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# FAUNAL COMPLIANCE STATEMENT FOR THE PROPOSED BOSCHENDAL FOUNDERS ESTATE

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Prepared for:

**Boschendal (Pty) Ltd**

Boschendal Estate, Pniel Road,  
Groot, Franschhoek, 7690

Prepared by:



30 Chudleigh Road  
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Cape Town, Western Cape



**April 2022**

## Details of Company

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## Authors

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### **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. She was awarded the Denzil and Dorethy Carr Prize for her plant collection in 2006. 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

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### **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;
- 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.

.....  
SIGNED

.....  
DATE

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## Acronyms

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<b>CBA</b>	Critical Biodiversity Area
<b>CR</b>	Critically Endangered
<b>CCR</b>	Core Cape Subregion
<b>ECO</b>	Environmental Control Officer
<b>EN</b>	Endangered
<b>EIA</b>	Environmental Impact Assessment
<b>EOO</b>	Extent of Occupancy
<b>FE</b>	Founders Estate
<b>GBIF</b>	Global Biodiversity Information Facility
<b>GCFR</b>	Greater Cape Floristic Region
<b>GIS</b>	Geographical Information System
<b>IBA</b>	Important Birding Areas
<b>IUCN</b>	International Union for Conservation of Nature
<b>KBA</b>	Key Birding Areas
<b>LC</b>	Least Concern
<b>NBSAP</b>	National Biodiversity and Strategy Action Plan
<b>NEMBA</b>	National Environmental Management Biodiversity Act
<b>PNCO</b>	Provincial Nature Conservation Ordinance
<b>SCC</b>	Species of Conservation Concern
<b>QDS</b>	Quarter Degree Square
<b>SA</b>	South Africa
<b>SANBI</b>	South African National Biodiversity Institute
<b>SCC</b>	Species of Conservation Concern
<b>TOPS</b>	Threatened and Protected Species
<b>VU</b>	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 (GN R. 320 of 2020).

SPECIALIST REPORT REQUIREMENTS			SECTION OF REPORT
1.	General Information		
1.4	Where the information gathered from the site sensitivity verification differs from the screening tool designation of <b>“very high” or “high”</b> , for terrestrial animal species sensitivity and it is found to be of a <b>“low”</b> sensitivity, then a Terrestrial Animal Species Compliance Statement must be submitted.		Refer to section 2.5, section 4.4 and chapter 5
2.	Terrestrial Animal Species Specialist Assessment		N/A
3.	Terrestrial Animal Species Specialist Assessment Report		N/A
4.	Medium Sensitivity Species of Conservation Concern Confirmation		N/A
5.	Terrestrial Animal Species Compliance Statement		
5.1	The compliance statement must be prepared by a SACNASP registered specialist under one of the two fields of practice (Zoological Science or Ecological Science).		Page 2-3 Appendix B and C
5.2	The compliance statement must:		
5.2.1	be applicable to the study area;		Section 2.1
5.2.2	confirm that the study area, is of “low” sensitivity for terrestrial animal species; and		Chapter 5
5.2.3	indicate whether or not the proposed development will have any impact on SCC.		Chapter 4
5.3	The 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 B and C
5.3.2	a signed statement of independence by the specialist;		Page 3
5.3.3	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;		Chapter 2
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	the mean density of observations/ number of samples sites per unit area.		Figure 2.1
5.3.6	where required, proposed impact management actions and outcomes or any monitoring requirements for inclusion in the EMP;.		Section 6.2
5.3.7	a description of the assumptions made and any uncertainties or gaps in knowledge or data; and		Section 1.3
5.3.8	any conditions to which the compliance statement is subjected.		Section 1.3
6.	A signed copy of the Terrestrial Animal Species Compliance Statement must be appended to the Basic Assessment Report or the Environmental Impact Assessment Report.		✓

# 1. INTRODUCTION

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## 1.1. Project Description

Boschendal (Pty) Ltd (the proponent) has acquired the land use rights to the subdivision and development of eighteen (18) so-called Founders' Estates (FEs) on a portion of its landholdings. The Founders' Estates comprise 18 different farms of approximately 25 ha each, with each one having an area of 8,000m<sup>2</sup> (referred to as the "Excluded Area") within which a homestead may be developed (subject to agreement from various authorities/ stakeholders and within the scope of a specific set of guidelines). A Developable Area (DA) has been provisionally determined within the 8000m<sup>2</sup> Excluded Area of each FE, ranging from 1,200m<sup>2</sup> to 2,400m<sup>2</sup>. The exact positioning of each DA within each Excluded Area must still be defined and will be subject to building design, heritage, and environmental considerations. These development footprints are not included in the scope of this environmental application and each DA would be subject to separate environmental application/s, if required, once defined.

In the interim, the proponent intends to install new service infrastructure and expand on existing infrastructure to ensure that the entire Founders Estate is serviced. The proponent also intends to formalise existing farm roads and develop new sections of roadway.

The scope of the environmental application includes the following:

- The installation of a new bulk foul sewer line, bulk water pipelines and rising main, stormwater infrastructure (swales and culverts) and fibre internet ducts;
- The expansion of existing electricity and irrigation lines;
- The formalisation of existing farm roads;
- The development of new sections of formal roadway (noting that there are existing dirt tracks and paved roads on the site which will be expanded upon in terms of length and not width);
- The construction of a new 100kl reservoir and new sewer pump station;
- The installation of an "external" (beyond the limits of the Founders Estate) sewer pipeline and water pipeline in order to connect the Estate to the municipal network.

Most of the service corridors will be located within existing roadway or informal, transformed road shoulders. However, there will be installation of services beyond existing roadway, and/or close to, within, or across watercourses, which in some areas would also entail the clearance of indigenous vegetation. Where the routings of service lines overlap, services will be installed within the same 1m wide trench.

Each service infrastructure component included in the scope of this Basic Assessment (BA) is summarised in Table 1.2 and depicted in Figure 1.2 below. Further descriptions of each component are included in the main BA report.



**Table 1.1: List of infrastructure and dimensions that for part of this assessment**

	<b>New Development component</b>	<b>Total length (m)</b>	<b>Width/diameter</b>	<b>Total footprint</b>
<b>Internal Services</b>	Sewer pipelines – below ground	3 750 m	160 mm diameter	3 750 m <sup>2</sup>
	Sewer pipelines - above ground	200 m	250 mm diameter	200 m <sup>2</sup>
	Water pipelines	7 350 m	110 mm diameter	7 350 m <sup>2</sup>
	Rising Main	2 350 m	75 mm diameter	2 350 m <sup>2</sup>
	Electricity lines	5 200 m	N/A	5 200 m <sup>2</sup>
	Irrigation lines	1 250 m	32 mm diameter	1 250 m <sup>2</sup>
	Fibre ducts	6 100 m	90 mm diameter	6 100 m <sup>2</sup>
	New roads	335 m	3.0 m – 5 m	1 435 m <sup>2</sup>
	Reservoir	N/A	N/A	20 m x 20 m
	Culverts	N/A	N/A	TBC
<b>External Services</b>	Water Pipeline	750 m	250 mm diameter	750 m <sup>2</sup>
	Sewer Pipeline	350 m	160 mm diameter	350 m <sup>2</sup>

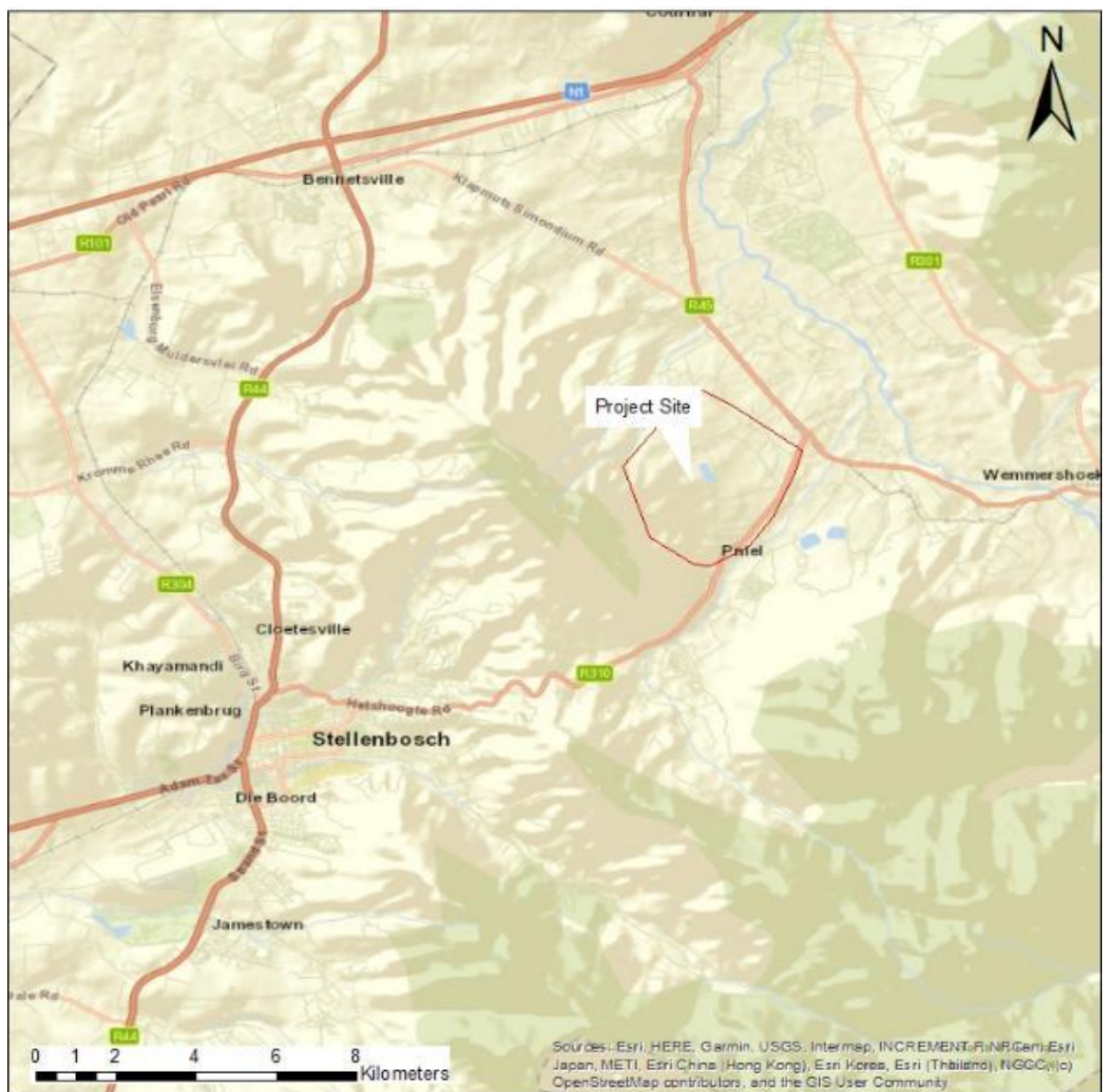
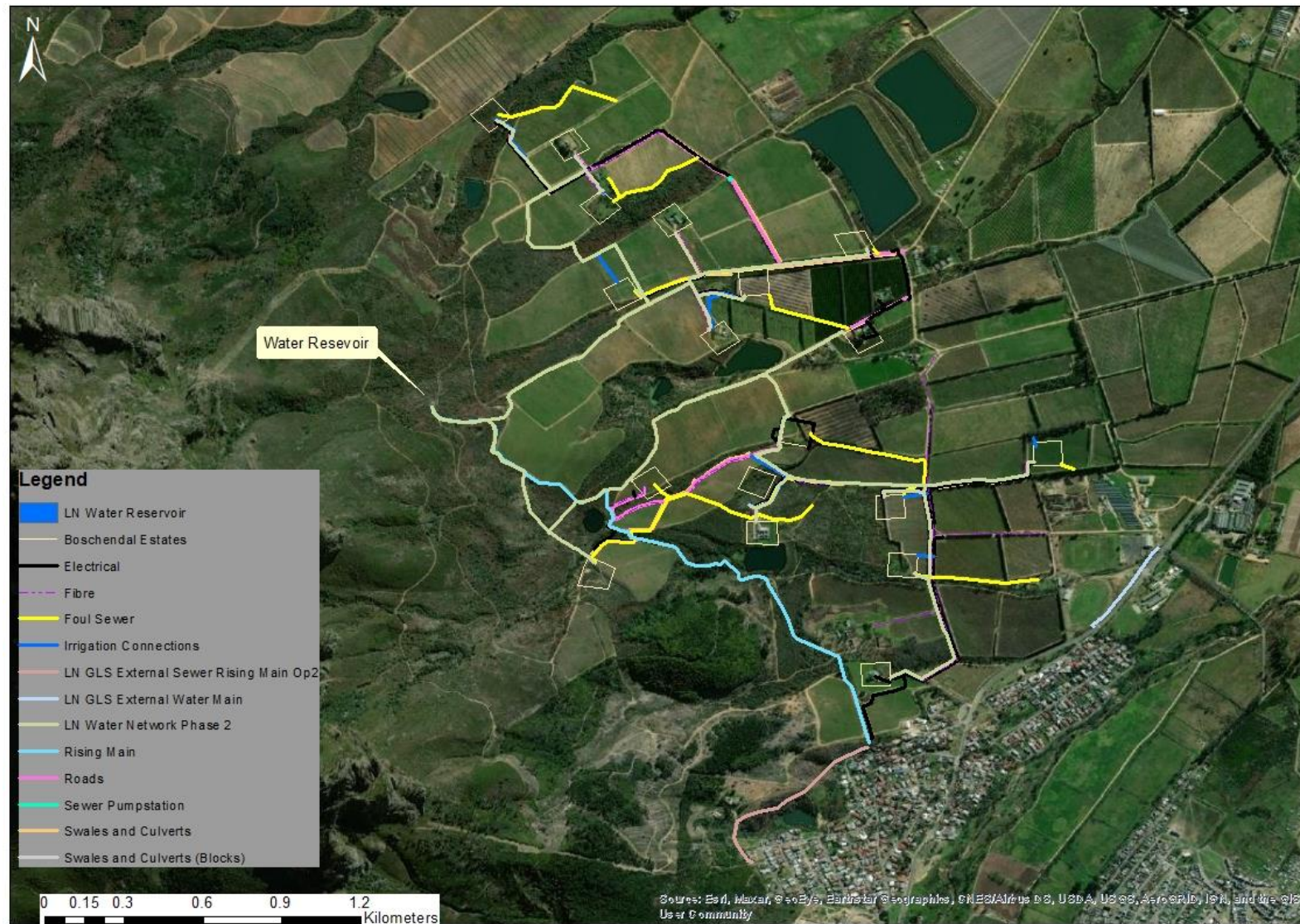


Figure 1.1: Locality map showing the project site in relation to Pniel and Stellenbosch



**Figure 1.2: Infrastructure Map showing the location of the service infrastructure required**

## **1.2. Objectives**

The objectives of this faunal assessment are as follows:

- Undertake a desktop assessment to generate a faunal species list for the area and identify which of those species are species of conservation concern (SCC).
- Undertake a field survey, to record the following information:
  - Faunal species present
  - Faunal species of conservation concern present
  - Faunal habitat present and condition of each habitat
- Assess the site ecological importance using the sensitivity analysis outlined in the Species Guideline Document (2020).
- Where necessary, provide mitigation measures to reduce the impact of the infrastructure on the fauna..
- Provide a specialist statement/opinion

## **1.3. Limitations and Assumptions**

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

- The report is based on a project description received from the client.
- Species of Conservation Concern (SCC) are difficult to find and may be difficult to identify, thus species described in this report may be at a desktop level.
- Sampling could only be carried out at one stage in the annual or seasonal cycle. The survey was conducted in late spring and some species may have gone undetected, however, the time available in the field, and information gathered during the survey was sufficient to provide enough information to determine the status of the affected area.
- This report only covers the faunal aspects of the site. Botanical aspects are covered in a separate report.



## 2. METHODOLOGY

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### 2.1. Project Area

The “project area” or “impacted project site” is defined as the area that will be directly impacted by project infrastructure such as the pipelines, roads, electrical and fibre lines (Figure 1.2).

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

### 2.2. Desktop Assessment

The known diversity of the vertebrate fauna 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:

- Amphibians –Du Preez & Carruthers (2017), FrogMap (ADU, 2021)
- Reptiles – Branch (1998), ReptileMap (ADU, 2021),
- Birds – Chittenden (2009), SABAP2
- Mammals – Stuart & Stuart (2014), MammalMap (ADU, 2021).

To establish which of those species identified in the literature review are Species of Conservation Concern (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 Data book of Birds of South Africa, Lesotho and Swaziland (Taylor *et al.*, 2015)
- Red List of Mammals of South Africa, Swaziland and Lesotho.
- CITES Appendix I and II

### 2.3. Field Survey

A field survey was undertaken during from the 25-26 October 2021. The site was assessed for suitable breeding habitat and nests for the Black Harrier and a vantage point count was conducted in the morning and afternoon. Additionally, active searches for mammal, reptile and amphibian species was also undertaken during the site visit and involved direct sightings of the species as well as looking for evidence of their occurrence e.g. burrows, scat and spoor.

### 2.4. Site Sensitivity Assessment

The Species Environmental Assessment guideline (SANBI, 2020) was applied to assess the Site Ecological Importance (SEI) of the project area. The habitats and the species of conservation concern in the project area were assessed based on their conservation importance, functional integrity and receptor resilience (Table 2.1). 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 2.1: Criteria for establishing Site Ecological importance and description of criteria**

Criteria	Description
Conservation Importance (CI)	<i>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 &amp; NT), Rare, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes.</i>
Functional Integrity (FI)	<i>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.</i>
Biodiversity Importance (BI) is a function of Conservation Importance (CI) and the Functional Integrity (FI) of a receptor.	
Receptor Resilience (RR)	<i>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.</i>
Site Ecological Importance (SEI) is a function of Biodiversity Importance (BI) and Receptor Resilience (RR)	

## 2.5. DFFE Screener and Compliance Statement

Based on the results from the screening tool for the site, the proposed project area falls within an area with a high Animal Species Theme based on the presence of an endangered bird species (*Circus maurus* – Black Harrier) and two invertebrate species. Please note that this quote does not cover the invertebrate species.

Based on the type of project the specialist notes that a Terrestrial Animal Species Compliance Statement is required and not a Terrestrial Animal Species Specialist Assessment Report. As per 1.4 of GNR. 320 (2020) if the site sensitivity verification differs from the screening tool and the terrestrial animal species sensitivity is found to be of a “**low**” sensitivity then a Terrestrial Animal Species Compliance Statement must be submitted. However, this species is assessed in full in the Section 4.4 and Chapter 5.



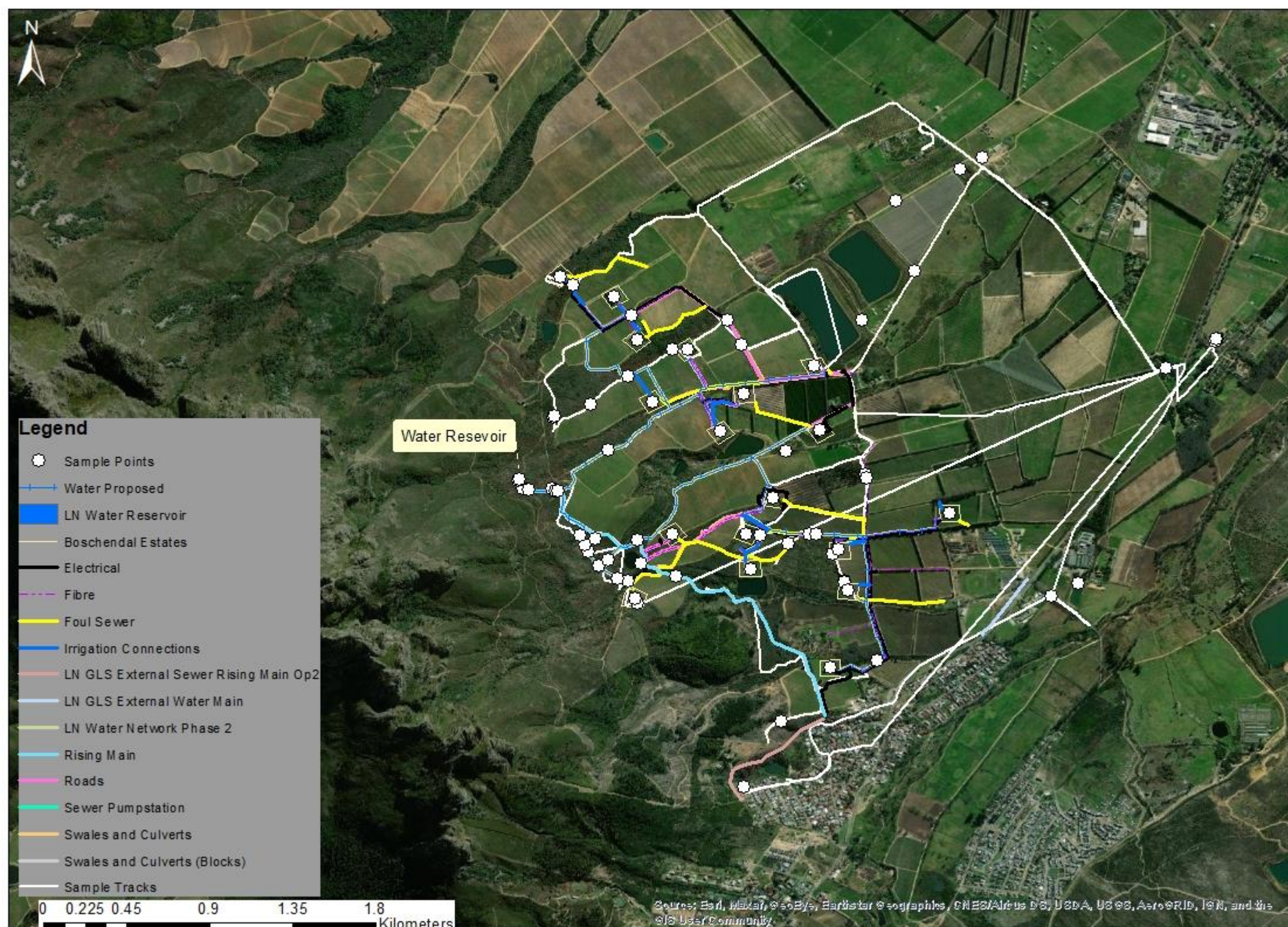


Figure 2.1: Map showing sample tracks within and adjacent to the project site.



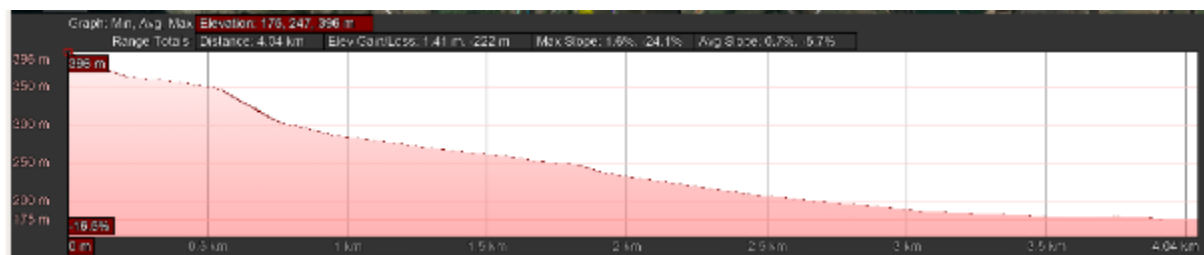
### 3. BIOPHYSICAL DESCRIPTION

#### 3.1. Climate

The project site is situated in the south-western part of the Core Cape Subregion (CCR) which experiences a strictly Mediterranean climate with rainfall occurring primarily in the winter months (Manning and Goldblatt, 2012). Pniel, the closest town to the project site, experiences its highest rainfall from May to September (worldweatheronline, 2021) while summers are typically warm and dry. January and February are the hottest months with average temperatures of 27°C while July and August are the coolest months with minimum average temperatures of 7°C. The steep slopes of the mountain ranges such as the Drakenstein and Simonsberg, that occur within close proximity to the project site, provide greater climatic variation resulting in a higher diversity of habitats and therefore species diversity (Manning and Goldblatt, 2012).

#### 3.2. Topography

The project site is situated on the eastern slopes of the Simonsberg Mountain Range. The site slopes towards the northeast with the elevation changing from 396 masl in the west to 184 masl in the east (Figure 3.1 and 3.2).



**Figure 3.1: Elevation profile showing the change in slope from south west to north east**



**Figure 3.2: Photograph illustrating the general topography of the site.**



### 3.3. Geology and Soils

The project site is located within the Cape Granite Suite which is comprised of porphyritic, medium or fine grained granite and granodiorite (a coarse-grained plutonic rock containing quartz and plagioclase). It is also comprised of subordinate syenite (a coarse-grained grey igneous rock), gabbro (a dark, coarse-grained plutonic rock of crystalline texture), diorite (a speckled, coarse-grained igneous rock) and quartz porphyry (a type of igneous rock containing large quartz crystals) (CapeFarmMapper, 2021).

The underlying geology gives rise to apedal, freely drained red-yellow soils. Clay content varies between 15 and 35% with soil depths >750mm.

### 3.4. Hydrology

The main river flowing through Boschendal is the Dwars River, a perennial tributary of the Berg River. A number of tributaries that feed into the Dwars and Berg Rivers cross the study area. The tributaries on the northern side of Helshoogte Road drain the Simonsberg Mountains and many of them flow into the Werda River which then enters the Berg River. Although the streams are in a near pristine state in their upper catchments, many of these are altered as they flow into the cultivated areas. Additionally, many of these streams enter farm dams scattered across the farm. Water abstraction occurs from both the dams and impoundments as well as directly from the water courses crossing the farm (FCG, 2019).

### 3.5. Vegetation

The vegetation types recorded within the PAOI are:

- Intact Boland Granite Fynbos
- Degraded Boland Granite Fynbos
- Agricultural and Transformed Land

Intact Boland Granite Fynbos occurs along the western portion of the project site and along drainage lines and streams. This vegetation type is characterised by the presence of species such as *Cliffortia polygonifolia*, *Cliffortia ruscifolia*, *Dicerotheramnus rhinocerotis*, *Helichrysum petiolar*, *Leucadendron salicifolium*, *Osteospermum moniloferum*, *Pelargonium alchemilloides*, *Stoebe plumsosum* and *Searsia angustifolia*. Trees and shrubs along the riparian areas include *Brabejum stellatifolium*, *Searsia angustifolia*, *Diospyros glabra* and often invasive species such as *Acacia mearnsii*. *Pteridium aquilinum* (bracken) typically occurs adjacent to riparian areas.

Within the intact patches are a few patches of Degraded Boland Granite Fynbos that have been infested with alien species and have been, or are in the process of, being cleared. These areas are often covered in large patches of *Pteridium aquilinum* (bracken), some indigenous species such as *Dicerotheramnus rhinocerotis*, *Helichrysum petiolar*, *Osteospermum moniloferum* as well as saplings of invasive species such as *Acacia longifolia*, *Acacia mearnsii*, *Verbena bonariensis* and *Solanum mauritanium*.

The agricultural land is completely transformed and not representative of natural vegetation. Fallow areas are characterised by ruderal and grass species.

### **3.6. Faunal Habitat**

Faunal habitats are defined for the purposes of this report as the natural environment or place where an organism, population or species lives, breeds and/or forages. Each habitat type has different environmental conditions which influences faunal species distribution. Habitat types are often similar to vegetation types, but the classification of vegetation types is very dependant of the plant species composition. Habitat types are based on a combination of plant species composition, as well as vegetation structure, topography, substrate and ecosystem goods and services.

Seven broad habitats were identified across the Boschendal Estate, namely:

1. Aquatic and riparian habitat surrounding dams, rivers and wetlands
2. Fynbos habitat (intact and degraded natural Boland Granite Fynbos)
3. Rocky outcrops
4. Agriculture (Pastures & Vineyards/Orchards)

## 4. RESULTS

### 4.1. Amphibians

The Western Cape hosts 62 amphibian species, of which 36 are endemic to the province, eight are threatened and seven are near-threatened (Turner & Villiers, 2017).

The project site intersects the distribution range of 20 amphibian species of which 19 species have been recorded in the quarter degree squares (3318DD) within which the study site occurs (ADU, 2018) (Appendix A). Previous studies recorded the Raucous Toad (*Sclerophrys capensis*), Cape Sand Frog (*Tomopterna delalandii*), Clicking Stream Frog (*Strongylopus grayii*), Cape River Frog (*Amietia fuscigula*) and Common Platanna (*Xenopus laevis*) in aquatic habitats across the Boschendal Estate (CES, 2019).

The project site intersects the distribution of 11 endemic and three are Near-Threatened amphibian species. The three Near-Threatened amphibian species are also endemic to the Western Cape Province and two species, the Cape Rain Frog (*Breviceps gibbosus*) and Cape Caco (*Cacosternum capense*) have high likelihood of occurrence based on distribution, habitat requirements and available habitat on site (Table 4.1). Although these two species are likely to be present, project infrastructure will have a negligible impact on their habitat as it has been designed to follow existing roads and service corridors and the footprint is relatively small.

**Table 4.1: Amphibian SCC (Endemic to the WC) with a distribution that includes the project area.**

Common name	Habitat	Treat Status		Likelihood of Occurrence
		(IUCN)	(Minter <i>et al.</i> , 2004)	
Landroskop Moss Frog ( <i>Arthroleptella landdrosia</i> )	<p>AOO: 406.27km<sup>2</sup>            EOO: 1357.44km<sup>2</sup>            &lt;1200m asl</p> <p>This species is only known from 12 locations and is endemic to the Hottentots Holland, Jonkershoek and Helderberg Mountain ranges (Figure 4.1).</p> <p>It inhabits riverine forest near streams and very steep seepages including cliff faces, preferring higher altitudes. It does not survive in degraded areas.            (du Preez &amp; Carruthers, IUCN SSC ASG, 2016).</p>	NT	NT	<p><b>Low</b></p> <p>This species was recorded in June 2019 from Simonsberg Nature reserve (Mountain backing the FE's to the west) (iNat, 2022) and one individual was recorded in Sept 2001 in the same QDS as the project area (FrogMAP, 2022). This species specific habitat requirement means that although the project area intersects the a portion of its distribution, the species is likely to occur at higher elevations than where the project area is situated.</p>
Cape Rain Frog ( <i>Breviceps gibbosus</i> )	<p>This species favours Renosterveld fynbos heathland and is also found in disturbed habitats in burrows in well-drained soil</p>	<p>N T            (IUCN SSC, 2017).</p>	VU	<p><b>High</b></p> <p>Habitat exists on site, specifically the Boland Granite Fynbos. This species was last recording in the</p>

	(du Preez & Carruthers, 2017; IUCN SSC, 2017).			QDS in July 2020 with a total of 42 individuals for the QDS (FrogMAP, 2022) and a number of records 6km SW of Pniel near Stellenbosch from Oct 2021 (iNat, 2022).
Cape Caco ( <i>Cacosternum capense</i> )	<p>EOO: 14,505 km<sup>2</sup>          AOO: 6421.23km<sup>2</sup>          &lt;280m asl</p> <p>This species is only known from 12 locations</p> <p>This species is restricted to temporary rain-filled depressions and pans in low lying flat or gently undulating areas with poorly drained clay or loamy soils including cultivated land.          (du Preez &amp; Carruthers, 2017; IUCN SSC &amp; SA-FRoG, 2017)</p>	NT	VU	<p><b>High</b></p> <p>Last recorded 17 individuals in the QDS in 1999 (FrogMAP, 2022).          The project area is within the distribution range of this species and suitable habitat is present on site</p>

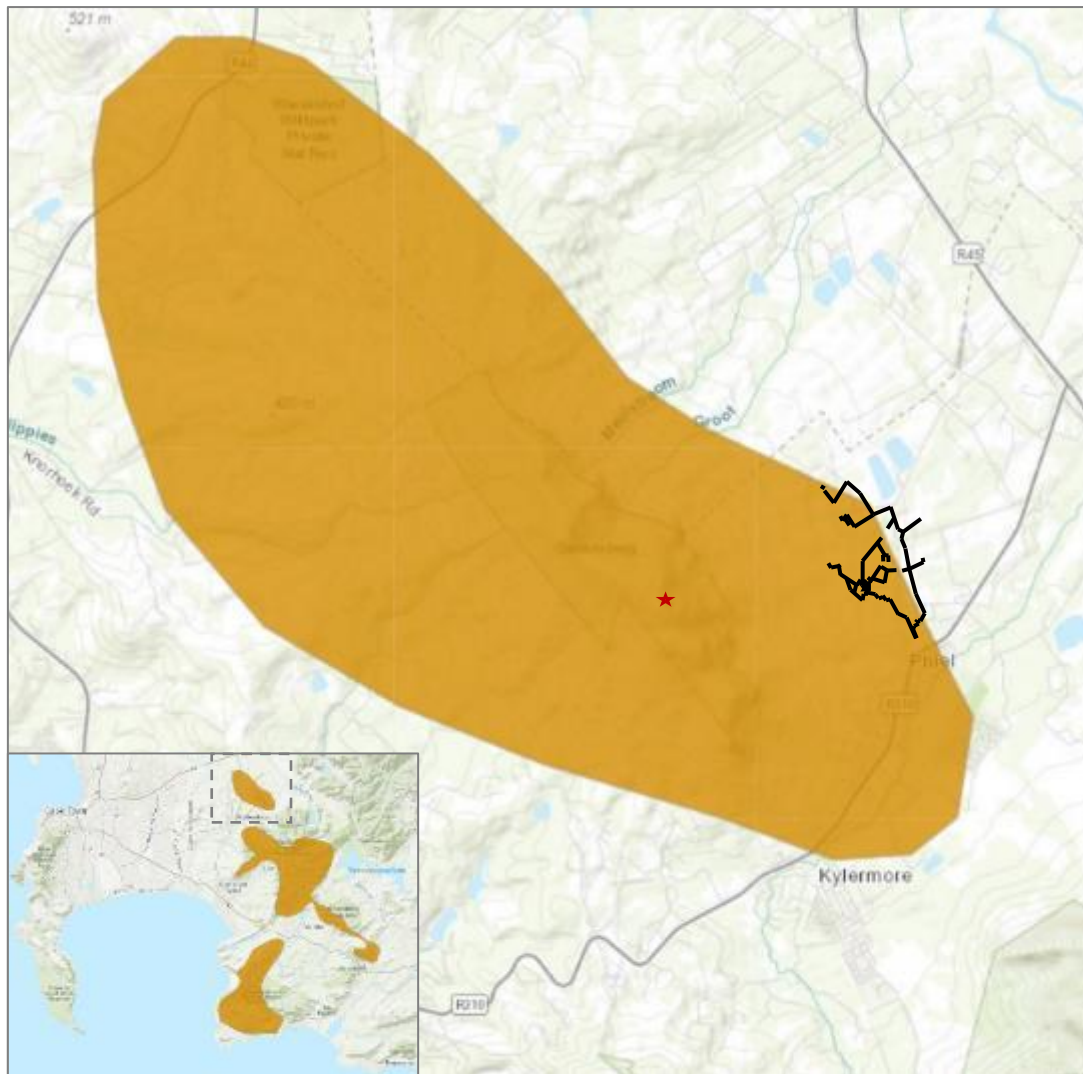


Figure 4.1: Landroskop Moss Frog (*Arthroleptella landdrosia*) (IUCN SSC & SA-FRoG, 2016).

## 4.2. Reptiles

The Western Cape Province hosts 155 reptile species of which 22 are endemic and 21 species are either threatened or near-threatened (Turner & Villiers, 2017). Approximately 53 of these reptile species have a distribution range that includes the project area of which 46 have been recorded within the QDS 338DD (Appendix A). The Southern Rock Agama (*Agama atra*) was observed at multiple higher elevation rocky outcrops across the site during the field survey (Figure 4.2). Previous studies recorded the Common Padloper (*Homopus areolatus*), Ocellated Gecko (*Pachydactylus geitje*), Red-sided Skink (*Trachylepis homalocephala*) and the Marbled Leaf-toed Gecko (*Afrogecko porphyreus*) (CES, 2019).

Two notable species of conservation concern have a distribution range which includes the project area and have a high likelihood of occurring in the project area, namely the Geometric Tortoise (*Psammobates geometricus*) listed as critically endangered, and the Cape Dwarf Chameleon (*Bradypodion pumilum*) listed as near-threatened (Table 5.2). Both species are also Western Cape endemics. Should *P. geometricus* occur in the project area it will be in the intact Boland Fynbos vegetation and *B. pumilum* is likely to inhabit the short-medium vegetation around the dam, wetlands and rivers. Given the type of development, (linear infrastructure, either crossing these habitats or placed within the road verge), the habitat important to these species is, for the most part, avoided.



Figure 4.2: Southern Rock Agama (*Agama atra*) observed at the project area

Table 4.2: Reptile SCC

Name	Habitat	Red list category		Likelihood of occurrence
		National (Minter <i>et al.</i> , 2004)	Global (IUCN)	
Geometric Tortoise ( <i>Psammobates geometricus</i> )	EOO: 2827km <sup>2</sup> AOO: 22 km <sup>2</sup> 70–600 m ASL MAR 350-600 mm  Endemic to the SW part of the WC. This species inhabits Fynbos	CE	CE	<b>High</b> In the low-lying intact Boland Granite Fynbos.  The nearest know records are from the Paarl district ±11.5km North of the site.

	(alluvium, shale, sand/stone & granite) and Renosterveld (shale, granite and silcrete) on low-lying, undulating plains and occasionally utilises other animals' burrows (Hofmeyr & Baard, 2018).			Records from this area are from Sept 2021 (iNat, 2022). ReptileMAP recorded 33 individuals in the QDS last record July 2020
Cape Dwarf Chameleon <i>(Bradypodion pumilum)</i>	<p>EOO: 11518km<sup>2</sup></p> <p>Endemic to SW corner of the WC.</p> <p>This species inhabits the canopy of shrubs in fynbos, renosterveld and thicket vegetation. It will also inhabit riparian vegetation and some exotic and native trees but is absent from agricultural habitats (Tolley, 2018).</p>	VU	NT (Tolley, 2018)	<p><b>High</b></p> <p>In the fynbos vegetation surrounding the aquatic features.</p> <p>Last recorded Dec 2020 (ReptileMAP, 2022) with a total count of 79 for the QDS. Nearest record on iNat is at the Banhoek Conservancy 3km SSW of Pniel in April 2020.</p>



### 4.3. Mammals

The Western Cape hosts approximately 172 mammal species of which 24 species are threatened and 13 species are near threatened. Eight species are endemic and ten species are near endemic (Birss, 2017). Approximately 93 mammal species have been recorded in QDS 3318DD within which the site is located (ADU, 2022; Appendix A). However, the QDS records include large mammal species that no longer occur in the area including large antelope and carnivores (lion, wolf), unless otherwise introduced. Rodents (mice, rats, porcupines), shrews, hares, bats, small antelope and small carnivores (mongoose, otters) are expected to utilise the site either permanently (shelter/breeding) or intermittently for foraging and/or cover.

Previous assessments on the property recorded the Cape Porcupine (*Hystrix africaeaustralis*), Mongoose, Duiker (*Sylvicapra grimmia*), Cape Gerbil (*Gerbilliscus afra*), Moles, Hares and the Eastern Grey Squirrel (*Sciurus carolinensis*) (Biodiversity Africa, 2021; CES, 2019). The site visit confirmed the presence of Porcupine, Mongoose and Golden Moles (Figure 4.3).

One vulnerable, six near threatened, three endemic and five near endemic mammal species have a distribution which includes the project area (Table 4.3). Three species have a high likelihood of occurrence, the Fynbos Golden Mole (*Amblysomus corriae*), Cape Golden Mole (*Chrysochloris asiatica*) and African Clawless Otter (*Aonyx capensis*). Trench construction may disturb some on the Mole species tunnels and may even expose species themselves, provided development keeps trenching size to a minimum and allows for moles that may burrow into the trenches to escape by including gradual slopes at intervals in the trenches the development is unlikely to impact the mole species. For the most part habitat important to the otter and mole species is avoided.



**Figure 4.3: Signs of mammals in the project area. Porcupine den, Golden Mole subsurface tunnel and Mongoose hole .**



**Table 4.3: SCC with a distribution that includes the project area**

Name	Conservation status		Habitat requirements	Occurrence	Likelihood of Occurrence in the Project Area
	National	Global			
Leopard ( <i>Panther pardus</i> )	VU	VU	Densely wooded and rocky areas are preferred habitat although across its distribution it has a wide habitat tolerance (grassland savannah, coastal scrub, shrubland and semidesert) (Swanepoel, et al., 2016; Stein, et al., 2020).	Last recorded in Oct 2020, with 140 records for the species in QDS 3318DD. iNat illustrates two records in the project area in 2015 and 2012 with the most recent record across the R310 in May 2021.	Moderate  If this species uses the project area, it is unlikely to be permanent and only as passage
White-tailed Rat ( <i>Mystromys albicaudatus</i> )	VU	VU	Population: 6,997-13,648. AOO: 3,719 km <sup>2</sup> 0-3719m asl This species shows a preference for grasslands with shallow limestone substrate/calcrete soils living in burrows or crevices. Little is known about this species as it has proved difficult to sample (Avenant, et al., 2016; Avenant, et al., 2019).	No records on MammalMAP or iNaturalist for the area.	Low
Grey Rhebok ( <i>Pelea capreolus</i> )	NT	NT	Inhabit rocky hills, grassy mountain slopes, and plateau grasslands and require good grass cover for shelter (Taylor, Cowell & Drouilly, 2017; Taylor, et al., 2016).	Only 3 records in the QDS 3318DD and the last record is from 1980 (MammalMAP, 2022).  One confirmed record from east of the site in the Hawequas Nature Reserve in 2013 (iNaturalist,2022).	Low  Although habitat exists on site this species is likely restricted to the mountainous areas around Stellenbosch and if it occurs will occur at higher elevations away from where the infrastructure will be placed.
Spectacled Dormouse ( <i>Graphiurus ocellaris</i> )	NT	LC	Inhabits sandstone crevices in Shrubland areas.	Six individuals recorded in in the QDS 3318DD and the last record is from 2008. The nearest records on iNaturalist are just south of Ceres.	Low  Habitat in the project area is likely unsuitable for this species.
Laminate Vlei Rat	NT	NT	0-2000m asl	No records on MammalMAP or iNaturalist for the area but it has “a	Moderate

( <i>Otomys laminatus</i> )			Inhabits grasslands, wetlands, restio-dominated fynbos, coastal forests and pine plantations.	<i>patchy distribution in the Western Cape (Paarl and Cape Town areas)</i> " (Taylor, Baxter & Child, 2016)	Habitat exists on site and is known to occur just north of the site.
Fynbos Golden Mole ( <i>Amblysomus corriae</i> )	NT	NT	AOO: 256 km <sup>2</sup> EOO: 71,900 km <sup>2</sup>  Inhabits Renosterveld and Fynbos sandy soils and soft loams as well as afromontane forest, moist savanna, plantations and transformed area such as agricultural areas, golf courses and gardens. Only known from 16 Locations in the Western Cape.	Last recorded in 2005, with 55 records for the species in QDS 3318DD.  Occurs through Paarl and Stellenbosch and coexist with the Cape Golden Mole ( <i>Chrysochloris asiatica</i> ) in these areas.	High  A golden mole subsurface tunnel was observed on site.
Cape Golden Mole <i>Chrysochloris asiatica</i>	NT	LC	EOO: 82,000 km <sup>2</sup> WC Near-Endemic Inhabits sandy soils in Renosterveld, Fynbos and Strandveld Succulent Karoo and even forages on beaches. It tolerates transformed areas such as cultivated lands and lawned areas. This species can reach a density of 4 per ha in prime habitat (Bronner, 2015).	Last recorded in 2013, with 51 records for the species in QDS 3318DD. Recorded SE near Stellenbosch and NW near Klapmuts on iNaturalist (2022)	High  A golden mole subsurface tunnel was observed on site.
African Clawless Otter ( <i>Aonyx capensis</i> )	NT	NT	0-3000m asl Provided freshwater (0.5–1.5 m deep) is available this species can occur in a variety of habitats. Permanent habitation is dependent on the availability of prey and shelter and females may exhibit territoriality in these areas.	Last recorded in 2012, with 29 records for the species in QDS 3318DD. Records from Jonkershoek (2021) and Paarl (2022)	High  Along rivers and other aquatic features such as wetlands and dams.
African Marsh Rat ( <i>Dasymys sp</i> )	NT	LC	Inhabits well vegetated and wet habitats occurring " <i>specifically, in reed beds and among semi-aquatic grasses in wetlands or swampy areas or along rivers and streams, as well as in grassy areas close to water. They nest in holes along the banks of rivers and ponds</i> " (Pillay, 2016).	No records on MammalMAP or iNaturalist for the area. It is known from just a few localities, occurring from Wolsley to Knysna (Pillay, 2016).	Moderate  Along rivers and other aquatic features such as wetlands and dams.

## 4.4. Birds

The western Cape hosts 608 bird species (including offshore water birds) and the South African Bird Atlas Project (SABAP2) records state 124 species have been recorded in the same pentad (3350\_1855) as the project area (Figure 4.3). A previous study by CES (2019) recorded 62 bird species on the Boschendal estate including the Cape Sugarbird specific to the Fynbos vegetation.

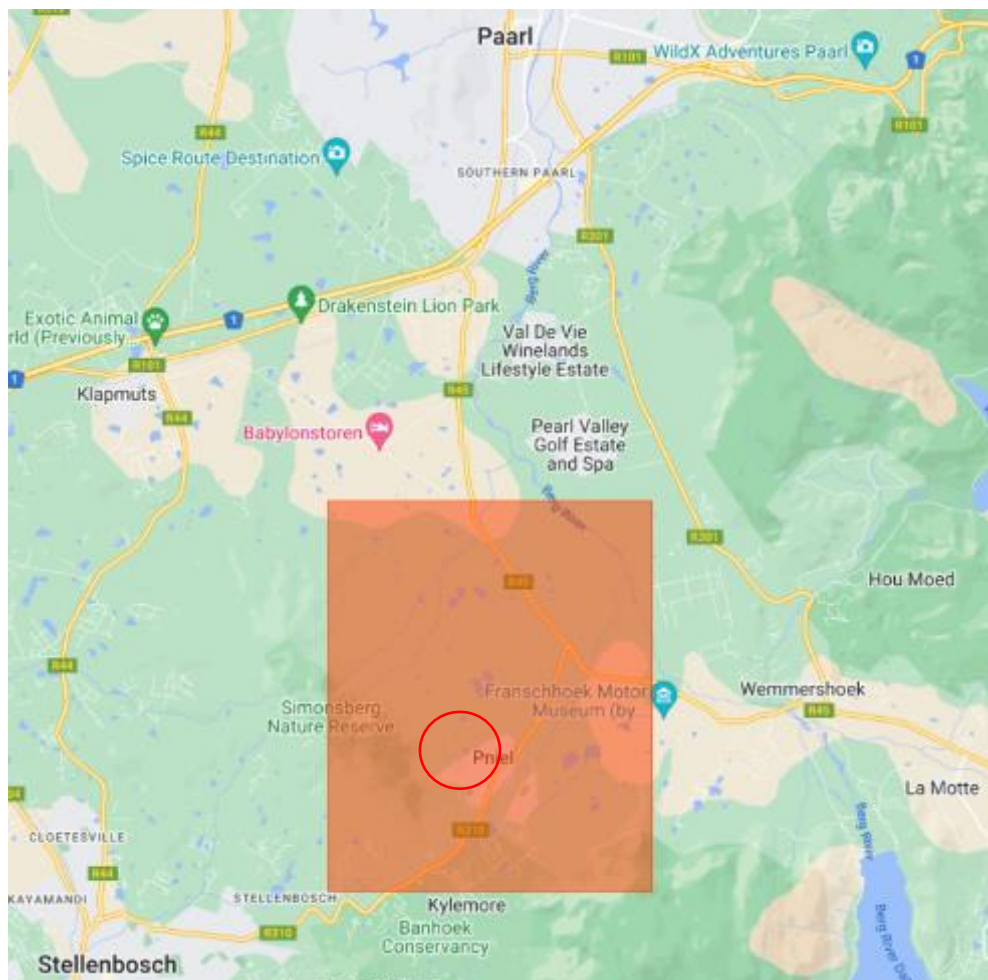


Figure 4.4: SABAP 2 Pentads 3350\_1855 in relation to the project area (yellow circle).

One bird species of conservation concern was highlighted in the DFFE Screener, namely the, Black Harrier (*Circus maurus*) (listed as endangered). This is due to the project area having suitable mapped habitat within its distribution range.

**Table 4.4: Bird SCC flagged by the DFFE Screener, their habitat requirements and likelihood of occurrence in the project area**

Species	Threat Status	Habitat Requirements	Likelihood of Occurrence
Black Harrier  ( <i>Circus maurus</i> )	EN	<p>1,340,000km<sup>2</sup> 251-999 individuals</p> <p>The Black Harrier occurs in coastal and montane fynbos in the Western Cape particularly near vleis, marshes, streams or dams as well as dry grasslands, Karoo subdesert scrub, open plains with low shrubs and croplands. In renosterveld breeding is restricted to intact patches exceeding 100ha.</p> <p>This species breeds close to coastal and upland marshes with tall shrubs or reeds, and damp sites, near vleis, marshes or streams, are preferred for breeding. Nests are shallow platform nests built on the ground, either dry or damp underfoot and not over water. They are typically concealed by rank vegetation. Breeding occurs from Aug- Nov with nestlings departing approximately two months later.</p> <p>Prefers open ground with low vegetation for hunting, where it feeds on a diet comprising mainly of small mammals, especially <i>Otomys</i> and <i>Rhabdomys</i> species at coastal sites and birds in montane habitats. At inland sites the diet shifts between small mammals to birds depending on the season.</p> <p>(BirdLife Int., 2016; Taylor et al., 2015; Tarboton, 2014 and Chittenden, 2009)</p>	<p><i>Moderate</i></p> <p><i>C. maurus</i> was recorded by the SABAP2 in March 2019 in pentads (3350_1855). The nearest records to the project area were in Franshoek in Aug 2020 19km east of the project area (iNaturalist, 2022).</p> <p><i>Rhabdomys pumilio</i> was recorded 2.5km west and 4.5km NW of the project area in 2018 and 2020 respectively (iNaturalist, 2022) and MammalMAP has 391 records for the QDS with the last record from 2016. It is highly likely <i>C. maurus</i> prey exists within the project area.</p> <p><i>The project area does not offer suitable breeding habitat, if it does breed it will be restricted to the wetland features. It does, however, offer foraging ground as its prey (birds and rodents) have been recorded in the area.</i></p> <p><i>All proposed infrastructure is below ground, including electrical cabling. If this species forages on site the project is not expected to significantly disturb its foraging activities given the type and size of the development.</i></p>

In addition to the above, the Western Cape hosts 28 threatened and 19 near threatened bird species of which 10 threatened and 13 near-threatened birds have a distribution which includes the project area. The Black Harrier, Cape Rockjumper and Ground Woodpecker were recorded in the pentad on SABAP2 in 2019 and the study by CES (2019) recorded the Forest Buzzard and Blue Crane.

**Table 4.5: SCC with a distribution that includes the project area**

Common name	Scientific name	Red list category		SABAP2
		National (Minter, et al., 2014)	Global (IUCN)	
Bank Cormorant	<i>Phalacrocorax neglectus</i>	Endangered	Endangered	-
Black Harrier	<i>Circus maurus</i>	Endangered	Endangered	X
Cape Cormorant	<i>Phalacrocorax capensis</i>	Endangered	Endangered	-
Cape Vulture	<i>Gyps coprotheres</i>	Endangered	Endangered	-
Fynbos Buttonquail	<i>Turnix hottentottus</i>	Endangered	Endangered	
Black Bustard	<i>Eupodotis afra</i>	Vulnerable	Vulnerable	-
Blue Crane	<i>Anthropoides paradiseus</i>	Vulnerable	Vulnerable	X
Damara Tern	<i>Sternula balaenarum</i>	Vulnerable	Vulnerable	-
Maccoa Duck	<i>Oxyura maccoa</i>	Vulnerable	Vulnerable	-
Martial Eagle	<i>Polemaetus bellicosus</i>	Vulnerable	Endangered	-
Secretary Bird	<i>Sagittarius serpentarius</i>	Vulnerable	Endangered	-
Bar-tailed Godwit	<i>Limosa lapponica</i>	NT	NT	-
Cape Rockjumper	<i>Chaetops frenatus</i>	NT	NT	X
Chestnut-banded Plover	<i>Charadrius pallidus</i>	NT	NT	-
Crowned Cormorant	<i>Microcarbo coronatus</i>	NT	NT	-
Curlew Sandpiper	<i>Calidris ferruginea</i>	NT	NT	-
Denham's Bustard	<i>Neotis denhami</i>	NT	NT	-
Eurasian Curlew	<i>Numenius arquata</i>	NT	NT	-
Forest Buzzard	<i>Buteo trizonatus</i>	NT	NT	X
Ground Woodpecker	<i>Geocolaptes olivaceus</i>	NT	NT	X
Lesser Flamingo	<i>Phoeniconaias minor</i>	NT	NT	-
Protea Canary	<i>Crithagra leucoptera</i>	NT	NT	-
Red Knot	<i>Calidris canutus</i>	NT	NT	-
Sentinel Rock-Thrush	<i>Monticola explorator</i>	NT	NT	-

## 5. SENSITIVITY

The Site Ecological Importance (SEI) was assessed for each habitat type identified for the project site.

- The habitat provided by rocky outcrops, rivers, wetlands and intact Boland Granite Fynbos is considered to have a High SEI for faunal species.
- The habitat provided by the degraded natural Boland Granite Fynbos vegetation is considered to have a Medium SEI for faunal species.
- The habitat provided by agricultural land is considered to have a Low SEI.

The majority of the proposed project has been placed within road verges and the infrastructure that falls within Medium SEI habitat has been kept to a minimum. Infrastructure (in trenches) will only disturb the habitats during construction and then trenches will be covered and left to recover during operation.

**Table 5.1: Evaluation of Site Ecological Importance (SEI) of habitat and SCC**

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience	SEI
Black Harrier ( <i>Circus maurus</i> )	High	High	Very High	Low
	Listed as EN under criteria C2a(ii)	Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches.	Species that have a very high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a very high likelihood of returning to a site once the disturbance or impact has been removed	
Rivers and Wetlands	Medium	High	Medium	Medium
	> 50% of receptor contains natural habitat with potential to support SCC	Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches.	Species have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	
	Medium	High	Medium	Medium

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience	SEI
Intact Natural Boland Granite Fynbos	> 50% of receptor contains natural habitat with potential to support SCC	Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types. Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches.	Species have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	
Degraded natural Boland Granite Fynbos	Medium	Medium	High	Low
	> 50% of receptor contains natural habitat with potential to support SCC	Mostly minor current negative ecological impacts with some major impacts (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential.	Species that have a high likelihood of returning to a site once the disturbance or impact has been removed.	
Agricultural	Low	Low	High	Very Low
	< 50% of receptor contains natural habitat with limited potential to support SCC	Several minor and major current negative ecological impacts.	Species that have a high likelihood of remaining at a site even when a disturbance occurs and likely to return to a site once the disturbance or impact has been removed.	

## 6. CONCLUSIONS AND RECOMMENDATIONS

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### 6.1. Conclusions

The majority of natural faunal habitat will not be impacted on by the proposed project as the infrastructure falls within and adjacent to existing road networks. For the most part the proposed development has been placed in areas of low ecological importance.

The Black Harrier (*Circus maurus*) (listed as endangered) was highlighted in the DFFE Screener as high sensitivity and would ordinarily require a Terrestrial Animal Species Specialist Assessment Report. However, the infrastructure has not been placed in habitats or near habitat features that could offer suitable breeding habitat for this species and the type of infrastructure (linear and trenching) would not significantly disturb its foraging activities nor does current evidence confirm use of the site for either activity (refer Table 4.4). The SEI for this species is considered Low and therefore only a Terrestrial Animal Species Compliance Statement is required. Despite this *C. maurus* has been assessed in full above and recommendations suggested below.

### 6.2. Recommendations

The following avoidance, management and mitigation measures have been proposed in an effort to protect faunal species during construction and operation of the proposed service infrastructure development.

- Keep vegetation clearing of Boland Granite Fynbos for the development to a minimum.
- Faunal species often use drainage lines for passage and the development footprints/ layouts have should these as well as a 32m buffer or the drainage line. Where these cannot be avoided the vegetation around rivers and wetlands should be restored.
- Should any fauna be encountered during construction, these must be recorded (photographed, gps co-ord) and placed on iNaturalist.
- Should any slow-moving fauna (e.g. tortoises) be in harm's way during construction these must be moved to adjacent suitable habitat.
- Any faunal species that may die as a result of construction must be recorded (photographed, gps co-ord) and if somewhat intact preserved and donated to the nearest university, museum or SANBI.
- A staff member must be designated and trained as a snake capturer and ideally be always onsite during construction to remove and relocate snakes out of harms way. Venomous snakes such as the puff adder and cape cobra have been recorded on the site. Emergency protocol must be set up should anyone be bitten by a venomous snake.
- Speed restrictions within the development for all vehicles (30km/h is recommended) should be in place to reduce the impact of killing fauna on the project roads.
- Trenches must be constructed so side walls have a gradual slope and not at right angles to allow small faunal species to exit.
- No night lighting should be used. If unavoidable, external lighting lights must be down lights, placed as low to the ground as possible and of low UV emitting lights, such as most LEDs. Lighting in open space areas within development must be minimised.



- Induction material must iterate safety to fauna and personnel through avoidance of wildlife. Snakes tend to only strike if threatened (cornered or attacked).
- In addition to all mitigations listed above a clause must be included in contracts for all personnel 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.

### **6.3. Ecological Statement and Opinion of the Specialist**

Given that the footprint of the infrastructure within sensitive areas has been kept to a minimum and has largely avoided sensitive faunal habitats, the specialist is of the opinion that the development can proceed provided the recommendations contained in this report are implemented.

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## APPENDIX A: LIST OF FAUNAL SPECIES WITH A DISTRIBUTION WHICH INCLUDES THE SITE

Table A1: List of frogs with a distribution range that overlaps with the project site

<i>Scientific name</i>	<i>Common name</i>	<i>Recorded on site</i>
<i>Amietia fuscigula</i>	Cape River Frog	1
<i>Arthroleptella landdrosia</i>	Landroskop Moss Frog	
<i>Arthroleptella villiersi</i>	Villiersdorp Moss Frog	
<i>Breviceps acutirostris</i>	Strawberry Rain Frog	
<i>Breviceps gibbosus</i>	Cape Rain Frog	1
<i>Breviceps montanus</i>	Cape Mountain Rain Frog	
<i>Breviceps rosei</i>	Sand Rain Frog	
<i>Cacosternum boettgeri</i>	Boettger's Caco	
<i>Cacosternum capense</i>	Cape Caco	
<i>Heleophryne purcelli</i>	Cape Ghost Frog	
<i>Hyperolius horstockii</i>	Arum Lily Frog	
<i>Hyperolius marmoratus verrucosus</i>	Painted Reed Frog	
<i>Poyntonia paludicola</i>	Marsh Frog	
<i>Sclerophrys capensis</i>	Raucous Toad	1
<i>Strongylopus bonaespei</i>	Banded Stream Frog	
<i>Strongylopus grayii</i>	Clicking Stream Frog	1
<i>Tomopterna delalandii</i>	Cape Sand Frog	1
<i>Vandijkophrynus angusticeps</i>	Cape Sand Toad	
<i>Xenopus laevis</i>	Common Platanna	1

**Table A2: List of reptiles with a distribution range that overlaps with the project site**

Common name	Scientific name	Recorded at Boschendal
<b>Lizards</b>		
Hawequa Flat Gecko	<i>Afroedura hawequensis</i>	
Marbled Leaf-toed Gecko	<i>Afrogecko porphyreus</i>	1
Southern Rough Gecko	<i>Pachydactylus formosus</i>	
Ocellated Gecko	<i>Pachydactylus geitje</i>	1
Marico Gecko	<i>Pachydactylus mariquensis</i>	
Southern Rock Agama	<i>Agama atra</i>	1
Spiny Ground Agama	<i>Agama hispida</i>	
Little Karoo Dwarf Chameleon	<i>Bradypodion gutturale</i>	
Cape Dwarf Chameleon	<i>Bradypodion pumilum</i>	
Cape Mountain Lizard	<i>Tropidosaura gularis</i>	
Common Mountain Lizard	<i>Tropidosaura montana montana</i>	
Cape Grass Lizard	<i>Chamaesaura anguina anguina</i>	
Cape Girdled Lizard	<i>Cordylus cordylus</i>	
Oelofsen's Girdled Lizard	<i>Cordylus oelofseni</i>	
Yellow-throated plated Lizard	<i>Gerrhosaurus flavigularis</i>	
Graceful Crag Lizard	<i>Hemicordylus capensis</i>	
Karoo Girdled Lizard	<i>Karusasaurus polyzonus</i>	
Knox's Desert Lizard	<i>Meroles knoxii</i>	
Delalande's sandveld lizard	<i>Nucras lalandii</i>	
Comman sand lizard	<i>Pedioplanis lineoocellata pulchella</i>	
Cape Crag Lizard	<i>Pseudocordylus microlepidotus microlepidotus</i>	
Silvery Dwarf Burrowing Skink	<i>Scelotes bipes</i>	
Cape Legless Skink	<i>Acontias meleagris</i>	
Short-legged Seps	<i>Tetradactylus seps</i>	
Cape Long-tailed Seps	<i>Tetradactylus tetradactylus</i>	
Cape Skink	<i>Trachylepis capensis</i>	
Red-sided Skink	<i>Trachylepis homalocephala</i>	1
<b>Snakes</b>		
Many-spotted Snake	<i>Amplorhinus multumaculatus</i>	
Puff Adder	<i>Bitis arietans arietans</i>	
Berg adder	<i>Bitis Atropos</i>	
Red-lipped Herald Snake	<i>Crotaphopeltis hotamboeia</i>	
Rhombic Egg-eater	<i>Dasypeltis scabra</i>	
Boomslang	<i>Dispholidus typus typus</i>	
Common slug eater	<i>Duberria lutrix</i>	
Rinkhals	<i>Hemachatus haemachatus</i>	

Spotted Harlequin Snake	<i>Homoroselaps lacteus</i>	
Brown House Snake	<i>Boaedon capensis</i>	
Aurora House Snake	<i>Lamprophis aurora</i>	
Yellow-bellied House Snake	<i>Lamprophis fuscus</i>	
Spotted House Snake	<i>Lamprophis guttatus</i>	
Olive House Snake	<i>Lycodonomorphus inornatus</i>	
Brown Water Snake	<i>Lycodonomorphus rufulus</i>	
Cape Cobra	<i>Naja nivea</i>	
Sundevall's Shovel-snout	<i>Prosymna sundevallii</i>	
Cross-marked Grass Snake	<i>Psammophis crucifer</i>	
Cape Sand Snake	<i>Psammophis leightoni</i>	
Karoo Sand snake	<i>Psammophis notostictus</i>	
Spotted Grass Snake	<i>Psammophylax rhombeatus</i>	
Mole Snake	<i>Pseudaspis cana</i>	
Brahminy Blind Snake	<i>Ramphotyphlops braminus</i>	
Delalande's Beaked Blind Snake	<i>Rhinotyphlops lalandei</i>	
<b>Tortoises and terrapins</b>		
Angulate Tortoise	<i>Chersina angulate</i>	
Common Padloper	<i>Homopus areolatus</i>	1
Marsh Terrapin	<i>Pelomedusa subrufa</i>	
Geometric Tortoise	<i>Psammobates geometricus</i>	
Leopard Tortoise	<i>Stigmochelys pardalis</i>	

**Table A3: List of mammals with a distribution range that overlaps with the project site**

Common name	Scientific name	Recorded at Boschendal
<b>Bovidae</b>		
Hartebeest	<i>Alcelaphus buselaphus</i>	
Red Hartebeest	<i>Alcelaphus buselaphus caama</i>	
Springbok	<i>Antidorcas marsupialis</i>	
Blue Wildebeest	<i>Connochaetes taurinus taurinus</i>	
Bontebok	<i>Damaliscus pygargus pygargus</i>	
Sable Antelope	<i>Hippotragus niger niger</i>	
Black Wildebeest	<i>Connochaetes gnou</i>	
Klipspringer	<i>Oreotragus oreotragus</i>	
Vaal Rhebok	<i>Pelea capreolus</i>	
Blue Duiker	<i>Philantomba monticola</i>	
Steenbok	<i>Raphicerus campestris</i>	
Cape Grysbok	<i>Raphicerus melanotis</i>	
Bush Duiker	<i>Sylvicapra grimmia</i>	1
Common Eland	<i>Taurotragus oryx</i>	1
Gemsbok	<i>Oryx gazella</i>	1
<b>Carnivore</b>		
Cape Fox	<i>Vulpes chama</i>	
Black-backed Jackal	<i>Canis mesomelas</i>	
Bat-eared Fox	<i>Otocyon megalotis</i>	
Caracal	<i>Caracal caracal</i>	
Wildcat	<i>Felis silvestris</i>	
Leopard	<i>Panthera pardus</i>	
Marsh Mongoose	<i>Atilax paludinosus</i>	
Egyptian Mongoose	<i>Herpestes ichneumon</i>	
Cape Grey Mongoose	<i>Herpestes pulverulentus</i>	1
Yellow Mongoose	<i>Cynictis penicillata</i>	
African Clawless Otter	<i>Aonyx capensis</i>	
Striped Polecat	<i>Ictonyx striatus</i>	
Honey Badger	<i>Mellivora capensis</i>	
African Striped Weasel	<i>Poecilogale albinucha</i>	
Common Genet	<i>Genetta genetta</i>	
Cape Genet	<i>Genetta tigrina</i>	
<b>Primates</b>		
Chacma Baboon	<i>Papio ursinus</i>	
<b>Afrosoricida</b>		
Fynbos Golden Mole	<i>Amblysomus corraie</i>	
Cape Golden Mole	<i>Chrysochloris (Chrysochloris) asiatica</i>	
Hottentot Golden Mole	<i>Amblysomus hottentotus</i>	
<b>Lagomorph</b>		
Cape Hare	<i>Lepus capensis</i>	

Scrub Hare	<i>Lepus saxatilis</i>	
Smith's Red Rock Hare	<i>Pronolagus rupestris</i>	
Hewitt's Red Rock Rabbit	<i>Pronolagus saundersiae</i>	
<b>Rodents</b>		
Cape Spiny Mouse	<i>Acomys subspinosus</i>	
Namaqua Rock Mouse	<i>Aethomys namaquensis</i>	
Cape Gerbil	<i>Gerbilliscus afra</i>	1
Southern African Pygmy Mouse	<i>Mus minutoides</i>	
Verreaux's Mouse	<i>Myomyscus verreauxi</i>	
Verreaux's White-footed Rat	<i>Myomyscus verreauxii</i>	
Southern African Vlei Rat	<i>Otomys irroratus</i>	
KwaZulu Vlei Rat	<i>Otomys laminatus</i>	
Saunders' Vlei Rat	<i>Otomys saundersiae</i>	
Brown Rat	<i>Rattus norvegicus</i>	
Roof Rat	<i>Rattus rattus</i>	
Xeric Four-striped Grass Rat	<i>Rhabdomys pumilio</i>	
Grey African Climbing Mouse	<i>Dendromus melanotis</i>	
Brants's African Climbing Mouse	<i>Dendromus mesomelas</i>	
Kreb's African Fat Mouse	<i>Steatomys krebsii</i>	
Eastern Grey Squirrel	<i>Sciurus carolinensis</i>	1
Smith's Bush Squirrel	<i>Paraxerus cepapi</i>	
Spectacled African Dormouse	<i>Graphiurus (Graphiurus) ocularis</i>	
Cape Porcupine	<i>Hystrix africaeaustralis</i>	1
Cape Dune Mole-rat	<i>Bathergus suillus</i>	
Southern African Mole-rat	<i>Cryptomys hottentotus</i>	
Cape Mole-rat	<i>Georchus capensis</i>	
<b>Eulipotyphla</b>		
Southern African Hedgehog	<i>Atelerix frontalis</i>	
Reddish-gray Musk Shrew	<i>Crocidura cyanea</i>	
Greater Red Musk Shrew	<i>Crocidura flavescens</i>	
Forest Shrew	<i>Myosorex varius</i>	
Least Dwarf Shrew	<i>Suncus infinitesimus</i>	
<b>Macroscelidae</b>		
Cape Elephant Shrew	<i>Elephantulus edwardii</i>	
<b>Hyracoidea</b>		
Cape Rock Hyrax	<i>Procavia capensis</i>	
<b>Bats</b>		
Egyptian Slit-faced Bat	<i>Nycteris thebaica</i>	
Egyptian Rousette	<i>Rousettus (Rousettus) aegyptiacus</i>	
Cape Horseshoe Bat	<i>Rhinolophus capensis</i>	
Schreibers's Long-fingered Bat	<i>Miniopterus schreibersii</i>	
Temminck's Myotis	<i>Myotis tricolor</i>	
Cape Serotine	<i>Neoromicia capensis</i>	
Egyptian Free-tailed Bat	<i>Tadarida aegyptiaca</i>	
<b>Perissodactyla</b>		



Cape Mountain Zebra	<i>Equus zebra zebra</i>	
<b>Tubulidentata</b>		
Aardvark	<i>Orycteropus afer</i>	

**Table A4: List of birds with a distribution range that overlaps with the project site**

Common Name	Species Name
Bokmakierie	<i>Telophorus zeylonus</i>
Hamerkop	<i>Scopus umbretta</i>
Neddicky	<i>Cisticola fulvicapilla</i>
Bar-throated Apalis	<i>Apalis thoracica</i>
Acacia Pied Barbet	<i>Tricholaema leucomelas</i>
Cape Batis	<i>Batis capensis</i>
Southern Red Bishop	<i>Euplectes orix</i>
Yellow Bishop	<i>Euplectes capensis</i>
Southern Boubou	<i>Laniarius ferrugineus</i>
Cape Bulbul	<i>Pycnonotus capensis</i>
Cape Bunting	<i>Emberiza capensis</i>
Common Buzzard	<i>Buteo buteo</i>
Jackal Buzzard	<i>Buteo rufofuscus</i>
Brimstone Canary	<i>Crithagra sulphurata</i>
Cape Canary	<i>Serinus canicollis</i>
Familiar Chat	<i>Oenanthe familiaris</i>
Grey-backed Cisticola	<i>Cisticola subruficapilla</i>
Levaillant's Cisticola	<i>Cisticola tinniens</i>
Zitting Cisticola	<i>Cisticola juncidis</i>
Red-knobbed Coot	<i>Fulica cristata</i>
Reed Cormorant	<i>Microcarbo africanus</i>
White-breasted Cormorant	<i>Phalacrocorax lucidus</i>
Blue Crane	<i>Grus paradisea</i>
Pied Crow	<i>Corvus albus</i>
Klaas's Cuckoo	<i>Chrysococcyx klaas</i>
Red-chested Cuckoo	<i>Cuculus solitarius</i>
African Darter	<i>Anhinga rufa</i>
Cape Turtle Dove	<i>Streptopelia capicola</i>
Laughing Dove	<i>Spilopelia senegalensis</i>
Red-eyed Dove	<i>Streptopelia semitorquata</i>

Rock Dove	<i>Columba livia</i>
Fork-tailed Drongo	<i>Dicrurus adsimilis</i>
African Black Duck	<i>Anas sparsa</i>
Yellow-billed Duck	<i>Anas undulata</i>
African Fish Eagle	<i>Haliaeetus vocifer</i>
Booted Eagle	<i>Hieraaetus pennatus</i>
Spotted Eagle-Owl	<i>Bubo africanus</i>
Western Cattle Egret	<i>Bubulcus ibis</i>
Peregrine Falcon	<i>Falco peregrinus</i>
Southern Fiscal	<i>Lanius collaris</i>
African Dusky Flycatcher	<i>Muscicapa adusta</i>
African Paradise Flycatcher	<i>Terpsiphone viridis</i>
Fiscal Flycatcher	<i>Melaenornis silens</i>
Egyptian Goose	<i>Alopochen aegyptiaca</i>
Spur-winged Goose	<i>Plectropterus gambensis</i>
African Goshawk	<i>Accipiter tachiro</i>
Cape Grassbird	<i>Sphenoeacus afer</i>
Great Crested Grebe	<i>Podiceps cristatus</i>
Little Grebe	<i>Tachybaptus ruficollis</i>
Helmeted Guinea fowl	<i>Numida meleagris</i>
Kelp Gull	<i>Larus dominicanus</i>
Black Harrier	<i>Circus maurus</i>
African Harrier-Hawk	<i>Polyboroides typus</i>
Black-headed Heron	<i>Ardea melanocephala</i>
Grey Heron	<i>Ardea cinerea</i>
Greater Honeyguide	<i>Indicator indicator</i>
African Hoopoe	<i>Upupa africana</i>
African Sacred Ibis	<i>Threskiornis aethiopicus</i>
Hadada Ibis	<i>Bostrychia hagedash</i>
Rock Kestrel	<i>Falco rupicolus</i>
Giant Kingfisher	<i>Megaceryle maxima</i>
Pied Kingfisher	<i>Ceryle rudis</i>

Black-winged Kite	<i>Elanus caeruleus</i>
Yellow-billed Kite	<i>Milvus aegyptius</i>
Blacksmith Lapwing	<i>Vanellus armatus</i>
Crowned Lapwing	<i>Vanellus coronatus</i>
Red-capped Lark	<i>Calandrella cinerea</i>
Cape Longclaw	<i>Macronyx capensis</i>
Brown-throated Martin	<i>Riparia paludicola</i>
Rock Martin	<i>Ptyonoprogne fuligula</i>
Common Moorhen	<i>Gallinula chloropus</i>
Red-faced Mousebird	<i>Urocolius indicus</i>
Speckled Mousebird	<i>Colius striatus</i>
Western Barn Owl	<i>Tyto alba</i>
Indian Peafowl	<i>Pavo cristatus</i>
Great White Pelican	<i>Pelecanus onocrotalus</i>
African Olive Pigeon	<i>Columba arquatrix</i>
Speckled Pigeon	<i>Columba guinea</i>
African Pipit	<i>Anthus cinnamomeus</i>
Nicholson's Pipit	<i>Anthus nicholsoni</i>
Plain-backed Pipit	<i>Anthus leucophrys</i>
Kittlitz's Plover	<i>Charadrius pecuarius</i>
Karoo Prinia	<i>Prinia maculosa</i>
White-necked Raven	<i>Corvus albicollis</i>
Cape Robin-Chat	<i>Cossypha caffra</i>
Cape Rockjumper	<i>Chaetops frenatus</i>
Common Sandpiper	<i>Actitis hypoleucos</i>
Black (Southern Africa) Saw-wing	<i>Psalidoprocne pristoptera holomelas</i>
Streaky-headed Seed eater	<i>Crithagra gularis</i>
Cape Shoveler	<i>Spatula smithii</i>
Cape Siskin	<i>Crithagra totta</i>
Cape Sparrow	<i>Passer melanurus</i>
House Sparrow	<i>Passer domesticus</i>
Southern Grey-headed Sparrow	<i>Passer diffusus</i>

Black Sparrowhawk	<i>Accipiter melanoleucus</i>
Cape Spurfowl	<i>Pternistis capensis</i>
Common Starling	<i>Sturnus vulgaris</i>
Red-winged Starling	<i>Onychognathus morio</i>
White Stork	<i>Ciconia ciconia</i>
Cape Sugarbird	<i>Promerops cafer</i>
Amethyst Sunbird	<i>Chalcomitra amethystina</i>
Malachite Sunbird	<i>Nectarinia famosa</i>
Orange-breasted Sunbird	<i>Anthobaphes violacea</i>
Southern Double-collared Sunbird	<i>Cinnyris chalybeus</i>
Barn Swallow	<i>Hirundo rustica</i>
Greater Striped Swallow	<i>Cecropis cucullata</i>
Pearl-breasted Swallow	<i>Hirundo dimidiata</i>
White-throated Swallow	<i>Hirundo albigularis</i>
African Black Swift	<i>Apus barbatus</i>
Alpine Swift	<i>Tachymarptis melba</i>
Little Swift	<i>Apus affinis</i>
White-rumped Swift	<i>Apus caffer</i>
Spotted Thick-knee	<i>Burhinus capensis</i>
Cape Rock Thrush	<i>Monticola rupestris</i>
Olive Thrush	<i>Turdus olivaceus</i>
Cape Wagtail	<i>Motacilla capensis</i>
Lesser Swamp Warbler	<i>Acrocephalus gracilirostris</i>
Little Rush Warbler	<i>Bradypterus baboecala</i>
Willow Warbler	<i>Phylloscopus trochilus</i>
Common Waxbill	<i>Estrilda astrild</i>
Sweet Waxbill	<i>Coccyzygia melanotis</i>
Cape Weaver	<i>Ploceus capensis</i>
Southern Masked Weaver	<i>Ploceus velatus</i>
Cape White-eye	<i>Zosterops virens</i>
Pin-tailed Whydah	<i>Vidua macroura</i>
Ground Woodpecker	<i>Geocolaptes olivaceus</i>

Olive Woodpecker	<i>Dendropicos griseocephalus</i>
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## APPENDIX B: PROOF OF SACNASP REGISTRATION AND HIGHEST QUALIFICATION

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*we certify that*

*Amber Leah Jackson*

*was admitted to the degree of*

*Master of Philosophy  
in Environmental Management*

*on 9 June 2011*

A handwritten signature in black ink, appearing to read 'Alan Paine', written over a horizontal line.

Vice-Chancellor



A handwritten signature in black ink, appearing to read 'Hugh Amoore', written over a horizontal line.

Registrar

# APPENDIX C: CV

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## CONTACT DETAILS

<b>Name</b>	<b>Amber Jackson</b>
<b>Name of Company</b>	<b>Biodiversity Africa</b>
<b>Designation</b>	Director
<b>Profession</b>	Faunal Specialist and Environmental Manager
<b>E-mail</b>	<a href="mailto:amber@biodiversityafrica.com">amber@biodiversityafrica.com</a>
<b>Office number</b>	+27 (0)78 340 6295
<b>Education</b>	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)
<b>Nationality</b>	<b>South African</b>
<b>Professional Body</b>	<b>SACNASP:</b> South African Council for Natural Scientific Profession (100125/12) <b>ZSSA:</b> Zoological Society of Southern Africa <b>HAA:</b> Herpetological Association of Southern Africa <b>IAIASa:</b> Member of the International Association for Impact Assessments South Africa
<b>Key areas of expertise</b>	<ul style="list-style-type: none"><li>• Biodiversity Surveys and Impact Assessments</li><li>• Environmental Impact Assessments</li><li>• Critical Habitat Assessments</li><li>• Biodiversity Management and Monitoring Plans</li></ul>

## 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, IAIAAsa** 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
- **IAIAAsa National Annual Conference** September 2013  
Thaba'Nchu Sun, Bloemfontein
- **St Johns Life first aid course** July 2012

**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 Programme (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