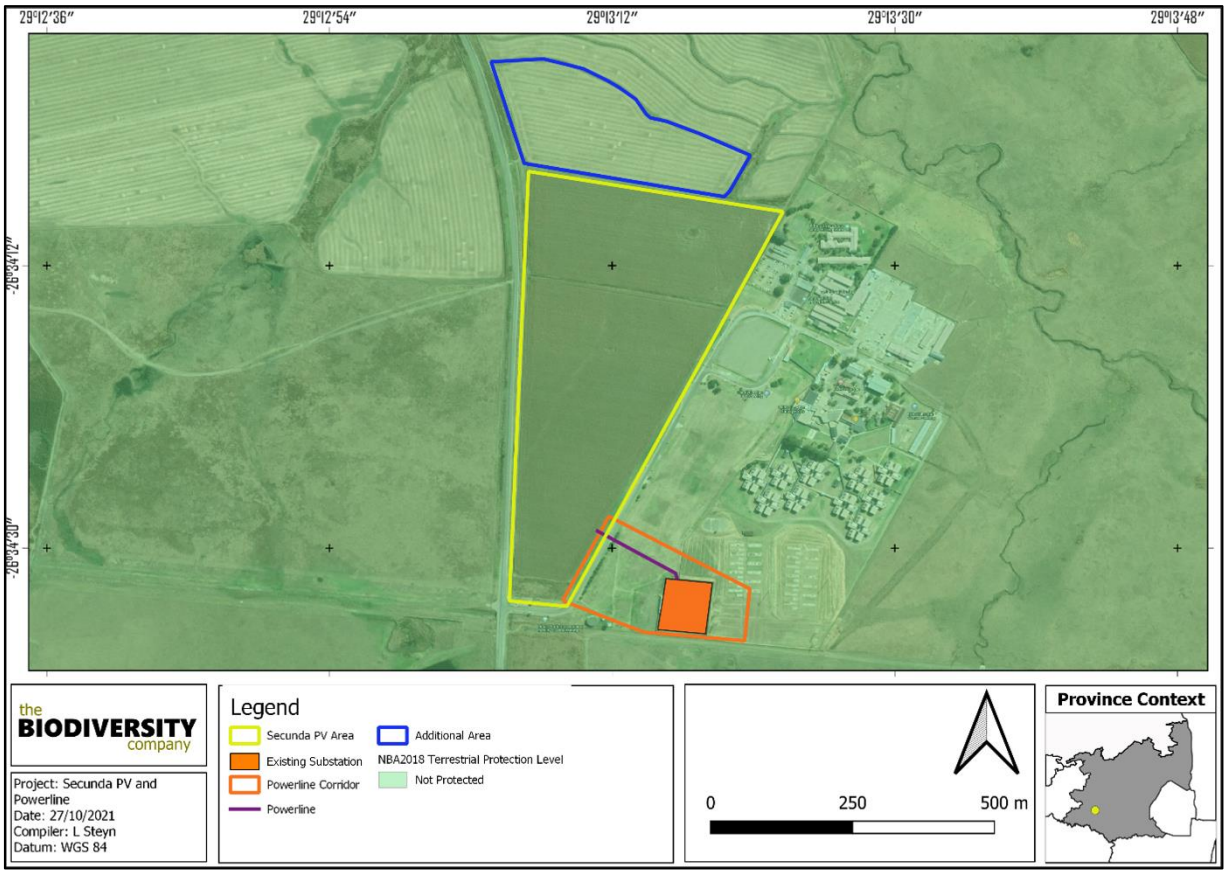


Figure 5-2 Map illustrating the ecosystem protection level associated with the project area

5.1.1.3 Critical Biodiversity Areas and Ecological Support Areas

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

Figure 5-3 shows the project area superimposed on the Terrestrial CBA map. The project area overlaps with a heavily modified area.

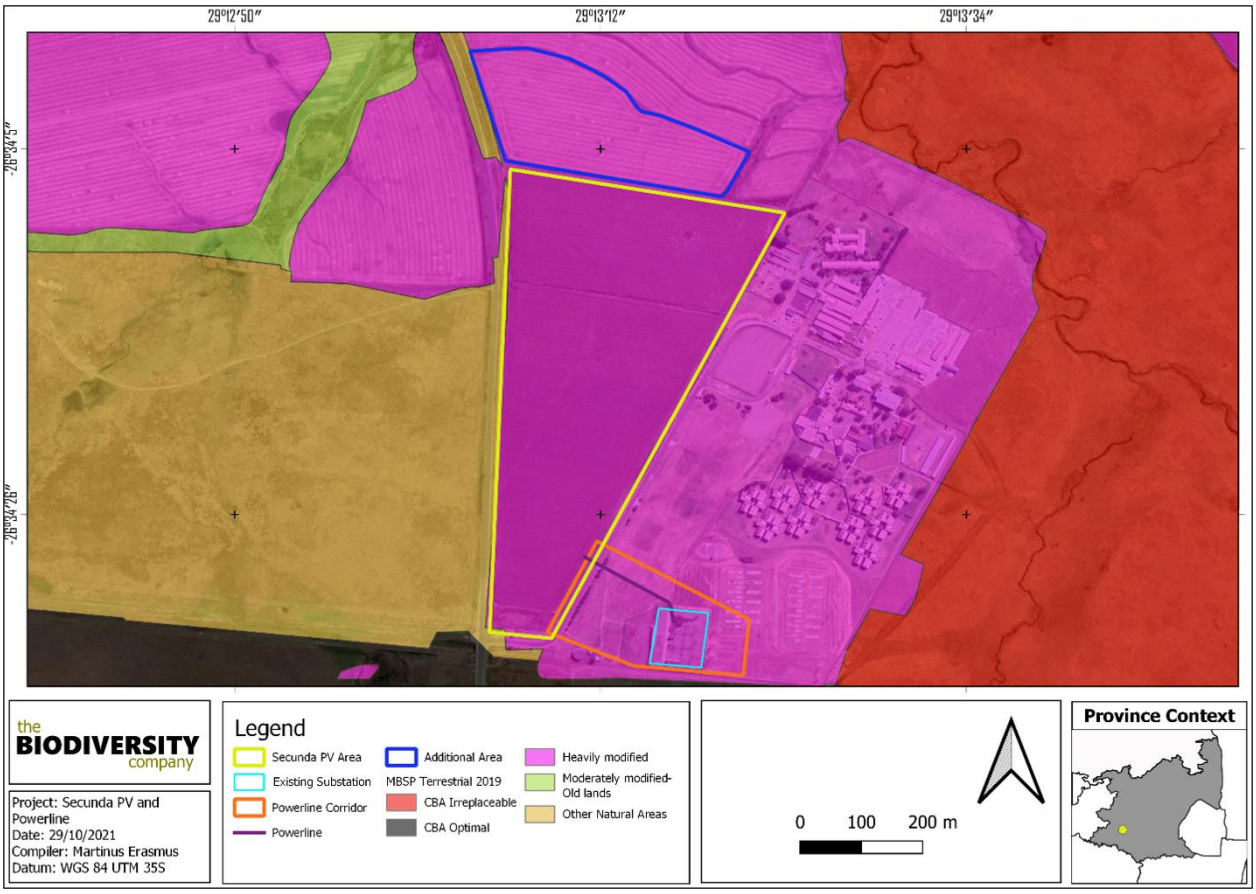


Figure 5-3 Map illustrating the locations of CBAs in the project area

5.1.1.4 Hydrological Setting

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was released with the NBA 2018. Ecosystem threat status (ETS) of river and wetland ecosystem types are based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as CR, EN, VU or LT, with CR, EN and VU ecosystem types collectively referred to as 'threatened' (Van Deventer *et al.,* 2019; Skowno *et al.,* 2019). The project area does not overlap a wetland system, but a CR river and wetland occur within 500 meters of the project area (Figure 5-4).

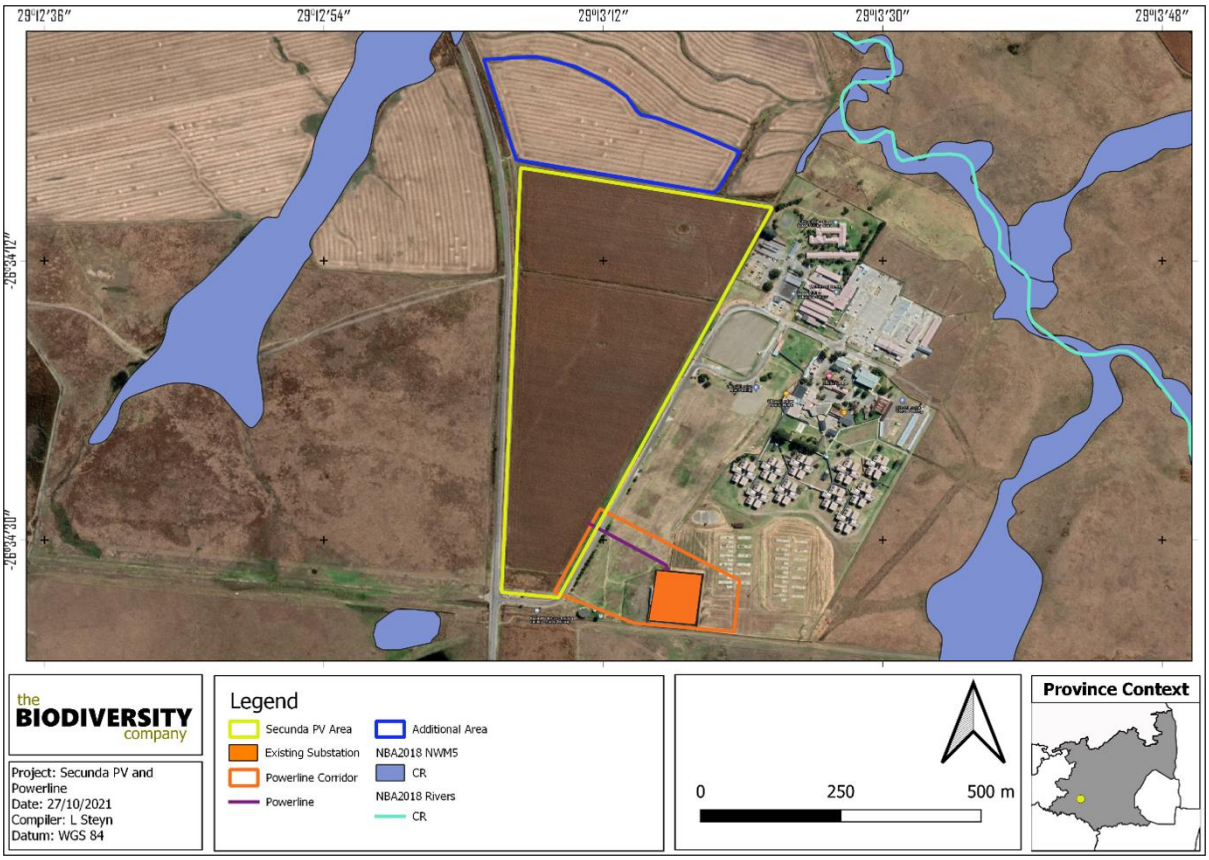


Figure 5-4 Map illustrating ecosystem threat status of rivers and protection level of wetland ecosystems in the project area

5.1.1.5 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 5-5 shows the project area does not overlap with any FEPA wetlands or rivers. Unclassified wetlands and an Upstream Management Area River occur within 500 meters of the project area.

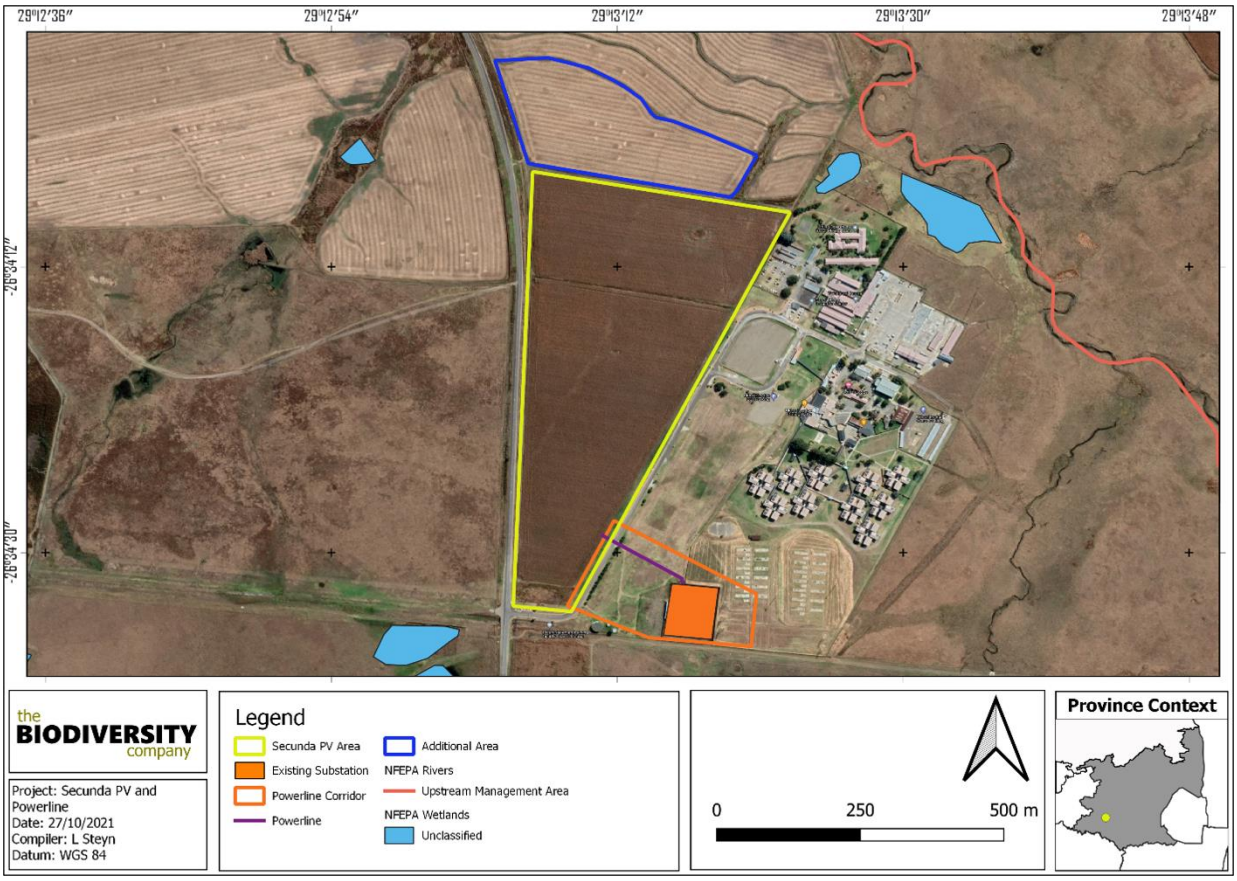


Figure 5-5 The project area in relation to the National Freshwater Ecosystem Priority Areas, River lines and Inland water areas

5.1.1.6 National Protected Area Expansion Strategy

National Protected Area Expansion Strategy 2017 (NPAES) focus areas 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, 2017). The project area partially overlaps with a priority focus area (Figure 5-6).

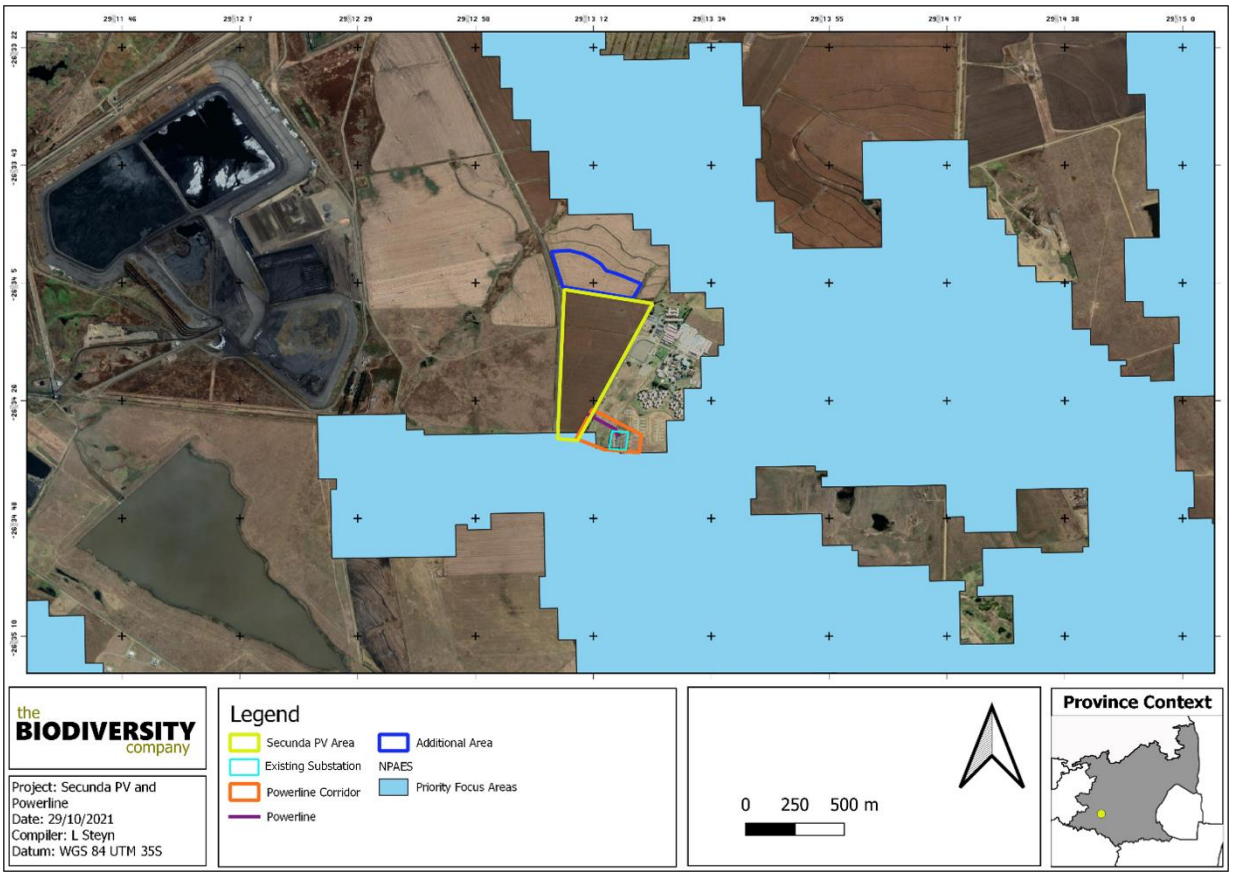


Figure 5-6 The project area in relation to the National Protected Areas Expansion Strategy areas

5.1.1.7 MPAES

The project area in relation to the MPAES can be seen in Figure 5-7.The project area doesn't overlap any MPAES areas; however, it occurs in proximity to an MPAES area.

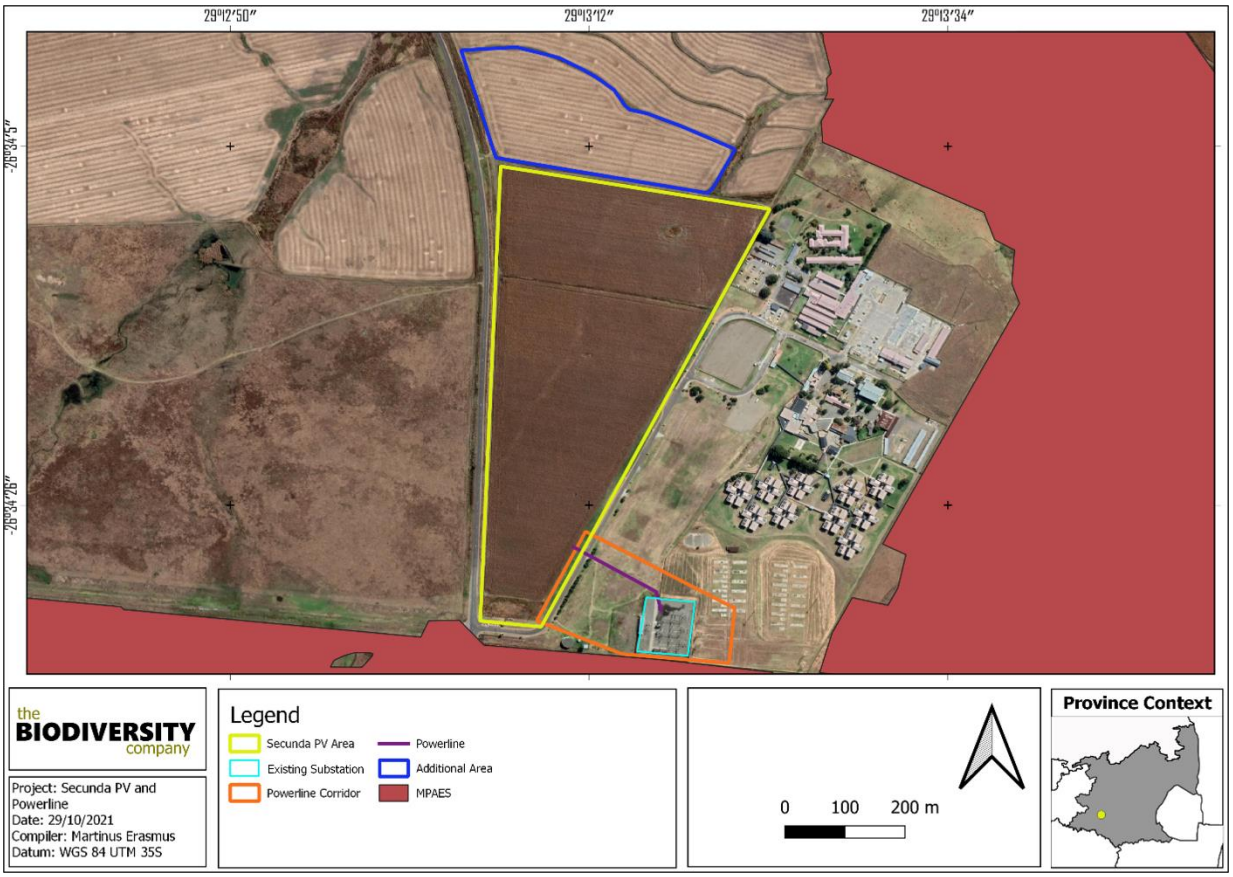


Figure 5-7 The project area in relation to the Mpumalanga Protected Areas Expansion Strategy areas

5.1.1.8 Mpumalanga Highveld Wetlands

The Mpumalanga Highveld Grasslands Wetland data also classifies National Freshwater Ecosystem Priority Areas (NFEPA) land cover based on the defined condition of each area. These are known as the NFEPA wetland conditions categories.

The project area does not overlap with any MPHG wetlands. MPHG Wetlands do however occur within 500 meters of the project area. These wetlands are classified as AB (Natural or Good) as well as C (Moderately modified). Some artificial dams are also present.

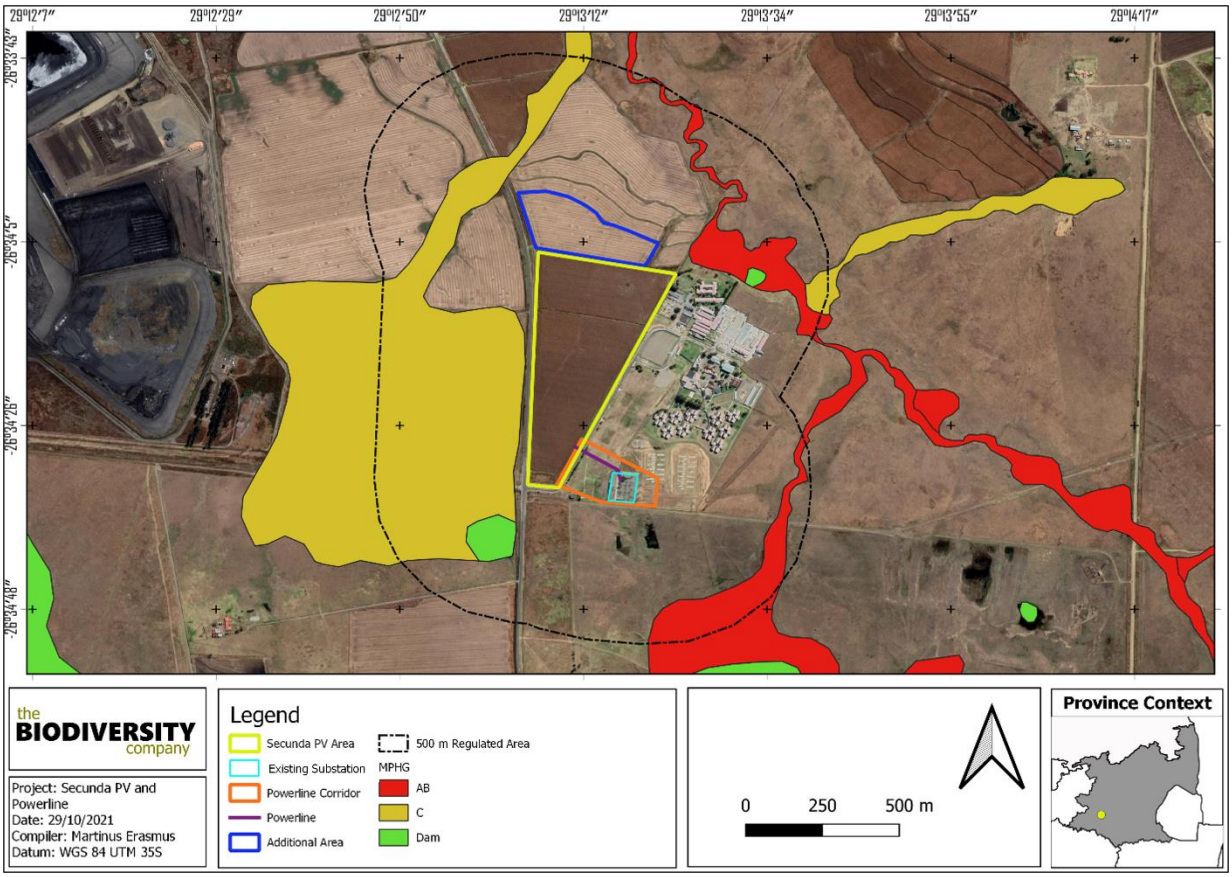


Figure 5-8 The project area in relation to the MPHG wetlands

5.1.2 Flora Assessment

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

5.1.2.1 Vegetation Type

The project area is situated within the grassland biome. This biome is centrally located in southern Africa, and adjoins all except the desert, fynbos and succulent Karoo biomes (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the grassland biome include:

a) Seasonal precipitation; and

b) The minimum temperatures in winter (Mucina & Rutherford, 2006).

The grassland biome is found chiefly on the high central plateau of South Africa, and the inland areas of KwaZulu-Natal and the Eastern Cape. The topography is mainly flat and rolling but includes the escarpment itself. Altitude varies from near sea level to 2 850 m above sea level.

Grasslands are dominated by a single layer of grasses. The amount of cover depends on rainfall and the degree of grazing. The grassland biome experiences summer rainfall and dry winters with frost (and fire), which are unfavourable for tree growth. Thus, trees are typically absent, except in a few localized habitats. Geophytes (bulbs) are often abundant. Frosts, fire and grazing maintain the grass dominance and prevent the establishment of trees.

The grassland biome comprises many different vegetation types. According to Mucina and Rutherford (2006), the project area is situated within the Soweto Highveld Grassland vegetation type (Figure 5-9).

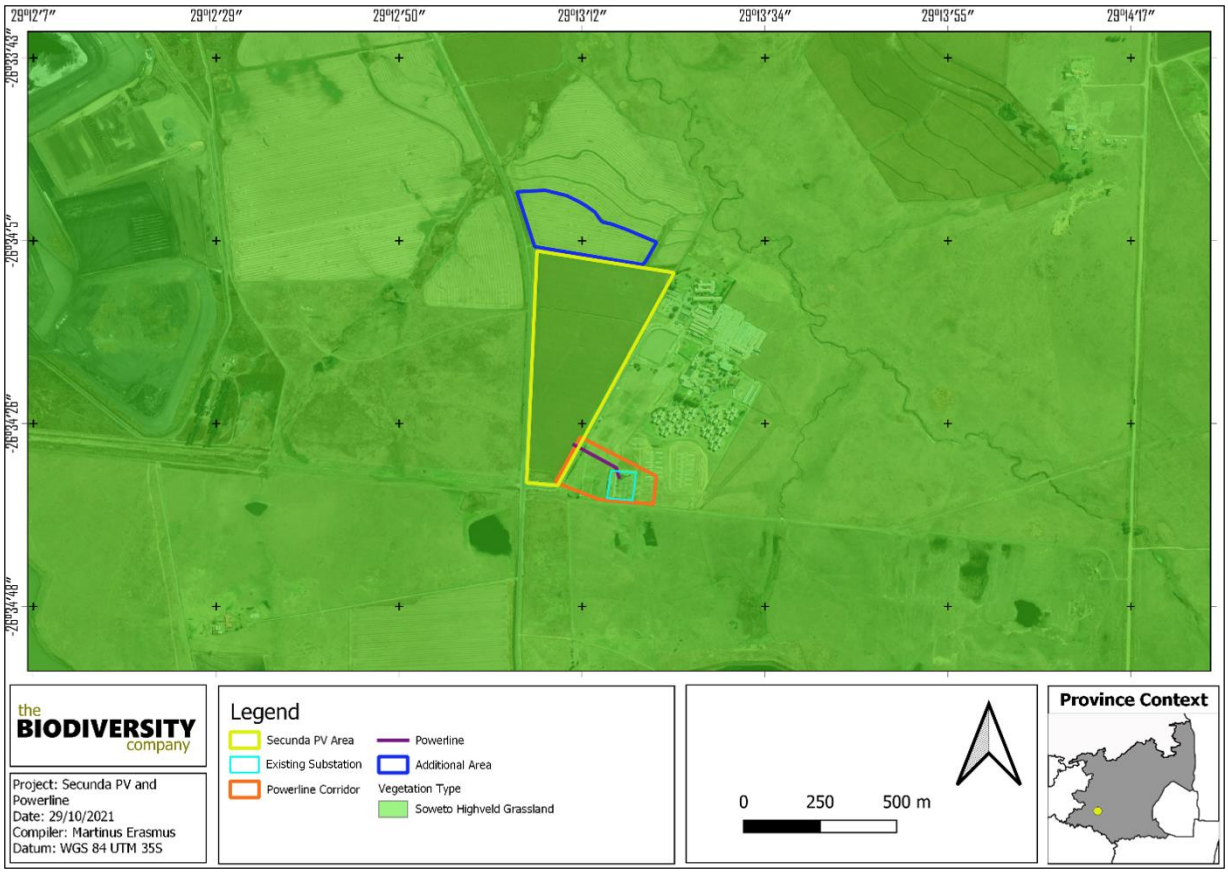


Figure 5-9 Map illustrating the vegetation type associated with the project area

5.1.2.1.1 Soweto Highveld Grassland

The Soweto Highveld Grassland vegetation type is found in Mpumalanga, Gauteng and to a small extent also in neighboring Free State and North-West Provinces. This vegetation type typically comprises an undulating landscape on the Highveld plateau supporting short to medium-high, dense, tufted grassland dominated almost entirely by *Themeda triandra* and accompanied by a variety of other grasses such as *Elionurus muticus, Eragrostis racemosa, Heteropogon contortus* and *Tristachya leucothrix*. Scattered small wetlands, narrow stream alluvia, pans and occasional ridges or rocky outcrops interrupt the continuous grassland cover (Mucina & Rutherford, 2006).

The following species are important in the **Soweto Highveld Grassland** vegetation type:

Graminoids: *Andropogon appendiculatus, Brachiaria serrata, Cymbopogon pospischilii, Cynodon dactylon, Elionurus muticus , Eragrostis capensis, E. chloromelas, E. curvula, E. plana, E. planiculmis, E. racemosa, Heteropogon contortus, Hyparrhenia hirta, Setaria nigrirostris, S. sphacelata, Themeda triandra, Tristachya leucothrix, Andropogon schirensis, Aristida adscensionis, A. bipartita, A. congesta, A. junciformis subsp. galpinii, Cymbopogon caesius, Digitaria diagonalis, Diheteropogon amplectens, Eragrostis micrantha, E. superba, Harpochloa falx, Microchloa caffra, Paspalum dilatatum* (Mucina & Rutherford, 2006).

Herbs: *Hermannia depressa, Acalypha angustata, Berkheya setifera, Dicoma anomala, Euryops gilfillanii, Geigeria aspera var. aspera, Graderia subintegra, Haplocarpha scaposa, Helichrysum miconiifolium, H. nudifolium var. nudifolium, H. rugulosum, Hibiscus pusillus, Justicia anagalloides, Lippia scaberrima, Rhynchosia effusa, Schistostephium crataegifolium, Selago densiflora, Senecio coronatus, Vernonia oligocephala, Wahlenbergia undulata* (Mucina & Rutherford, 2006).

Geophytic Herbs: *Haemanthus humilis subsp. hirsutus, H. montanus. Herbaceous Climber: Rhynchosia totta* (Mucina & Rutherford, 2006).

Low Shrubs: *Anthospermum hispidulum, A. rigidum subsp. pumilum, Berkheya annectens, Felicia muricata, Ziziphus zeyheriana* (Mucina & Rutherford, 2006).

Conservation Status of the Vegetation Type

According to Mucina & Rutherford (2006), this vegetation type is classified as Endangered. The national target for conservation protection for both these vegetation types is 24%, but only a few patches are statutorily conserved in the Waldrift, Krugersdorp, Leeuwkuil, Suikerbosrand, Rolfe's Pan Nature Reserves or privately conserved in Johanna Jacobs, Tweefontein, Gert Jacobs, Nikolaas and Avalon Nature Reserves, Heidelberg Natural Heritage Site.

By 2006, nearly half of the area of occupancy of this vegetation type had already been transformed by cultivation, urban sprawl, mining and building of road infrastructure. The amount of area transformed has most likely increased substantially. Some Soweto Grassland areas have been flooded by dams including Grootdraai, Leeukuil, Trichardtsfontein, Vaal and Willem Brummer.

5.1.2.2 Expected Flora Species

The POSA database indicates that 391 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. Six (6) national SCC based on their conservation status could be expected to occur within the project area and are provided in Table 5-2 below. Sixteen provincially protected SCC are also expected in the project area (Table 5-3). None of these species were observed during the field assessment.

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

Family	Taxon	Author	IUCN	Ecology
Apocynaceae	*Miraglossum davyi*	(N.E.Br.) Kupicha	VU	Indigenous; Endemic
Apocynaceae	*Stenostelma umbelluliferum*	(Schltr.) Bester & Nicholas	NT	Indigenous; Endemic
Asphodelaceae	*Kniphofia typhoides*	Codd	NT	Indigenous; Endemic
Asteraceae	*Cineraria austrotransvaalensis*	Cron	NT	Indigenous; Endemic
Fabaceae	*Argyrolobium campicola*	Harms	NT	Indigenous; Endemic
Iridaceae	*Gladiolus robertsoniae*	F.Bolus	NT	Indigenous; Endemic

Table 5-3 Provincially threatened flora species

Family	Taxon	IUCN	Mpumalanga Conservation act 1998	Ecology
Iridaceae	*Gladiolus dalenii subsp. dalenii*	LC	Schedule 11	Indigenous
Orchidaceae	*Habenaria falcicornis subsp. caffra*	LC	Schedule 11	Indigenous
Amaryllidaceae	*Haemanthus humilis subsp. hirsutus*	LC	Schedule 11	Indigenous
Amaryllidaceae	*Haemanthus montanus*	LC	Schedule 11	Indigenous
Asphodelaceae	*Kniphofia typhoides*	NT	Schedule 11	Indigenous; Endemic
Iridaceae	*Gladiolus crassifolius*	LC	Schedule 11	Indigenous
Asphodelaceae	*Aloe ecklonis*	LC	Schedule 11	Indigenous
Iridaceae	*Gladiolus elliotii*	LC	Schedule 11	Indigenous
Iridaceae	*Gladiolus robertsoniae*	NT	Schedule 11	Indigenous; Endemic
Amaryllidaceae	*Crinum graminicola*	LC	Schedule 11	Indigenous
Apocynaceae	*Orbea cooperi*	LC	Schedule 11	Indigenous

Orchidaceae	*Eulophia ovalis var. ovalis*	LC	Schedule 11	Indigenous
Iridaceae	*Gladiolus longicollis subsp. platypetalus*	LC	Schedule 11	Indigenous
Iridaceae	*Gladiolus longicollis subsp. longicollis*	LC	Schedule 11	Indigenous
Hyacinthaceae	*Eucomis autumnalis subsp. clavata*	NE	Schedule 11	Indigenous
Amaryllidaceae	*Crinum lugardiae*	LC	Schedule 11	Indigenous

5.1.3 Faunal Assessment

5.1.3.1 Amphibians

Based on the IUCN Red List Spatial Data and AmphibianMap, 22 amphibian species are expected to occur within the area (Appendix B). One of the species are SCCs (Table 5-4

Table 5-4 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)	
Pyxicephalus adspersus	Giant Bullfrog	NT	LC	Moderate

The Giant Bull Frog (*Pyxicephalus adspersus*) is a species of conservation concern that may potentially occur in the project area. The Giant Bull Frog is listed as NT on a regional scale. It is a species of drier savannahs. It is fossorial for most of the year, remaining buried in cocoons. They emerge at the start of the rains, and breed in shallow, temporary waters in pools, pans and ditches (IUCN, 2017). This species may occur in this area due to the wetland habitat present in the area, this habitat is degraded as such the likelihood of occurrence were rated as moderate.

5.1.3.2 Reptiles

Based on the IUCN Red List Spatial Data and the ReptileMAP database, 44 reptile species are expected to occur within the area (Appendix C). Three (3) are regarded as threatened (Table 5-5). All three species have a low likelihood of occurrence based on the disturbed nature of the area and the lack of suitable habitat.

Table 5-5 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)	
Chamaesaura aenea	Coppery Grass Lizard	NT	NT	Low
Crocodylus niloticus	Nile Crocodile	VU	LC	Low
Smaug giganteus	Giant Dragon Lizard	VU	VU	Low

5.1.3.3 Mammals

The IUCN Red List Spatial Data lists 70 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. Seventeen (17) of these expected species are regarded as threatened (Table 5-6), thirteen (13) of these have a low likelihood of occurrence based on the lack of suitable habitat and food sources in the project area as well as the close proximity to urban development.

Table 5-6 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)	
Amblysomus septentrionalis	Highveld Golden Mole	NT	NT	Low

Aonyx capensis	Cape Clawless Otter	NT	NT	Moderate
Atelerix frontalis	South Africa Hedgehog	NT	LC	Low
Crocidura maquassiensis	Makwassie musk shrew	VU	LC	Low
Dasymys incomtus	African Marsh rat	NT	LC	Low
Eidolon helvum	African Straw-colored Fruit Bat	LC	NT	Low
Felis nigripes	Black-footed Cat	VU	VU	Low
Hydrictis maculicollis	Spotted-necked Otter	VU	NT	Low
Leptailurus serval	Serval	NT	LC	Moderate
Mystromys albicaudatus	White-tailed Rat	VU	EN	Low
Ourebia ourebi	Oribi	EN	LC	Low
Panthera pardus	Leopard	VU	VU	Low
Parahyaena brunnea	Brown Hyaena	NT	NT	Low
Pelea capreolus	Grey Rhebok	NT	NT	Low
Poecilogale albinucha	African Striped Weasel	NT	LC	Moderate
Redunca fulvorufula	Mountain Reedbuck	EN	LC	Low

Aonyx capensis (Cape Clawless Otter) is the most widely distributed otter species in Africa (IUCN, 2017). This species is predominantly aquatic, and it is seldom found far from water. Based on the presence of the streams on the edge of the project area which provides suitable habitat, the species were given a moderate likelihood of occurrence.

Leptailurus serval (Serval) occurs widely through sub-Saharan Africa and is commonly recorded from most major national parks and reserves (IUCN, 2017). The Serval's status outside reserves is not certain, but they are inconspicuous and may be common in suitable habitat as they are tolerant of farming practices provided there is cover and food available. In sub-Saharan Africa, they are found in habitat with well-watered savanna long-grass environments and are particularly associated with reedbeds and other riparian vegetation types. The distance of the river and wetlands and the availability of food sources increases the likelihood of occurrence. However, the proximity to urbanization decreases it. The likelihood of occurrence is therefore rated as moderate.

Poecilogale albinucha (African Striped Weasel) is usually associated with savanna habitats, although it probably has a wider habitat tolerance (IUCN, 2017). Due to its secretive nature, it is often overlooked in many areas where it does occur. This species has been recorded on the edges and in between agricultural fields; therefore, this species has a moderate likelihood of occurring.

5.1.3.4 Avifauna

The SABAP2 Data lists 197 avifauna species that could be expected to occur within the area (Appendix E). Fifteen (15) of these expected species are regarded as threatened (Table 5-7). Twelve (12) species have a low likelihood of occurrence based on the lack of suitable habitat.

Table 5-7 Threatened avifauna species that are expected to occur within the project area.

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Calidris ferruginea	Sandpiper, Curlew	LC	NT	Low
Circus macrourus	Harrier, Pallid	NT	NT	Low
Circus ranivorus	Marsh-harrier, African	EN	LC	Low
Coracias garrulus	Roller, European	NT	LC	Moderate

Eupodotis caerulescens	Korhaan, Blue	LC	NT	Low
Falco biarmicus	Falcon, Lanner	VU	LC	High
Falco vespertinus	Falcon, Red-footed	NT	NT	Moderate
Glareola nordmanni	Pratincole, Black-winged	NT	NT	Low
Grus paradisea	Crane, Blue	NT	VU	Low
Hydroprogne caspia	Tern, Caspian	VU	LC	Low
Oxyura maccoa	Duck, Maccoa	NT	NT	Low
Phoeniconaias minor	Flamingo, Lesser	NT	NT	Low
Phoenicopterus roseus	Flamingo, Greater	NT	LC	Low
Rostratula benghalensis	Painted-snipe, Greater	NT	LC	Low
Sagittarius serpentarius	Secretarybird	VU	VU	Low

Coracias garrulous (European Roller) is a winter migrant from most of South-central Europe and Asia occurring throughout sub-Saharan Africa (IUCN, 2017). The European Roller has a preference for bushy plains and dry savannah areas (IUCN, 2017). There is a moderate chance of this species occurring in the project area as they prefer to forage in open/disturbed agricultural areas.

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 presence of many bird species on which Lanner Falcons may predate.

Falco vespertinus (Red-footed Falcon) is known to breed from eastern Europe and northern Asia to north-western China, heading south in the non-breeding season to southern Angola and southern Africa. Within southern Africa, it is locally uncommon to common in Botswana, northern Namibia, central Zimbabwe and the area in and around Gauteng, South Africa (Hockey *et al,* 2005). Prey species are present in the project area and could draw this species to the project area.

5.2 Field Assessment

The following sections provide the results from the field survey for the proposed development that was undertaken on the 2nd of November 2021.

5.2.1 Flora Assessment

This section is divided into two sections:

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

5.2.1.1 Indigenous Flora

The vegetation assessment was conducted throughout the extent of the project area. A total of 26 tree, shrub, herbaceous and graminoid plant species were recorded in the project area during the field assessment (Table 5-8). 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.

Table 5-8 Trees, shrub and herbaceous plant species recorded in the project area.

Family	*Scientific Name*	Common Name	Threat Status (SANBI, 2017)	Invasive Category
Amaranthaceae	*Amaranthus hybridus*	Smooth pigweed		Not indigenous; Naturalised
Asparagaceae	*Agave americana*	Century Plant		Not indigenous; Naturalised
Asteraceae	*Cirsium vulgare*	Spear Thistle		NEMBA 1b
Asteraceae	*Tagetes minuta*	Khaki-weed		Not indigenous; Naturalised
Asteraceae	*Xanthium sp*	Cocklebur		NEMBA 1b
Asteraceae	*Cosmos bipinnatus*	Cosmos		Not indigenous; Naturalised
Asteraceae	*Conyza bonariensis*	Flax-leaf Fleabane		Not indigenous; Naturalised
Asteraceae	*Gazania krebsiana*	Common Gazania	LC	
Hypoxidaceae	*Hypoxis argentea*	Small Silver Star-flower	LC	
Hypoxidaceae	*Hypoxis rigidula*	Silver-leaved Star-flower	LC	
Malvaceae	***Hibiscus trionum***	Flower-of-an-hour		Not indigenous; Naturalised
Onagraceae	*Oenothera rosea*	Evening Primrose		Not indigenous; Naturalised
Papaveraceae	*Argemone ochroleuca*	Mexican poppy		NEMBA 1b
Poaceae	*Cynodon dactylon*	Couch grass	LC	
Poaceae	*Eragrostis chloromelas*	Blue Love Grass	LC	
Poaceae	*Eragrostis curvula*	Berg-Soetgras	LC	
Poaceae	*Themeda triandra*	Red Grass	LC	
Poaceae	*Hyparrhenia hirta*	Thatch Grass	LC	
Poaceae	*Pennisetum clandestinum*	Kikuyu		NEMBA 1b
Poaceae	*Eragrostis plana*	Tough love-grass	LC	
Poaceae	*Hyperthelia dissoluta*	Yellow thatching grass	LC	
Scrophulariaceae	*Selago densiflora*		LC	
Solanaceae	*Datura stramonium*	Jimsonweed		NEMBA 1b
Solanaceae	*Solanum campylacanthum*	Bitter Apple	LC	

Typhaceae	*Typha capensis*	Bulrush	LC	
Verbenaceae	*Verbena bonariensis*	Purpletop vervain		NEMBA 1b

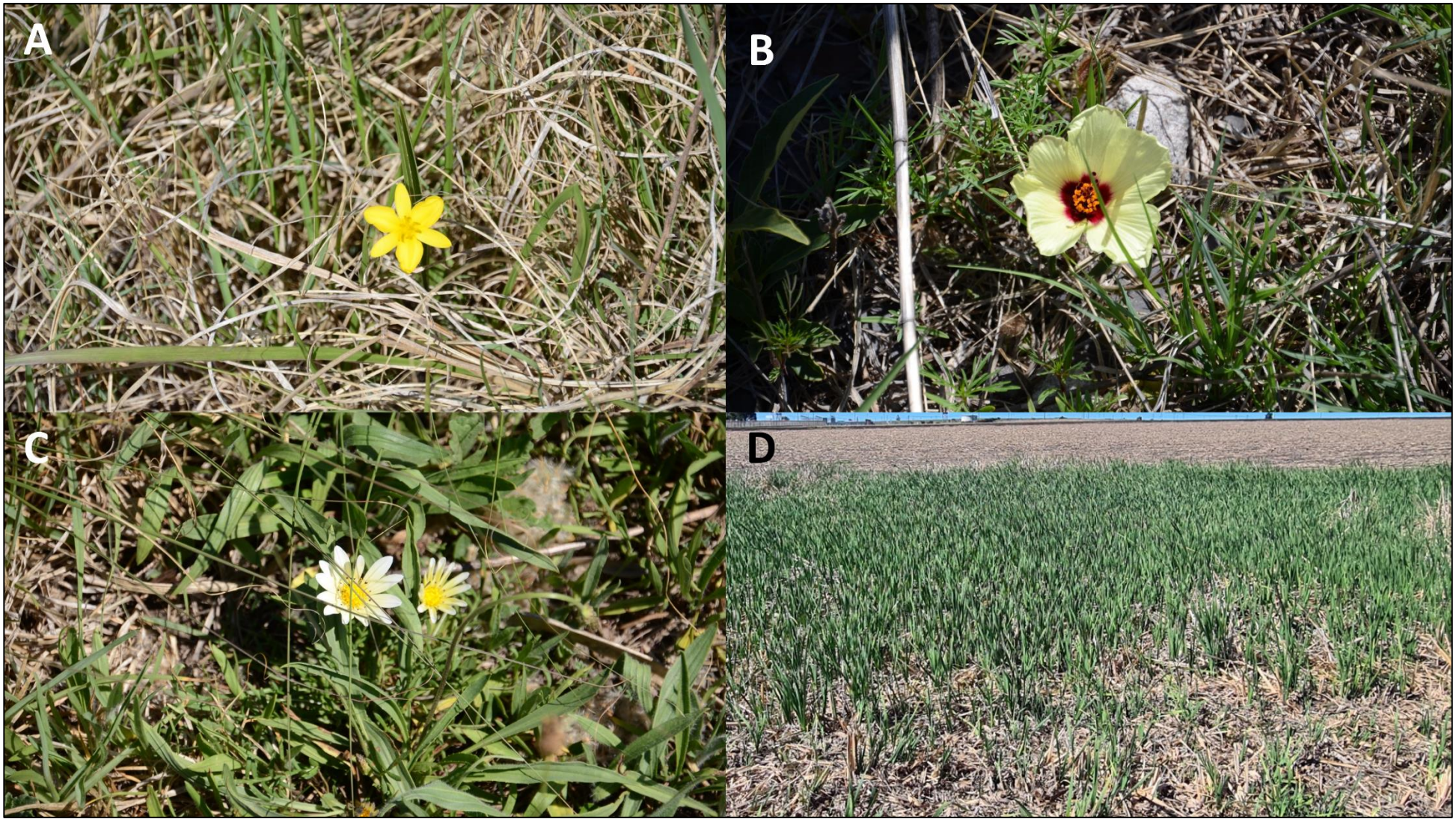


Figure 5-10 Photographs illustrating some of the flora recorded within the assessment area. A) Hypoxis argentea B) Hibiscus trionum, C) Gazania krebsiana and D) Typha capensis.

5.2.1.2 Invasive Alien Plants

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

NEMBA is the most recent legislation pertaining to alien invasive plant species. In August 2014, the list of Alien Invasive Species was published in terms of the NEMBA. The Alien and Invasive Species Regulations were published in the Government Gazette No. 44182, 24th of February 2021. The legislation calls for the removal and / or control of 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.
- *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.

Six (6) IAP species were recorded within the project area. These species are listed under the Alien and Invasive Species List 2020, Government Gazette No. GN1003 as Category 1b. Category 1b species must be controlled by implementing an IAP Management Programme, in compliance with section 75 of the NEMBA, as stated above.

5.2.2 Faunal Assessment

Herpetofauna and mammal observations and recordings fall under this section.

5.2.2.1 Amphibians and Reptiles

No species of reptiles were recorded in the project area during the survey period. However, there is the possibility of more species being present, as certain reptile species are secretive. No amphibian species were recorded during the survey period.

5.2.2.2 Mammals

Two (2) mammal species were observed during the survey of the project area (Table 5-9) based on either direct observation or the presence of visual tracks and signs (Table 5-9). None of the species recorded are regarded as SCC.

Table 5-9 Summary of mammal species recorded within the project area

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Hystrix africaeaustralis	Cape Porcupine	LC	LC
Lepus saxatilis	Scrub Hare	LC	LC

5.2.2.3 Avifauna

Twenty-one (21) species were recorded in the project area during the survey based on either direct observation, vocalisations, or the presence of visual tracks & signs, (Table 5-10) (Figure 5-11). None of the species are considered as SCC.

Table 5-10 A list of avifaunal species recorded for the project area.

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Apus apus	Swift, Common	Unlisted	LC
Bostrychia hagedash	Ibis, Hadeda	Unlisted	LC
Bubulcus ibis	Egret, Cattle	Unlisted	LC
Burhinus capensis	Thick-knee, Spotted	Unlisted	LC
Columba livia	Dove, Rock	Unlisted	LC
Corvus albus	Crow, Pied	Unlisted	LC
Elanus caeruleus	Kite, Black-shouldered	Unlisted	LC
Euplectes progne	Widowbird, Long-tailed	Unlisted	LC
Lanius collaris	Fiscal, Common (Southern)	Unlisted	LC
Myrmecocichla formicivora	Chat, Anteating	Unlisted	LC
Numida meleagris	Guineafowl, Helmeted	Unlisted	LC
Passer domesticus	Sparrow, House	Unlisted	LC
Passer melanurus	Sparrow, Cape	Unlisted	LC
Ploceus cucullatus	Weaver, Village	Unlisted	LC
Saxicola torquatus	Stonechat, African	Unlisted	LC
Spilopelia senegalensis	Dove, Laughing	Unlisted	LC
Streptopelia capicola	Turtle-dove, Cape	Unlisted	LC
Sturnus vulgaris	Starling, Common	Unlisted	LC
Threskiornis aethiopicus	Ibis, African Sacred	Unlisted	LC

Vanellus armatus	Lapwing, Blacksmith	Unlisted	LC
Vanellus coronatus	Lapwing, Crowned	Unlisted	LC

Figure 5-11 ***Some of the avifaunal species recorded; A) Fiscal, Common (Southern) (Lanius collaris), B) Thick-knee, Spotted (Burhinus capensis), C) Stonechat, African (Saxicola torquatus) and D) Lapwing, Blacksmith (Vanellus armatus)***

6 Habitat Assessment and Site Ecological Importance

6.1 Habitat Assessment

The main habitat types identified across the project area were initially identified largely based on aerial imagery. These main habitat types were refined based on the field coverage and data collected during the survey; the delineated habitats can be seen in Figure 6-1. Emphasis was placed on limiting timed meander searches along the proposed route within the natural habitats and therefore habitats with a higher potential of hosting SCC.

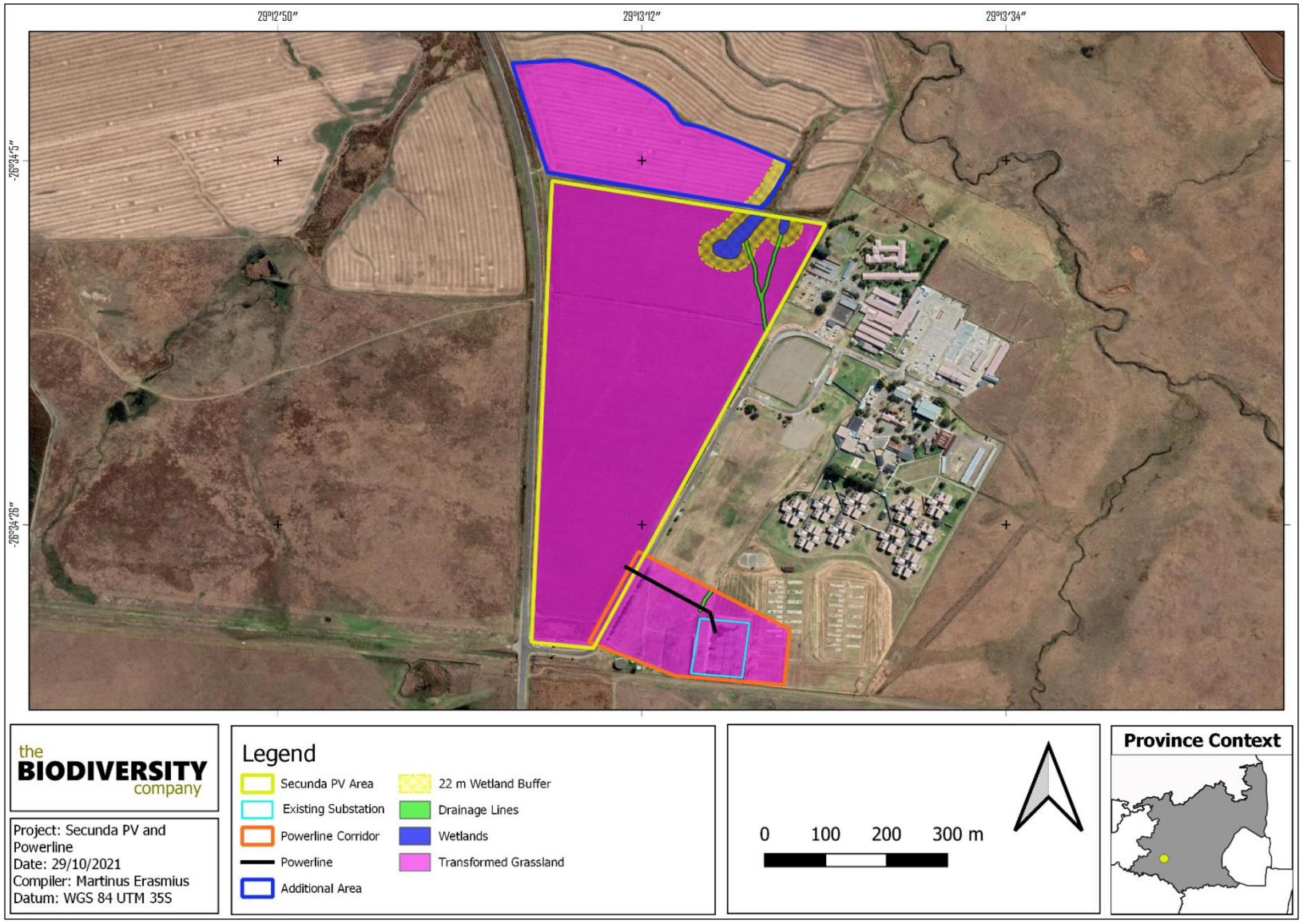


Figure 6-1 Habitats identified in the project area.

Modified Grassland (Disturbed and Transformed)

The condition of the modified grassland ranges, the difference within this habitat is determined by the extent of the disturbance;

- Modified (Figure 6-2), grassland areas have been impacted more by historic overgrazing, mismanagement and land use. These areas aren't entirely transformed but in a constant disturbed state, as they can't recover to a more natural state due to ongoing disturbances and impacts received from grazing from sheep and edge effects from the adjacent land use; and
- Heavily modified (Figure 6-3), transformed largely due to previous and current agricultural activities.

Even though there is a difference in the degree of disturbance, both these areas are considered to have a very low sensitivity.

Figure 6-2 Examples of modified grassland (Disturbed) habitat from the project area.

Figure 6-3 Examples of modified grassland (Transformed) habitat from the project area.

Wetlands and Drainage lines

This habitat unit represents the watercourse and wetland areas with the grasslands that it is connected to. The wetland habitats are according to the Wetland Assessment TBC (2021). This habitat type is

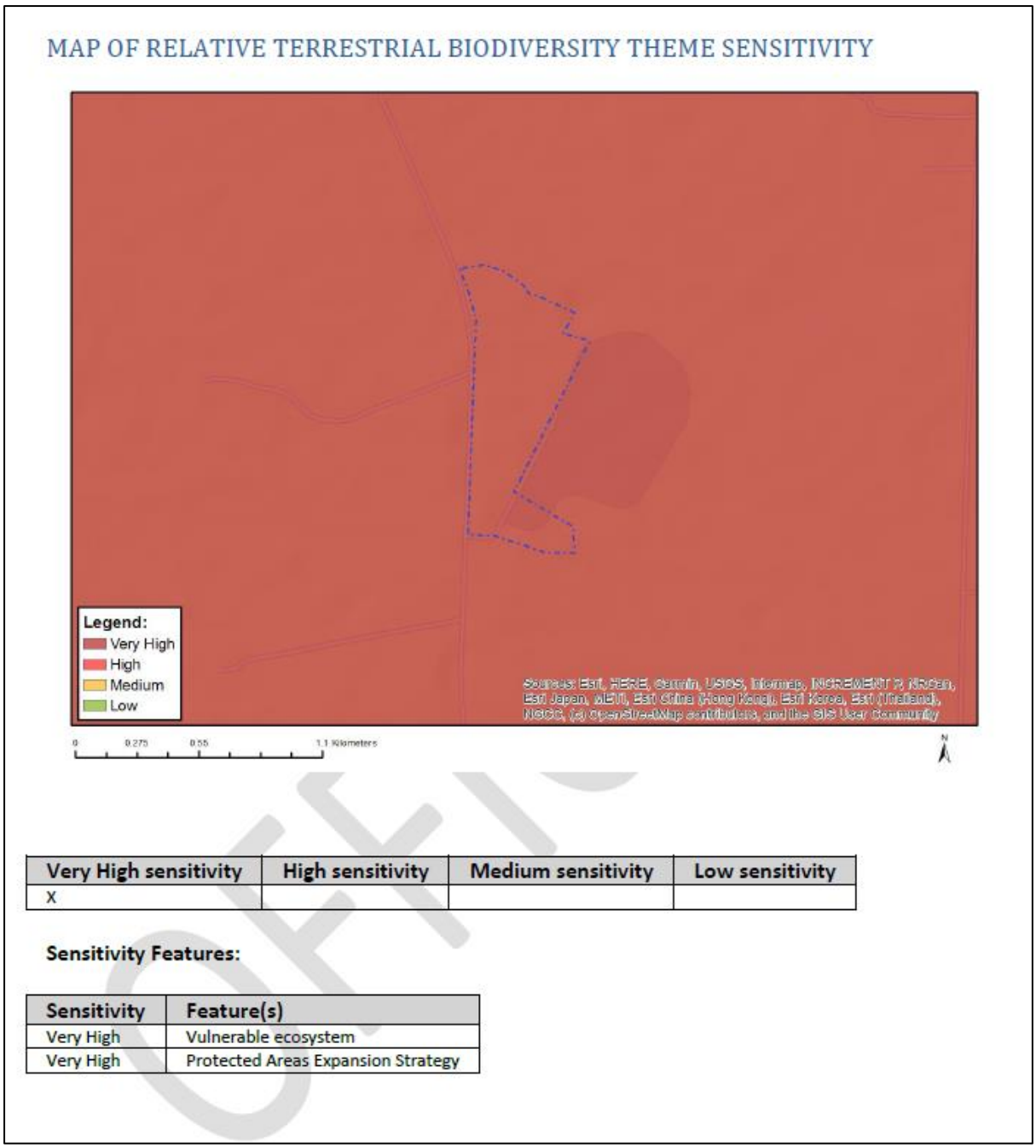
regarded as intact and therefore natural but impacted due to agriculture and the surrounding land use. Despite this and due to its limited distribution in the landscape, this habitat is regarded as having a high sensitivity. Temporary drainage lines also exist within the area and are considered to be of low sensitivity.

Figure 6-4 A typical example the wetland habitat from the project area.

6.2 Site Ecological Importance

The biodiversity theme sensitivity, as indicated in the national screening report, was derived to be Very High, mainly due to the project area being with a VU ecosystem and Protected Areas Expansion Strategy Focus Area (Figure 6-5).

The field results however dispute the results of the screening assessment as the area has been found modified, no longer representing those classifications as shown in Figure 6-6.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Very High	Vulnerable ecosystem
Very High	Protected Areas Expansion Strategy

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

The location and extent of these habitats is illustrated in Figure 6-1. Based on the criteria provided in Section 4.4 of this report, all habitats within the assessment area of the proposed project were allocated a sensitivity category (Table 6-1). The sensitivities of the habitat types delineated are illustrated in Figure 6-6.

"High Sensitivity' areas are due to the following and the guidelines can be seen in Table 6-2:

- Water Resources (Wetlands)

Table 6-1 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
Water Resource	High	Medium	Medium	Low	High
Drainage Lines	Very Low	Low	Very Low	Very Low	Low
Modified Grassland	Low	Very Low	Very Low	Low	Very Low

Table 6-2 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.
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.

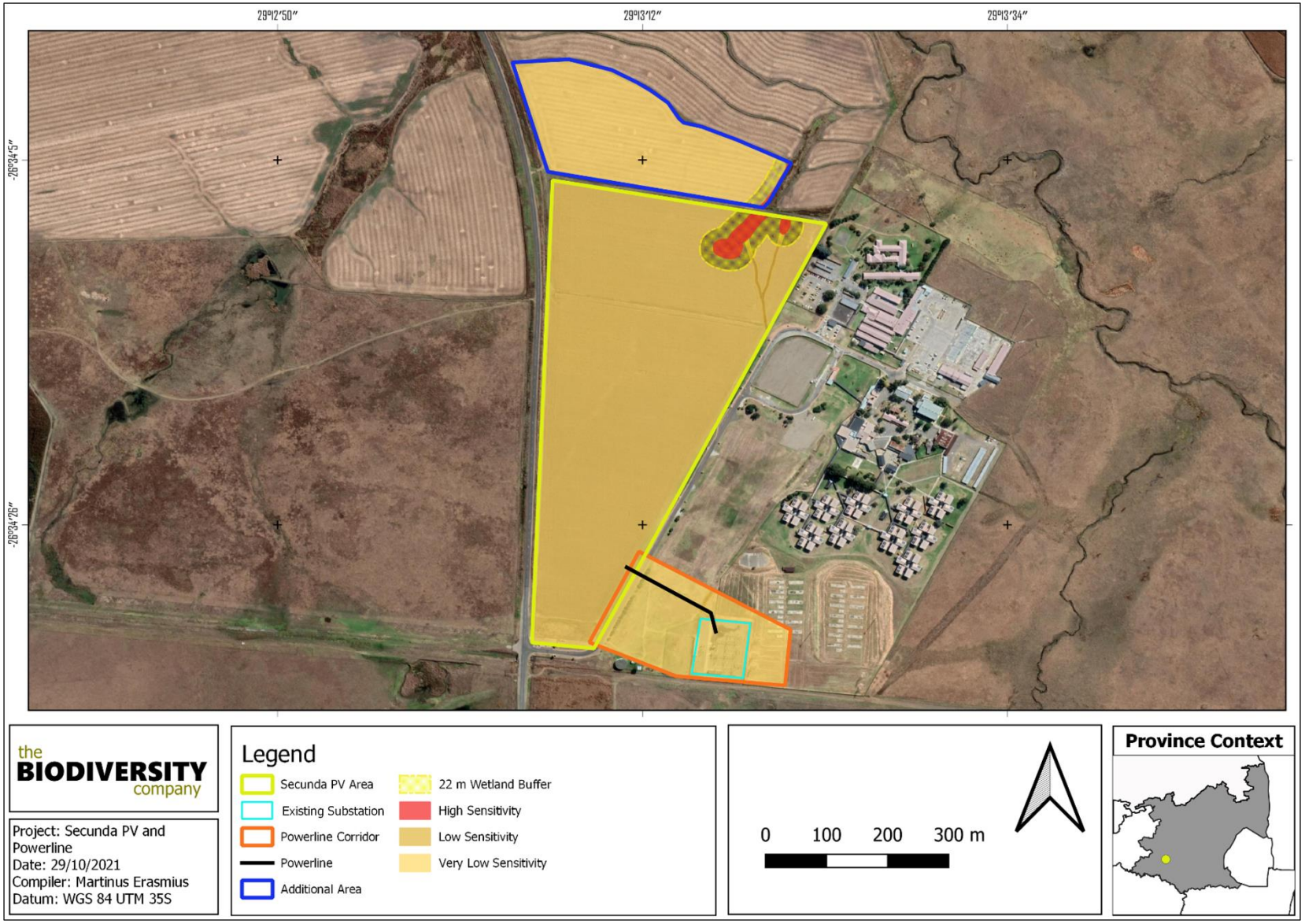


Figure 6-6 Sensitivity of the project area

7 Impact Risk Assessment

The section below and associated tables serve to indicate and summarise the significance of perceived impacts on the terrestrial ecology of the project area. Potential impacts were evaluated against the data captured during the desktop and field assessment to identify relevance to the project area. The relevant impacts associated with the proposed construction of the development were then subjected to a prescribed impact assessment methodology which was provided by Savannah Environmental and is shown in Appendix F.

7.1 Present Impacts to Biodiversity

Considering the anthropogenic activities and influences within the landscape, several negative impacts to biodiversity were observed within the project area (Figure 7-1). These include:

- Current and historic land modification (agriculture);
- Existing Infrastructure and vegetation maintenance;
- Livestock;
- Farm roads and main roads (and associated traffic and wildlife road mortalities);
- Alien and/or Invasive Plants (AIP); and
- Fences and associated maintenance.

Figure 7-1 Some of the identified impacts within the project area; A) Livestock, B) Fencing and existing infrastructure, C) Agricultural fields and D) Vegetation maintenance.

7.1.1 Terrestrial Impact Assessment

Potential impacts were evaluated against the data captured during the desktop and field assessments to identify relevance to the project area. The relevant impacts associated with the proposed development were then subjected to a prescribed impact assessment methodology which was provided by Savannah Environmental and is available on request. The construction phase impacts and those of the decommissioning phase will be the same.

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

7.1.2 Alternatives considered.

No alternatives were provided for the development.

7.1.3 Loss of Irreplaceable Resources

- The area has already been modified. No loss of irreplaceable resources is expected.

7.1.4 Anticipated Impacts

The impacts anticipated for the proposed activities are considered in order to predict and quantify these impacts and assess & evaluate the magnitude on the identified terrestrial biodiversity (Table 7-1).

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

Main Impact	Project activities that can cause loss/impacts to habitat (especially with regard to the proposed infrastructure areas):	Secondary impacts anticipated
1. Destruction, fragmentation and degradation of habitats and ecosystems	Physical removal of vegetation (limited)	Displacement/loss of flora & fauna
	Access roads and servitudes	Increased potential for soil erosion
	Soil dust precipitation	Habitat fragmentation
	Random events such as fire (cigarettes)	Increased potential for establishment of alien & invasive vegetation
		Erosion
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 SCC)
	Vehicles potentially spreading seed	Spreading of potentially dangerous diseases due to invasive and pest species
	Unsanitary conditions surrounding infrastructure promoting the establishment of alien and/or invasive rodents	Alteration of fauna assemblages due to habitat modification
	Creation of infrastructure suitable for breeding activities of alien and/or invasive birds	
Main Impact	**Project activities that can cause direct mortality of fauna**	**Secondary impacts anticipated**
3. Direct mortality of fauna	Clearing of vegetation	Loss of habitat
		Loss of ecosystem services
	Roadkill due to vehicle collision	

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

7.1.5 Unplanned Events

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

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

Table 7-2 Summary of unplanned events for terrestrial biodiversity

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

7.1.6 Identification of Additional Potential Impacts

7.1.6.1 Assessment of Impact Significance

The assessment of impact significance considers pre-mitigation as well as implementation of post-mitigation scenarios. The mitigation actions required to lower the risk of the impact are provided in Section 7.1.9 of this report.

7.1.6.2 Construction Phase

The following potential main impacts on biodiversity (based on the framework above) were considered for the construction phase of the proposed development. This phase refers to the period during construction when the proposed features are constructed; and is considered to have the largest direct impact on biodiversity. The following potential impacts to terrestrial biodiversity were considered:

- Destruction, further loss and fragmentation of the of habitats, ecosystems and vegetation community (Table 7-3),
- Introduction of alien species, especially plants (Table 7-4); and
- Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, vibration and poaching) (Table 7-5).

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

Impact Nature: Loss of vegetation within development footprint		
Destruction, further loss and fragmentation of the of habitats, ecosystems and vegetation community		
	Without mitigation	**With mitigation**
Extent	Moderate (3)	Low (2)
Duration	Permanent (5)	Short term (2)
Magnitude	Low (4)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes, although this impact cannot be well mitigated as the loss of vegetation is unavoidable, however limited.	
Mitigation:		
See Biodiversity Management Outcomes		
Residual Impacts:		
The loss of currently intact vegetation is an unavoidable consequence of the project and cannot be entirely mitigated, however rated low due to the limited extent of vegetation. The residual impact would however be low.		

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

Impact Nature: Introduction of alien species, especially plants		
Degradation and loss of surrounding natural vegetation		
	Without mitigation	**With mitigation**
Extent	High (4)	Low (2)
Duration	Long term (4)	Short term (2)

Impact Nature: Introduction of alien species, especially plants		
Degradation and loss of surrounding natural vegetation		
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation:		
See Biodiversity Management Outcomes		
Residual Impacts:		
Long-term broad scale. IAP infestation if not mitigated.		

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

Impact Nature: Displacement of faunal community due to habitat loss, direct mortalities and disturbance		
Construction activity will likely lead to direct mortality of fauna due to earthworks, vehicle collisions, accidental hazardous chemical spills and persecution. Disturbance due to dust and noise pollution and vibration may disrupt behaviour.		
	Without mitigation	**With mitigation**
Extent	Moderate (3)	Very low (2)
Duration	Short term (2)	Very short term(1)
Magnitude	Low (4)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes, to some extent. Noise and disturbance cannot be well mitigated. Impacts on fauna due to human presence, such as vehicle collisions, poaching, and persecution can be mitigated.	
Mitigation:		
See Biodiversity Management Outcomes		
Residual Impacts:		
It is probable that some individuals of susceptible species will be lost to construction-related activities despite mitigation. However, this is not likely to impact the viability of the local population of any fauna species.		

7.1.6.3 Operation Phase

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

- Continued fragmentation and degradation of habitats and ecosystems (Table 7-6);
- Spread of alien and/or invasive species (Table 7-7);
- Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, collisions with substation, noise, light, dust, vibration) (Table 7-8).

Table 7-6 Impacts to biodiversity associated with the proposed operational phase

Impact Nature: Continued fragmentation and degradation of habitats and ecosystems		
Disturbance created during the construction phase will leave the project area vulnerable to erosion and IAP encroachment.		
	Without Mitigation	With Mitigation
Extent	Moderate (3)	Low (2)
Duration	Long term (4)	Very short term (1)
Magnitude	Low (4)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes, with proper management and avoidance, this impact can be mitigated to a low level.	
Mitigation:		
See Biodiversity Management Outcomes		
Residual Impacts		
There is still the potential some potential for erosion and IAP encroachment even with the implementation of control measures but would have a low impact.		

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

Impact Nature: Spread of alien and/or invasive species		
Degradation and loss of surrounding natural vegetation		
	Without mitigation	**With mitigation**
Extent	High (4)	Low (2)
Duration	Long term (4)	Short term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation:		
See Biodiversity Management Outcomes		

Impact Nature: Spread of alien and/or invasive species
Degradation and loss of surrounding natural vegetation
Residual Impacts:
Long term broad scale IAP infestation if not mitigated.

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

Impact Nature: Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, collisions with substation, noise, light, dust, vibration		
The operation and maintenance of the proposed development may lead to disturbance or persecution of fauna in the vicinity of the development.		
	Without Mitigation	**With Mitigation**
Extent	Low (2)	Very low (1)
Duration	Long term (4)	Short term (2)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Improbable (2)
Significance	**Medium**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation:		
See Biodiversity Management Outcomes		
Residual Impacts		
Disturbance from maintenance activities will occur albeit at a low and infrequent level.		

7.1.6.4 Cumulative Impacts

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

Table 7-9 Cumulative Impacts to biodiversity associated with the proposed project.

Impact Nature: Cumulative habitat loss within the region		
The development of the proposed infrastructure will contribute to cumulative habitat loss especially in the ecological corridors on the edge of the agricultural field and thereby impact the ecological processes in the region.		
	Overall impact of the proposed development considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Low (2)	Low (2)
Duration	Short term (2)	Short term (2)
Magnitude	Low (4)	Low (4)
Probability	Improbable (2)	Improbable (2)
Significance	**Low**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	High	High

Irreplaceable loss of resources?	No	No

7.1.7 Biodiversity Management Plan

The aim of the management outcomes is to present the mitigations in such a way that they can be incorporated into the Environmental Management Programme (EMPr), allowing for more successful implementation and auditing of the mitigations and monitoring guidelines Table 7-10 presents the recommended mitigation measures and the respective timeframes, targets and performance indicators for the terrestrial study.

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

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

Table 7-10 Mitigation measures including requirements for timeframes, roles and responsibilities for the terrestrial study

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Responsible Party	Frequency
Management outcome: Vegetation and Habitats				
Areas rated as High sensitivity and their buffers in proximity to the development areas should be declared as 'no-go' areas during the life of the project, and all efforts must be made to prevent access to these areas from construction workers and machinery. The infrastructure should be realigned to prioritise development within low sensitivity areas. Mitigated development in medium sensitivity areas is permissible.	Construction/Life of operation	Project manager, Environmental Officer, Design Engineer	Developer's Environmental Officer (dEO), Environmental Control Officer (ECO)	Monthly
Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further than that proposed for the project. Clearing of vegetation outside of the project footprint should be minimized and avoided where possible.	Construction/Life of operation	Project manager, Environmental Officer, Contractor/Operator	dEO/ECO	Monthly
Where possible, existing access routes and walking paths must be made use of.	Construction/Operational Phase	Contractor/Operator	dEO/ECO	Monthly
All laydown areas, chemical toilets etc. should be restricted to very low-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.	Construction/Operational Phase	Design Engineer, Contractor/Operator	dEO/ECO	Monthly
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species.	Operational phase	Operator	dEO	Quarterly for up to two years after closure
Any woody material removed can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent further erosion.	Operational and Decommissioning phase	Contractor/Operator	dEO	Monthly
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 / Operator 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 may occur 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.	Construction/Life of operation	Environmental Officer & Contractor/Operator	dEO/ECO	Monthly

Storm Water run-off & Discharge Water Quality monitoring must be undertaken	Life of operation	Environmental Officer	dEO/ECO	Monthly
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.	Construction/Life of operation	Environmental Officer, Contractor/Operator	dEO/ECO	Monthly
A fire management plan needs to be complied and implemented to restrict the impact fire might have on the surrounding areas.	Before construction phase / Construction/ Life of operation	Environmental Officer & Contractor/Operator	dEO/ECO	Monthly
Management outcome: Fauna				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Responsible Party	Frequency
The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments, • Signs must be put up to enforce this	Construction/Operational Phase	Environmental Officer, Contractor/Operator	dEO/ECO	Monthly
Noise must be kept to an absolute minimum during the evenings and at night where possible, to minimize all possible disturbances to amphibian species and nocturnal mammals	Construction/Operational Phase	Environmental Officer, Contractor/Operator	dEO/ECO	Monthly
No trapping, killing, or poisoning of any wildlife is to be allowed. • Signs must be put up to enforce this;	Construction/Life of operation	Environmental Officer	dEO/ECO	Monthly
Outside lighting should be designed and limited to minimize impacts on fauna where possible. All outside lighting should be directed away from highly sensitive areas where possible. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (green/red) lights should be used wherever possible.	Construction/Operational Phase	Design Engineer & Contractor/Operator	dEO/ECO	Monthly
All construction workers should undergo an environmental induction that includes instruction on the need to comply with speed limits and the requirements of the EMPr and other permits that may be issued for the project to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.	Construction/Life of operation	Health and Safety Officer	dEO/ECO	Monthly
Schedule activities and operations during least sensitive periods where possible, to avoid migration, nesting and breeding seasons.	Construction/Life of operation	Project manager & Contractor/Operator	dEO/ECO	Monthly
Any excavations or holes must be conducted in a progressive manner. • Should the holes/excavations stay open overnight they must be covered temporarily, to ensure no small fauna species fall in.	Planning and construction	Environmental Officer & Contractor, Engineer	dEO/ECO	As and when required
A qualified environmental control officer must be on site when construction begins. The area must be walked through with a suitably qualified specialist prior to construction, to ensure no faunal species	Construction Phase	Developer, Environmental Officer &Contractor	ECO	Once off, at the commencement of construction

remain in the habitat and get killed. Should animals (including SCCs) not move out of the area on their own, relevant specialists must be contacted to advise on how the species can be relocated.				
Heat generated from substation, if any, must be monitored to ensure it does not negatively affect the local fauna	Operational Phase	Environmental Officer & Contractor	dEO	Weekly
Ensure that any cables and connections are insulated successfully to reduce electrocution risk.	Life of project (including construction)	Environmental Officer & Contractor, Engineer	dEO/ECO	Monthly
Monitoring of all 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.	Operational Phase	Environmental Officer	MdEO	Monthly
Management outcome: Alien Vegetation and fauna				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Responsible Party	Frequency
Compilation of and implementation of an alien vegetation management plan.	Construction/Operational Phase	Environmental Officer & Contractor	dEO/ECO	Twice a year
The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas.	Construction/Operational Phase	Environmental Officer & Contractor/Operator	dEO/ECO	Monthly
Waste management must be a priority and all waste must be collected and stored adequately. Waste should be stored at a licensed facility. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site.	Construction/Life of operation	Environmental Officer & Health and Safety Officer	dEO/ECO	Weekly
A pest control plan must be put in place and implemented; it is imperative that poisons not be used due to the likely presence of SCCs.	Construction/Life of operation	Environmental Officer & Health and Safety Officer	dEO/ECO	Monthly
Management outcome: Dust				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Responsible Party	Frequency
Dust-reducing mitigation measures must be put in place and strictly adhered to. This includes wetting of exposed soft soil surfaces. • No non-environmentally friendly suppressants may be used, as this could result in pollution of water sources.	Construction/Operational Phase	Contractor / Operator	dEO/ECO	Monthly
Management outcome: Waste management				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Responsible Party	Frequency

Waste management must be a priority and all waste must be collected and stored adequately and at a licensed facility. It is recommended that all waste be removed from site by a service provider on a weekly basis to prevent rodents and pests entering the site. • Refuse bins will be emptied and secured; • Temporary storage of domestic waste shall be in covered waste skips; and • Maximum domestic waste storage period will be 10 days.	Construction Phase	Environmental Officer & Health and Safety Officer	ECO	Monthly
Toilets at the recommended Health and Safety standards must be provided. These should be emptied twice a day, to prevent staff from using the surrounding vegetation.	Construction Phase	Environmental Officer & Health and Safety Officer	ECO	Daily
The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility. Under no circumstances may domestic waste be burned on site.	Construction Phase	Environmental Officer, Contractor & Health and Safety Officer	ECO	Ongoing
Suitable temporary solid waste facilities are to be incorporated into the design to prevent unsanitary conditions. These are to be cleared weekly and waste collected by the local waste management department. The residents must be encouraged to recycle.	Construction / Operational Phase	Project manager, Environmental Officer	dEO	Weekly
Management outcome: Erosion				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Responsible Party	Frequency
Speed limits must be put in place to reduce erosion. • Reducing the dust generated by the listed activities above, especially the earthmoving machinery, through wetting the soil surface; putting up signs to enforce speed limit; and speed bumps built to force slow speeds; • Signs must be put up to enforce this.	Construction/Life of operation	Environmental Officer, Contractor/Operator	dEO/ECO	Monthly
Where possible, existing access routes and walking paths must be made use of.	Construction/Life of operation	Environmental Officer	dEO/ECO	Monthly
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation, to prevent erosion during flood events and strong winds.	Operational Phase	Contractor/Operator	dEO	Progressively
A stormwater management plan must be compiled and implemented.	Before the commencement of the construction phase / Life of operation	Project Manager / Environmental Officer	dEO	Monthly

8 Conclusion and Impact Statement

8.1 Conclusion

8.1.1 Terrestrial Ecology

The completion of a comprehensive desktop study, 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 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.

Regarding the current layout, no project infrastructure is expected to have a significant impact on the VU ecosystem and Protected Areas Expansion Strategy, as these have been found to be modified. No faunal component of significance was observed, which further reduced the impact significance of the development on terrestrial biodiversity.

Historically, agriculture and the land use has led to the deterioration of these habitats. The classification of project area as heavily modified area is corroborated.

8.2 Impact Statement

Considering that this area has been identified as being of low significance for biodiversity maintenance and ecological processes, development may proceed. All mitigations measures prescribed herein must be considered by the issuing authority for authorisation. No fatal flaws are evident for the proposed project.

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10 Appendix Items

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

Family	Taxon	Author	IUCN	Ecology
Acanthaceae	*Blepharis subvolubilis*	C.B.Clarke	LC	Indigenous
Acanthaceae	*Crabbea acaulis*	N.E.Br.	LC	Indigenous
Acanthaceae	*Thunbergia atriplicifolia*	E.Mey. ex Nees	LC	Indigenous
Acanthaceae	*Crabbea hirsuta*	Harv.	LC	Indigenous
Acanthaceae	*Dyschoriste burchellii*	(Nees) Kuntze	LC	Indigenous
Agavaceae	*Chlorophytum fasciculatum*	(Baker) Kativu	LC	Indigenous
Agavaceae	*Chlorophytum cooperi*	(Baker) Nordal	LC	Indigenous
Alliaceae	*Tulbaghia acutiloba*	Harv.	LC	Indigenous
Alliaceae	*Tulbaghia sp.*			
Alliaceae	*Tulbaghia leucantha*	Baker	LC	Indigenous
Amaranthaceae	*Dysphania ambrosioides*	(L.) Mosyakin & Clemants		Not indigenous; Naturalised; Invasive
Amaranthaceae	*Chenopodium hircinum*	Schrad.		Not indigenous; Naturalised
Amaranthaceae	*Amaranthus hybridus subsp. hybridus*	L.		Not indigenous; Naturalised
Amaranthaceae	*Dysphania pumilio*	(R.Br.) Mosyakin & Clemants		Not indigenous; Naturalised; Invasive
Amaranthaceae	*Chenopodium phillipsianum*	Aellen		Indigenous
Amaranthaceae	*Amaranthus hybridus subsp. hybridus*	L.		Not indigenous; Naturalised
Amaranthaceae	*Dysphania schraderiana*	(Schult.) Mosyakin & Clemants		Indigenous
Amaranthaceae	*Dysphania multifida*	(L.) Mosyakin & Clemants		Not indigenous; Naturalised; Invasive
Amaranthaceae	*Achyranthes aspera var. aspera*	L.		Not indigenous; Naturalised
Amaranthaceae	*Amaranthus thunbergii*	Moq.	LC	Indigenous
Amaranthaceae	*Alternanthera pungens*	Kunth		Not indigenous; Naturalised
Amaranthaceae	*Gomphrena celosioides*	Mart.		Not indigenous; Naturalised
Amaryllidaceae	*Haemanthus humilis subsp. hirsutus*	Jacq.	LC	Indigenous
Amaryllidaceae	*Nerine krigei*	W.F.Barker	LC	Indigenous; Endemic
Amaryllidaceae	*Haemanthus montanus*	Baker	LC	Indigenous
Amaryllidaceae	*Crinum graminicola*	I.Verd.	LC	Indigenous
Amaryllidaceae	*Nerine laticoma*	(Ker Gawl.) T.Durand & Schinz	LC	Indigenous
Amaryllidaceae	*Crinum lugardiae*	N.E.Br.	LC	Indigenous
Anacardiaceae	*Searsia discolor*	(E.Mey. ex Sond.) Moffett	LC	Indigenous
Anacardiaceae	*Searsia rigida var. margaretae*	(Mill.) F.A.Barkley	LC	Indigenous; Endemic
Anacardiaceae	*Searsia rigida var. rigida*	(Mill.) F.A.Barkley	LC	Indigenous; Endemic
Anacardiaceae	*Searsia dentata*	(Thunb.) F.A.Barkley	LC	Indigenous
Anacardiaceae	*Searsia gerrardii*	(Harv. ex Engl.) Moffett	LC	Indigenous
Apiaceae	*Conium chaerophylloides*	(Thunb.) Sond.	LC	Indigenous

Apiaceae	*Centella asiatica*	(L.) Urb.	LC	Indigenous
Apiaceae	*Berula repanda*	(Hiern) Spalik & S.R.Downie	LC	Indigenous
Apocynaceae	*Asclepias gibba var. media*	(E.Mey.) Schltr.	LC	Indigenous
Apocynaceae	*Gomphocarpus rivularis*	Schltr.	LC	Indigenous
Apocynaceae	*Aspidoglossum lamellatum*	(Schltr.) Kupicha	LC	Indigenous
Apocynaceae	*Pachycarpus schinzianus*	(Schltr.) N.E.Br.	LC	Indigenous
Apocynaceae	*Stenostelma periglossoides*	(Schltr.) Bester & Nicholas		Indigenous; Endemic
Apocynaceae	*Cordylogyne globosa*	E.Mey.	LC	Indigenous
Apocynaceae	*Miraglossum davyi*	(N.E.Br.) Kupicha	VU	Indigenous; Endemic
Apocynaceae	*Aspidoglossum interruptum*	(E.Mey.) Bullock	LC	Indigenous
Apocynaceae	*Xysmalobium undulatum var. undulatum*	(L.) W.T.Aiton	LC	Indigenous
Apocynaceae	*Stenostelma umbelluliferum*	(Schltr.) Bester & Nicholas	NT	Indigenous; Endemic
Apocynaceae	*Asclepias multicaulis*	(E.Mey.) Schltr.	LC	Indigenous
Apocynaceae	*Orbea cooperi*	(N.E.Br.) L.C.Leach	LC	Indigenous
Apocynaceae	*Asclepias stellifera*	Schltr.	LC	Indigenous
Apocynaceae	*Gomphocarpus fruticosus subsp. fruticosus*	(L.) W.T.Aiton	LC	Indigenous
Apocynaceae	*Asclepias gibba var. gibba*	(E.Mey.) Schltr.	LC	Indigenous
Aponogetonaceae	*Aponogeton junceus*	Lehm.	LC	Indigenous
Asparagaceae	*Asparagus setaceus*	(Kunth) Jessop	LC	Indigenous
Asparagaceae	*Asparagus cooperi*	Baker	LC	Indigenous
Asphodelaceae	*Bulbine capitata*	Poelln.	LC	Indigenous
Asphodelaceae	*Trachyandra erythrorrhiza*	(Conrath) Oberm.	LC	Indigenous; Endemic
Asphodelaceae	*Kniphofia typhoides*	Codd	NT	Indigenous; Endemic
Asphodelaceae	*Aloe ecklonis*	Salm-Dyck	LC	Indigenous
Asphodelaceae	*Kniphofia albescens*	Codd	LC	Indigenous; Endemic
Aspleniaceae	*Asplenium adiantum-nigrum var. solidum*	L.	LC	Indigenous; Endemic
Aspleniaceae	*Asplenium cordatum*	(Thunb.) Sw.	LC	Indigenous
Asteraceae	*Haplocarpha nervosa*	(Thunb.) Beauverd	LC	Indigenous
Asteraceae	*Othonna natalensis*	Sch.Bip.	LC	Indigenous
Asteraceae	*Afroaster serrulatus*	(Harv.) J.C.Manning & Goldblatt	LC	Indigenous
Asteraceae	*Gerbera viridifolia*	(DC.) Sch.Bip.	LC	Indigenous
Asteraceae	*Nidorella anomala*	Steetz	LC	Indigenous
Asteraceae	*Euryops laxus*	(Harv.) Burtt Davy	LC	Indigenous
Asteraceae	*Berkheya onopordifolia var. onopordifolia*	(DC.) O.Hoffm. ex Burtt Davy	LC	Indigenous
Asteraceae	*Gazania sp.*			
Asteraceae	*Platycarphella parvifolia*	(S.Moore) V.A.Funk & H.Rob.	LC	Indigenous; Endemic
Asteraceae	*Berkheya radula*	(Harv.) De Wild.	LC	Indigenous
Asteraceae	*Senecio othonniflorus*	DC.	LC	Indigenous

Asteraceae	*Denekia capensis*	Thunb.	LC	Indigenous
Asteraceae	*Tagetes minuta*	L.		Not indigenous; Naturalised; Invasive
Asteraceae	*Geigeria aspera var. aspera*	Harv.	LC	Indigenous
Asteraceae	*Nolletia jeanettae*	P.P.J.Herman	LC	Indigenous; Endemic
Asteraceae	*Cineraria austrotransvaalensis*	Cron	NT	Indigenous; Endemic
Asteraceae	*Nidorella hottentotica*	DC.	LC	Indigenous
Asteraceae	*Sonchus asper subsp. asper*	(L.) Hill		Not indigenous; Naturalised; Invasive
Asteraceae	*Senecio inaequidens*	DC.	LC	Indigenous
Asteraceae	*Cotula sp.*			
Asteraceae	*Zinnia peruviana*	(L.) L.		Not indigenous; Naturalised; Invasive
Asteraceae	*Helichrysum rugulosum*	Less.	LC	Indigenous
Asteraceae	*Schkuhria pinnata*	(Lam.) Kuntze ex Thell.		Not indigenous; Naturalised
Asteraceae	*Senecio hieracioides*	DC.	LC	Indigenous
Asteraceae	*Ursinia nana subsp. leptophylla*	DC.	LC	Indigenous
Asteraceae	*Dimorphotheca caulescens*	Harv.	LC	Indigenous
Asteraceae	*Sonchus nanus*	Sond. ex Harv.	LC	Indigenous
Asteraceae	*Cosmos bipinnatus*	Cav.		Not indigenous; Naturalised
Asteraceae	*Helichrysum nudifolium var. nudifolium*	(L.) Less.	LC	Indigenous
Asteraceae	*Senecio burchellii*	DC.	LC	Indigenous; Endemic
Asteraceae	*Erigeron canadensis*	L.		Not indigenous; Naturalised; Invasive
Asteraceae	*Haplocarpha scaposa*	Harv.	LC	Indigenous
Asteraceae	*Seriphium plumosum*	L.		Indigenous
Asteraceae	*Nidorella resedifolia subsp. resedifolia*	DC.	LC	Indigenous
Asteraceae	*Pulicaria scabra*	(Thunb.) Druce	LC	Indigenous
Asteraceae	*Pseudognaphalium oligandrum*	(DC.) Hilliard & B.L.Burtt	LC	Indigenous
Asteraceae	*Berkheya discolor*	(DC.) O.Hoffm. & Muschl.	LC	Indigenous
Asteraceae	*Senecio affinis*	DC.	LC	Indigenous
Asteraceae	*Tolpis capensis*	(L.) Sch.Bip.	LC	Indigenous
Asteraceae	*Cineraria lyratiformis*	Cron	LC	Indigenous
Asteraceae	*Osteospermum scariosum var. scariosum*	DC.	NE	Indigenous
Asteraceae	*Helichrysum psilolepis*	Harv.	LC	Indigenous
Asteraceae	*Senecio coronatus*	(Thunb.) Harv.	LC	Indigenous
Asteraceae	*Berkheya pinnatifida subsp. ingrata*	(Thunb.) Thell.	LC	Indigenous; Endemic
Asteraceae	*Haplocarpha lyrata*	Harv.	LC	Indigenous; Endemic
Asteraceae	*Lactuca inermis*	Forssk.	LC	Indigenous
Asteraceae	*Bidens pilosa*	L.		Not indigenous; Naturalised
Asteraceae	*Artemisia afra var. afra*	Jacq. ex Willd.	LC	Indigenous

Asteraceae	*Senecio sp.*			
Asteraceae	*Euryops transvaalensis subsp. transvaalensis*	Klatt	LC	Indigenous
Asteraceae	*Erigeron bonariensis*	L.		Not indigenous; Naturalised; Invasive
Asteraceae	*Pseudognaphalium luteoalbum*	(L.) Hilliard & B.L.Burtt	LC	Not indigenous; Cryptogenic
Asteraceae	*Dicoma anomala subsp. gerrardii*	Sond.	LC	Indigenous
Asteraceae	*Senecio venosus*	Harv.	LC	Indigenous
Asteraceae	*Conyza podocephala*	DC.		Indigenous
Asteraceae	*Helichrysum chionosphaerum*	DC.	LC	Indigenous
Asteraceae	*Geigeria burkei subsp. burkei*	Harv.	NE	Indigenous
Asteraceae	*Schistostephium crataegifolium*	(DC.) Fenzl ex Harv.	LC	Indigenous
Asteraceae	*Geigeria burkei subsp. burkei*	Harv.	NE	Indigenous
Asteraceae	*Senecio inornatus*	DC.	LC	Indigenous
Boraginaceae	*Lithospermum cinereum*	A.DC.	LC	Indigenous
Boraginaceae	*Anchusa riparia*	A.DC.	LC	Indigenous
Boraginaceae	*Cynoglossum lanceolatum*	Forssk.	LC	Indigenous
Boraginaceae	*Cynoglossum hispidum*	Thunb.	LC	Indigenous
Brassicaceae	*Brassica rapa*	L.		Not indigenous; Naturalised
Brassicaceae	*Erucastrum austroafricanum*	Al-Shehbaz & Warwick	LC	Indigenous
Brassicaceae	*Sisymbrium capense*	Thunb.	LC	Indigenous
Brassicaceae	*Nasturtium officinale*	W.T.Aiton		Not indigenous; Naturalised; Invasive
Brassicaceae	*Sisymbrium turczaninowii*	Sond.	LC	Indigenous
Brassicaceae	*Rorippa fluviatilis var. fluviatilis*	(E.Mey. ex Sond.) R.A.Dyer	LC	Indigenous
Brassicaceae	*Lepidium transvaalense*	Marais	LC	Indigenous
Brassicaceae	*Sinapis arvensis*	L.		Not indigenous; Naturalised
Campanulaceae	*Wahlenbergia undulata*	(L.f.) A.DC.	LC	Indigenous
Caryophyllaceae	*Silene undulata*	Aiton		Indigenous
Caryophyllaceae	*Dianthus basuticus subsp. basuticus*	Burtt Davy	NE	Indigenous
Caryophyllaceae	*Herniaria erckertii subsp. erckertii*	F.Herm.	LC	Indigenous
Caryophyllaceae	*Dianthus mooiensis subsp. mooiensis*	F.N.Williams	NE	Indigenous; Endemic
Caryophyllaceae	*Pollichia campestris*	Aiton	LC	Indigenous
Cleomaceae	*Cleome monophylla*	L.	LC	Indigenous
Colchicaceae	*Colchicum striatum*	(Hochst. ex A.Rich.) J.C.Manning & Vinn.	LC	Indigenous
Commelinaceae	*Cyanotis speciosa*	(L.f.) Hassk.	LC	Indigenous
Commelinaceae	*Commelina africana var. africana*	L.	LC	Indigenous
Convolvulaceae	*Cuscuta campestris*	Yunck.		Not indigenous; Naturalised; Invasive
Convolvulaceae	*Convolvulus multifidus*	Thunb.	LC	Indigenous; Endemic
Convolvulaceae	*Convolvulus sagittatus*	Thunb.	LC	Indigenous

Convolvulaceae	*Ipomoea crassipes var. crassipes*	Hook.	LC	Indigenous
Convolvulaceae	*Ipomoea oblongata*	E.Mey. ex Choisy	LC	Indigenous
Crassulaceae	*Crassula setulosa var. setulosa*	Harv.	NE	Indigenous
Crassulaceae	*Crassula natans var. natans*	Thunb.	LC	Indigenous
Crassulaceae	*Crassula alba var. alba*	Forssk.	NE	Indigenous
Crassulaceae	*Crassula lanceolata subsp. lanceolata*	(Eckl. & Zeyh.) Endl. ex Walp.	LC	Indigenous
Cucurbitaceae	*Cucumis myriocarpus subsp. myriocarpus*	Naudin	LC	Indigenous
Cupressaceae	*Cupressus sempervirens*	L.		Not indigenous; Cultivated; Naturalised
Cupressaceae	*Cupressus arizonica*	Greene		Not indigenous; Cultivated; Naturalised
Cyperaceae	*Carex glomerabilis*	V.I.Krecz.	LC	Indigenous
Cyperaceae	*Eleocharis limosa*	(Schrad.) Schult.	LC	Indigenous
Cyperaceae	*Eleocharis dregeana*	Steud.	LC	Indigenous
Cyperaceae	*Cyperus albostriatus*	Schrad.	LC	Indigenous
Cyperaceae	*Fimbristylis complanata*	(Retz.) Link	LC	Indigenous
Cyperaceae	*Cyperus congestus*	Vahl	LC	Indigenous
Cyperaceae	*Schoenoplectus decipiens*	(Nees) J.Raynal	LC	Indigenous
Cyperaceae	*Abildgaardia ovata*	(Burm.f.) Kral	LC	Indigenous
Cyperaceae	*Cyperus esculentus var. esculentus*	L.	LC	Indigenous
Cyperaceae	*Cyperus longus var. tenuiflorus*	L.	NE	Indigenous
Cyperaceae	*Pycreus cooperi*	C.B.Clarke	LC	Indigenous
Cyperaceae	*Bulbostylis humilis*	(Kunth) C.B.Clarke	LC	Indigenous
Cyperaceae	*Cyperus semitrifidus*	Schrad.	LC	Indigenous
Cyperaceae	*Cyperus marginatus*	Thunb.	LC	Indigenous
Cyperaceae	*Cyperus fastigiatus*	Rottb.	LC	Indigenous
Cyperaceae	*Eleocharis sp.*			
Cyperaceae	*Carex spartea*	Wahlenb.		Indigenous
Dipsacaceae	*Cephalaria zeyheriana*	Szabo	LC	Indigenous
Dipsacaceae	*Cephalaria pungens*	Szabo	LC	Indigenous
Dipsacaceae	*Cephalaria oblongifolia*	(Kuntze) Szabo	LC	Indigenous
Dipsacaceae	*Scabiosa columbaria*	L.	LC	Indigenous
Ebenaceae	*Diospyros austroafricana var. microphylla*	De Winter	LC	Indigenous
Euphorbiaceae	*Euphorbia inaequilatera var. inaequilatera*	Sond.	NE	Indigenous
Euphorbiaceae	*Acalypha caperonioides var. caperonioides*	Baill.	DD	Indigenous
Euphorbiaceae	*Euphorbia striata*	Thunb.	LC	Indigenous
Euphorbiaceae	*Euphorbia clavarioides*	Boiss.	LC	Indigenous
Fabaceae	*Tephrosia capensis var. capensis*	(Jacq.) Pers.	LC	Indigenous
Fabaceae	*Rhynchosia adenodes*	Eckl. & Zeyh.	LC	Indigenous

Fabaceae	*Tephrosia multijuga*	R.G.N.Young	LC	Indigenous
Fabaceae	*Medicago sativa*	L.	NE	Not indigenous; Cultivated; Naturalised; Invasive
Fabaceae	*Argyrolobium campicola*	Harms	NT	Indigenous; Endemic
Fabaceae	*Listia heterophylla*	E.Mey.	LC	Indigenous
Fabaceae	*Melolobium candicans*	(E.Mey.) Eckl. & Zeyh.	LC	Indigenous
Fabaceae	*Indigofera evansiana*	Burtt Davy	LC	Indigenous
Fabaceae	*Trifolium pratense var. pratense*	L.	NE	Not indigenous; Naturalised
Fabaceae	*Leobordea mucronata*	(Conrath) B.-E.van Wyk & Boatwr.		Indigenous
Fabaceae	*Indigofera dregeana*	E.Mey.	LC	Indigenous
Fabaceae	*Indigofera zeyheri*	Spreng. ex Eckl. & Zeyh.	LC	Indigenous
Fabaceae	*Indigofera hedyantha*	Eckl. & Zeyh.	LC	Indigenous
Fabaceae	*Lessertia affinis*	Burtt Davy	LC	Indigenous; Endemic
Fabaceae	*Eriosema salignum*	E.Mey.	LC	Indigenous
Fabaceae	*Medicago laciniata var. laciniata*	(L.) Mill.	NE	Not indigenous; Naturalised
Fabaceae	*Dolichos falciformis*	E.Mey.	LC	Indigenous
Fabaceae	*Rhynchosia totta var. totta*	(Thunb.) DC.	LC	Indigenous
Fabaceae	*Melolobium calycinum*	Benth.	LC	Indigenous
Fabaceae	*Indigofera obscura*	N.E.Br.	LC	Indigenous
Fabaceae	*Trifolium africanum var. africanum*	Ser.	NE	Indigenous
Fabaceae	*Dolichos linearis*	E.Mey.	LC	Indigenous
Fabaceae	*Leobordea adpressa subsp. adpressa*	(N.E.Br.) B.-E.van Wyk & Boatwr.	LC	Indigenous
Fabaceae	*Erythrina zeyheri*	Harv.	LC	Indigenous
Fabaceae	*Eriosema nutans*	Schinz	LC	Indigenous
Fabaceae	*Vigna vexillata var. vexillata*	(L.) A.Rich.	LC	Indigenous
Fabaceae	*Trifolium burchellianum subsp. burchellianum*	Ser.	LC	Indigenous
Fabaceae	*Indigofera melanadenia*	Benth. ex Harv.	LC	Indigenous
Gentianaceae	*Sebaea repens*	Schinz	LC	Indigenous
Gentianaceae	*Chironia palustris subsp. palustris*	Burch.	LC	Indigenous
Gentianaceae	*Sebaea leiostyla*	Gilg	LC	Indigenous
Geraniaceae	*Pelargonium malacoides*	R.Knuth		Indigenous
Geraniaceae	*Pelargonium luridum*	(Andrews) Sweet	LC	Indigenous
Gesneriaceae	*Streptocarpus pentherianus*	Fritsch	LC	Indigenous
Gisekiaceae	*Gisekia pharnaceoides var. pharnaceoides*	L.	LC	Indigenous
Hyacinthaceae	*Drimia elata*	Jacq. ex Willd.	DD	Indigenous
Hyacinthaceae	*Drimia multisetosa*	(Baker) Jessop	LC	Indigenous
Hyacinthaceae	*Ornithogalum flexuosum*	(Thunb.) U.Mull.-Doblies & D.Mull.-Doblies	LC	Indigenous
Hyacinthaceae	*Schizocarphus nervosus*	(Burch.) Van der Merwe	LC	Indigenous

Hyacinthaceae	*Dipcadi viride*	(L.) Moench	LC	Indigenous
Hyacinthaceae	*Albuca baurii*	Baker	LC	Indigenous; Endemic
Hyacinthaceae	*Albuca virens subsp. virens*	(Ker Gawl.) J.C.Manning & Goldblatt	LC	Indigenous
Hyacinthaceae	*Ledebouria ovatifolia*	(Baker) Jessop		Indigenous
Hyacinthaceae	*Drimia pauciflora*	Baker		Indigenous
Hyacinthaceae	*Eucomis autumnalis subsp. clavata*	(Mill.) Chitt.	NE	Indigenous
Hydrocharitacea e	*Lagarosiphon major*	(Ridl.) Moss ex Wager	LC	Indigenous
Hypoxidaceae	*Hypoxis argentea var. argentea*	Harv. ex Baker	LC	Indigenous
Hypoxidaceae	*Hypoxis rigidula var. rigidula*	Baker	LC	Indigenous
Hypoxidaceae	*Empodium elongatum*	(Nel) B.L.Burtt	LC	Indigenous
Hypoxidaceae	*Hypoxis multiceps*	Buchinger ex Baker	LC	Indigenous
Hypoxidaceae	*Hypoxis acuminata*	Baker	LC	Indigenous
Iridaceae	*Gladiolus dalenii subsp. dalenii*	Van Geel	LC	Indigenous
Iridaceae	*Gladiolus crassifolius*	Baker	LC	Indigenous
Iridaceae	*Gladiolus elliotii*	Baker	LC	Indigenous
Iridaceae	*Gladiolus robertsoniae*	F.Bolus	NT	Indigenous; Endemic
Iridaceae	*Moraea simulans*	Baker	LC	Indigenous
Iridaceae	*Gladiolus longicollis subsp. platypetalus*	Baker	LC	Indigenous
Iridaceae	*Gladiolus longicollis subsp. longicollis*	Baker	LC	Indigenous
Iridaceae	*Babiana bainesii*	Baker	LC	Indigenous
Juncaceae	*Juncus exsertus*	Buchenau	LC	Indigenous
Juncaceae	*Juncus dregeanus subsp. dregeanus*	Kunth	LC	Indigenous
Lamiaceae	*Salvia repens var. repens*	Burch. ex Benth.	LC	Indigenous
Lamiaceae	*Aeollanthus buchnerianus*	Briq.	LC	Indigenous
Lamiaceae	*Salvia runcinata*	L.f.	LC	Indigenous
Lamiaceae	*Ajuga ophrydis*	Burch. ex Benth.	LC	Indigenous
Lamiaceae	*Stachys hyssopoides*	Burch. ex Benth.	LC	Indigenous
Lamiaceae	*Salvia repens var. transvaalensis*	Burch. ex Benth.	LC	Indigenous
Lamiaceae	*Mentha longifolia subsp. polyadena*	(L.) Huds.	LC	Indigenous
Lamiaceae	*Syncolostemon canescens*	(Gurke) D.F.Otieno	LC	Indigenous
Lamiaceae	*Plectranthus ramosior*	(Benth.) Van Jaarsv.	LC	Indigenous; Endemic
Limeaceae	*Limeum viscosum subsp. viscosum*	(J.Gay) Fenzl	NE	Indigenous
Lobeliaceae	*Monopsis decipiens*	(Sond.) Thulin	LC	Indigenous
Lythraceae	*Nesaea sagittifolia var. sagittifolia*	(Sond.) Koehne	LC	Indigenous
Lythraceae	*Nesaea schinzii*	Koehne	LC	Indigenous
Malvaceae	*Hermannia cordata*	(E.Mey. ex E.Phillips) De Winter	LC	Indigenous; Endemic
Malvaceae	*Grewia flava*	DC.	LC	Indigenous

Malvaceae	*Hermannia cristata*	Bolus	LC	Indigenous
Malvaceae	*Hermannia coccocarpa*	(Eckl. & Zeyh.) Kuntze	LC	Indigenous
Malvaceae	*Hibiscus trionum*	L.		Not indigenous; Naturalised
Malvaceae	*Hibiscus microcarpus*	Garcke	LC	Indigenous
Malvaceae	*Hermannia depressa*	N.E.Br.	LC	Indigenous
Malvaceae	*Hermannia sp.*			
Malvaceae	*Hermannia oblongifolia*	(Harv.) Hochr.	LC	Indigenous; Endemic
Malvaceae	*Sida rhombifolia subsp. rhombifolia*	L.	LC	Indigenous
Melianthaceae	*Greyia sutherlandii*	Hook. & Harv.	LC	Indigenous
Molluginaceae	*Psammotropha myriantha*	Sond.	LC	Indigenous
Myrothamnaceae	*Myrothamnus flabellifolius*	Welw.	DD	Indigenous
Myrtaceae	*Eucalyptus sideroxylon*	A.Cunn. ex Woolls		Not indigenous; Cultivated; Naturalised; Invasive
Onagraceae	*Oenothera jamesii*	Torr. & A.Gray		Not indigenous; Naturalised; Invasive
Onagraceae	*Oenothera tetraptera*	Cav.		Not indigenous; Naturalised; Invasive
Orchidaceae	*Habenaria falcicornis subsp. caffra*	(Burch. ex Lindl.) Bolus	LC	Indigenous
Orchidaceae	*Eulophia ovalis var. ovalis*	Lindl.	LC	Indigenous
Orobanchaceae	*Alectra orobanchoides*	Benth.	LC	Indigenous
Orobanchaceae	*Striga elegans*	Benth.	LC	Indigenous
Orobanchaceae	*Cycnium tubulosum subsp. tubulosum*	(L.f.) Engl.	LC	Indigenous
Orobanchaceae	*Striga bilabiata subsp. bilabiata*	(Thunb.) Kuntze	LC	Indigenous
Oxalidaceae	*Oxalis obliquifolia*	Steud. ex A.Rich.	LC	Indigenous
Oxalidaceae	*Oxalis corniculata*	L.		Not indigenous; Naturalised; Invasive
Papaveraceae	*Papaver aculeatum*	Thunb.	LC	Indigenous
Peraceae	*Clutia natalensis*	Bernh.	LC	Indigenous
Phrymaceae	*Mimulus gracilis*	R.Br.	LC	Indigenous
Phytolaccaceae	*Phytolacca heptandra*	Retz.	LC	Indigenous
Pinaceae	*Pinus halepensis*	Mill.		Not indigenous; Naturalised; Invasive
Plantaginaceae	*Plantago lanceolata*	L.	LC	Indigenous
Plantaginaceae	*Veronica anagallis-aquatica*	L.	LC	Indigenous
Poaceae	*Imperata cylindrica*	(L.) P.Beauv.		Indigenous
Poaceae	*Aristida junciformis subsp. junciformis*	Trin. & Rupr.	LC	Indigenous
Poaceae	*Paspalum distichum*	L.	LC	Not indigenous; Naturalised; Invasive
Poaceae	*Setaria incrassata*	(Hochst.) Hack.	LC	Indigenous
Poaceae	*Setaria italica*	(L.) P.Beauv.	NE	Not indigenous; Naturalised
Poaceae	*Panicum volutans*	J.G.Anderson	LC	Indigenous; Endemic
Poaceae	*Panicum schinzii*	Hack.	LC	Indigenous

Poaceae	*Hyparrhenia sp.*			
Poaceae	*Hyparrhenia hirta*	(L.) Stapf	LC	Indigenous
Poaceae	*Themeda triandra*	Forssk.	LC	Indigenous
Poaceae	*Eragrostis capensis*	(Thunb.) Trin.	LC	Indigenous
Poaceae	*Eragrostis racemosa*	(Thunb.) Steud.	LC	Indigenous
Poaceae	*Brachiaria eruciformis*	(Sm.) Griseb.	LC	Indigenous
Poaceae	*Polypogon viridis*	(Gouan) Breistr.	NE	Not indigenous; Naturalised
Poaceae	*Brachiaria advena*	Vickery	NE	Not indigenous; Naturalised
Poaceae	*Koeleria capensis*	(Steud.) Nees	LC	Indigenous
Poaceae	*Stipagrostis zeyheri subsp. sericans*	(Nees) De Winter	LC	Indigenous
Poaceae	*Harpochloa falx*	(L.f.) Kuntze	LC	Indigenous
Poaceae	*Tragus berteronianus*	Schult.	LC	Indigenous
Poaceae	*Cynodon dactylon*	(L.) Pers.	LC	Indigenous
Poaceae	*Brachiaria serrata*	(Thunb.) Stapf	LC	Indigenous
Poaceae	*Sporobolus africanus*	(Poir.) Robyns & Tournay	LC	Indigenous
Poaceae	*Digitaria ternata*	(A.Rich.) Stapf	LC	Indigenous
Poaceae	*Cymbopogon pospischilii*	(K.Schum.) C.E.Hubb.	NE	Indigenous
Poaceae	*Aristida congesta subsp. congesta*	Roem. & Schult.	LC	Indigenous
Poaceae	*Eragrostis curvula*	(Schrad.) Nees	LC	Indigenous
Poaceae	*Aristida diffusa subsp. burkei*	Trin.	LC	Indigenous
Poaceae	*Eragrostis planiculmis*	Nees	LC	Indigenous
Poaceae	*Alloteropsis semialata subsp. semialata*	(R.Br.) Hitchc.	LC	Indigenous
Poaceae	*Leersia hexandra*	Sw.	LC	Indigenous
Poaceae	*Cymbopogon caesius*	(Hook. & Arn.) Stapf	LC	Indigenous
Poaceae	*Catalepis gracilis*	Stapf & Stent	LC	Indigenous
Poaceae	*Setaria sphacelata var. sphacelata*	(Schumach.) Stapf & C.E.Hubb. ex M.B.Moss	LC	Indigenous
Poaceae	*Andropogon appendiculatus*	Nees	LC	Indigenous
Poaceae	*Eleusine coracana subsp. africana*	(L.) Gaertn.	LC	Indigenous
Poaceae	*Heteropogon contortus*	(L.) Roem. & Schult.	LC	Indigenous
Poaceae	*Eragrostis chloromelas*	Steud.	LC	Indigenous
Poaceae	*Phalaris canariensis*	L.	NE	Not indigenous; Naturalised
Poaceae	*Aristida bipartita*	(Nees) Trin. & Rupr.	LC	Indigenous
Poaceae	*Elionurus muticus*	(Spreng.) Kunth	LC	Indigenous
Poaceae	*Eragrostis micrantha*	Hack.	LC	Indigenous
Poaceae	*Eragrostis plana*	Nees	LC	Indigenous
Poaceae	*Setaria sphacelata var. sericea*	(Schumach.) Stapf & C.E.Hubb. ex M.B.Moss	LC	Indigenous
Poaceae	*Chloris virgata*	Sw.	LC	Indigenous

Poaceae	*Digitaria eriantha*	Steud.	LC	Indigenous
Poaceae	*Eragrostis cilianensis*	(All.) Vignolo ex Janch.	LC	Indigenous
Poaceae	*Setaria sp.*			
Poaceae	*Trachypogon spicatus*	(L.f.) Kuntze	LC	Indigenous
Poaceae	*Setaria nigrirostris*	(Nees) T.Durand & Schinz	LC	Indigenous
Polygalaceae	*Polygala gracilenta*	Burtt Davy	LC	Indigenous
Polygonaceae	*Persicaria lapathifolia*	(L.) Delarbre		Not indigenous; Naturalised; Invasive
Polygonaceae	*Rumex acetosella subsp. angiocarpus*	L.		Not indigenous; Naturalised
Polygonaceae	*Polygonum aviculare*	L.		Not indigenous; Naturalised
Polygonaceae	*Persicaria madagascariensis*	(Meisn.) S.Ortiz & Paiva		Indigenous
Polygonaceae	*Fagopyrum esculentum*	Moench		Not indigenous; Naturalised
Polygonaceae	*Rumex crispus*	L.		Not indigenous; Naturalised; Invasive
Polygonaceae	*Persicaria hystricula*	(J.Schust.) Sojak	LC	Indigenous
Polygonaceae	*Rumex lanceolatus*	Thunb.	LC	Indigenous
Polygonaceae	*Persicaria amphibia*	(L.) Delarbre	LC	Not indigenous; Naturalised
Polygonaceae	*Fallopia convolvulus*	(L.) Holub		Not indigenous; Naturalised
Portulacaceae	*Portulaca oleracea*	L.		Not indigenous; Naturalised
Pteridaceae	*Pellaea calomelanos var. calomelanos*	(Sw.) Link	LC	Indigenous
Pteridaceae	*Cheilanthes hirta var. hirta*	Sw.	LC	Indigenous
Ranunculaceae	*Ranunculus trichophyllus*	Chaix	LC	Indigenous
Ranunculaceae	*Ranunculus dregei*	J.C.Manning & Goldblatt	LC	Indigenous
Ranunculaceae	*Ranunculus multifidus*	Forssk.	LC	Indigenous
Rhamnaceae	*Ziziphus mucronata subsp. mucronata*	Willd.	LC	Indigenous
Rosaceae	*Agrimonia procera*	Wallr.	LC	Not indigenous; Naturalised; Invasive
Rubiaceae	*Anthospermum rigidum subsp. pumilum*	Eckl. & Zeyh.	LC	Indigenous
Rubiaceae	*Anthospermum rigidum subsp. rigidum*	Eckl. & Zeyh.	LC	Indigenous
Rubiaceae	*Galium capense subsp. capense*	Thunb.	LC	Indigenous
Salviniaceae	*Azolla filiculoides*	Lam.	NE	Not indigenous; Naturalised; Invasive
Santalaceae	*Thesium lesliei*	N.E.Br.	LC	Indigenous
Scrophulariaceae	*Chaenostoma patrioticum*	(Hiern) Kornhall	LC	Indigenous
Scrophulariaceae	*Diclis rotundifolia*	(Hiern) Hilliard & B.L.Burtt	LC	Indigenous
Scrophulariaceae	*Diclis reptans*	Benth.	LC	Indigenous
Scrophulariaceae	*Nemesia umbonata*	(Hiern) Hilliard & B.L.Burtt	LC	Indigenous
Scrophulariaceae	*Jamesbrittenia montana*	(Diels) Hilliard	LC	Indigenous
Scrophulariaceae	*Nemesia sp.*			

Scrophulariaceae	*Manulea paniculata*	Benth.	LC	Indigenous
Scrophulariaceae	*Jamesbrittenia stricta*	(Benth.) Hilliard	LC	Indigenous
Scrophulariaceae	*Jamesbrittenia sp.*			
Scrophulariaceae	*Gomphostigma virgatum*	(L.f.) Baill.	LC	Indigenous
Scrophulariaceae	*Jamesbrittenia aurantiaca*	(Burch.) Hilliard	LC	Indigenous
Scrophulariaceae	*Hebenstretia rehmannii*	Rolfe	LC	Indigenous; Endemic
Scrophulariaceae	*Manulea rhodantha subsp. aurantiaca*	Hilliard	LC	Indigenous; Endemic
Scrophulariaceae	*Selago cucullata*	Hilliard	LC	Indigenous
Scrophulariaceae	*Selago densiflora*	Rolfe	LC	Indigenous
Selaginellaceae	*Selaginella caffrorum var. caffrorum*	(Milde) Hieron.	LC	Indigenous
Solanaceae	*Solanum lichtensteinii*	Willd.	LC	Indigenous
Solanaceae	*Solanum capense*	L.	LC	Indigenous
Solanaceae	*Withania somnifera*	(L.) Dunal	LC	Indigenous
Solanaceae	*Solanum retroflexum*	Dunal	LC	Indigenous
Solanaceae	*Physalis viscosa*	L.		Not indigenous; Naturalised; Invasive
Solanaceae	*Physalis angulata*	L.		Not indigenous; Naturalised; Invasive
Solanaceae	*Datura stramonium*	L.		Not indigenous; Naturalised; Invasive
Solanaceae	*Solanum campylacanthum*	Hochst. ex A.Rich.		Indigenous
Thymelaeaceae	*Lasiosiphon capitatus*	(L.f.) Burtt Davy	LC	Indigenous
Thymelaeaceae	*Gnidia gymnostachya*	(C.A.Mey.) Gilg	LC	Indigenous
Thymelaeaceae	*Lasiosiphon burchellii*	Meisn.	LC	Indigenous
Typhaceae	*Typha capensis*	(Rohrb.) N.E.Br.	LC	Indigenous
Verbenaceae	*Lantana rugosa*	Thunb.	LC	Indigenous
Verbenaceae	*Verbena rigida*	Spreng.		Not indigenous; Naturalised; Invasive
Verbenaceae	*Verbena brasiliensis*	Vell.		Not indigenous; Naturalised; Invasive
Zygophyllaceae	*Tribulus terrestris*	L.	LC	Indigenous

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

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Amietia delalandii	Delalande's River Frog	LC	LC
Amietia fuscigula	Common River Frog	LC	LC
Amietia poyntoni	Poynton's River Frog	LC	LC
Cacosternum boettgeri	Common Caco	LC	LC
Cacosternum nanum nanum	Bronze Caco	LC	LC
Hyperolius marmoratus	Painted Reed Frog	LC	LC
Kassina senegalensis	Bubbling Kassina	LC	LC
Phrynobatrachus natalensis	Snoring Puddle Frog	LC	LC
Poyntonophrynus vertebralis	Southern Pygmy Toad	LC	LC
Ptychadena porosissima	Striped Grass Frog	LC	LC
Pyxicephalus adspersus	Giant Bullfrog	NT	LC
Schismaderma carens	African Red Toad	LC	LC
Sclerophrys capensis	Raucous Toad	LC	LC
Sclerophrys gutturalis	Guttural Toad	LC	LC
Sclerophrys pusilla	Flatbacked Toad	LC	LC
Semnodactylus wealii	Rattling Frog	LC	LC
Strongylopus fasciatus	Striped Stream Frog	LC	LC
Strongylopus grayii	Clicking Stream Frog	LC	LC
Tomopterna cryptotis	Tremelo Sand Frog	LC	LC
Tomopterna natalensis	Natal Sand Frog	LC	LC
Tomopterna tandyi	Tandy's Sand Frog	LC	LC
Xenopus laevis	Common Platanna	LC	LC

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

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Acontias gracilicauda	Thin-tailed Legless Skink	LC	LC
Afroedura nivaria	Drankensberg Flat Gecko	LC	LC
Afrotyphlops bibronii	Bibron's Blind Snake	LC	LC
Agama aculeata distanti	Eastern Ground Agama	LC	LC
Agama atra	Southern Rock Agama	LC	LC
Amplorhinus multimaculatus	Many-spotted Snake	LC	LC
Aparallactus capensis	Black-headed Centipede-eater	LC	LC
Bitis arietans arietans	Puff Adder	LC	Unlisted
Boaedon capensis	Brown House Snake	LC	LC
Bradypodion ventrale	Eastern Cape Dwarf Chameleon	LC	LC
Causus rhombeatus	Rhombic Night Adder	LC	LC
Chamaeleo dilepis	Common Flap-neck Chameleon	LC	LC
Chamaesaura aenea	Coppery Grass Lizard	NT	NT
Cordylus vittifer	Common Girdled Lizard	LC	LC
Crocodylus niloticus	Nile Crocodile	VU	LC
Crotaphopeltis hotamboeia	Red-lipped Snake	LC	Unlisted
Dasypeltis scabra	Rhombic Egg-eater	LC	LC
Duberria lutrix	Common Slug-eater	LC	LC
Gerrhosaurus flavigularis	Yellow-throated Plated Lizard	LC	Unlisted
Hemachatus haemachatus	Rinkhals	LC	LC
Homoroselaps lacteus	Spotted Harlequin Snake	LC	LC
Lamprophis aurora	Aurora House Snake	LC	LC
Lamprophis guttatus	Spotted Rock Snake	LC	LC
Leptotyphlops scutifrons	Peters' Thread Snake	LC	Unlisted
Lycodonomorphus inornatus	Olive House Snake	LC	LC
Lycodonomorphus rufulus	Brown Water Snake	LC	Unlisted
Lycophidion capense capense	Cape Wolf Snake	LC	Unlisted
Lygodactylus ocellatus	Spotted Dwarf Gecko	LC	LC
Naja mossambica	Mozambique Spitting Cobra	LC	Unlisted
Pachydactylus affinis	Transvaal Gecko	LC	LC
Pachydactylus capensis	Cape Gecko	LC	Unlisted
Pachydactylus vansoni	VAN Son's Gecko	LC	LC
Prosymna ambigua	Angolan Shovel-snout	Unlisted	LC
Psammophis brevirostris	Short-snouted Grass Snake	LC	Unlisted
Psammophis crucifer	Cross-marked Grass Snake	LC	LC
Psammophylax rhombeatus	Spotted Grass Snake	LC	Unlisted

Psammophylax tritaeniatus	Striped Grass Snake	LC	LC
Pseudaspis cana	Mole Snake	LC	Unlisted
Pseudocordylus melanotus melanotus	Common Crag Lizard	LC	LC
Smaug giganteus	Giant Dragon Lizard	VU	VU
Trachylepis capensis	Cape Skink	LC	Unlisted
Trachylepis punctatissima	Speckled Rock Skink	LC	LC
Trachylepis varia	Variable Skink	LC	LC
Varanus niloticus	Water Monitor	LC	Unlisted

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

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Aethomys ineptus	Tete Veld Rat	LC	LC
Aethomys namaquensis	Namaqua rock rat	LC	LC
Amblysomus septentrionalis	Highveld Golden Mole	NT	NT
Aonyx capensis	Cape Clawless Otter	NT	NT
Atelerix frontalis	South Africa Hedgehog	NT	LC
Atilax paludinosus	Water Mongoose	LC	LC
Canis mesomelas	Black-backed Jackal	LC	LC
Caracal caracal	Caracal	LC	LC
Crocidura cyanea	Reddish-grey Musk Shrew	LC	LC
Crocidura maquassiensis	Makwassie musk shrew	VU	LC
Cryptomys hottentotus	Common Mole-rat	LC	LC
Cynictis penicillata	Yellow Mongoose	LC	LC
Dasymys incomtus	African Marsh rat	NT	LC
Dendromus melanotis	Grey Climbing Mouse	LC	LC
Eidolon helvum	African Straw-colored Fruit Bat	LC	NT
Elephantulus myurus	Eastern 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
Herpestes sanguineus	Slender Mongoose	LC	LC
Hydrictis maculicollis	Spotted-necked Otter	VU	NT
Hystrix africaeaustralis	Cape Porcupine	LC	LC
Ichneumia albicauda	White-tailed Mongoose	LC	LC
Ictonyx striatus	Striped Polecat	LC	LC
Kerivoula lanosa	Lesser Woolly Bat	LC	LC
Leptailurus serval	Serval	NT	LC
Lepus saxatilis	Scrub Hare	LC	LC
Lepus victoriae	African Savanna Hare	LC	LC
Mastomys coucha	Multimammate Mouse	LC	LC
Mastomys natalensis	Natal Multimammate Mouse	LC	LC
Mellivora capensis	Honey Badger	LC	LC
Mungos mungo	Banded Mongoose	LC	LC
Mus musculus	House Mouse	Unlisted	LC

Myotis welwitschii	Welwitsch's Hairy Bat	LC	LC
Mystromys albicaudatus	White-tailed Rat	VU	EN
Neoromicia capensis	Cape Serotine Bat	LC	LC
Neoromicia zuluensis	Aloe Bat	LC	LC
Nycteris thebaica	Egyptian Slit-faced Bat	LC	LC
Orycteropus afer	Aardvark	LC	LC
Otomys angoniensis	Angoni Vlei Rat	LC	LC
Otomys irroratus	Vlei Rat (Fynbos type)	LC	LC
Ourebia ourebi	Oribi	EN	LC
Panthera pardus	Leopard	VU	VU
Papio ursinus	Chacma Baboon	LC	LC
Parahyaena brunnea	Brown Hyaena	NT	NT
Pedetes capensis	Springhare	LC	LC
Pelea capreolus	Grey Rhebok	NT	NT
Poecilogale albinucha	African Striped Weasel	NT	LC
Procavia capensis	Rock Hyrax	LC	LC
Pronolagus saundersiae	Natal Red Rock Rabbit	LC	LC
Proteles cristata	Aardwolf	LC	LC
Raphicerus campestris	Steenbok	LC	LC
Rattus rattus	House Rat	Exotic (Not listed)	LC
Redunca fulvorufula	Mountain Reedbuck	EN	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
Scotophilus dinganii	Yellow House Bat	LC	LC
Steatomys krebsii	Krebs's Fat Mouse	LC	LC
Steatomys pratensis	Fat Mouse	LC	LC
Suncus varilla	Lesser Dwarf Shrew	LC	LC
Suricata suricatta	Suricate	LC	LC
Sylvicapra grimmia	Common Duiker	LC	LC
Tadarida aegyptiaca	Egyptian Free-tailed Bat	LC	LC
Taphozous mauritianus	Mauritian Tomb Bat	LC	LC
Thryonomys swinderianus	Greater Cane Rat	LC	LC
Vulpes chama	Cape Fox	LC	LC

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

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Acridotheres tristis	Myna, Common	Unlisted	LC
Acrocephalus arundinaceus	Reed-warbler, Great	Unlisted	LC
Acrocephalus baeticatus	Reed-warbler, African	Unlisted	Unlisted
Acrocephalus gracilirostris	Swamp-warbler, Lesser	Unlisted	LC
Acrocephalus palustris	Warbler, Marsh	Unlisted	LC
Acrocephalus schoenobaenus	Warbler, Sedge	Unlisted	LC
Actitis hypoleucos	Sandpiper, Common	Unlisted	LC
Alopochen aegyptiaca	Goose, Egyptian	LC	LC
Amadina erythrocephala	Finch, Red-headed	Unlisted	LC
Amandava subflava	Waxbill, Orange-breasted	Unlisted	Unlisted
Anas capensis	Teal, Cape	Unlisted	LC
Anas erythrorhyncha	Teal, Red-billed	Unlisted	LC
Anas platyrhynchos	Duck, Mallard	Unlisted	LC
Anas sparsa	Duck, African Black	Unlisted	LC
Anas undulata	Duck, Yellow-billed	Unlisted	LC
Anastomus lamelligerus	Openbill, African	Unlisted	LC
Anhinga rufa	Darter, African	Unlisted	LC
Anomalospiza imberbis	Finch, Cuckoo	Unlisted	LC
Anser anser	Goose, Domestic	Unlisted	LC
Anthus cinnamomeus	Pipit, African	Unlisted	LC
Anthus leucophrys	Pipit, Plain-backed	Unlisted	LC
Apus affinis	Swift, Little	Unlisted	LC
Apus apus	Swift, Common	Unlisted	LC
Apus caffer	Swift, White-rumped	Unlisted	LC
Ardea alba	Egret, Great	Unlisted	LC
Ardea cinerea	Heron, Grey	Unlisted	LC
Ardea goliath	Heron, Goliath	Unlisted	LC
Ardea intermedia	Egret, Yellow-billed (Intermediate)	Unlisted	LC
Ardea melanocephala	Heron, Black-headed	Unlisted	LC
Ardea purpurea	Heron, Purple	Unlisted	LC
Ardeola ralloides	Heron, Squacco	Unlisted	LC
Asio capensis	Owl, Marsh	Unlisted	LC
Bostrychia hagedash	Ibis, Hadeda	Unlisted	LC
Bradypterus baboecala	Rush-warbler, Little	Unlisted	LC
Bubo africanus	Eagle-owl, Spotted	Unlisted	LC
Bubulcus ibis	Egret, Cattle	Unlisted	LC

Burhinus capensis	Thick-knee, Spotted	Unlisted	LC
Buteo buteo	Buzzard, Common (Steppe)	Unlisted	LC
Buteo rufofuscus	Buzzard, Jackal	Unlisted	LC
Calandrella cinerea	Lark, Red-capped	Unlisted	LC
Calidris ferruginea	Sandpiper, Curlew	LC	NT
Calidris minuta	Stint, Little	LC	LC
Calidris pugnax	Ruff	Unlisted	LC
Cecropis cucullata	Swallow, Greater Striped	Unlisted	LC
Ceryle rudis	Kingfisher, Pied	Unlisted	LC
Charadrius pecuarius	Plover, Kittlitz's	Unlisted	LC
Charadrius tricollaris	Plover, Three-banded	Unlisted	LC
Chersomanes albofasciata	Lark, Spike-heeled	Unlisted	LC
Chlidonias hybrida	Tern, Whiskered	Unlisted	LC
Chlidonias leucopterus	Tern, White-winged	Unlisted	LC
Chroicocephalus cirrocephalus	Gull, Grey-headed	Unlisted	LC
Chrysococcyx caprius	Cuckoo, Diderick	Unlisted	LC
Ciconia ciconia	Stork, White	Unlisted	LC
Circus macrourus	Harrier, Pallid	NT	NT
Circus pygargus	Montagu's Harrier	Unlisted	LC
Circus ranivorus	Marsh-harrier, African	EN	LC
Cisticola aridulus	Cisticola, Desert	Unlisted	LC
Cisticola ayresii	Cisticola, Wing-snapping	Unlisted	LC
Cisticola cinnamomeus	Cisticola, Pale-crowned	Unlisted	LC
Cisticola juncidis	Cisticola, Zitting	Unlisted	LC
Cisticola textrix	Cisticola, Cloud	Unlisted	LC
Cisticola tinniens	Cisticola, Levaillant's	Unlisted	LC
Colius striatus	Mousebird, Speckled	Unlisted	LC
Columba guinea	Pigeon, Speckled	Unlisted	LC
Columba livia	Dove, Rock	Unlisted	LC
Coracias garrulus	Roller, European	NT	LC
Corvus albus	Crow, Pied	Unlisted	LC
Corvus capensis	Crow, Cape	Unlisted	LC
Corythornis cristatus	Kingfisher, Malachite	Unlisted	Unlisted
Cossypha caffra	Robin-chat, Cape	Unlisted	LC
Coturnix coturnix	Quail, Common	Unlisted	LC
Creatophora cinerea	Starling, Wattled	Unlisted	LC
Crithagra atrogularis	Canary, Black-throated	Unlisted	LC
Crithagra flaviventris	Canary, Yellow	Unlisted	LC
Crithagra mozambica	Canary, Yellow-fronted	Unlisted	LC

Cuculus solitarius	Cuckoo, Red-chested	Unlisted	LC
Cypsiurus parvus	Palm-swift, African	Unlisted	LC
Delichon urbicum	House-martin, Common	Unlisted	LC
Dendrocygna bicolor	Duck, Fulvous	Unlisted	LC
Dendrocygna viduata	Duck, White-faced Whistling	Unlisted	LC
Egretta ardesiaca	Heron, Black	Unlisted	LC
Egretta garzetta	Egret, Little	Unlisted	LC
Elanus caeruleus	Kite, Black-shouldered	Unlisted	LC
Emberiza tahapisi	Bunting, Cinnamon-breasted	Unlisted	LC
Estrilda astrild	Waxbill, Common	Unlisted	LC
Euplectes afer	Bishop, Yellow-crowned	Unlisted	LC
Euplectes albonotatus	Widowbird, White-winged	Unlisted	LC
Euplectes axillaris	Widowbird, Fan-tailed	Unlisted	LC
Euplectes orix	Bishop, Southern Red	Unlisted	LC
Euplectes progne	Widowbird, Long-tailed	Unlisted	LC
Eupodotis caerulescens	Korhaan, Blue	LC	NT
Falco amurensis	Falcon, Amur	Unlisted	LC
Falco biarmicus	Falcon, Lanner	VU	LC
Falco rupicoloides	Kestrel, Greater	Unlisted	LC
Falco rupicolus	Kestrel, Rock	Unlisted	LC
Falco vespertinus	Falcon, Red-footed	NT	NT
Fulica cristata	Coot, Red-knobbed	Unlisted	LC
Gallinago nigripennis	Snipe, African	Unlisted	LC
Gallinula chloropus	Moorhen, Common	Unlisted	LC
Glareola nordmanni	Pratincole, Black-winged	NT	NT
Grus paradisea	Crane, Blue	NT	VU
Haliaeetus vocifer	Fish-eagle, African	Unlisted	LC
Himantopus himantopus	Stilt, Black-winged	Unlisted	LC
Hirundo albigularis	Swallow, White-throated	Unlisted	LC
Hirundo rustica	Swallow, Barn	Unlisted	LC
Hydroprogne caspia	Tern, Caspian	VU	LC
Ixobrychus minutus	Bittern, Little	Unlisted	LC
Jynx ruficollis	Wryneck, Red-throated	Unlisted	LC
Lamprotornis bicolor	Starling, Pied	Unlisted	LC
Lamprotornis nitens	Starling, Cape Glossy	Unlisted	LC
Lanius collaris	Fiscal, Common (Southern)	Unlisted	LC
Lanius collurio	Shrike, Red-backed	Unlisted	LC
Lanius minor	Shrike, Lesser Grey	Unlisted	LC
Lophaetus occipitalis	Eagle, Long-crested	Unlisted	LC

Lybius torquatus	Barbet, Black-collared	Unlisted	LC
Macronyx capensis	Longclaw, Cape	Unlisted	LC
Megaceryle maxima	Kingfisher, Giant	Unlisted	Unlisted
Melaenornis silens	Flycatcher, Fiscal	Unlisted	LC
Microcarbo africanus	Cormorant, Reed	Unlisted	LC
Milvus aegyptius	Kite, Yellow-billed	Unlisted	Unlisted
Mirafra africana	Lark, Rufous-naped	Unlisted	LC
Monticola explorator	Rock-thrush, Sentinel	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
Netta erythrophthalma	Pochard, Southern	Unlisted	LC
Numida meleagris	Guineafowl, Helmeted	Unlisted	LC
Nycticorax nycticorax	Night-Heron, Black-crowned	Unlisted	LC
Oena capensis	Dove, Namaqua	Unlisted	LC
Oenanthe pileata	Wheatear, Capped	Unlisted	LC
Oriolus larvatus	Oriole, Black-headed	Unlisted	LC
Ortygospiza atricollis	Quailfinch, African	Unlisted	LC
Oxyura maccoa	Duck, Maccoa	NT	NT
Passer diffusus	Sparrow, Southern Grey-headed	Unlisted	LC
Passer domesticus	Sparrow, House	Unlisted	LC
Passer melanurus	Sparrow, Cape	Unlisted	LC
Petrochelidon spilodera	Cliff-swallow, South African	Unlisted	LC
Phalacrocorax lucidus	Cormorant, White-breasted	Unlisted	LC
Phoeniconaias minor	Flamingo, Lesser	NT	NT
Phoenicopterus roseus	Flamingo, Greater	NT	LC
Phoeniculus purpureus	Wood-hoopoe, Green	Unlisted	LC
Phylloscopus trochilus	Warbler, Willow	Unlisted	LC
Platalea alba	Spoonbill, African	Unlisted	LC
Plectropterus gambensis	Goose, Spur-winged	Unlisted	LC
Plegadis falcinellus	Ibis, Glossy	Unlisted	LC
Plocepasser mahali	Sparrow-weaver, White-browed	Unlisted	LC
Ploceus capensis	Weaver, Cape	Unlisted	LC
Ploceus cucullatus	Weaver, Village	Unlisted	LC
Ploceus velatus	Masked-weaver, Southern	Unlisted	LC
Podiceps cristatus	Grebe, Great Crested	Unlisted	LC
Porphyrio madagascariensis	Swamphen, African Purple	Unlisted	Unlisted
Prinia flavicans	Prinia, Black-chested	Unlisted	LC

Prinia subflava	Prinia, Tawny-flanked	Unlisted	LC
Psittacula krameri	Parakeet, Rose-ringed	Unlisted	LC
Pternistis swainsonii	Spurfowl, Swainson's	Unlisted	LC
Ptyonoprogne fuligula	Martin, Rock	LC	LC
Pycnonotus tricolor	Bulbul, Dark-capped	Unlisted	Unlisted
Quelea quelea	Quelea, Red-billed	Unlisted	LC
Recurvirostra avosetta	Avocet, Pied	Unlisted	LC
Riparia cincta	Martin, Banded	Unlisted	LC
Riparia paludicola	Martin, Brown-throated	Unlisted	LC
Rostratula benghalensis	Painted-snipe, Greater	NT	LC
Sagittarius serpentarius	Secretarybird	VU	VU
Sarkidiornis melanotos	Duck, Comb	Unlisted	LC
Saxicola torquatus	Stonechat, African	Unlisted	LC
Scleroptila afra	Francolin, Grey-winged	Unlisted	LC
Scleroptila gutturalis	Francolin, Orange River	Unlisted	LC
Scleroptila levaillantii	Francolin, Red-winged	Unlisted	LC
Scopus umbretta	Hamerkop	Unlisted	LC
Serinus canicollis	Canary, Cape	Unlisted	LC
Spatula hottentota	Teal, Hottentot	Unlisted	LC
Spatula smithii	Shoveler, Cape	LC	LC
Spilopelia senegalensis	Dove, Laughing	Unlisted	LC
Spizocorys conirostris	Lark, Pink-billed	Unlisted	LC
Streptopelia capicola	Turtle-dove, Cape	Unlisted	LC
Streptopelia semitorquata	Dove, Red-eyed	Unlisted	LC
Struthio camelus	Ostrich, Common	Unlisted	LC
Tachybaptus ruficollis	Grebe, Little	Unlisted	LC
Tadorna cana	Shelduck, South African	Unlisted	LC
Telophorus zeylonus	Bokmakierie, Bokmakierie	Unlisted	LC
Thalassornis leuconotus	Duck, White-backed	Unlisted	LC
Threskiornis aethiopicus	Ibis, African Sacred	Unlisted	LC
Trachyphonus vaillantii	Barbet, Crested	Unlisted	LC
Tringa glareola	Sandpiper, Wood	Unlisted	LC
Tringa nebularia	Greenshank, Common	Unlisted	LC
Tringa stagnatilis	Sandpiper, Marsh	Unlisted	LC
Turdus litsitsirupa	Thrush, Groundscraper	Unlisted	Unlisted
Turdus smithi	Thrush, Karoo	Unlisted	LC
Tyto alba	Owl, Barn	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
Vanellus senegallus	Lapwing, African Wattled	Unlisted	LC
Vidua macroura	Whydah, Pin-tailed	Unlisted	LC
Zosterops virens	White-eye, Cape	Unlisted	LC

10.6 Appendix F – Summary of Savanna Environmental Impact Assessment methods

The assessment of the impact considers the following:

- the nature of the impact, which shall include a description of what causes the effect, what will be affected, and how it will be affected;
- the extent of the impact, indicating whether the impact will be local or regional;
- the duration of the impact, very short-term duration (0-1 year), short-term duration (2-5 years), medium-term (5-15 years), long-term (> 15 years) or permanent;
- the probability of the impact, describing the likelihood of the impact actually occurring, indicated as improbable, probable, highly probable or definite;
- the severity/beneficial scale indicating whether the impact will be very severe/beneficial (a permanent change which cannot be mitigated/permanent and significant benefit with no real alternative to achieving this benefit), severe/beneficial (long-term impact that could be mitigated/long-term benefit), moderately severe/beneficial (medium- to long-term impact that could be mitigated/ medium- to long-term benefit), slight, or have no effect;
- the significance which shall be determined through a synthesis of the characteristics described above and can be assessed as low medium or high;
- the status which will be described as either positive, negative or neutral;
- the degree to which the impact can be reversed;
- the degree to which the impact may cause irreplaceable loss of resources; and
- the degree to which the impact can be mitigated.

Extent of impact	**Description**	**Rating**
Site specific	Very low (1)	1
Footprint & surrounding areas	Low (2)	2
Local area	Moderate (3)	3
Regional	High (4)	4
Entire habitat unit / Entire system	Very high (5)	5
Duration of impact	**Description**	**Rating**
The lifetime of the impact will be of a very short duration (0–1 years)	Very short term (1)	1

The lifetime of the impact will be of a short duration (2-5 years)	Short term (2)	2
Medium term (5–15 years)	Moderate term (3)	3
Long term (> 15 years)	Long term (4)	4
Permanent	Permanent (5)	5
Consequence/Magnitude of impact	**Description**	**Rating**
Small and will have no effect on the environment	None (0)	0
Minor and will not result in an impact on processes	MIinor (2)	2
Low and will cause a slight impact on processes	Low (4)	4
Moderate and will result in processes continuing but in a modified way	Moderate (6)	6
High (processes are altered to the extent that they temporarily cease	High (8)	8
Very high and results in complete destruction of patterns and permanent cessation of processes	Very high (10)	10
Probability of impact	**Description**	**Rating**
Very improbable (probably will not happen)	Very improbable (1)	1
Improbable (some possibility, but low likelihood)	Improbable (2)	2
Probable (distinct possibility)	Probable (3)	3
Highly probable (most likely)	Highly probable (4)	4
Definite (impact will occur regardless of any prevention measures)	Definite (5)	5
Status	**Description**	**Rating**
Positive	Positive	Positive
Negative	Negative	Negative
Neutral	Neutral	Neutral
Reversability	**Description**	**Rating**
None	None	None
Low	Low	Low
Moderate	Moderate	Moderate
High	High	High
Irreplaceable loss of resources?	**Description**	**Rating**
Yes	Yes	Yes
No	No	No
Can impacts be mitigated?	**Description**	**Rating**
Yes	Yes	Yes
No	No	No
Significance	**Description**	**Rating**
< 30 points	Low	Low
30-60 points	Medium	Medium
> 60 points	High	High