TERRESTRIAL BIODIVERSITY COMPLIANCE STATEMENT FOR THE PROPOSED MOGOBE ELECTRICAL GRID INFRASTRUCTURE, NORTHERN CAPE PROVINCE

Prepared for:

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Details of Company

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Authors

Tarryn Martin (Botanical Specialist) (*Pri. Sci. Nat* 008745)

Tarryn has over ten years of experience working as a botanist, nine of which are in the environmental sector. She has worked as a specialist and project manager on projects within South Africa, Mozambique, Lesotho, Zambia, Tanzania, Cameroon, Swaziland and Malawi. The majority of these projects required lender finance and consequently met both in-country and lender requirements.

Tarryn has extensive experience writing botanical impact assessments, critical habitat assessments, biodiversity management plans, biodiversity monitoring plans and Environmental Impact Assessments to International Standards, especially to those of the International Finance Corporation (IFC). Her experience includes working on large mining projects such as the Kenmare Heavy Minerals Mine, where she monitored forest health, undertook botanical impact assessments for their expansion projects and designed biodiversity management and monitoring plans. She has also project managed Environmental Impact Assessments for graphite mines in northern Mozambique and has a good understanding of the Mozambique Environmental legislation and processes.

Tarryn holds a BSc (Botany and Zoology), a BSc (Hons) in African Vertebrate Biodiversity and an MSc with distinction in Botany from Rhodes University. Tarryn's Master's thesis examined the impact of fire on the recovery of C3 and C4 Panicoid and non-Panicoid grasses within the context of climate change for which she won the Junior Captain Scott-Medal (Plant Science) for producing the top MSc of 2010 from the South African Academy of Science and Art as well as an Award for Outstanding Academic Achievement in Range and Forage Science from the Grassland Society of Southern Africa.
Tarryn is a professional member of the South African Council for Natural Scientific Professionals (since 2014).

Amber Jackson (Faunal Specialist) (*Cand. Nat. Sci)*

Amber has over ten years' experience in environmental consulting and has managed projects across various sectors including mining, agriculture, forestry, renewable energy, housing, coastal and wetland recreational infrastructure. Most of these projects required lender finance and therefore met both in-country, lender and sector specific requirements.

Amber completed the IFC lead and Swiss funded programme in Environmental and Social Risk Management course in 2018. The purpose of the course was to upskill Sub-Saharan African environmental consultants to increase the uptake of E&S standards by Financial Institutions.

Amber specialises in terrestrial vertebrate faunal assessments. She has conducted large scale faunal impact assessments that are to international lender's standards in Mozambique, Tanzania, Lesotho and Malawi. In South Africa her faunal impact assessments comply with the protocols for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity and follows the SANBI Species Environmental Assessment Guideline. Her specialist input goes beyond impact assessments and includes faunal opportunities and constraints assessments, Critical Habitat Assessments, Biodiversity related Management Plans and Biodiversity Monitoring Programmes.

Amber holds a BSc (Zoology and Ecology, Environment & Conservation) and BSc (Hons) in Ecology, Environment & Conservation from WITS University and an MPhil in Environmental Management from University of Cape Town. Amber's honours focused on the landscape effects on Herpetofauna in Kruger National Park and her Master's thesis focused on the management of social and natural aspects of environmental systems with a dissertation in food security that investigated the complex food system of informal and formal distribution markets.

Declaration of Independence

Tarryn Martin (Botanical Specialist)

- I, Tarryn Martin, declare that, in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Amended Environmental Impact Assessment Regulations, 2017;
- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this report are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Amber Jackson (Faunal Specialist)

- I, Amber Jackson, declare that, in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Amended Environmental Impact Assessment Regulations, 2017;
- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
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- All the particulars furnished by me in this report are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Non-Technical Summary

Introduction

Mogobe EGI (Pty) Ltd ('the Applicant') is proposing the construction of up to 132 kV Electrical Grid Infrastructure (EGI) to support the Mogobe BESS project located on Portion 1 of the Farm Legoko 460, south east of the town of Kathu within the Gamagara Local Municipality in the Northern Cape Province. The EGI will traverse Portion 1 of the Farm Legoko 460 and Farm Sekgame 461. The site is accessible via the existing farm access from the N14.

The Mogobe EGI will comprise of the following:

- A 132 kV double circuit monopole and/or lattice tower overhead power line, approximately 9.0 km in length and 30 m in height to connect to the existing Eskom Ferrum Substation located within an approved corridor of approximately 200 m wide. The power line will be constructed within an approximately 31 m wide servitude.
- A service road of approximately 4 m wide below the power line.
- An on-site switching station, with an estimated footprint of 1.0 ha and up to 5 m in height, at the Mogobe BESS facility. This refers specifically to Eskom's section of the on-site substation, planned to be at 132 kV, which will be transferred from the IPP to Eskom. Lightning masts of up to 21 m will be installed within the substation yard.
- Associated electrical infrastructure at the Eskom Ferrum Substation. This will include, but not limited to, a new feeder bay which comprises of the extension to the existing platform and busbars of the 132 kV yard inside Eskom Ferrum Substation.

Methodology

A desktop assessment was undertaken prior to the site visit to determine whether there are any terrestrial biodiversity features within the project area that are considered sensitive. This was followed by field survey undertaken during late summer (6 March 2024) to confirm the site sensitivity of the project area.

Since the site sensitivity verification report determined that the project area was located within an area of mostly low to very low Site Ecological Importance (EGI), a compliance statement was sufficient for this project area.

Results

The project area occurs within Kathu Bushveld which is listed as Least Concern with 98% of its remaining extent intact. The field survey identified three plant communities within this vegetation type, namely, Tarchonanthus Veld, *Vachellia erioloba* Bushveld and Secondary Vegetation. Tarchonanthus Veld and *Vachellia erioloba* Bushveld were determined to have a low SEI in the context of this project while Secondary Vegetation was found to have a very low SEI.

No threatened (Critically Endangered, Endangered or Vulnerable) or Near Threatened plant species were recorded within the project area. However, one protected tree species (*Vachellia erioloba*) with a conservation status of least concern (LC), was confirmed to occur within the project area and one

protected species (*Boophone disticha*), also with a conservation status of LC, has a high likelihood of occurrence within the project area. Both species will require permits for their removal and/or destruction.

Two faunal species, Temminick's Pangolin and Littledale's Whistling Rat, have a high likelihood of occurrence within the project area. The SEI associated with each of these species' habitat was assessed and was found to be low.

Based on the low to very low SEI, impacts from project activities on the terrestrial biodiversity, fauna and flora will be low to negligible. Management guidelines indicate that for areas with a low and very low SEI, development of medium to high impacts are acceptable and mitigation measures may not be required.

Recommendations

Recommended management actions that include mitigation measures to further reduce the impact of the project on the terrestrial biodiversity environment have been outlined in chapter 8. These recommendations must be included in the Environmental Management Plan and as a condition of authorisation.

Conclusion

Given that the project area has a low to very low SEI, the specialists are of the opinion that the development can proceed, provided the recommendations contained in this report are implemented.

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Glossary of Terms

Alien Invasive Species refers to an exotic species that can spread rapidly and displace native species causing damage to the environment

Biodiversity is the term that is used to describe the variety of life on Earth and is defined as "*the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems*" (Secretariat of the Convention on Biological Diversity, 2005).

Habitat Fragmentation occurs when large expanses of habitat are transformed into smaller patches of discontinuous habitat units isolated from each other by transformed habitats such as farmland.

Natural Habitat refers to habitats composed of viable assemblages of plant and/or animal species of largely native origin and/or where human activity has not essentially modified an area's primary ecological function and species composition.

Project Area is defined as the area that will be directly impacted by project infrastructure such as the roads, solar panels and offices.

Project area of influence (PAOI) refers to the broader area around the project area that may be indirectly impacted by project activities.

Protected Area is a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values *(IUCN Definition 2008).*

Sensitive Species are species that are sensitive to illegal harvesting. As such, their names are obscured and listed as "Sensitive species #". As per the best practice guideline that accompanies the protocol and screening tool, the name of the sensitive species may not appear in any BAR or EIA report, nor any specialist reports released into the public domain.

Species of Conservation Concern (SCC) includes all species that are assessed according the IUCN Red List Criteria as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Data Deficient (DD) or Near Threatened (NT), as well as range-restricted species which are not declining and are nationally listed as Rare or Extremely Rare [also referred to in some Red Lists as Critically Rare] (SANBI, 2021).

Acronyms

ADU	Animal Demography Unit
BESS	Battery Energy Storage System
CBA	Critical Biodiversity Area
CI	Conservation Importance
CR	Critically Endangered
DFFE	Department of Forestry, Fisheries and Environment
EA	Environmental Authorisation
EGI	Electrical Grid Infrastructure
EIA	Environmental Impact Assessment
EN	Endangered
EOO	Extent of Occupancy
FI	Functional Integrity
GIS	Geographical Information System
GN	Government Notice
IUCN	International Union for Conservation of Nature
LC	Least Concern
NEM:BA	National Environmental Management: Biodiversity Act
NT	Near Threatened
PAOI	Project Area of Influence
PNCO	Provincial Nature Conservation Ordinance
POSA	Plants of Southern Africa
QDS	Quarter Degree Square
RR	Receptor Resilience
SA	South Africa
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SEF	Solar Energy Facility
SEI	Site Ecological Importance
TOPS	Threatened and Protected Species
VU	Vulnerable

Specialist Check List

The contents of this specialist report complies with the legislated requirements as described in the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity, Plant and Animal Species (GN R. 320 of March 2020 and GN R1150 of 30 October 2020).

SPECIALIST REPORT REQUIREMENTS ACCORDING TO GN 1150			SECTION OF REPORT
5.1	The Terrestrial **Animal Species** Compliance Statement must contain, as a minimum, the following information:		
	5.3.1	Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Page 2 & 3; Appendix 1 & 2
	5.3.2	A signed statement of independence by the specialist;	Page 5
	5.3.3	A statement of the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 1.4 and 2.3
	5.3.4	A description of the methodology used to undertake the site sensitivity verification and impact assessment and site inspection, including equipment and modelling used, where relevant;	Chapter 2
	5.3.5	The mean density of observations/ number of samples sites per unit area	Section 2.3 and Figure 2.1
	5.3.6	Where required, proposed impact management actions and outcomes or any monitoring requirements for inclusion in the EMPr;	Chapter 8
	5.3.7	A description of the assumptions made and any uncertainties or gapsin knowledge or data; and	Section 1.4
	5.3.8	Any conditions to which the compliance statement is subjected.	Chapter 8 and 9
3.2	A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.		

SPECIALIST REPORT REQUIREMENTS ACCORDING TO GN R. 320			SECTION OF REPORT
5.3	The **Plant Species** Compliance Statement must contain, as a minimum, the following information:		
	5.3.1	Contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the compliance statement including a curriculum vitae;	Page 2 & 3; Appendix 1 & 2
	5.3.2	A signed statement of independence by the specialist;	Page 4
	5.3.3	A statement of the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 1.4 and 2.3
	5.3.4	A description of the methodology used to undertake the site survey and prepare the compliance statement, including equipment and modelling used where relevant;	Chapter 2
	5.3.5	Where required, proposed impact management actions and outcomes or any monitoring requirements for inclusion in the EMPr;	Chapter 8
	5.3.6	A description of the assumptions made and any uncertainties or gaps in knowledge or data;	Section 1.4
	5.3.7	The mean density of observations/ number of samples sites per unit area; and	Section 2.3

	5.3.8	Any conditions to which the compliance statement is subjected.	Chapter 8 and 9
	A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.		

SPECIALIST REPORT REQUIREMENTS ACCORDING TO GN R. 320			SECTION OF REPORT
4.1	The **Terrestrial Biodiversity** Compliance Statement must contain, as a minimum, the following information:		
	4.3.1	Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Page 2 & 3; Appendix 1 & 2
	4.3.2	A signed statement of independence by the specialist;	Page 5
	4.3.3	A statement of the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 1.4 and 2.3
	4.3.4	A baseline profile description of biodiversity and ecosystems of the site;	Chapter 6
	4.3.5	A methodology used to verify the sensitivities of the terrestrial biodiversity features on the site, including equipment and modelling used, where relevant;	Chapter 2
	4.3.6	In the case of a linear activity, confirmation from the terrestrial biodiversity specialist that, in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase;	Section 6.2
	4.3.7	Where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr;	Chapter 8
	4.3.8	A description of the assumptions made and any uncertainties or gaps in knowledge or data; and	Section 1.4
	4.3.9	Any conditions to which this statement is subjected.	Chapter 8 and 9
4.4	A signed copy of the compliance statement must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.		

1. INTRODUCTION

1.1. Project Description

Mogobe EGI (Pty) Ltd ('the Applicant') is proposing the construction of up to 132 kV Electrical Grid Infrastructure (EGI) to support the Mogobe Battery Energy Storage System (BESS) project located on Portion 1 of the Farm Legoko 460, south east of the town of Kathu within the Gamagara Local Municipality in the Northern Cape Province (Figure 1.1). The EGI will traverse Portion 1 of the Farm Legoko 460 and Farm Sekgame 461. The site is accessible via the existing farm access from the N14.

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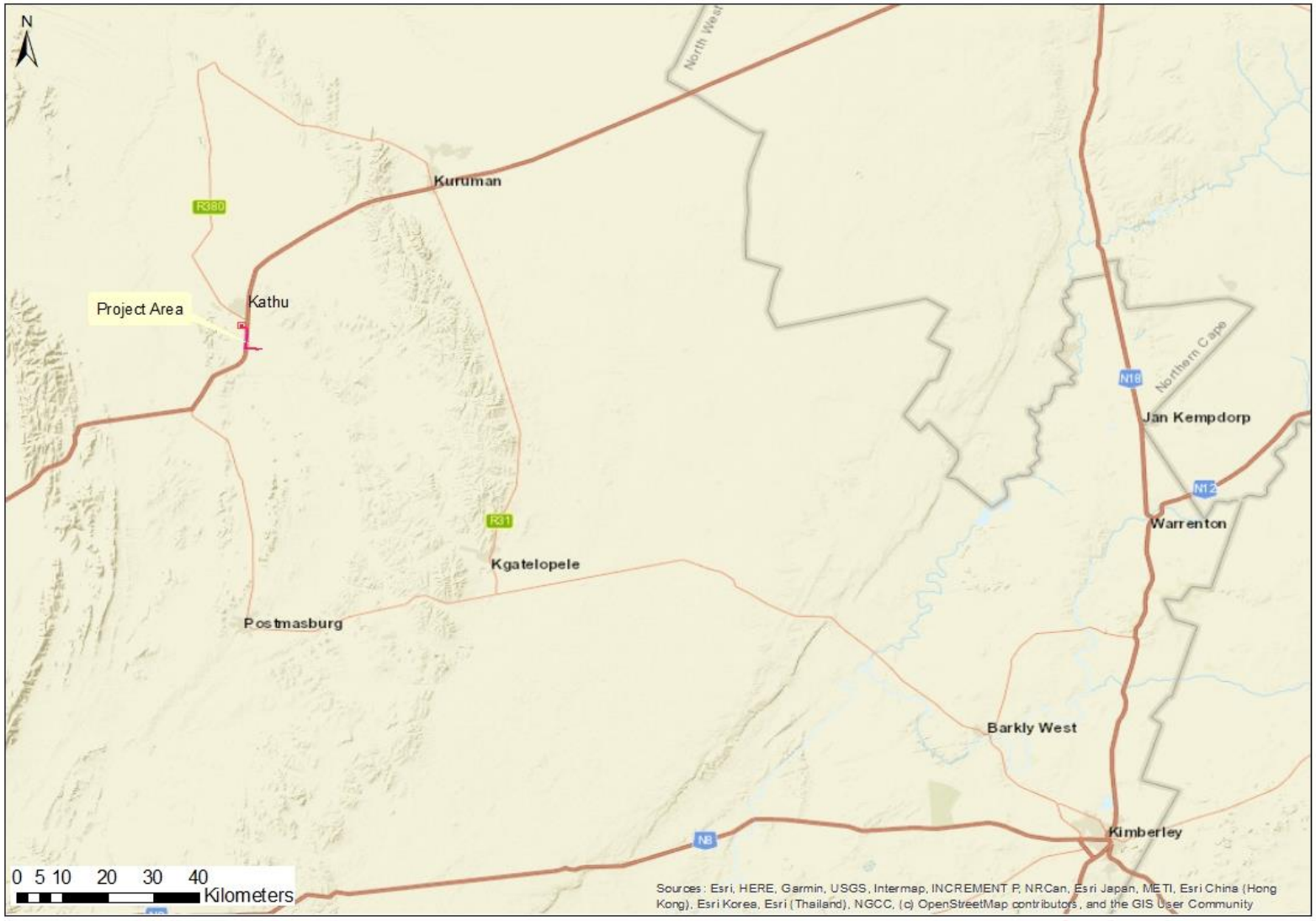


Figure 1.1: Location of the project area in relation to Kroonstad

1.2. Reporting Requirements

In terms of the Protocol for the Specialist Assessment and Minimum Reporting Content Requirements for Environmental Impacts on Terrestrial Biodiversity (GN R. 320 of 2020) and Terrestrial Animal and Plant Species (GN R. 1150), prior to the commencement of a specialist assessment, the current use of the land and the potential environmental sensitivity of the site under consideration as identified by the screening tool, must be confirmed by undertaking a site sensitivity verification. The results of the screening tool, together with the site sensitivity verification, ultimately determines the minimum report content requirements. Where the information gathered from the site sensitivity verification differs from the screening tool designation of 'very high' or 'high' and is found to be of a 'low' sensitivity, then a Compliance Statement must be submitted. However, if the site sensitivity verification confirms the findings of the Screening Report generated for this site, then a full Terrestrial Biodiversity Impact Assessment must be submitted as part of the Application for Environmental Authorisation (EA).

According to the Site Sensitivity Verification Report undertaken for this project, the Animal Species Theme was found to be low, the Plant Species Theme was found to be low and the Terrestrial Biodiversity Theme was found to be low. According to the Species Environmental Assessment Guideline (SANBI, 2020), the SEI evaluated for each taxon/receptor should be combined into a single multi-taxon/receptor evaluation of SEI for the project area to allow the component authority to evaluate the SEI for the entire project area rapidly and at a single glance. As such, the highest overall SEI rating has been applied to each habitat type assessed in terms of the faunal and botanical sensitivity, which in this instance is low. Given the low SEI for the project area and because no CBAs and ESAs will be affected by project infrastructure, a compliance statement has been undertaken for the project.

1.3. Scope, Purpose and Objectives

In accordance with GN R 1150, this report serves as the Terrestrial Biodiversity Impact Assessment, including terrestrial biodiversity, animals (excluding birds, bats and invertebrates), and plants and was prepared as part of the Scoping and Environmental Impact Assessment (S&EIA) for the proposed Mogobe EGI, Northern Cape Province.

The purpose of this report is to confirm the vegetation types, faunal habitat, and Species of Conservation Concern (SCC) present within the project area, assess the Site Ecological Importance (SEI) of the project area, assess the impact of the development on the terrestrial biological features present and, where feasible, provide mitigation measures to reduce the impacts including identifying no-go areas.

Based on the above, the objectives and Terms of Reference for the Terrestrial Ecological Impact Assessment are as follows:

- Undertake a desktop assessment of the site to determine its sensitivity and identify SCC (plants, amphibians, reptiles, mammals) that could be present within the project area.
- Undertake a field survey, to record the following information:

    - Species present
    - Identification of species that are either protected (TOPS and PNCO) or considered threatened (CR, EN, VU) on the South African Red Data List
    - Assess the level of degradation/ecological status of the site (i.e. intact, near natural, transformed).
- Assess the SEI of the project area using the sensitivity analysis outlined in the Species Environmental Assessment Guideline (SANBI, 2020).
- For areas of moderate and high sensitivity, assess the impact that the construction of the project infrastructure will have on the vegetation, faunal habitat, ecological processes and SCC.
- Where necessary, provide mitigation measures to reduce the significance of the impacts associated with the proposed development on the terrestrial biodiversity features of the project area.
- Provide a specialist statement/opinion regarding the acceptability of the proposed development in terms of the terrestrial biodiversity of the project area

1.4. Limitations and Assumptions

This report is based on current available information and, as a result, the following limitations and assumptions are implicit:

- SCC are difficult to find and may be difficult to identify, thus species described in this report do not comprise an exhaustive list. It is almost certain that additional SCCs are present. However, every effort was made to identify SCC present in the project area during the field survey. Furthermore, a desktop assessment to identify SCC that could occur within the project area was undertaken and the likelihood of occurrence, based on observed habitat availability, was determined. The field survey and desktop assessment provided sufficient information to confirm the presence/absence of SCC.
- Sampling was carried out at one stage in the annual or seasonal cycle. The survey was conducted in late summer (6 March 2024) towards the end of the flowering season. Although some early flowering species may have gone undetected, sufficient information was collected to provide comment on the likelihood of occurrence of SCC. Furthermore, the assessment was supplemented with a previous study undertaken for the BESS by Simon Todd in 2015 (3Foxes, 2015).
- This assessment includes plants, mammals (excluding bats), amphibians and reptiles. It does not include birds, bats or invertebrates. Birds have been assessed separately by specialists within this field.
- The faunal assessment is based on a field survey to assess available habitat present within the project area, coupled with a desktop assessment to determine the likelihood of occurrence of SCC.
- The assessment has been undertaken to meet the Protocol for the Specialist Assessment and Minimum Report Requirements for Environmental Impacts on Terrestrial Biodiversity (2020) and the Species Environmental Assessment Guidelines (2021).

2. METHODOLOGY

2.1. DFFE Screening Report

The DFFE screening report identifies environmental sensitivities for the project area. This is based on available desktop data and requires that a suitably qualified specialist verify the findings. Of relevance to this report is the animal species theme, plant species theme, and the terrestrial biodiversity theme (Table 2.1). Comment has been provided in the table below indicating how these themes have been assessed.

Table 2.1: Summary of DFFE screening report themes relevant to this study.

Theme	Sensitivity	Assessment
Animal Species Theme (Figure 2.1)	Medium • Possible presence of two sensitive bird species	The animal species theme has been categorised as medium due to the possible presence of two sensitive bird species. Birds are assessed separately by an avifaunal specialist. The faunal assessment also identifies amphibians, reptiles and mammals that could occur within the project area and provides comment on the likelihood of occurrence of SCC (Refer to Chapter 4).
Plant Species Theme (Figure 2.2)	Low • Unlikely presence of sensitive plant species	A desktop assessment that includes records from both Plants of Southern Africa (POSA) and iNaturalist databases was undertaken in conjunction with a field survey. For SCC that might occur within the project area, the likelihood of occurrence has been assessed based on distribution records and available habitat on site (Refer to Chapter 5).
Terrestrial Biodiversity Theme (Figure 2.3)	Very High • Ecological Support Area	The assessment provides comment on the impact of project activities on the ESA.

2.2. Desktop Assessment

2.2.1. Animal Species Theme

The known diversity of the vertebrate fauna (excluding birds and bats) in the project area was determined by a literature review. Species known from the region, or from adjacent regions, whose preferred habitat(s) were known to occur within the study area, were also included. Literature sources included:

- The DFFE screening report for the site (April 2024).
- Amphibians –Du Preez & Carruthers (2017), FrogMap (ADU, 2024).
- Reptiles – Branch (1998), ReptileMap (ADU, 2024).
- Mammals – Stuart & Stuart (2014), MammalMap (ADU, 2024).
- IUCN.
- iNaturalist.

To establish which of those species identified in the literature review are SCC, the following sources were consulted:

- Atlas and Red List of Reptiles of South Africa, Lesotho and Swaziland (Bates *et al*., 2014).
- Atlas and Red List of Frogs of South Africa, Lesotho and Swaziland (Minter *et al*., 2004).
- Red List of Mammals of South Africa, Swaziland and Lesotho (Child, *et al.*, 2016).

2.2.2. Plant Species Theme

A species list was compiled for the site and the likelihood of occurrence assessed for species listed as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) and Near Threatened (NT). Key resources consulted include:

- The Plants of Southern Africa (POSA) database (2024).
- iNaturalist (2024).
- The DFFE screening report for the site (April 2024).

Species threat status was checked against the South African Red Data List.

2.2.3. Terrestrial Biodiversity Theme

A desktop assessment was undertaken prior to the site visit to determine whether there are any terrestrial biodiversity features within the site that are considered sensitive. The vegetation types present within the site and, where applicable, key features driving the CBA status of the site were identified and confirmed during the field survey. Key resources consulted include:

- The DFFE screening report for the site (April 2024).
- The South African Vegetation Map (Mucina and Rutherford, 2018).
- Northern Cape Critical Biodiversity Area (2016).
- The International Union for the Conservation of Nature (IUCN) Red List of Ecosystems for South Africa (SANBI, 2021).

- National Biodiversity Management: Biodiversity Act (NEM:BA) List of Threatened or Protected Species.
- The National Biodiversity Assessment (SANBI, 2018).

2.3. Field Survey

A field survey was undertaken in late summer (6 March 2024) to confirm the current land use, vegetation types and faunal habitat present. The information gathered from the site visit was sufficient to determine the sensitivity of the site. Figure 2.1 indicates the sample sites and tracks of the specialist.

2.3.1. Terrestrial Biodiversity and Plant Species Theme

The purpose of the botanical survey was to assess the site-specific botanical state of the Project Area of Influence (PAOI) by recording the species present (both indigenous and alien invasive species), identifying sensitive plant communities such as vegetation associated with rocky outcrops, riparian areas or areas with species of conservation concern, and identifying the current land use.

The project area was driven and walked, and sample plots were analysed by determining the dominant species in each plot, as well as any alien invasive species and potential SCC occurring within the plots (Figure 2.1). Each sample plot was sampled until no new species were recorded. Vegetation communities were then described according to the dominant species recorded from each type, and these were mapped and assigned a sensitivity score.

2.3.2. Animal Species Theme

The purpose of the faunal survey was to determine the types of faunal habitats present within the project area supplemented with a desktop assessment to determine the likelihood of occurrence of SCC present within available habitat. Faunal habitat within the project area was recorded and mapped by the faunal specialist which provided sufficient information to draw conclusions on the likelihood of occurrence of SCC.

2.4. Site Sensitivity Assessment

The Species Environmental Assessment Guideline (SANBI, 2021) was applied to assess the Site Ecological Importance (SEI) of the project area. The habitats and the SCC in the project area were assessed based on their conservation importance, functional integrity and receptor resilience (Table 2.2). The combination of these resulted in a rating of SEI and interpretation of mitigation requirements based on the ratings.

The sensitivity map was developed using available spatial planning tools as well as by applying the SEI sensitivity based on the field survey.

Table 2.2: Criteria for establishing Site Ecological Importance and description of criteria.

Criteria	Description
Conservation Importance (CI)	*The importance of a site for supporting biodiversity features of conservation concern present e.g. populations of Threatened and Near-Threatened species (CR, EN, VU & NT), Rare, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes.*
Functional Integrity (FI)	*A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts.*
Biodiversity Importance (BI) is a function of Conservation Importance (CI) and the Functional Integrity (FI) of a receptor.	
Receptor Resilience (RR)	*The intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention.*
Site Ecological Importance (SEI) is a function of Biodiversity Importance (BI) and Receptor Resilience (RR)	

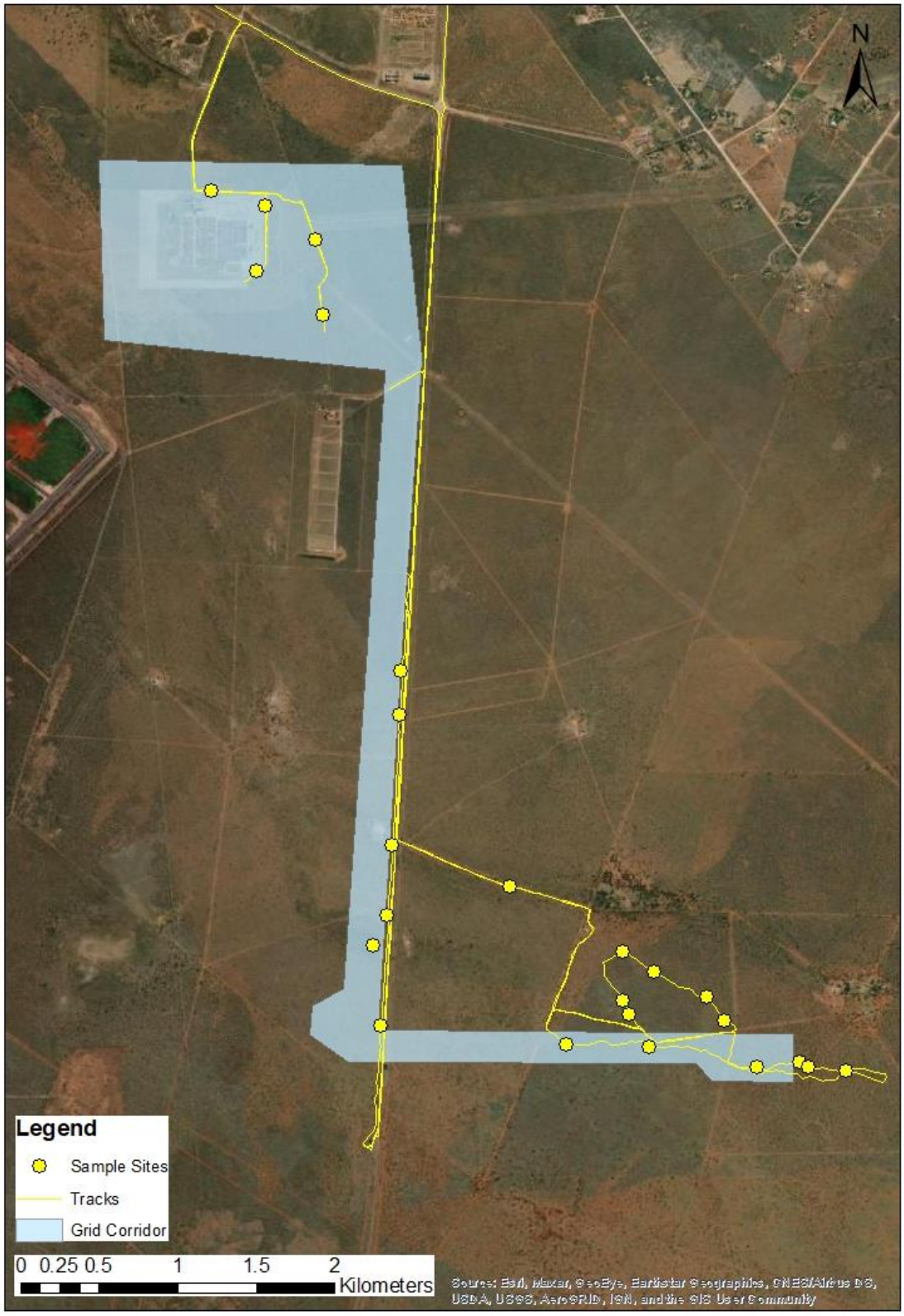


Figure 2.1: Map showing sample sites and tracks in relation to the project area.

3. BIOPHYSICAL DESCRIPTION OF THE PROJECT AREA

3.1. Environmental Factors Influencing the Vegetation Types and Habitats of the Project Area

The project area occurs within the Savanna Biome. The Savanna Biome of South Africa and Swaziland constitutes the southernmost extent of the most widespread biome in Africa. In South Africa, it is estimated to cover 32.8% of the total land surface area (399 600 km^2) with the largest portion of the biome occurring in the north of the country and extending down the eastern seaboard interior and valleys where is transitions into Albany Thicket in the Eastern Cape (Mucina *et al*., 2011).

Savanna is characterised by two layers: a herbaceous layer dominated by grasses and a discontinuous, sometimes sparse, upper woody layer of trees. Grasses are typically C_4-type which is advantageous in hotter areas, but where winter rainfall occurs C_3-type grasses dominate. Tree canopy height ranges from 1-20 m but it is more typically around 3-7 m. The density and height of the woody layer determines the 'type' of Savanna. 'Savanna grasslands' may grade into 'tree savanna', 'shrub savanna', 'savanna woodland' or 'savanna parkland'. This structure has an important influence on the animals that occur – for example, the presence of various browsers is determined by the tree height which in turn influences the predators present within a particular area. Dense woody vegetation provides shade and protection from predators or scavengers and in areas such as the southwestern Kalahari, the sparse woody component provides cover for hunting for species such as leopards (Mucina *et al*., 2011).

SANBI (2021) has subdivided the Savanna Biome into eight (8) ecosystem groups, including Kalahari Duneveld, Kalahari Bushveld, Central Plains Bushveld, Mopane Bushveld, Arid Lowveld Bushveld, Moist Sour Lowveld Bushveld, Subescarpment Savanna and Inland Aquatic Ecosystems. Within each ecosystem group is a number of different vegetation types. The project area falls within the Kalahari Bushveld ecosystem group.

The Kalahari Bushveld is characterised by open tree savanna and palatable (sweet) grasses which support animal production throughout the year. The distribution, structure and species composition of this ecosystem group and its associated vegetation types is determined by a complex set of environmental factors, also termed 'ecological drivers', including climate (rainfall and temperature), soils, grazing and browsing, and fire. These are discussed below.

3.1.1. Climate

Climate, specifically rainfall, is the main driver in the Kalahari Bushveld. Annual rainfall varies significantly but typically ranges from ~300 mm per annum in the drier west to ~550 mm per annum in the moister east with regular extreme droughts. Average annual temperatures are around 18°C but cool towards the east of the group where they drop below 18°C.

The climate of the project area is influenced by the local steppe-climate and classified as 'BSh' (hot semi-arid) in terms of the Köppen-Geiger climate classification. The summers are hot and wet while

the winters are dry and cool. The average annual temperature is 18.8°C and the average annual rainfall received is 374 mm. Temperatures peak in the summer months (December, January, February) with the hottest temperatures recorded in January (average of 25°C). Temperatures drop notably during the winter months, with the coldest temperatures recorded in July (average of 10.5°C). July is also the driest month of the year with an average of 4 mm of rain and the wettest month is January with an average of 75 mm of rain (Climate-data.org).

3.1.2. Soils

Lithologies and derived soil types, particularly soil depth and rockiness, clay content, drainage regime and the variability of nutrients influences the distribution of vegetation types within the Savanna Biome. Clay soils typically favour grass growth while sandy soils favour tree growth.).

Kalahari Bushveld typically occurs on plains covered with deep aeolian sand. According to SOTER (2008) the soils within the project area are classified as calcic solonchaks. Solonchaks are soils that are characterised by a high concentration of soluble salts. The term 'calcic' refers to solonchaks with a horizon characterised by a concentration of secondary carbonates between 50 and 100 cm from the soil surface (ISRIC, n.d).

3.1.3. Fire

Although fire is an important ecological driver within the Savanna Biome, due to the low vegetation cover and low fuel loads, fire is uncommon in the Kalahari Bushveld Ecosystem. However, under very hot conditions after a high rainfall season, higher grass cover and fuel loads increase the fire hazard. According to SANBI (2021), applying fire as a management tool is not common practice in Kalahari Bushveld especially if the grass is grazed. Incorrect seasonality and frequency and intensity of burning could have negative impacts on the structure and composition of Kalahari Bushveld vegetation.

3.1.4. Grazing

Historically (before human settlement), herds of large indigenous game would have migrated across these landscapes in search of grazing. Natural grazing maintained and enhanced biodiversity (SANBI, 2021). However, with human settlement came the erection of fences, the establishment of permanent water bodies and subsequent overgrazing which can have severe negative ecological consequences.

Grazing by domestic livestock and browsing by game could either help to maintain biodiversity or decrease it depending on the management strategies applied. Kalahari Bushveld is characterised by palatable (sweet) grasses however, due to the low and unpredictable rainfall, the grazing capacity and stocking rates are typically low (SANBI, 2021).

Overgrazing is one of the greatest pressures affecting the Kalahari Bushveld. It can lead to a reduction in the grass cover and species present, bush encroachment (thickening), and soil erosion.

3.1.5. Increasing CO_2

Another ecological driver worth mentioning is the effect of higher CO_2 levels associated with global warming. Increasing CO_2 levels are aggravating bush encroachment. It is difficult to mitigate this impact, but some recommendations include maintaining ecological corridors and ecotones and identifying climate refugia to increase the resilience of these ecosystems.

It is important that ecological drivers are considered during the design and planning of a project as any land-use changes that affects ecological drivers within remaining natural areas will have implications for biodiversity and the ecosystems services derived from it.

4. ANIMAL SPECIES THEME

4.1. Faunal Habitat Present

Habitats are defined in this study as the natural environment or place where faunal species *live, breed and/or forage*. Each habitat type has different environmental conditions and structure which influences a species' distribution range.

The habitat in the PAOI is primarily bushveld of varying degrees of density and habitat diversity within the project area is typically low and comprised of Secondary Vegetation, buildings associated with the substation, Tarchonanthus Veld and *Vachellia erioloba* Thornveld (refer to section 6.2 for a description). There was no evidence of rocky outcrops or wetlands and pans within the footprint of the project area.

4.2. Amphibians

The project area intersects with the distribution range of twelve amphibian species, of which four species have been recorded in the Quarter Degree Squares (2723CA and 2723CC) within which the project area occurs, and a further two were recorded in the general area (IUCN, 2024; iNaturalist, 2024; FitzPatrick, 2024). A previous study undertaken by 3Foxes (2015) recorded two amphibian species which include the Eastern Olive Toad (*Amietophrynus garmani)* and Bushveld Rain Frog (*Breviceps adspersus).*

All amphibian species with a distribution range that intersects the project area are classified as Least Concern (LC). Amphibian species are likely to occur within the project area but are not likely to solely rely on it.

4.3. Reptiles

The project area intersects with the distribution range of fifty seven reptile species of which twelve species have been recorded in the QDS (2723CA and 2723CC) within which the project area occurs, and a further eight were recorded in the general area (IUCN, 2024; iNaturalist, 2024; FitzPatrick, 2024). A previous study undertaken by 3Foxes (2015) recorded ten reptile species in the PAOI. These are Cape Cobra (*Naja nivea*), Ground Agama (*Agama aculeata*), Spotted Sand Lizard (*Pedioplanis lineoocellata*), Variable Skink (*Trachylepis varia*), Bibron's Blind Snake (*Afrotyphlops bibronii*), Western Rock Skink (*Mabuya sulcata sulcata*), Cape Gecko (*Lygodactylus capensis capensis*), Speckled Rock Skink (*Trachylepis punctatissima*), Striped Skaapsteker (*Psammophylax tritaeniatus*) and Boomslang (*Dispholidus typus typus).*

All reptile species with a distribution range that intersects the project area are classified as Least Concern (LC). Reptile species are likely to occur within the project area but are not likely to solely rely on it.

4.4. Mammals

The project area intersects with the distribution of seventy-one mammal species of which twenty-three have been recorded with the QDS (2723CA and 2723CC) within which the project area occurs (FitzPatrick, 2024). A previous study undertaken by 3Foxes (2015) recorded twenty species within the PAOI. These included Aardvark (*Orycteropus afer)*, Cape Porcupine (*Hystrix africaeaustralis)*, Springhare (*Pedetes capensis)*, South African Ground Squirrel (*Xerus inauris)*, Vervet Monkey (*Chlorocebus pygerythrus)*, Small-spotted Genet (*Genetta genetta)*, Yellow Mongoose (*Cynictis penicillate)*, Slender Mongoose (*Herpestes sanguineus)*, Black-Backed Jackal (*Canis mesomelas)*, Steenbok (*Raphicerus campestris)*, Duiker, Springbok (*Antidorcas marsupialis)*, Gemsbok (*Oryx gazella)* and Kudu (*Tragelaphus strepsiceros)* as well as small mammals trapped in the area which include Desert Pygmy Mouse (*Mus indutus)*, Multimammate Mouse (*Mastomys coucha*), Bushveld Gerbil (*Tatera leucogaster*), Pouched Mouse (*Saccostomus campestris*) and Grey Climbing Mouse *(Dendromus melanotis)*.

Of the seventy-one species that have a distribution range that overlaps with the project area, one is listed as Critically Endangered (CR), three as Vulnerable and seven as Near Threatened. However, species such as Rhinocerus and Sensitive Species 5 are unlikely to occur outside of protected areas such as game reserves and national parks, and as such these species have been excluded from the likelihood of occurrence assessment in Table 4.2 below.

Only two species, Temminick's Pangolin (*Smutsia temminckii*) and Littledale's Whistling Rat (*Parotomys littledalei*), have a high likelihood of occurrence within the project area. The other SCC have a medium to low likelihood of occurrence mostly due to the project area occurring adjacent to a busy national road and mining area.

Table 4.1: Mammal Species of Conservation Concern and their likelihood of occurrence within the study area.

*CR – Critical; EN -Endangered; VU – Vulnerable; NT -Near Threatened

Name	Threat Status		Habitat	Known Occurrence	Likelihood of Occurrence
	National (SA red list, 2016)	TOPS			
Temminick's Pangolin *Smutsia temminckii*	VU		This species has a widespread distribution from south-eastern Chad, through South Sudan, much of East Africa and southern Africa. South Africa is estimated to have 16,329–24,102 mature individuals (Pietersen *et al*. 2016) but abundances in other regions of Africa are unknown. The population is decreasing due to ongoing exploitation of this species for traditional medicine and bushmeat, with future population reduction estimated at 30–40% over a 45-year period. This species inhabits savannas and woodlands in low-lying regions, in areas with moderate to dense scrub, provided there is sufficient prey (ants and termites) as well as dens or above-ground debris in which to shelter.	There are multiple records of this species within close proximity of the project area (iNaturalist, 2024).	**High** Suitable habitat is present and there are records of this species close to the project area.
Littledale's Whistling Rat *Parotomys littledalei*	NT		This species distribution is associated with the driest parts of southern Africa. In South Africa, it occurs in the Karoo regions. This species is dependent on ground cover, avoiding open areas, and therefore prefers shrublands. It is unknown how tolerant this species is of modified habitats although it has been recorded within rangelands. This species is herbivorous, feeding on plant material that includes annuals, succulent perennials, non-succulent perennials and grasses. It depends on green foliage, such as plant leaves and succulents, for food and doesn't switch to seeds.	No records of this species within 100km of the project area (iNaturalist, 2024).	**High** There is suitable habitat present for this species.
African Striped Weasel *Poecilogale albinucha*	NT		This species has a wide habitat tolerance including fynbos, lowland rainforest, semi-desert grassland, pine plantations and agricultural fields but is mainly found in savanna. Although this species has a wide range, it is not abundant and occurs at low densities. Given its high metabolic rate, it can only exist in habitat where there are sufficient numbers of prey.	There are no records of this species within 80km of the project area (iNat, 2024).	**Medium** This species could occur within the project area based on available habitat being present however, given the lack

Name	Threat Status		Habitat	Known Occurrence	Likelihood of Occurrence
	National (SA red list, 2016)	TOPS			
			Not many records exist for this species in the Northern Cape and as such the status of this species in this province is unclear. (Child, *et al*., 2016; Stuart, Stuart & Do Linh San, 2015).		of records in the Northern Cape it is assessed as being moderate rather than high.
Black-footed Cat *Felis nigripes*	VU	Protected	The Black-footed cat is typically a solitary, ground dweller that is crepuscular[1] and nocturnal (Sliwa *et al.,* 2016). During the day it makes use of dens, preferring hollowed termite mounds when available but also making use of burrows dug by other animals (e.g., Springhares, Ground Squirrels and Aardvark). It hunts small rodents and ground-dwelling birds found in short, open grasslands and is found in dry, open grasslands, savannah and karoo semi-desert. The estimated EOO is 930,000 km^2 and individual home ranges for males have been recorded to be approximately 16-20km^2 and for females were 9-10km^2 (Wilson *et al.* in Child *et al.,* 2016).	One record of this species from July 2023 approximately 150km south of the project area (iNat, 2024).	**Medium** Although there is suitable habitat present, the project area occurs along a busy national road (N14) most of which is within degraded habitat. If present, this species is likely to traverse the area but is unlikely to use it for breeding and foraging.
Southern African Hedgehog *Atelerix frontalis*	NT	Protected	The species occurs throughout Gauteng, Free State, North West, Northern Cape, western Limpopo and Mpumalanga provinces and southwards to the Eastern Cape. They marginally occur along the northern boundary with Free State and Mpumalanga provinces. This species inhabits savannah, grassland and Northern Upper Karoo vegetation types even suburban gardens. • Grassland vegetation types include the Soweto Highveld, Eastern Highveld, Rand Highveld,	No records of this species within 100km of the project area (iNaturalist, 2024).	**Medium** The project area is within the distribution range of this species but the small patches of natural habitat present are degraded and unlikely to offer suitable

[1] (of an animal) appearing or active in twilight.

Name	Threat Status		Habitat	Known Occurrence	Likelihood of Occurrence
	National (SA red list, 2016)	TOPS			
			Carletonville Dolomite, Vaal-Vet Sandy Grassland and Frankfort Highveld Grasslands. • Savannah vegetation types include Polokwane Plateau Bushveld, Central Sandy Bushveld, Kimberley Thornveld, Moot Plains Bushveld, and Queenstown Thornveld. The species appears to prefer dense vegetation habitats and rocky outcrops that may provide food, cover and nesting materials. EOO: 748,169 km^2.		foraging and breeding habitat.
Vlei Rat *Otomys auratus*	NT		This grassland species occurs throughout the Highveld grasslands and Drakensberg Escarpment of South Africa, Lesotho and Swaziland with isolated populations in the Soutpansberg Mountains or northern Limpopo and the Eastern Highlands of Zimbabwe. This species preferred habitat includes mesic grasslands and wetlands with alpine, montane and sub-montane regions, preferring dense vegetation that is within close proximity to water.	No records of this species within 100km of the project area (iNaturalist, 2024).	**Medium** Although the project area occurs within the distribution range of this species, suitable habitat was not recorded within the project area.
Leopard *Panthera pardus*	VU	VU	Leopards are widely distributed throughout southern Africa, typically occurring in densely wooded and rocky areas although it has been shown to have a wide habitat tolerance (grassland savannah, coastal scrub, shrubland, rugged mountainous regions and semidesert) (Swanepoel, *et al*., 2016; Stein, *et al*., 2020).	Five records of this species 60km north west of the project area (iNaturalist, 2024).	**Low** Although suitable habitat is present, the project area occurs along a busy national road, alongside a mine. If present, this species is likely to be a transient species within the area, using the project are to move through.

Name	Threat Status		Habitat	Known Occurrence	Likelihood of Occurrence
	National (SA red list, 2016)	TOPS			
African/Cape Clawless Otter *Aonyx capensis*	NT	-	This species is predominantly aquatic and seldom found far from permanent water. Freshwater is an essential water requirement, but they can occupy rivers with high pollution and eutrophication levels. The are generally found in marine habitats where there is access to freshwater, rocky shores and thick vegetation with an abundant food supply, but they have been recorded in rivers provided suitable sized pools persist (Okes *et al*., 2016 in Child *et al*., 2016).	No records of this species within 100km of the project area (iNaturalist, 2024).	**Low** Although the project area occurs within the distribution range of this species, suitable habitat is not present within the project area. The likelihood of occurrence in the project area is therefore classified as Low. If present, it is likely a transient.
Brown Hyena *Parahyaena brunnea*	NT	Protected	The Brown Hyena inhabits desert areas (<100 mm MAR), semi-desert, open scrub and open woodland savannah (<700 mm) (Wiesel, 2015). They typically avoid developed areas but can survive close to them. However, they do require some form of cover to lie under during the day. As such, they prefer rocky, mountainous areas with bush cover in the bushveld areas of South Africa (Yarnell *et al.,* 2016 in Child *et al*., 2016). The Brown Hyena population in SA is thought to be underestimated at 1700 individuals (800-2200) with greatest numbers in Limpopo, North West and Eastern Cape provinces. This species has low levels of occupancy throughout the Free State (Yarnell *et al.,* 2016). Densities are highest in protected areas compared to neighbouring unprotected rangelands but this species is tolerant of land-use change where reliable alternative food resources exist (Yarnell *et al.,* 2016). Brown	Records of this species 60km north west of the project area (iNaturalist, 2024).	**Low** Although suitable habitat is present within the project area (i.e., grasslands), this species is unlikely to occur outside of protected areas and alongside a busy national road and mining area.

Name	Threat Status		Habitat	Known Occurrence	Likelihood of Occurrence
	National (SA red list, 2016)	TOPS			
			Hyaenas are considered widespread but rare and secretive, and although 65% of the population live in mixed sex clans (4–14 individuals) they are solitary foragers who spend much of their time alone. The remaining 35% of the population immigrate within home ranges of ±100 km^2 (Yarnell *et al.,* 2016).		

5. PLANT SPECIES THEME

5.1. Species of Conservation Concern

The DFFE screening tool report lists the Plant Species Theme as low Sensitivity and does not identify any plant SCC that could occur within the project area. However, previous studies conducted in the area identified two NT species, one Rare species, two protected tree species and one protected species that could occur within the project area (Table 5.1). Of these, *Vachellia erioloba* (protected tree species with a conservation status of least concern) was confirmed to occur within the project area. *Boophone disticha* (protected species on the Northern Cape Nature Conservation Act with a conservation status of least concern) has a high likelihood of occurrence while *Vachellia haematoxylon* (protected tree species with a conservation status of least concern) and *Antimima lawsonii* have a medium likelihood of occurrence. *Asparagus stipulaceus* and *Gnaphalium declinatum* have a low likelihood of occurrence.

Table 5.1: Species of Conservation Concern that could occur within the project area.

Family	Species	Conservation Status	Likelihood of Occurrence
FABACEAE	*Vachellia erioloba*	Least Concern, Protected Tree Species	**Confirmed**
AMARYLLIDACEAE	*Boophone disticha*	LC, Protected Species on the Northern Cape Nature Conservation Act	**High** Confirmed by previous study to occur within the PAOI.
FABACEAE	*Vachellia haematoxylon*	Least Concern, Protected Tree Species	**Medium** Confirmed by previous study to occur within the PAOI but no individuals recorded within the project area.
MESEMBRYANTHEMACEAE	*Antimima lawsonii*	Rare	**Medium** Associated with limestone soils in Ghaap Plateau Vaalbosveld and only known from three locations.
ASPARAGACEAE	*Asparagus stipulaceus*	NT	**Low** This species does not occur in the area and is listed as a result of outdated historical records for the area.

ASTERACEAE	*Gnaphalium declinatum*	NT	**Low** This species does not occur in the area and is listed as a result of outdated historical records for the area.

5.2. Alien Invasive Plant Species

Two exotic species were recorded within the project area (Table 5.2) and were typically found within disturbed sites, such as along road verges and in secondary vegetation. Both species are listed alien invasive plant species (category 1b) on the National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 0f 2004) and both are listed as a Category 1 species on the Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983).

Under the NEM: BA act, Category 1b species must be eradicated and under CARA, Category 1 plant species must be removed & destroyed immediately. No trade in these plants is permitted.

Table 5.2: List of exotic plant species recorded on site.

Family	Species	NEM:BA Alien	CARA
PAPAVERACEAE	*Argemone ochroleuca*	Category 1b	Category 1
SOLANACEAE	*Datura ferox*	Category 1b	Category 1

6. TERRESTRIAL BIODIVERSITY THEME

The DFFE Screening Report classifies the Terrestrial Biodiversity Theme Sensitivity of the project area as VERY HIGH (Figure 2.3) due to the presence of an Ecological Support Area (ESA).

This chapter reviews the spatial planning tools associated with this feature and provides comment on the implication of development on this feature, should the project proceed. Furthermore, this chapter also describes the vegetation types present and comments on the distance of the project site from protected areas and areas designated as National Protected Area Expansion Strategy (NPAES) areas.

6.1. Northern Cape Critical Biodiversity Areas

Bioregional plans map biodiversity priority areas, including Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs) and Other Natural Areas (ONAs) which require safeguarding to ensure the persistence of biodiversity and ecosystems functioning, through a systematic conservation planning process. The project area occurs within an area designated as an ONA while a small portion of the eastern corridor near the substation occurs within an ESA (Figure 6.1).

ESA's are "*Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of Protected Areas (Pas) or CBAs and are often vital for delivering ecosystem services. They support landscape connectivity, encompass the ecological infrastructure from which ecosystem goods and services flow, and strengthen resilience to climate change*" (WCBSP Handbook, 2017). ESA's should be maintained in a functional and natural state although some habitat loss may be acceptable.

ONAs are "*Areas that have not been identified as a priority in the current biodiversity spatial plan but retain most of their natural character and perform a range of biodiversity and ecological infrastructure functions."* (WCBSP Handbook, 2017). Habitat and species loss must be minimised in ONAs.

Project infrastructure will not impact on the small patch of habitat designated as an ESA. However, some loss of habitat will occur within the area designated as an ONA, which is acceptable.

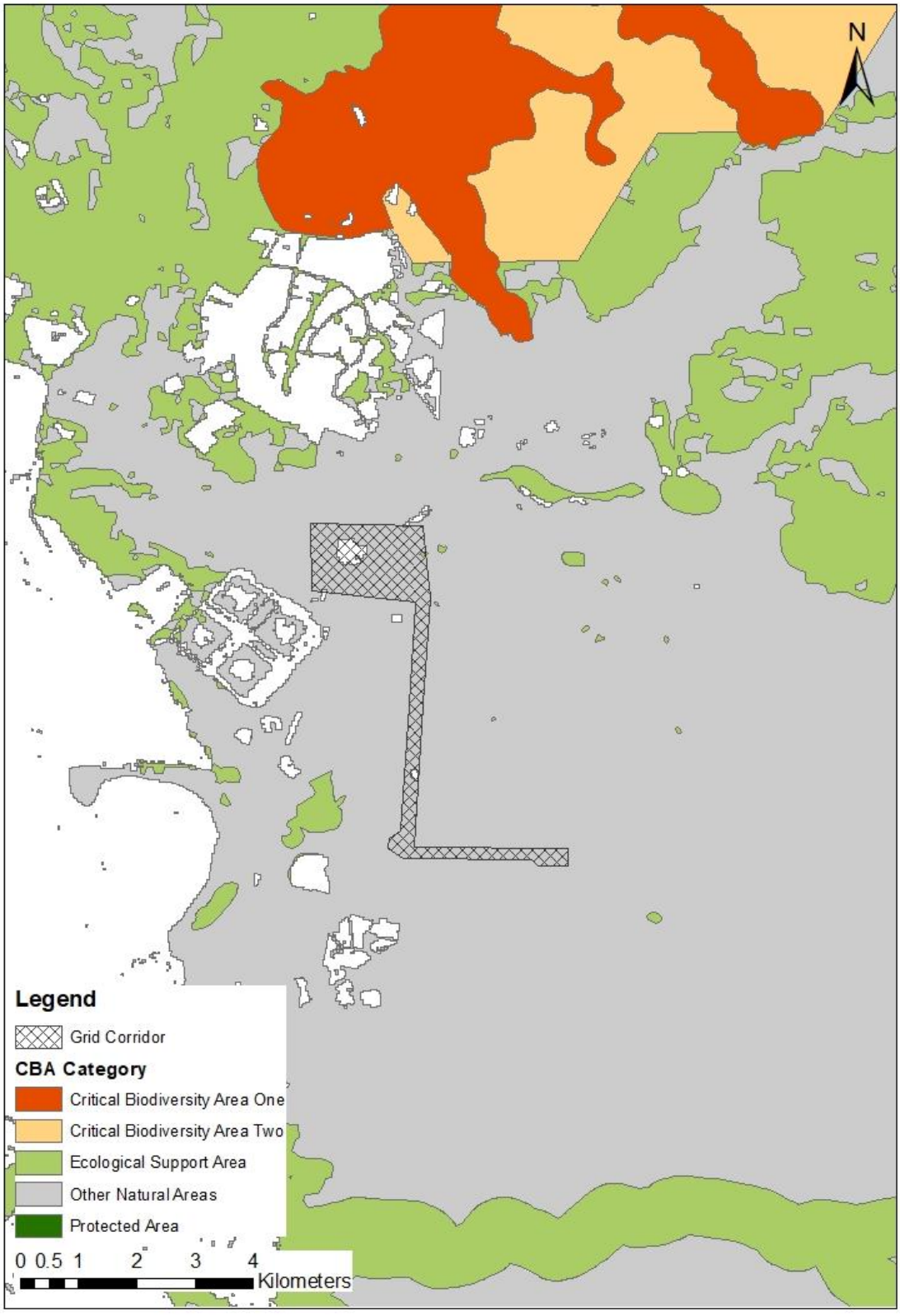


Figure 6.1: The Project area in relation to ONAs, CBAs and ESAs.

6.2. Vegetation Types Present

According to the National Vegetation Map (2018), which was compiled to provide a greater level of detail for floristically based vegetation units in South Africa, the project infrastructure occurs within Kathu Bushveld (Figure 6.2). Kathu Bushveld occurs in the Northern Cape Province and is characterised as having a medium-tall tree layer, a shrub layer and a variable grass layer. *Vachellia erioloba* is present within this vegetation type in places and the shrub layer is typically dominated by species such as *Vachellia mellifera, Diospyros lycoides* and *Lycium hirsutum.*

Although poorly protected, this vegetation type is listed as Least Concern with 98% of the remaining extent intact. The conservation target for this vegetation type is 16% and none is statutorily conserved.

Within this broad vegetation unit, three distinct plant communities were identified within the project area (Figure 6.3):

- ***Tarchonanthus* Veld**. This community was dominated by *Tarchonanthus camphoratus, Grewia flava, Zizuphus mucronata subsp. mucronata, Gymnosporia buxifolia, Senegalia mellifera and Lycium hirsutum.* There was an understory of grasses comprised of *Aristida* and *Eragrostis* species
- ***Vachellia erioloba* Thornveld**. This community is dominated by an open canopy of tree species dominated by *Vachellia erioloba* and an understorey of grasses dominated by the genera *Aristida* and *Eragrostis*. Trees in these areas typically have a high density and are between 2 and 4m in height.
- **Secondary Vegetation**. This community is associated with areas under existing powerlines and around the substation and were previously cleared but have regenerated. The vegetation that has returned is secondary in nature and representative of degraded *Tarchonanthus* Veld with an open canopy dominated by ruderal grasses and some shrubs.

Vegetation impacted by linear infrastructure is likely to return to a functional state within two years of completion of construction activities. However, given the dry nature of the environment, it is likely to take five to ten years for the species composition to return >70% of the original species.

6.3. Protected Areas and National Protected Area Expansion Strategy

The project area does not occur within any protected areas or NPAES or within 10km of a protected area or NPAES (Figure 6.7).

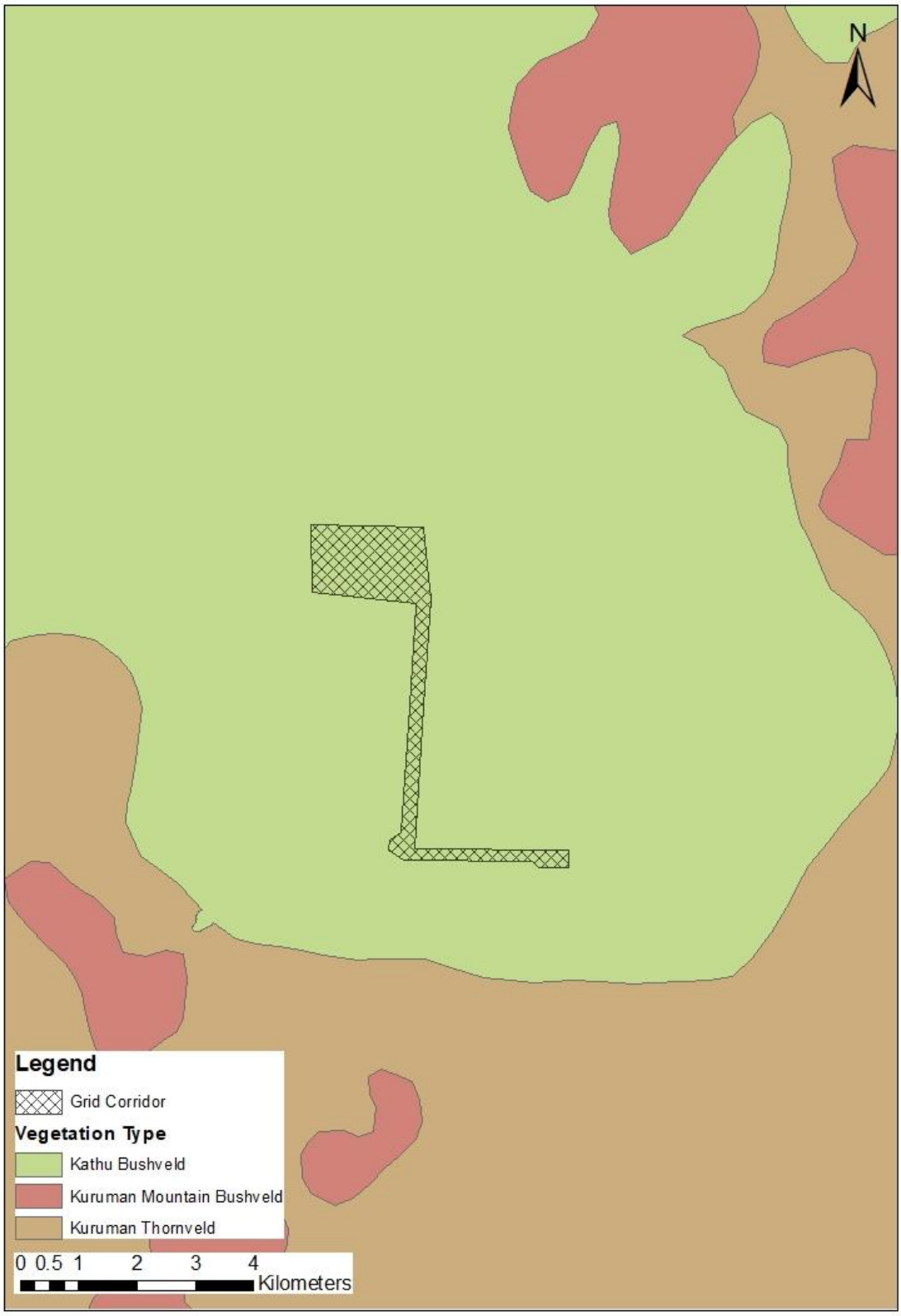


Figure 6.2: National Vegetation Map for the Project Area showing the remaining extent of vegetation.

Figure 6.3: Vegetation map for the project area based on data gathered from the field survey.

Figure 6.4: Photographs illustrating *Tarchonanthus* Veld

Figure 6.5: Photograph illustrating *Vachellia erioloba* Thornveld

Figure 6.6: Photograph illustrating Secondary Vegetation

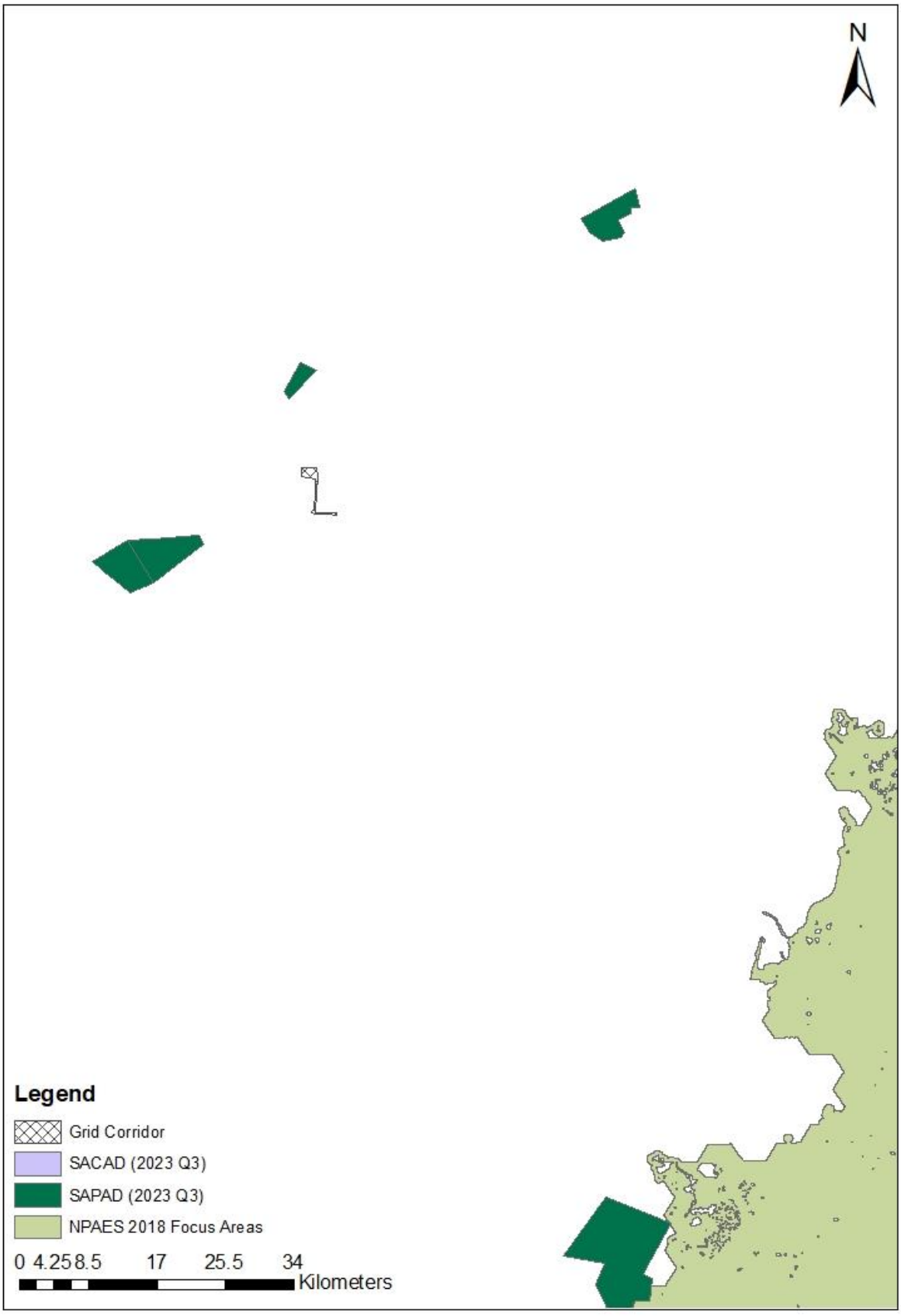


Figure 6.7: Map illustrating the project area in relation to conservation areas and NPAES.

7. SITE ECOLOGICAL IMPORTANCE

The results from the desktop assessment and field survey have been used to calculate the SEI for the vegetation and faunal habitat present within the project area.

7.1. Site Ecological Importance - Fauna

The Temminick's Pangolin (VU) and Littledale's Whistling Rat (NT) have a high likelihood of occurrence within the project area. As such, the SEI has been assessed for only these species (Table 7.1). The SEI for the overall project area is considered low for each habitat based on a medium CI, medium FI and high RR. Given the small size of the proposed facility together with the short construction time frame, it is anticipated that species will return to the PAOI once the disturbance has ceased. As such, the RR for all habitat types is high.

Table 7.1: Sensitivity assessment for faunal species within the project area.

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	SEI
Temminick's Pangolin (VU) in Tarchonanthus Veld and *Vachellia erioloba* Thornveld	Medium	Medium	Medium	High	**Low**
	Highly likely occurrence of a VU species listed under the A criterion category.	Semi-intact habitat adjacent to a busy national road and within a busy mining area. Narrow corridors of good habitat connectivity with signs of disturbance in the PAOI.		Receptor resilience is based on the specific project activities. In this instance the project footprint is small and the construction phase will be relatively short meaning that the disturbance to these species will be in the short term with a small spatial extent. As such, this species has a high likelihood of returning to site once the disturbance has ceased.	
Littledale's Whistling Rat (NT) *Parotomys littledalei*	Medium	Medium	Medium	High	**Low**
	Highly likely occurrence of a NT species.	Semi-intact habitat adjacent to a busy national road and within a busy mining area. Narrow corridors of good habitat connectivity with signs of		Receptor resilience is based on the specific project activities. In this instance the project footprint is small and the construction phase will be relatively short meaning that the disturbance to these species will be in	

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	SEI
		disturbance in the PAOI.		the short term with a small spatial extent. As such, this species has a high likelihood of returning to site once the disturbance has ceased.	

7.2. Site Ecological Importance - Flora

Three plant communities within the Kathu Bushveld were identified within the project area. All three communities have a low likelihood of supporting threatened (CR, EN and VU) or NT species and as such the CI for each of them was low. FI was medium due to the habitat being semi-intact and adjacent to a busy national road and mining area. The RR for *Tarchonanthus* Veld and *Vachellia erioloba* Thornveld was medium and for Secondary Vegetation it was high. The overall SEI for *Tarchonanthus* Veld and *Vachellia erioloba* Thornveld was low and for Secondary Vegetation it was very low (Table 7.2 and Figure 7.1).

Table 7.2: Sensitivity assessment for each vegetation type within the project area.

Habitat/ Species	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	SEI
Kathu Bushveld: *Vachellia erioloba* Thornveld	**Low** No confirmed or highly likely occurrence of CR, EN, VU or NT plant species or range restricted species.	**Medium** Semi-intact habitat adjacent to a busy national road and within a busy mining area. Narrow corridors of good habitat connectivity with signs of disturbance.	**Low**	**Medium** Receptor resilience is based on the specific project activities. In this instance the project footprint is small and the construction phase will be relatively short meaning that the disturbance to these species will be in the short term with a small spatial extent. Receptor resilience is medium as it will take more than ten years to restore >70% of the original species composition.	**Low**
Kathu Bushveld: Tarchonanthus Veld	**Low** No confirmed or highly likely occurrence of CR, EN, VU or NT plant species or range restricted species.	**Medium** Semi-intact habitat adjacent to a busy national road and within a busy mining area. Narrow corridors of good habitat connectivity with signs of disturbance.	**Low**	**Medium** Receptor resilience is based on the specific project activities. In this instance the project footprint is small and the construction phase will be relatively short meaning that the disturbance to these species will be in the short term with a small spatial extent. Receptor resilience is medium as it will take more than ten years to restore >70% of the original species composition.	**Low**
Secondary Vegetation	**Low** No confirmed or highly likely occurrence of CR, EN, VU or NT plant species or range restricted species.	**Medium** Semi-intact habitat adjacent to a busy national road and within a busy mining area. Narrow corridors of good habitat connectivity with signs of disturbance.	**Low**	**High** Receptor resilience is based on the specific project activities. In this instance the project footprint is small and the construction phase will be relatively short meaning that the disturbance to these species will be in the short term with a small spatial extent.	**Very Low**

				Receptor resilience is high as it will take 5-10 years to restore >70% of the original species composition.	

Figure 7.1: Botanical sensitivity map for the project area . This is based on data gathered from the field survey and the desktop assessment.

7.3. **Combined SEI**

According to the Species Environmental Assessment Guideline (SANBI, 2020), the SEI evaluated for each taxon/receptor should be combined into a single multi-taxon/receptor evaluation of SEI for the project area to allow the component authority to evaluate the SEI for the entire project area rapidly and at a single glance. As such, the highest overall SEI rating has been applied to each habitat type assessed in terms of the faunal and botanical sensitivity. Table 7.3 combines the overall SEI for each habitat type based on the assessment in Table 7.1 and 7.2.

Table 7.3: Combined overall SEI for each habitat type.

Habitat	Floral SEI	FAUNAL SEI	OVERALL COMBINED SEI
Vachellia erioloba Thornveld	Low	Low	Low
Tarchonanthus Veld	Low	Low	Low
Secondary Vegetation	Very Low	Very Low	Very Low

7.4. Management Guidelines

Management guidelines recommend the following:

- For areas of **low SEI,** development activities of medium to high impact are acceptable provided appropriate mitigation and management measures are implemented.
- For areas of **very low SEI**, development activities of medium to high impact are acceptable and mitigation and management measures may not be required although they are good practice.

Since project infrastructure is located in an area with an overall SEI of low and very low, development activities of medium to high impact are acceptable, provided appropriate mitigation and management measures are implemented.

8. PROPOSED MANAGEMENT ACTIONS

Given that development is located within an area of mostly very low sensitivity, direct ecological impacts are anticipated to be low to negligible for the project area, and as such, a compliance statement is sufficient. However, it is good practice to implement mitigation measures to further reduce impacts on the environment. Therefore, the following management actions are recommended and must be included as conditions in the Final EMPr as well as the conditions of the Environmental Authorisation (EA), if granted:

8.1. Mitigation measures for the Grid Infrastructure

*8.1.1. **Vegetation and Plant Species***

- Construction vehicles and machinery must not encroach into identified 'no-go' areas or areas outside the project footprint.
- Topsoil (20 cm, where possible) must be collected and stored in an area of low (preferable) and medium sensitivity and used to rehabilitate impacted areas that are no longer required during the operational phase (e.g. laydown areas).
- Only indigenous species must be used for rehabilitation.
- Where possible, lay down areas must be located within previously disturbed sites.
- Laydown areas that are not required once construction has ceased, must be rehabilitated back to their natural state using indigenous vegetation.
- Employees must be prohibited from making open fires during the construction phase to prevent uncontrolled run-away fires.
- Employees must be prohibited from collecting plants. It is recommended that spot checks of pockets and bags are done on a regular basis to ensure that no unlawful harvesting of plant species is occurring.
- The site must be checked regularly for the presence of alien invasive species. When alien invasive species are found, immediate action must be taken to remove them.
- An Alien Invasive Management Plan for the site must be created.
- The ECO must create a list with accompanying photographs of possible alien invasive species that could occur on site prior to construction. This photo guide must be used to determine if any alien invasive species are present.
- Although there are no SCC present within the project area, there are protected species that will require a permits for their removal. An ecological walkthrough of the project area was completed for the area at the same time that the field survey was completed. The Ecological Walkthrough report identified two species *(Boophone disticha* and *Vachellia erioloba)* that will require permit for their removal and/or destruction. Comment on the number of individuals that will be impacted has been provided in the report.
- *Boophone disticha* is a species that can be successfully transplanted. This species should be moved to areas within the property that will not be affected by project infrastructure.
- Where feasible, existing access roads must be used and upgraded.

*8.1.2. **Faunal Habitat and Species***

- The development must consolidate road networks to minimise the loss of faunal habitat.
- All construction and construction related activities (including parking of vehicles and machinery) must remain within the approved project footprint.
- No construction and construction related activities are permitted within identified 'no-go' areas and a fine system must be put in place for transgressions by the developer and included in contractual agreements with all staff and contractors.
- Microhabitats (e.g. rock stacks and logs) in the clearing footprint must be relocated to the same habitat immediately adjacent to the removal site. E.g. Rock stacks should be restacked.
- Rehabilitation efforts must provide habitat for faunal species by placing logs and rocks at strategic sites to provide shelter for small mammals and reptiles.
- A clause must be included in contracts for ALL construction personnel (i.e. including contractors) working on site stating that: "*no wild animals will be hunted, killed, poisoned or captured. No wild animals will be imported into, exported from or transported in or through the province. No wild animals will be sold, bought, donated and no person associated with the development will be in possession of any live wild animal, carcass or anything manufactured from the carcass."* A clause relating to fines, possible dismissal and legal prosecution must be included should any of the above transgressions occur, especially for SCC.
- The ECO should appoint a member of staff to walk ahead of construction machinery directly prior to vegetation clearance. Should any faunal species be identified during the walk through, these should be allowed to move out of harm's way prior to vegetation clearance.
- Dust suppression measures must be implemented in the dry and/or windy months.
- All machinery, vehicles and earth moving equipment must be maintained and the noise these create must meet industry minimum standards. e.g. the sound generated by a machine must be below a certain decibel as prescribed in the relevant noise control regulations.
- No construction night lighting must be allowed. If required, minimise lighting in open space areas within development and any external lights must be down lights placed as low as possible and installation of low UV emitting lights, such as most LEDs.
- Development must be designed to allow unencumbered movement, especially of small faunal species. e.g.
    - Permeable internal and external fences/walls (if any) must be implemented to allow for the movement of fauna through the development. These must have ground level gaps of 10cm x 10cm at 10m intervals. These gaps must be kept free of obstructions, including plant growth and debris.
    - All guttering and kerbstones must be sloped i.e. must be less than 450 on either side or kerbstones should be slanted or lowered (less than 10cm) at 10m intervals to allow for easy movement of toads
    - Steep sided drains, gutters, canals and open pits/trenches must be covered with mesh (5mm x 5mm) to prevent fauna falling in and getting stuck. No unnecessary structures that would act as pitfall traps for animals must be constructed
    - If there are retaining walls, steps should be formed to allow for toads to move over them. These must be vegetated with plant species that offer cover.
- Speed restrictions must be implemented on all vehicles within the development footprint (40km/h is recommended) to reduced faunal mortalities on the project roads.

- No night driving should be permitted, if unavoidable, this must be restricted, and speed limits adhered to.
- Any faunal species that may die as a result of construction must be recorded (i.e. be photographed, GPS co-ordinates taken) and the records uploaded to iNaturalist.
- A trained snake handler must be onsite during construction to remove any snakes within construction areas.
- A clause relating to fines, possible dismissal and legal prosecution must be included in all contracts for ALL personnel (i.e. including contractors) working on site should any speeding or persecution of animals occur.
- All decommissioning related activities (including parking of vehicles and machinery) must remain within the approved project footprint.
- No decommissioning related activities are permitted within identified 'no-go' areas and a fine system must be put in place for transgressions by the developer and included in contractual agreements with all staff and contractors.

9. CONCLUSIONS

9.1. Comment on the DFFE Screening Tool Report

9.1.1. ***Animal Species Theme***

The DFFE screening tool report identified the Animal Species Theme as Medium due to the likely presence of two sensitive bird species. This assessment only assesses reptiles, amphibians and mammals and as such only comment on these groups have been provided.

The desktop assessment identified two faunal SCC (Temminick's Pangolin and Littledale's Whistling Rat) that have a high likelihood of occurrence within the project area. The SEI analysis therefore took this into account and found that the project area has a low SEI for animal species. The specialist therefore disagrees with the DFFE screening tool report and is of the opinion that the sensitivity should be low rather than medium for the project area.

9.1.2. ***Plant Species Theme***

The DFFE screening tool report identified the Plant Species Theme as low due to the unlikely presence threatened plant species. Although the desktop assessment identified two NT and one Rare species as possibly occurring within the PAOI, the likelihood of occurrence of each of these species in the project area was determined to be medium and low. As such, the specialist agrees that the plant species theme should be of low sensitivity.

9.1.3. ***Terrestrial Biodiversity Theme***

The DFFE screening tool report identified the Terrestrial Biodiversity Theme as Very High due to the presence of an ESA. However, there are only two small patches of habitat along the north eastern edge of the corridor that are classified as ESAs while the remainder of the area is classified as an ONA. Project infrastructure is unlikely to affect the ESA and as such impacts on this area will be negligible.

Based on the above, and given the small footprint of the facility, the specialist is of the opinion that the sensitivity for the terrestrial biodiversity theme should be low rather than very high.

9.2. Conclusions and Recommendations

The SEI analysis indicates that the project area has an overall sensitivity of low to very low. The vegetation types recorded within the project area are either listed as Least Concern or are secondary in nature and no threatened or NT plant species were recorded within the project area or have a high likelihood of occurrence. Impacts associated with the Plant Species Theme are low to negligible.

Two mammal species, the Temminick's Pangolin and Littledale's Whistling Rat have a high likelihood of occurrence within the project area but project activities are unlikely to affect their breeding or foraging behaviour over the long term and as such impacts associated with the Animal Species Theme are low to negligible.

The project footprint will not impact any CBAs or ESAs and as such impacts on these features are low to negligible.

Although impacts are low to negligible, the applicant still has a duty of care to the environment. As such, recommended management actions that include mitigation measures to further reduce the impact of the project on the terrestrial biodiversity environment have been outlined in chapter 8. These recommendations must be included in the Environmental Management Plan and as a condition of authorisation.

9.3. Ecological Statement and Opinion of the Specialist

Given that the project area has a low to very sensitivity, the specialists are of the opinion that the development can proceed, provided the recommendations contained in this report are implemented

10. REFERENCES

3Foxes (Simon Todd), 2015. Fauna and Flora Specialist EIA Report for the proposed AEP Mogobe Solar PV Facility and associated infrastructure, Kathu, Northern Cape. Unpublished Report.

Bates, M. F., Branch, W.R., Bauer, A.M., Burger, M., Mariais, J., Alexander, G.J. & De Villiers, M. S. (eds). 2014. Atlas and Red List if the Reptiles of South Africa, Lesotho and Swaziland. Suricata 1. South African National Biodiversity Institute, Pretoria.

Branch, B. (1998) Field Guide to Snakes and other Reptiles of Southern Africa. Struik Publishers, Cape Town.

Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. 2016. The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa

DFFE, 2022. Revised List of Ecosystems that are Threatened and in Need of Protection.

Du Preez, L. and Carruthers, V. (2017). Frogs of Southern Africa: A Complete Guide. Struik Nature, Cape Town.

FitzPatrick Institute of African Ornithology (2023). FrogMAP Virtual Museum. Accessed at https://vmus.adu.org.za/?vm=FrogMAP on 2023-10-02

FitzPatrick Institute of African Ornithology (2023). ReptileMAP Virtual Museum. Accessed at https://vmus.adu.org.za/?vm=ReptileMAP on 2023-10-02

FitzPatrick Institute of African Ornithology (2023). MammalMAP Virtual Museum. Accessed at https://vmus.adu.org.za/?vm=MammalMAP on 2023-10-02

Milton, S.J. and Dean, W.R.J. 2000. Disturbance, drought and dynamics of desert dune grassland, South Africa. *Plant Ecology*. 150: 37-51

Mucina, L.; Rutherford, M.C.; Palmer, A.J.; Milton, S.J.; Scott, L.; Lloyd, J.W.; van der Merwe, B.; Hoare, D.B.; Bezuidenhout, H.; Vlok, J.H.J.; Euston-Brown, D.I.W.; Powrie, L.W. and Dold, A.P. 2011. Nama-Karoo Biome IN: Mucina, L. and Rutherford, M.C. (eds) 2011. The Vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.

Minter LR, Burger M, Harrison JA, Braack HH, Bishop PJ & Kloepfer D (eds). 2004. Atlas and Red Data book of the frogs of South Africa, Lesotho and Swaziland. SI/MAB Series no. 9. Smithsonian Institution, Washington, D.C

Ramesh T, Downs CT, Power RJ, Laurence S, Matthews W, Child MF. 2016. A conservation assessment of Leptailurus serval. In Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

Red List of terrestrial Ecosystems of South Africa. (2021). SANBI and DFFE.

South African National Biodiversity Institute (SANBI). 2021. *Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa*. South African National Biodiversity Institute, Pretoria. Version 2.1 2021.

Stuart, C. and Stuart, M. (2015) Stuart's Field Guide to Mammals of Southern Africa. Struik Nature, Penguin Random House South Africa (Pty) Ltd, Century City, Cape Town.

Stuart, C. and Stuart, M. (2013) A Field Guide to the Tracks and Signs of Southern, Central ad East African Wildlife. Struik Nature, Penguin Random House South Africa (Pty) Ltd, Century City, Cape Town.

Taylor A, Cowell C, Drouilly M, Schulze E, Avenant N, Birss C, Child MF. 2016. A conservation assessment of Pelea capreolus. In Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-

Mostert HT, editors. The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

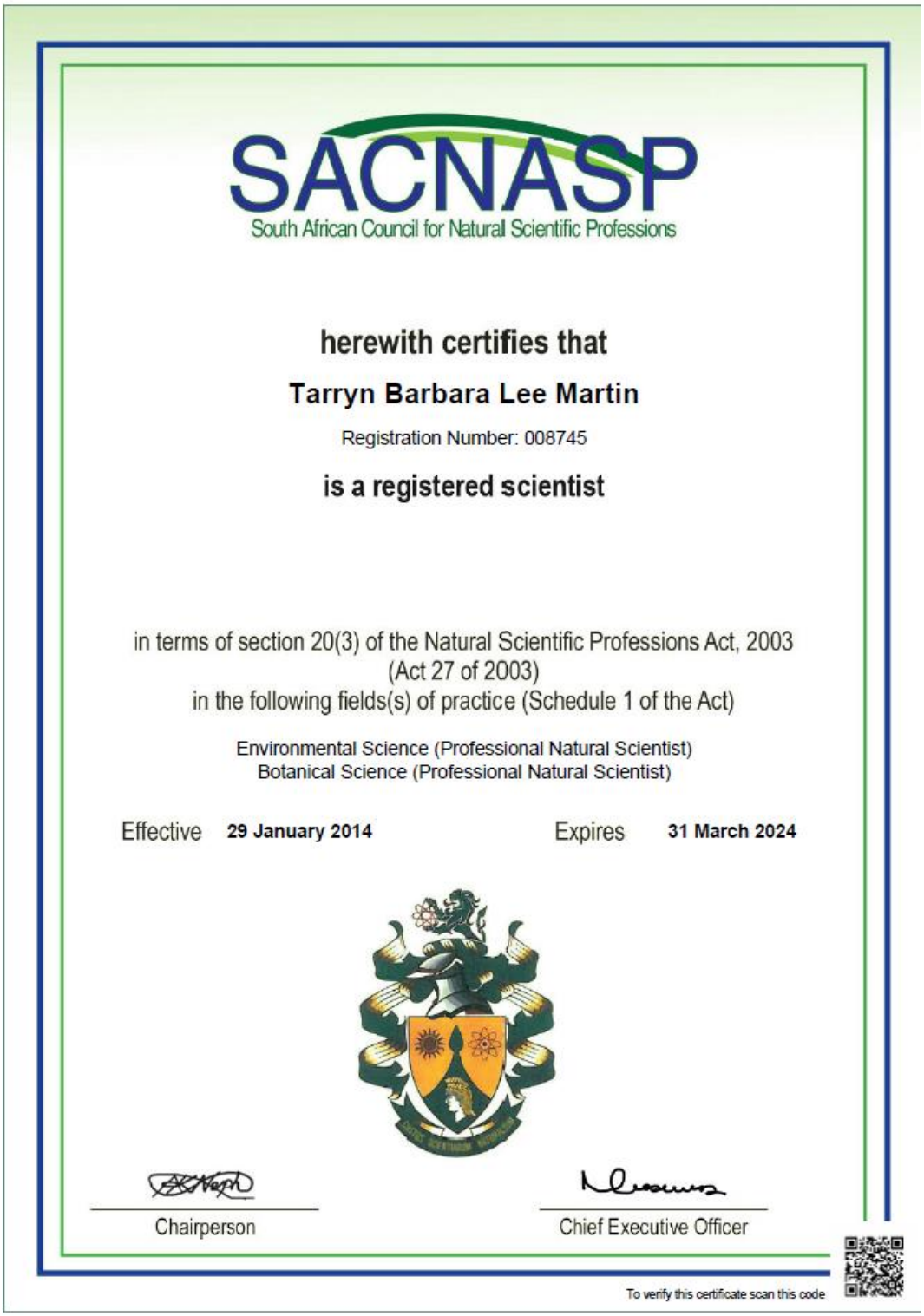
Victor, J.E. & Pfab, M.F. 2005. Khadia beswickii (L.Bolus) N.E.Br. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2024/01/22.

Wiesel, I. 2015. *Parahyaena brunnea.* The IUCN Red List of Threatened Species 2015: e.T10276A82344448. https://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T10276A82344448.en. Accessed on 13 June 2023.

Wilson B, Sliwa A, Drouilly M. 2016. A conservation assessment of Felis nigripes. In Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

Yarnell RW, Richmond-Coggan L, Bussière E, Williams K, Bissett C, Welch R, Wiesel I. 2016. A conservation assessment of Parahyaena brunnea. In Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa

APPENDIX 1: PROOF OF SACNASP REGISTRATION AND HIGHEST QUALIFICATION



SACNASP
South African Council for Natural Scientific Professions

herewith certifies that

Tarryn Barbara Lee Martin

Registration Number: 008745

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following fields(s) of practice (Schedule 1 of the Act)

Environmental Science (Professional Natural Scientist)
Botanical Science (Professional Natural Scientist)

Effective **29 January 2014** Expires **31 March 2024**

Chairperson

Chief Executive Officer

To verify this certificate scan this code

RHODES UNIVERSITY

THIS IS TO CERTIFY THAT

TARRYN BARBARA LEE MARTIN

WAS THIS DAY AT A CONGREGATION OF THE UNIVERSITY
ADMITTED TO THE DEGREE OF

MASTER OF SCIENCE

IN

BOTANY

WITH DISTINCTION

VICE CHANCELLOR

DEAN OF THE FACULTY OF SCIENCE

REGISTRAR

GRAHAMSTOWN
10 APRIL 2010

Application for Professional Natural Science in the field of Zoology is currently awaiting approval.

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Amber Leah Jackson
Registration number: 100125/12

is registered as a

Candidate Natural Scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule I of the Act)

Environmental Science **15 August 2012**

15 August 2012
Pretoria

President

Executive Director

we certify that

Amber Leah Jackson

was admitted to the degree of

Master of Philosophy

in Environmental Management

on 9 June 2011

Vice-Chancellor

Registrar

APPENDIX 2: CV

CONTACT DETAILS

Name	**Tarryn Martin**
Name of Company	**Biodiversity Africa**
Designation	Director
Profession	Botanical Specialist and Environmental Manager
E-mail	tarryn@biodiversityafrica.com
Office number	+27 (0)71 332 3994
Education	2010: Master of Science with distinction (Botany) 2004: Bachelor of Science (Hons) in African Terrestrial Vertebrate Biodiversity 2003: Bachelor of Science
Nationality	**South African**
Professional Body	**SACNASP**: South African Council for Natural Scientific Profession: Professional Natural Scientist (400018/14) **SAAB**: Member of the South African Association of Botanists **IAIASa**: Member of the International Association for Impact Assessments South Africa Member of Golden Key International Honour Society
Key areas of expertise	• Biodiversity Surveys and Impact Assessments • Environmental Impact Assessments • Critical Habitat Assessments • Biodiversity Management and Monitoring Plans

PROFILE

Tarryn has over ten years of experience working as a botanist, nine of which are in the environmental sector. She has worked as a specialist and project manager on projects within South Africa, Mozambique, Lesotho, Zambia, Tanzania, Cameroon and Malawi.

She has extensive experience writing botanical impact assessments, critical habitat assessments, biodiversity management plans, biodiversity monitoring plans and Environmental Impact Assessments to International Standards, especially to those of the International Finance Corporation (IFC). Her experience includes working on large mining projects such as the Kenmare Heavy Minerals Mine, where she monitored forest health, undertook botanical impact assessments for their expansion projects and designed biodiversity management and monitoring plans. She has also project managed Environmental Impact Assessments for graphite mines in northern Mozambique and has a good understanding of the Mozambique Environmental legislation and processes.

Tarryn holds a BSc (Botany and Zoology), a BSc (Hons) in African Vertebrate Biodiversity and an MSc with distinction in Botany from Rhodes University. Tarryn's Master's thesis examined the impact of fire on the recovery of C_3 and C_4 Panicoid and non-Panicoid grasses within the context of climate change for which she won the Junior Captain Scott-Medal (Plant Science) for producing the top MSc of 2010 from the South African Academy of Science and Art as well as an Award for Outstanding Academic Achievement in Range and Forage Science from the Grassland Society of Southern Africa. Tarryn is a professional member of the South African Council for Natural Scientific Professionals (since 2014).

EMPLOYMENT EXPERIENCE

Director and Botanical Specialist, Biodiversity Africa

July 2021 - present

- Botanical and ecological assessments for local and international EIAs in Southern Africa
- Identifying and mapping vegetation communities and sensitive areas
- Designing and implementing biodiversity management and monitoring plans
- Designing rehabilitation plans
- Designing alien management plans
- Critical Habitat Assessments
- Large ESIA studies
- Managing budgets

Principal Environmental Consultant, Branch Manager and Botanical Specialist, Coastal and Environmental Services

May 2012-June 2021

- Botanical and ecological assessments for local and international EIAs in Southern Africa
- Identifying and mapping vegetation communities and sensitive areas
- Designing and implementing biodiversity management and monitoring plans
- Designing rehabilitation and biodiversity offset plans
- Designing alien management plans
- Critical Habitat Assessments
- Large ESIA studies
- Managing budgets
- Cape Town branch manager
- Coordinating specialists and site visits

Accounts Manager, Green Route DMC

October 2011- January 2012

- Project and staff co-ordination
- Managing large budgets for incentive and conference groups travelling to southern Africa
- Creating tailor-made programs for clients
- Negotiating rates with vendors and assisting with the ground management of inbound groups to ensure client satisfaction.

Camp Administrator and Project Co-ordinator, Windsor Mountain International Summer Camp, USA

April 2011 - September 2012

- Co-ordinated staff and camper travel arrangements, main camp events and assisted with marketing the camp to prospective families.

Freelance Project Manager, Green Route DMC

November 2010 - April 2011

- Project and staff co-ordination
- Managing large budgets for incentive and conference groups travelling to southern Africa
- Creating tailor-made programs for clients
- Negotiating rates with vendors and assisting with the ground management of inbound groups to ensure client satisfaction.

Camp Counselor, Windsor Mountain Summer Camp, USA

June 2010 - October 2010

NERC Research Assistant, Botany Department, Rhodes University, Grahamstown in collaboration with Sheffield University, Sheffield, England

April 2009 - May 2010

- Set up and maintained experiments within a common garden plot experiment
- collected, collated and entered data
- Assisted with the analysis of the data and writing of journal articles

Head Demonstrator, Botany Department, Rhodes University

March 2007 - October 2008

Operations Assistant, Green Route DMC

September 2005 - February 2007

- Project and staff co-ordination
- Managing large budgets for incentive and conference groups travelling to southern Africa
- Creating tailor-made programs for clients
- Negotiating rates with vendors and assisting with the ground management of inbound groups to ensure client satisfaction

PUBLICATIONS

- Ripley, B.; Visser, V.; Christin, PA.; Archibald, S.; Martin, T and Osborne, C. Fire ecology of C_3 and C_4 grasses depends on evolutionary history and frequency of burning but not photosynthetic type. *Ecology.* 96 (10): 2679-2691. 2015
- Taylor, S.; Ripley, B.S.; Martin, T.; De Wet, L-A.; Woodward, F.I.; Osborne, C.P. Physiological advantages of C_4 grasses in the field: a comparative experiment demonstrating the importance of drought. *Global Change Biology*. 20 (6): 1992-2003. 2014
- Ripley, B; Donald, G; Osborne, C; Abraham, T and Martin, T. Experimental investigation of fire ecology in the C3 and C4 subspecies of *Alloteropsis semialata. Journal of Ecology.* 98 (5): 1196 - 1203. 2010
- South African Association of Botanists (SAAB) conference, Grahamstown. Title: Responses of C3 and C4 Panicoid and non-Panicoid grasses to fire. January 2010
- South African Association of Botanists (SAAB) conference, Drakensberg. Title: Photosynthetic and Evolutionary determinants of the response of selected C3 and C4 (NADP-ME) grasses to fire. January 2008

COURSES

- Rhodes University and CES, Grahamstown
- EIA Short Course 2012
- Fynbos identification course, Kirstenbosch, 2015.
- Photography Short Course, Cape Town School of Photography, 2015.
- Using Organized Reasoning to Improve Environmental Impact Assessment, 2018, International IAIA conference, Durban

CONSULTING EXPERIENCE

International Projects

- 2020 – 2021: Project manager for the 2Africa subsea cable ESIA in Mozambique.
- 2020 – 2021: Project manager for the Category B EIA for the Wihinana Graphite Mine, Cabo delgado, Mozambique
- 2020 – 2021: Project manager for the category B exploration ESIA for Sofala Heavy Minerals Mine, Inhambane, Mozambique
- 2020: Critical Habitat Assessment for a graphite mine in Cabo Delgado, Mozambique. This assessment was to IFC standards.
- 2020: Analysed the botanical dataset for Lurio Green Resources and provided comment on the findings and gaps.
- 2020: Biodiversity Management Plan and Monitoring Plan for mine at Pilivilli in Nampula Province, Mozambique. This assessment was to IFC standards.
- 2019: Botanical Assessment for a cocoa plantation, Tanzania. This assessment was to IFC standards.

- 2019: Critical Habitat Assessment, Biodiversity Management Plan and Ecosystem Services Assessment for JCM Solar Farm in Cameroon. This assessment was to IFC standards.
- 2019: Undertook the Kenmare Road and Infrastructure Botanical Baseline Survey and Impact Assessment for an infrastructure corridor that will link the existing mine at Moma to the new proposed mine at Pillivilli in Nampula Province, Mozambique. This assessment was to IFC standards.
- 2012 – Present: Kenmare Terrestrial Monitoring Program Project Manager and Specialist Survey, Nampula Province, Mozambique.
- 2018: Conducted a field survey and wrote a botanical report to IFC standards for the proposed Balama Graphite Mine Environmental and Social Impact Assessment (ESIA) in Cabo Delgado Province, Mozambique.
- 2018: Co-authored the critical habitat assessment chapter for the proposed Kenmare Pilivilli Heavy Minerals Mine.
- 2018: Authored the Conservation Efforts chapter for the Kenmare Pilivilli Heavy Minerals Mine.
- 2017-2018: Co-authored and analysed data for the Kenmare Bioregional Survey of *Icuria dunensis* (species trigger for critical habitat) in Nampula Province, Mozambique. This was for a mining project that needed to be IFC compliant.
- 2017: Conducted a field survey and wrote a botanical report to IFC standards for the proposed Ancuabe Graphite Mine Environmental and Social Impact Assessment (ESIA) in Cabo Delgado Province, Mozambique.
- 2017-2018: Managed the Suni Resources Montepuez Graphite Mine Environmental Impact Assessment. This included the management of ten specialists, the co-ordination of their field surveys, regular client liaison and the writing of the Environmental Impact Assessment Report which summarised the specialists findings, assessed the impacts of the proposed mine on the environment and provided mitigation measures to reduce the impact.
  I was also the lead botanist for this baseline survey and impact assessment and undertook the required field work and analysed the data and wrote the report.
- 2017: Undertook the botanical baseline survey and impact assessment for the proposed Kenmare Pilivili Heavy Mineral Mine in Nampula Province, Mozambique. This was to IFC Standards.
- 2017: Ecological Survey for the Megaruma Mining Limitada Ruby Mine Exploration License, Cabo Delgado, Mozambique.
- 2016: Undertook the botanical baseline survey and impact assessment, wrote an alien invasive management plan and co-authored the biodeiveristy monitoring plan for this farm. The project was located in Zambezia Province, Mozambique.
- 2015-2016: Conducted the Triton Minerals Nicanda Hills Graphite Mine Botanical Survey and Impact Assessment. Was also the project manager and specialist co-ordinator for this project. The project was located in Cabo Delgado Province, Mozambique.
- 2015: Was part of the team that undertook a Critical Habitat Assessment for the Nhangonzo Coastal Stream site at Inhassora in Mozambique that Sasol intend to establish drill pads at. This project needed to meet the IFC standards.
- 2014: Lurio Green Resources Wood Chip Mill and Medium Density Fibre-board Plant, Project Manager and Ecological Specialist, Nampula Province, Mozambique. 2014-2015.
- 2013-2014: LHDA Botanical Survey, Baseline and Impact assessment, Lesotho.
- 2014: Biotherm Solar Voltaic Ecological Assessment, Zambia.
- 2013-2014: Lurio Green Resources Plantation Botanical Assessment, Vegetation and Sensitivity Mapping, Specialist Co-ordination, Nampula Province, Mozambique.
- 2013: Syrah Resources Botanical Baseline Survey and Ecological Assessment., Cabo Delgado Mozambique.
- 2013-2014: Baobab Mining Ecological Baseline Survey and Impact Assessment, Tete, Mozambique.

South African Projects

- 2021 - Present: Project Manager for the Sturdee Energy Solar PV facility, Western Cape
- 2021: Ecological Assessment for the Sturdee Energy Solar PV facility, Western Cape
- 2021: Rehabilitation plan for a housing development (Hope Village)
- 2020: Ecological Assessment for the Eskom Juno-Gromis Powerline deviation, Western Cape
- 2020: Project Manager for the Basic Assessment for SANSA development at Matjiesfontein (Western Cape). Project received authorization in 2021.
- 2020: Ecological Assessment for construction of satellite antennae, Matjiesfontein, Western Cape
- 2019: Ecological Assessment for a wind farm EIA, Kleinzee, Northern Cape
- 2019: Ecological Assessment for two housing developments in Zeerust, North West Province
- 2019: Botanical Assessment in Retreat, Cape Town for the DRDLR land claim.
- 2019: Cape Agulhas Municipality Botanical Assessment for the expansion of industrial zone, Western Cape, South Africa, 2019.
- 2018: Ecological Assessment for the construction of a farm dam in Greyton, Western Cape.
- 2018: Conducted the Ecological Survey for a housing development in Noordhoek, Cape Town
- 2018: Conducted the field survey and developed an alien invasive management plan for the Swartland Municipality, Western Cape.
- 2017: Undertook the field survey and co-authored a coastal dune study that assesses the impacts associated with the proposed rezoning and subdivision of Farm Bookram No. 30 to develop a resort.
- 2017: Project managed and co-authored a risk assessment for the use of Marram Grass to stabilise dunes in the City of Cape Town.
- 2015-2016: iGas Saldanha to Ankerlig Biodiversity Assessment Project Manager, Saldanha.
- 2015: Innowind Ukomoleza Wind Energy Facility Alien Invasive Management Plan, Eastern Cape Province, South Africa.
- 2015: Savannah Nxuba Wind Energy Facility Powerline Ecological Assessment, ground truthing and permit applications, Eastern Cape South Africa.
- 2014: Cob Bay botanical groundtruthing assessment, Eastern Cape, South Africa.
- 2013-2016: Dassiesridge Wind Energy Facility Project Manager, Eastern Cape, South Africa.
- 2013: Harvestvale botanical groundtruthing assessment, Eastern Cape, South Africa.
- 2012: Tsitsikamma Wind Energy Facility Community Power Line Ecological Assessment, Eastern Cape, South Africa.
- 2012: Golden Valley Wind Energy Facility Power Line Ecological Assessment, Eastern Cape, South Africa.
- 2012: Middleton Wind Energy Facility Ecological Assessment and Project Management, Eastern Cape, South Africa.
- 2012: Mossel Bay Power Line Ecological Assessment, Western Cape, South Africa.
- 2012: Groundtruthing the turbine sites for the Waainek Wind Energy Facility, Eastern Cape, South Africa.
- 2012: Toliara Mineral Sands Rehabilitation and Offset Strategy Report, Madagascar.

CONTACT DETAILS

Name	**Amber Jackson**
Name of Company	**Biodiversity Africa**
Designation	Director
Profession	Faunal Specialist and Environmental Manager
E-mail	amber@biodiversityafrica.com
Office number	+27 (0)78 340 6295
Education	2011 M. Phil Environmental Management (University of Cape Town) 2008 BSc (Hons) Ecology, Environment and Conservation (University of the Witwatersrand) 2007 BSc 'Ecology, Environment and Conservation' and Zoology (WITS)
Nationality	**South African**
Professional Body	**SACNASP**: South African Council for Natural Scientific Profession (100125/12) **ZSSA**: Zoological Society of Southern Africa **HAA**: Herpetological Association of Southern Africa **IAIASa**: Member of the International Association for Impact Assessments South Africa
Key areas of expertise	• Biodiversity Surveys and Impact Assessments • Environmental Impact Assessments • Critical Habitat Assessments • Biodiversity Management and Monitoring Plans

PROFILE

Amber has over ten years' experience in environmental consulting and has managed projects across various sectors including mining, agriculture, forestry, renewable energy, housing, coastal and wetland recreational infrastructure. Most of these projects required lender finance and therefore met both in-country, lender and sector specific requirements.

Amber completed the IFC lead and Swiss funded programme in Environmental and Social Risk Management course in 2018. The purpose of the course was to upskill Sub-Saharan African environmental consultants to increase the uptake of E&S standards by Financial Institutions.

Amber specialises in terrestrial vertebrate faunal assessments. She has conducted large scale faunal impact assessments that are to international lender's standards in Mozambique, Tanzania, Lesotho and Malawi. In South Africa her faunal impact assessments comply with the protocols for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity and follows the SANBI Species Environmental Assessment Guideline. Her specialist input goes beyond impact assessments and includes faunal opportunities and constraints assessments, Critical Habitat Assessments, Biodiversity related Management Plans and Biodiversity Monitoring Programmes.

Amber holds a BSc (Zoology and Ecology, Environment & Conservation) and BSc (Hons) in Ecology, Environment & Conservation from WITS University and an MPhil in Environmental Management from University of Cape Town. Amber's honours focused on the landscape effects on Herpetofauna in Kruger National Park and her Master's thesis focused on the management of social and natural aspects of environmental systems with a dissertation in food security that investigated the complex food system of informal and formal distribution markets

EMPLOYMENT EXPERIENCE

Director and Faunal Specialist, Biodiversity Africa

July 2021 - present

- Faunal assessments for local and international EIAs in Southern Africa
- Identifying and mapping habitats and sensitive areas
- Designing and implementing biodiversity management and monitoring plans
- Critical Habitat Assessments
- Large ESIA studies
- Managing budgets

Principal Environmental Consultant and Faunal,

Coastal and Environmental Services

September 2011-June 2021

- Faunal and ecological assessments for local and international EIAs in Southern Africa
- Identifying and mapping habitat and sensitive areas
- Designing and implementing biodiversity management and monitoring plans
- Critical Habitat Assessments
- Large ESIA studies
- Coordinating specialists and site visits
- Faunal Impact Assessment
- Project Management, including budgets, deliverables and timelines.
- Environmental Impact Assessments and Basic Assessments project
- Environmental Control Officer
- Public/client/authority liaison
- Mentoring and training of junior staff

COURSES

- **Herpetological Association of Southern Africa Conference- Cape St Frances** September 2019
- **International Finance Corporation Environmental and Social Risk Management (ESRM) Program** January – November 2018
- **IAIA WC EMP Implementation Workshop** 27 February 2018
- **IAIAsa National Annual Conference** August 2017
  Goudini Spa, Rawsonville.
- **Biodiversity & Business Indaba, NBBN** April 2017
  Theme: Moving Forward Together (Partnerships & Collaborations)
- **Snake Awareness, Identification and Handling course, Cape Reptile Institute (CRI)** November 2016
- **Coaching Skills programme, Kim Coach** November 2016
- **Western Cape Biodiversity Information Event, IAIAsa** May 2016
  Theme: Biodiversity offsets & the launch of a Biodiversity Information Tool
- **Photography Short Course** 2015.
  Cape Town School of Photography,
- **Mainstreaming Biodiversity into Business: WHAT, WHY, WHEN and HOW** June 2014 Hosted by Dr Marie Parramon Gurney on behalf of the NBBN at the Rhodes Business School
- **IAIAsa National Annual Conference** September 2013
  Thaba'Nchu Sun, Bloemfontein
- **St Johns Life first aid course** July 2012

CONSULTING EXPERIENCE

International Projects

- 2018-Crooks Brothers Post EIA Work- Environmental and Social EMPr, Policies, E&S Management Plans and Monitoring Programmes
- 2018-Triton Ancuabe Graphite Mine (ESHIA), Mozambique. IFC Standards.
- 2016-Bankable Feasibility Study of Simandou Infrastructure Project – Port and Railway Summary of critical habitat, biodiversity offset plan and monitoring and evaluation plan.
- 2016-Lurio Green Resources Forestry Projects ESIA project upgrade to Lender standards including IFC, EIB, FSC and AfDB.
- 2014-Green Resources Woodchip and MDF plant (EPDA).
- 2014-Niassa Green Resources Forestry Projects ESIA to Lender standards including IFC, EIB, FSC and AfDB.

- 2020-Kenmare Faunal Biodiversity Management Plan, Mozambique.
- 2020-Kenmare Faunal Monitoring Pogramme (year 1)- Baseline, Mozambique.
- 2019-Kenmare addendum ESIA Faunal Impact Assessment, Mozambique.
- 2019-Kenmare infrastructure corridor ESIA Faunal Impact Assessment, Mozambique.
- 2019/20-Olam Cocoa Plantation Faunal Impact Assessment, Tanzania.
- 2019-JCM Solar Voltaic project Faunal desktop critical habitat assessment, Cameroon.
- 2018-Suni Resources Balama Graphite Mine Project Faunal Impact Assessment, Mozambique.
- 2017/18-Battery Minerals Montepuez Graphite Mine Project Faunal Impact Assessment, Mozambique.
- 2017-Triton Minerals Nicanda Hills Graphite Mine Project Faunal Impact Assessment, Mozambique.
- 2017-Sasol Biodiversity Assessment, Mozambique.
- 2014-Lesotho Highlands Water Project Faunal Impact Assessment, Lesotho.
- 2012-Malawi Monazite mine Projects (ESIA) EMP ecological management contribution
- Liberia Palm bay & Butow (ESIA)
- PGS Seismic Project (ESIA), Mozambique.

South African Projects

- 2018-Port St Johns Second Beach Coastal Infrastructure Project - E&S Risk Assessment
- 2015-Blouberg Development Initiative- E&S Risk Assessment
- 2019-Boulders Powerline BA Faunal desktop impact assessment, WC, SA.
- 2019-Ramotshere housing development BA Faunal desktop impact assessment, NW, SA.
- 2019-Cape Agulhas Municipality Industrial development faunal impact assessment, WC, SA.
- 2019-SANSA Solar PV BA Faunal desktop impact assessment, WC, SA.
- 2019-Wisson Coal to Urea Faunal desktop assessment, Mpumalanga.
- 2019-Assessment Boschendal Estate Faunal Opportunities and Constraints, WC, SA.
- 2019-Ganspan-Pan Wetland Reserve Recreational and Tourist Development Avifaunal Impact Assessment, NC, SA.
- 2018-City of Johannesburg Municipal Reserve Proclamation for Linksfield Ridge and Northcliff Hill Faunal Assessment, South Africa.
- 2017-Augrabies falls hydro-electric project Hydro-SA Faunal Impact Assessment.
- Port St Johns Second Beach Coastal Infrastructure Project (EIA), South Africa.
- Woodbridge Island Revetment checklist.
- Belmont Valley Golf Course and Makana Residential Estate (EIA)
- Belton Farm Eco Estate (BA).
- Ramotshere housing development (BA).
- G7 Brandvalley Wind Energy Project (EIA)
- G7 Rietkloof Wind Energy Project (EIA)
- G7 Brandvalley Powerlines (BA)
- G7 Rietkloof Powerlines (BA)
- Boschendal wine estate Hydro-electric schemes (BA, 24G and WULA)
- Mossel Bay Wind Energy Project (EIA)
- Mossel Bay Powerline (BA) 132kV interconnection
- Inyanda Farm Wind Energy (EIA)
- Middleton Wind Energy (EIA)
- Peddie Wind Energy (EIA)

- Cookhouse Wind Energy Project (EIA)
- Haverfontein Wind Energy Project (EIA)
- Plan 8 Wind Energy Project (EIA)
- Brakkefontein Wind Energy Project (EIA)
- Grassridge Wind Energy Project (EIA) (Coega)
- St Lucia Wind Energy Project (EIA)
- ACSA ECO CT (Lead ECO)
- Enel Paleisheuwel Solar farm (Lead ECO)
- NRA Caledon road upgrade ECO
- Solar Capital DeAar Solar farm annual audits
- Eskom Pinotage substation WUL offset compliance