TERRESTRIAL BIODIVERSITY, PLANT AND ANIMAL SPECIES THEME IMPACT ASSESSMENT REPORT FOR THE SUNVELD SOLAR PV AND BESS, WESTERN CAPE

Prepared for:

Sunveld Energy (Pty) Ltd

240 Main Road
Rondebosch
7700

Prepared by:

Biodiversity Africa

30 Chudleigh Road
Plumstead, 7800
Cape Town, Western Cape



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Details of Company

Name	Biodiversity Africa
Email	Tarryn@biodiversityafrica.com
Tel	071 332 3994 or 078 340 6295
Address	30 Chudleigh Road Plumstead, 7800 Cape Town

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.

Signature: Date: 12 March 2024

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;
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Signature Date: 12 March 2024

Non-Technical Summary

Introduction

Sunveld Energy (Pty) Ltd is proposing the construction and operation of a Solar Photovoltaic (PV) Facility and associated infrastructure on the farms Kruispad (Re/120) and Doornfontein A (RE/118) located approximately 7.5 km east of Velddrif in the Western Cape Province. The size of the study area is approximately 2360 ha and the development footprint is approximately 723ha.

The net generation capacity of the Solar PV Facility will be up to 600 MW, which will consist of seven project areas comprised of twelve 50MW phases that may be developed singly or in groups in a phased-development approach. Each of the 12 x 50 MW sites will have distributed inverters and lead via underground cables to distributed 33 kV mini-substations. The mini-substations will feed underground to two (2) on-site substations or the two (2) Battery Energy Storage Systems (BESS) then to the Main Transmission Substation (MTS) via 132 kV overhead cables. Each BESS will be 1200MWh. Collectively, both BESS's will supply 2400MWH which is approximately 4 hours of 600 MW. The BESS's will make use of the same on-site substations to connect to the MTS at night. The MTS will be assessed in a separate environmental assessment process.

The proposed Solar PV Facility and associated infrastructure will include the following:

- Solar PV panels (monofacial or bifacial) with a maximum height of ±3 m above the ground.
- Two (2) BESS sites (±14ha each) with a combined capacity of 2400 MWh.
- Two (2) on-site substation complexes each 300 MVA. Each substation will have a base of 75 x 75 m with a 200 x 200 m fenced area and a footprint of approximately 9 ha. These are collector/switching substations with 33kV input from the mini-substations and transforming to 132 kV to be routed via overhead powerlines to the Main Transmission Substation (MTS).
- Grid Connection (the length and preferred route of which will be determined after the site sensitivity verification assessments have been undertaken and layouts revised).
- Approximately 10 ha of temporary laydown areas. A permanent laydown area of a maximum of 2 ha will remain for operations.
- A network of gravel internal access roads (65 ha), each with a width of up to ± 4x m, will be constructed to provide access to the various components of each facility.
- Ancillary buildings of approximately 8 ha including (but not limited to) a 33kV switch room, gate-house, ablutions, workshops, storage and warehousing areas, site offices and control centre, canteen & visitors centre, staff lockers etc.
- Facility (IPP) substation (up to 4 ha).
- Distributed within the PV area are many mini Inverter-stations, transformers and internal electrical reticulation (underground cabling).
- Rainwater Tanks.
- Electrified perimeter fencing (not exceeding 3.5 m in height) and security infrastructure.

Biodiversity Africa has been appointed to undertake the Terrestrial Biodiversity, plant and Animal Impact assessment and fulfil the minimum report content requirements in terms of the Terrestrial Biodiversity, Plant and Animal Species for the proposed Sunveld Energy PV Facility and BESS.

Methodology

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. This was followed by field survey undertaken in late Winter (24-25 July 2023), during the optimal flowering season, to confirm the site sensitivity for the project area. The site sensitivity verification report determined that most of the project infrastructure was located in an area with a medium site ecological importance (SEI) with a few small areas of high and very high SEI being impacted on. Based on the results of the SSVR, a Terrestrial Biodiversity Impact Assessment Report was required.

Results

Most of the project infrastructure is located in areas that have been transformed or are characterised by secondary vegetation. However, there is some project infrastructure located withing degraded and very degraded Saldanha Flats Strandveld as well as 9.1 ha of infrastructure located within near-intact Saldanha Flats Strandveld. The loss of 9.1 ha of this vegetation type is equivalent to 0.015% of its remaining extent. Considering the low overall loss of this vegetation type and because it is located on the edge of an area that has already been transformed, the overall impact on near-intact Saldanha Flats Strandveld is anticipated to be of moderate significance.

Three threatened plant species (one EN and two VU) and one near-threatened plant species were confirmed to occur within the project area. Furthermore, there is a high likelihood of occurrence of an additional ten species being present within near-intact and Saldanha Flats Strandveld.

Two threatened animal species (one EN and one VU) and one near-threatened animal species have a high likelihood of occurrence within the project area and may be impacted on by project infrastructure.

Based on the findings from the field survey, combined with a desktop assessment, the combined SEI for the project area was determined to be Very High for near-intact Saldanha Flats Strandveld, High for Degraded Saldanha Flats Strandveld and Medium for secondary vegetation and areas that have been transformed. The Medium SEI for transformed areas are due to the faunal SEI being Medium and the highest sensitivity being applied.

The applicant has designed the project layout to largely avoid areas of high and very high SEI to minimise the impact of the development on the biodiversity within the project area.

Impacts

The mitigation hierarchy was applied to all impacts. For negative impacts that can often not be avoided, the mitigation hierarchy then aims to minimise the impact, and should residual impacts remain, mitigation measures are then applied and in extreme cases offsets may be required. Some impacts will remain the same despite mitigation measures having been applied. However, it should be noted that although a mitigation measure may not reduce the impact significance rating (high,

medium and low) they must still be applied because the impact has not been avoided in its entirety and the 'Duty of Care' is placed on the applicant/developer.

Eleven construction phase impacts, two operational phase impacts, two decommissioning phase impacts and two cumulative impacts have been identified for the project area. Of these seventeen impacts, eight were of moderate significance and nine were of low significance prior to mitigation. However, if the mitigation hierarchy is applied and the recommendations outlined in the report implemented, these can be reduced to impacts of low significance (Table 1).

Table 1: Summary of impacts

Impact		Significance and Ranking	
		Pre-Mitigation	Post-Mitigation
CONSTRUCTION PHASE			
Impact 1	Loss of Near-Intact Saldanha Flats Strandveld	Moderate	Low
Impact 2	Loss of degraded Saldanha Flats Strandveld	Moderate	Low
Impact 3	Loss of Secondary Vegetation	Low	Low
Impact 4	Loss of Faunal Habitat	Low	Low
Impact 5	Loss of Plant SCC	Moderate	Low
Impact 6a	Loss of Faunal SCC: Cape Caco (NT)	Low	Low
Impact 6b	Loss of Faunal SCC: Kasner's Dwarf Burrowing Skink (EN)	Low	Low
Impact 6c	Loss of Faunal SCC: Grant's Golden Mole (VU)	Low	Low
Impact 7	Disruption of Ecosystem Function and Process	Low	Low
Impact 8	Disturbance to faunal species and their livelihood activities (shelter, foraging and breeding) due to construction related noise, vibrations, dust, night lighting and obstructions.	Moderate	Low
Impact 9	Mortality of faunal species due to project related activities	Moderate	Low
OPERATIONAL PHASE			
Impact 10	Infestation of alien invasive plant species	Moderate	Low
Impact 11	Mortality of faunal species due to operational project related activities	Moderate	Low
DECOMMISSIONING PHASE			
Impact 12	Loss of indigenous vegetation and species of conservation concern	Low	Low
Impact 13	Disturbance to faunal species and potential reduction in abundance and mortality of faunal species	Moderate	Low
CUMULATIVE IMPACTS			
Impact 14	Loss of indigenous vegetation and species of conservation concern	Low	Low
Impact 15	Increased reduction in faunal habitat and increase disturbance of faunal species	Low	Low

Recommendations

Fauna

- The development must consolidate road networks to minimise the loss of faunal habitat.

- Laydown areas must be rehabilitated with specific measures to create fauna habitat.
- Speed restrictions for all vehicles (40km/h is recommended) should be in place to reduce the impact of faunal mortality as a result of road kill.
- Development must be designed to allow unencumbered movement of this species. e.g., trenches with sloped side to allow faunal species to exit.
- Should any faunal SCC be encountered during construction and operation, these must be recorded (i.e. be photographed, GPS co-ordinates taken) and photographs placed on iNaturalist
- Any faunal species that may die as a result of construction activities must be recorded (i.e. be photographed, GPS co-ordinates taken) and these records placed on iNaturalist.
- 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, especially for SCC.

Botanical

- The remaining vegetation within the property should remain intact so that it can continue to function as an ecological corridor for species movement.
- All necessary plant permits must be obtained prior to the commencement of any construction activities.
- Where feasible, laydown areas must be placed in previously disturbed sites.
- A walkthrough of the final layout must be undertaken by a botanist and if populations of SCC will be impacted, infrastructure should be moved to avoid these areas. Where this is not feasible, a search and rescue plan will be required.
- If any SCC are to be impacted, these must be relocated to nearest appropriate habitat unless they are unlikely to transplant successfully.
- 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 sensitivity and used to rehabilitate impacted areas that are no longer required during the operational phase (e.g. laydown areas).
- Employees must be prohibited from collecting any plants.
- Alien invasive plant clearing should be undertaken in line with an Alien Vegetation Management plan, which should be compiled as part of the EMPr and implemented simultaneously with the development.
- Only indigenous plant species typical of the local vegetation and approved by a botanist should be used for the rehabilitation of natural habitat.

Ecological Statement and Opinion of the Specialist

Project infrastructure has been designed to largely avoid sensitive features such as near-intact and degraded Saldanha Flats Strandveld. Further to the above, impacts on the terrestrial plant species and faunal habitats can be reduced to acceptable levels through the implementation of mitigation measures. The specialist is therefore of the opinion that the development can proceed provided the recommendations contained in this report are implemented.

Table of Contents

List of Figures

List of Tables

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
ECO	Environmental Control Offices
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
MTS	Main Transmission Substation
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
S&EIA	Scoping and Environmental Impact Assessment
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
3.1	The Terrestrial **Animal Species** Specialist Assessment Report must contain, as a minimum, the following information:		
	3.1.1	Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Page 2 & 3; Appendix 3 & 4
	3.1.2	A signed statement of independence by the specialist;	Page 5
	3.1.3	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
	3.1.4	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 and Appendix 2
	3.1.5	A description of the mean density of observations/number of sample sites per unit area and the site inspection observations;	Section 2.3 and Figure 2.1
	3.1.6	A description of the assumptions made and any uncertainties or gaps in knowledge or data;	Section 1.4
	3.1.7	Details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported;	Section 4.3
	3.1.8	The online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the study area;	Refer to footnote on page 33
	3.1.9	A location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Section 7.1
	3.1.10	A discussion on the cumulative impacts;	Section 8.4
	3.1.11	Impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Chapter 8 and Section 10.3
	3.1.12	A reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not of the development and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant; and	Chapter 10
	3.1.13	A motivation must be provided if there were development footprints identified as per paragraph 2.2.12 above that were identified as having a "low" or "medium" terrestrial animal species sensitivity and were not considered appropriate;	N/A
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
3.1	The Terrestrial **Plant Species** Specialist Assessment Report must contain, as a minimum, the following information:		
	3.1.1	Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Page 2 & 3; Appendix 3 & 4
	3.1.2	A signed statement of independence by the specialist;	Page 4
	3.1.3	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
	3.1.4	A description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;	Chapter 2 and Appendix 2
	3.1.5	A description of the assumptions made and any uncertainties or gaps in knowledge or data;	Section 1.4
	3.1.6	A description of the mean density of observations/number of samples sites per unit area of site inspection observations;	Section 2.3 and Figure 2.1
	3.1.7	Details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported;	Section 5.2
	3.1.8	The online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the study area;	Section 5.2
	3.1.9	A location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Section 7.2
	3.1.10	A discussion on the cumulative impacts;	Section 8.1.4 and 8.4
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	3.1.12	A reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not, of the development related to the specific theme considered, and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant; and	Chapter 10
	3.1.13	A motivation must be provided if there were any development footprints identified as per paragraph 2.3.12 above that were identified as having "low" or "medium" terrestrial plant species sensitivity and were not considered appropriate.	N/A
3.3	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
3.1	The **Terrestrial Biodiversity** Specialist Assessment Report must contain, as a minimum, the following information:		
	3.1.1	Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Page 2 & 3; Appendix 3 & 4
	3.1.2	A signed statement of independence by the specialist;	Page 4 & 5
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	3.1.6	A location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Chapter 7
	3.1.7	Additional environmental impacts expected from the proposed development;	Chapter 8
	3.1.8	Any direct, indirect and cumulative impacts of the proposed development;	
	3.1.9	The degree to which the impacts and risks can be mitigated;	
	3.1.10	The degree to which the impacts and risks can be reversed;	
	3.1.11	The degree to which the impacts and risks can cause loss of irreplaceable resources;	
	3.1.12	Proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Chapter 8 and Section 10.3
	3.1.13	A motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified as having a "low" terrestrial biodiversity sensitivity and that were not considered appropriate;	N/A
	3.1.14	A substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, if it should receive approval or not; and	Chapter 10
	3.1.15	Any conditions to which this statement is subjected.	Section 10.3
3.2	The findings of the Terrestrial Biodiversity Specialist Assessment must be incorporated into the Basic Assessment Report or the Environmental Impact Assessment Report, including the mitigation and monitoring measures as identified, which must be incorporated into the EMPr where relevant.		
3.3	A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.		

1. INTRODUCTION

1.1. Project Description

Sunveld Energy (Pty) Ltd is proposing the construction and operation of a Solar Photovoltaic (PV) Facility and associated infrastructure on the farms Kruispad (Re/120) and Doornfontein A (RE/118) located approximately 7.5 km east of Velddrif in the Western Cape Province (Figure 1.1). The size of the study area is approximately 2360 ha and the development footprint is approximately 723ha.

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The proposed Solar PV Facility and associated infrastructure will include the following (Figure 1.2):

- Solar PV panels (monofacial or bifacial) with a maximum height of ±3 m above the ground.
- Two (2) BESS sites (±14ha each) with a combined capacity of 2400 MWh.
- Two (2) on-site substation complexes each 300 MVA. Each substation will have a base of 75 x 75 m with a 200 x 200 m fenced area and a footprint of approximately 9ha. These are collector/switching substations with 33kV input from the mini-substations and transforming to 132 kV to be routed via overhead powerlines to the Main Transmission Substation (MTS).
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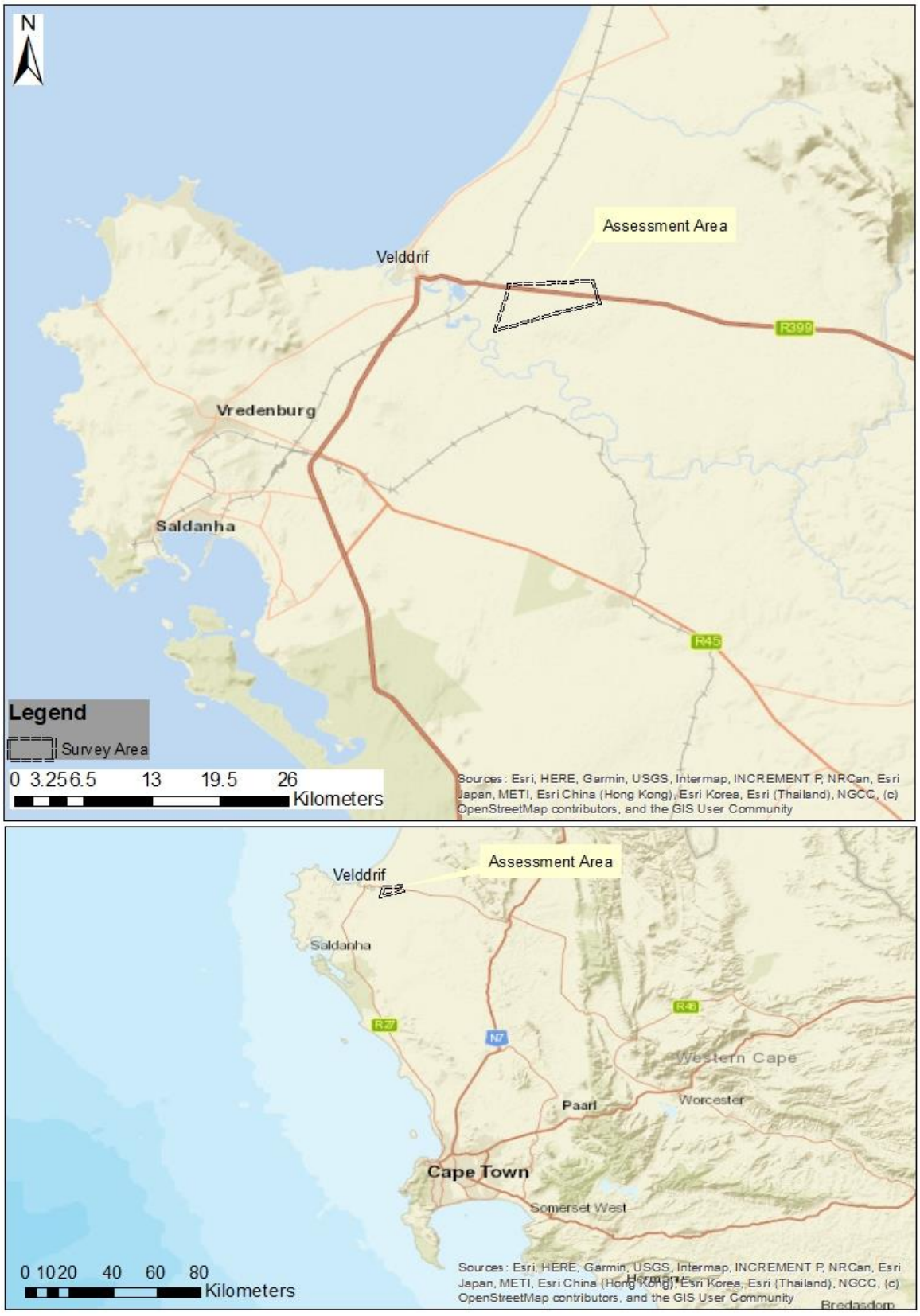


Figure 1.1: Location of the project area in relation to Saldanha and Vredenburg.

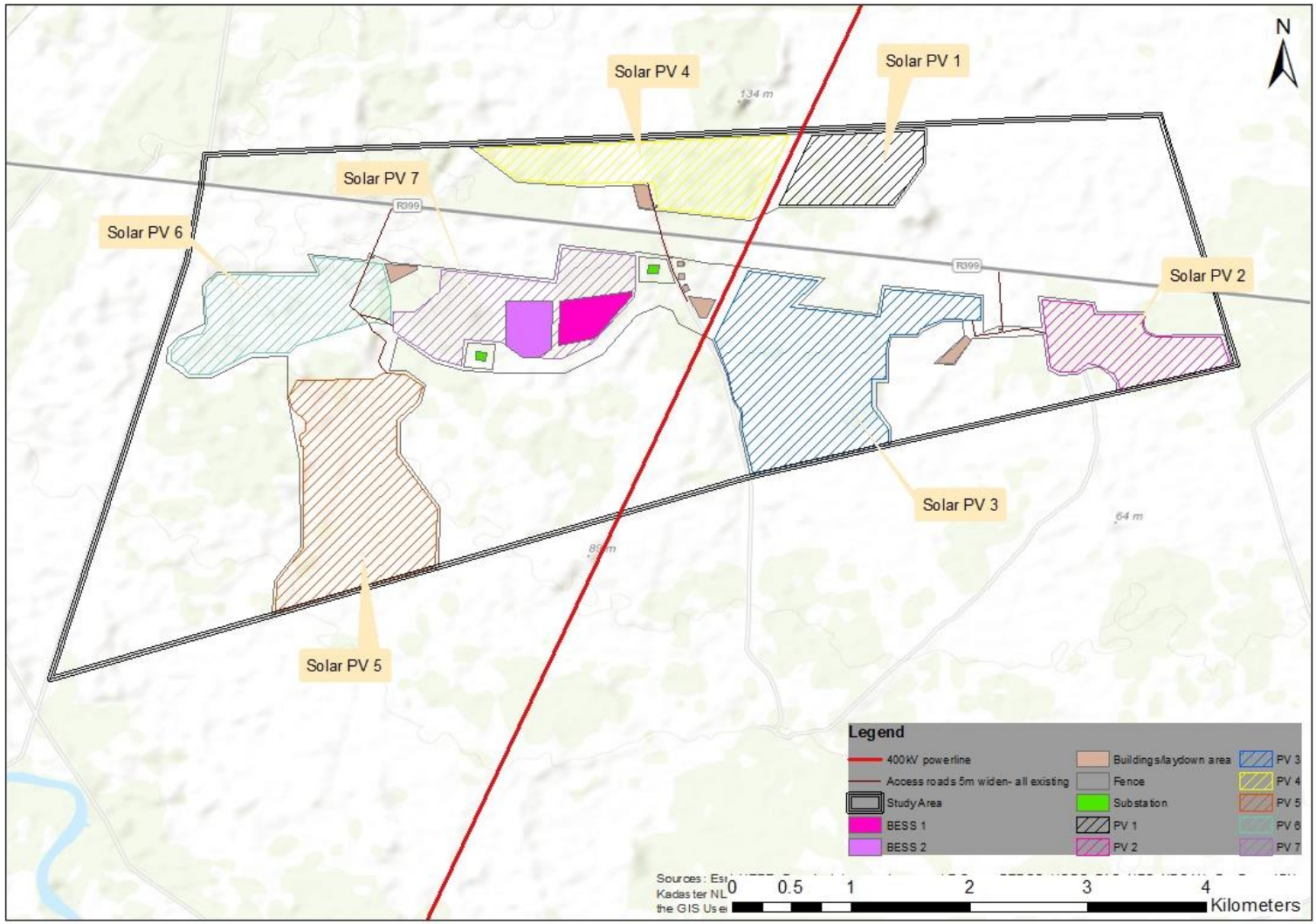


Figure 1.2: Infrastructure layout

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 (SSVR) undertaken for this project, the Animal Species Theme was found to be Medium, the Plant Species Theme was found to be Very High for near-intact Saldanha Flats Strandveld, high for degraded Saldanha Flats Strandveld, low for Secondary Vegetation and Very Low for Transformed areas. The Terrestrial Biodiversity Theme was found to be very high for areas that are a CBA 1 and overlap the near-intact Saldanha Flats Strandveld but low and very low for Secondary Vegetation and transformed areas, respectively.

Based on the results of the SSVR, a full Terrestrial Biodiversity Impact Assessment, including plants and animals, has been undertaken for the project area.

1.3. Scope, Purpose and Objectives

In accordance with GN R 1150, this report serves as the Terrestrial Ecological 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 Sunveld Solar PV Facility, Western 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 Biodiversity 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.
- Sampling could only be carried out at one stage in the annual or seasonal cycle. The survey was conducted in late Winter which is the start of the flowering season for this region and therefore falls within the correct sampling time. Although it is likely that some late flowering species have gone undetected, 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 and provide comment on the likelihood of occurrence of SCC.
- Since SCC are difficult to find and identify, the field survey was supplemented with a detailed desktop assessment which identified SCC that could occur within the project area and assessed the likelihood of occurrence based on habitat availability. This information is sufficient to determine SCC that could occur within the project area.
- This assessment includes plants, mammals (excluding bats), amphibians and reptiles. It does not include birds, bats or invertebrates. Birds and invertebrates 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	**HIGH** • Likely presence of four (4) bird species • Likely presence of one invertebrate species.	The animal species theme has been categorised as high due to the presence of four (4) bird species and one invertebrate species. The faunal assessment in this report focuses on amphibians, reptiles and mammals and includes a desktop assessment and field survey (refer to Chapter 4). Birds and invertebrates have been addressed in separate specialist reports and as such, comment will be provided on this theme by the respective specialist.
Plant Species Theme	**MEDIUM** • Likely presence of 39 SCC	A desktop assessment that includes records from both the Plants of Southern Africa (POSA) database and iNaturalist 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 in the project area (Refer to Chapter 5).
Terrestrial Biodiversity Theme	**VERY HIGH** • Critical Biodiversity Area (CBA) 1 and 2 present • Ecological Support Area (ESA) 1 and 2 present • Endangered ecosystem – Saldanha Flats Strandveld	The features driving the CBA and ESA status have been identified and comment has been provided on the implications of the project development on the functioning of the CBA/ESAs (refer to Chapter 6). Comment has been provided on the impact of the project on the Endangered (EN) ecosystem (refer to Chapter 6).

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:

- Amphibians –Du Preez & Carruthers (2017), FrogMap (FitzPatrick, 2023).
- Reptiles – Branch (1998), ReptileMap (FitzPatrick, 2023).
- Mammals – Stuart & Stuart (2014), MammalMap (FitzPatrick, 2023).
- IUCN, 2023.
- iNaturalist, 2023.

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 project area and the likelihood of occurrence assessed for species listed as CR, EN, VU and Near Threatened (NT). Key resources consulted include:

- The DFFE screening report for the project area (May 2023).
- The Plants of Southern Africa (POSA) database.
- iNaturalist.
- The Red List of South African Plants.

Species threat status was checked against the Red List of South African Plants. Protected species listed on the Western Cape Nature Conservation Laws Amendment Act, 2000 were also identified as they require permits for their removal and/or translocation.

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 project area that are considered sensitive. The vegetation types present within the project area and key features driving the CBA status of portions of the project area, were identified and confirmed during the field survey. Key resources consulted include:

- The DFFE screening report for the project area (May 2023).
- The South African Vegetation Map (SANBI, 2018).
- The Western Cape Biodiversity Spatial Plan (WCBSP) (2017).
- The Red List of Ecosystems for South Africa: Remnants Spatial Dataset (SANBI, 2021).

- The Revised National List of Ecosystems that are Threatened and in need of Protection (DFFE, 2022).
- National Protected Area Expansion Strategy (NPAES) (2010 & 2018).
- The South African Protected Areas Database (SAPAD, Q1, 2023) and the South African Conservation Areas Database (SACAD, Q1, 2023).

2.3. Field Survey

A field survey was undertaken during the early flowering season from 24-25 July 2023. Figure 2.1 indicates the sample sites and tracks for the botanical and faunal specialists.

2.3.1. Animal Species Theme

The purpose of the faunal survey was to determine the faunal habitats present in the project area and conduct searches for evidence of mammal, reptile, and amphibian species.

The project area was driven, and active searching conducted in various habitats present within the project area. Active searching for amphibians, reptiles, and mammals (excluding bats) includes direct and indirect observation.

Direct observations were made by walking and driving through the project area and recording species seen. In addition, habitats that typically provide refuge for faunal species were targeted to search for specific species:

- Reptiles and terrestrial amphibians were targeted in microhabitats by lifting rocks and logs, peeling away bark and scraping through leaf litter.
- Amphibians were targeted at water bodies where individuals were searched for along the banks and verge vegetation.
- Camera and binoculars were used to view mammal species from a distance without disturbing them. While walking the project area, mammals are often flushed from hiding and were recorded.

Indirect observation is the searching for evidence of faunal presence and includes spoor, skat, roadkill, skulls, quills, dens, burrows, hairs, scrapings, and diggings.

2.3.2. 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 (SCC), 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.

2.4. 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)	

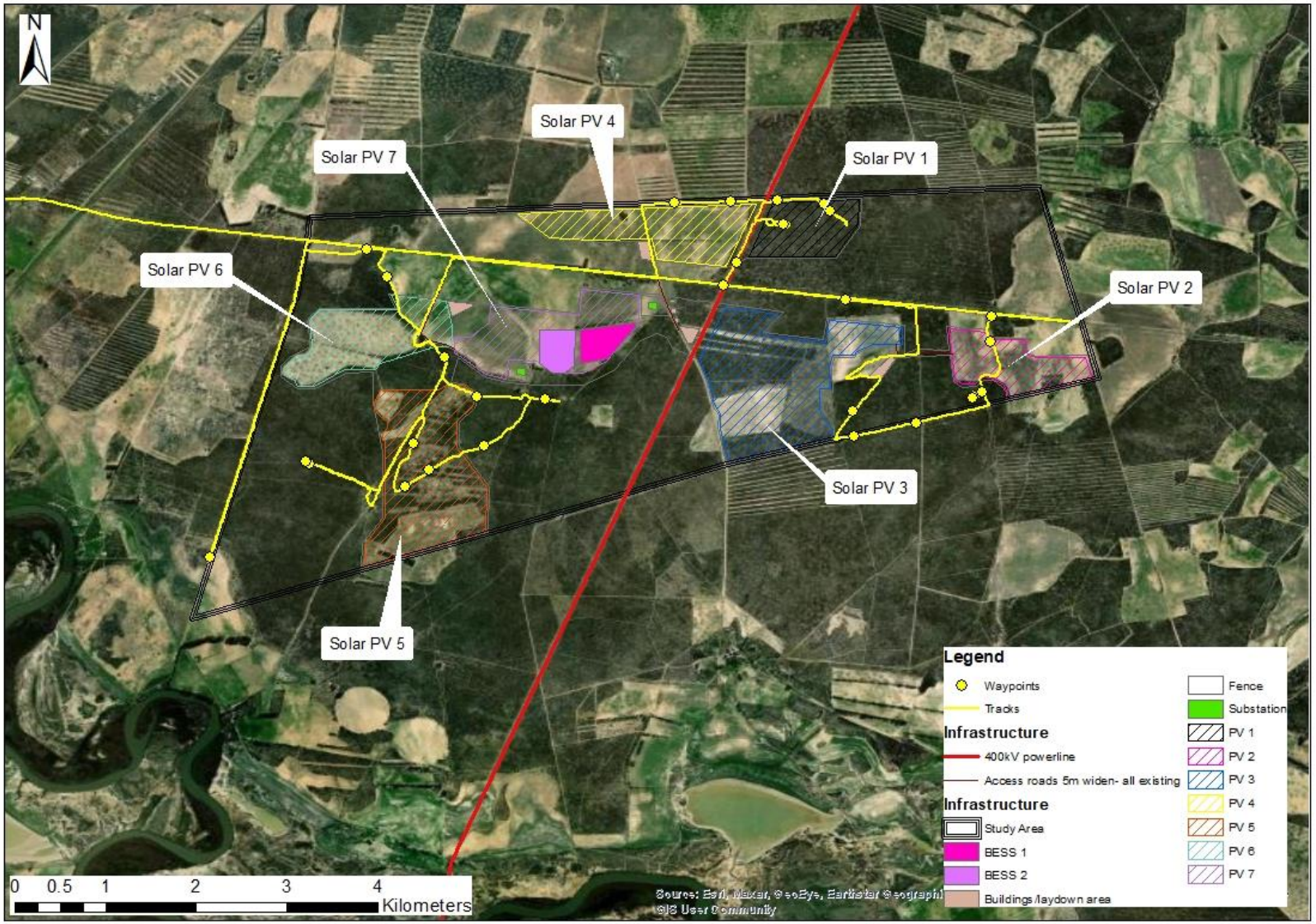


Figure 2.1: Map showing sample sites and tracks in relation to the project area.

2.5. Description of impact analysis methodology used

The environmental assessment aims to identify the various possible environmental impacts that could result from the proposed project activity. Each impact needs to be evaluated in terms of its significance, and in doing so, highlight the most critical issues to be addressed.

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale (e.g. project site, local, national or global) whereas intensity is defined by the severity of the impact (e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence).

Significance is an indication of the importance of the impact in terms of both physical extent and temporal (time) scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

A full description of the impact assessment methodology has been included in Appendix 5 of this report.

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 Fynbos Biome which stretches from the plateau above Vanrhynsdorp in the northwest to the city of Gqeberha in the southeast. This distribution largely conforms to the sandstone and quartzite formations of the Cape Fold Belt. However, outliers and smaller enclaves of Fynbos occur well beyond the boundaries of the biome (Manning, 2007).

The Fynbos biome forms part of the Cape Floristic Region (CFR) which is renowned for its high diversity and levels of endemism, with over 9 000 species of flowering plants, two-thirds of which are endemic. Although other biomes occur within the CFR, most of the diversity is associated with the fynbos biome (Manning, 2007; Mucina *et al.,* 2011).

The Fynbos biome is defined on the basis of climate, corresponding life-form patterns, and major natural disturbance (Mucina *et al.,* 2006). Due to the large extent and the topographical diversity, the climatic conditions and Mean Annual Precipitation (MAP) varies from the extreme southwest to the extreme eastern extent of the biome. The West Coast is influenced by the Benguela Current which flows northwards and carries cold water from the Antarctic while the Southern Coast is influenced by the warm Algulhas current which flows down from the equator. The true Mediterranean climate is restricted to the extreme southwest of the Cape Floristic Region (west of Mossel Bay) where rainfall occurs predominantly in the Winter months. Along the Southern Coast (between Mossel Bay Gqeberha) the rainfall is typically non-seasonal with rainfall occurring throughout the year. East of Gqeberha, the climate becomes more subtropical with rising temperatures and summer rainfall. The coldest temperatures occur in July (~7-15°C) and the warmest temperatures occur in January (~15-25°C) for most of the region, except for the inland valleys where temperatures can reach highs of 30-40°C (Manning, 2007).

Fynbos is typically regarded as “hard-leaved, relatively open shrubland, about 1-3 m tall, often with scattered taller bushes protruding above the canopy” (Manning, 2007). However, Mucina et al (2011), subdivided the Fynbos biome into three (3) quite different, naturally fragmented vegetation complexes including Fynbos, Renosterveld, and Strandveld. Both Fynbos and Renosterveld occur within the project area and are therefore described below. These descriptions have been obtained from Mucina et al (2011). Strandveld occurs within the project area and is therefore described in further detail below.

3.1.1. Strandveld

Strandveld is typically found close to the sea but never in areas that are directly impacted by sea spray. The vegetation communities are typically comprised of medium dense to closed shrublands that are dominated by sclerophyllous, broad leaved shrubs that ae typically very low. In more arid areas, there is a more dominant succulent component. Proteaceae are absent from Strandveld and Ericaceae are extremely rare.

3.2. Ecological Drivers

Ecological drivers are both abiotic and biotic factors that influence the structure, species composition, and the primary productivity of vegetation types. Strandveld differs from Fynbos in that it generally occurs on mineral-rich soil with high concentrations of calcium. Furthermore, unlike fynbos, fire plays lesser of a role as an ecological driver in strandveld communities and fire frequency in these areas is usually low. Other, important ecological drivers in this community is the climate which is characterised by hot, dry summers and cool, wet winters that are typically Mediterranean in nature as well as animal-plant interactions that include grazing, pollination and seed dispersal (Rebelo *et. al.*, 2011)

4. ANIMAL SPECIES THEME

4.1. Animal species with a distribution that includes the project area

The Western Cape, in which the project area occurs, is host to approximately 62 amphibian species, 155 reptile species and 172 mammal species (Birss, 2017; Shaw & Waller, 2017; Turner & Villiers, 2017). Of these, approximately 12 amphibian species, 62 reptile species and 108 mammal species (IUCN, 2023) have distribution ranges that occur within the project area. However, of these, only eight amphibian species, 36 reptile species and 58 terrestrial mammal species have been recorded within the same quarter degree square (QDS 3218CC, 3218CD) as the project area (Figure 4.1) (FitzPatrick, 2023).

It is important to note that although an area may be within a species distribution, the species may no longer inhabit the area or may not inhabit it permanently due to a lack of available habitat. For example, the Bontebok has a distribution which includes the project area, but these animals no longer occur outside of reserves and private game farms. The QDS[1] (16,331ha) may include habitat features that are not present within the project area or within the PAOI, therefore, a species may occur in the broader area where habitat is available but since its preferred habitat is not present in the project area, it is unlikely to occur there.

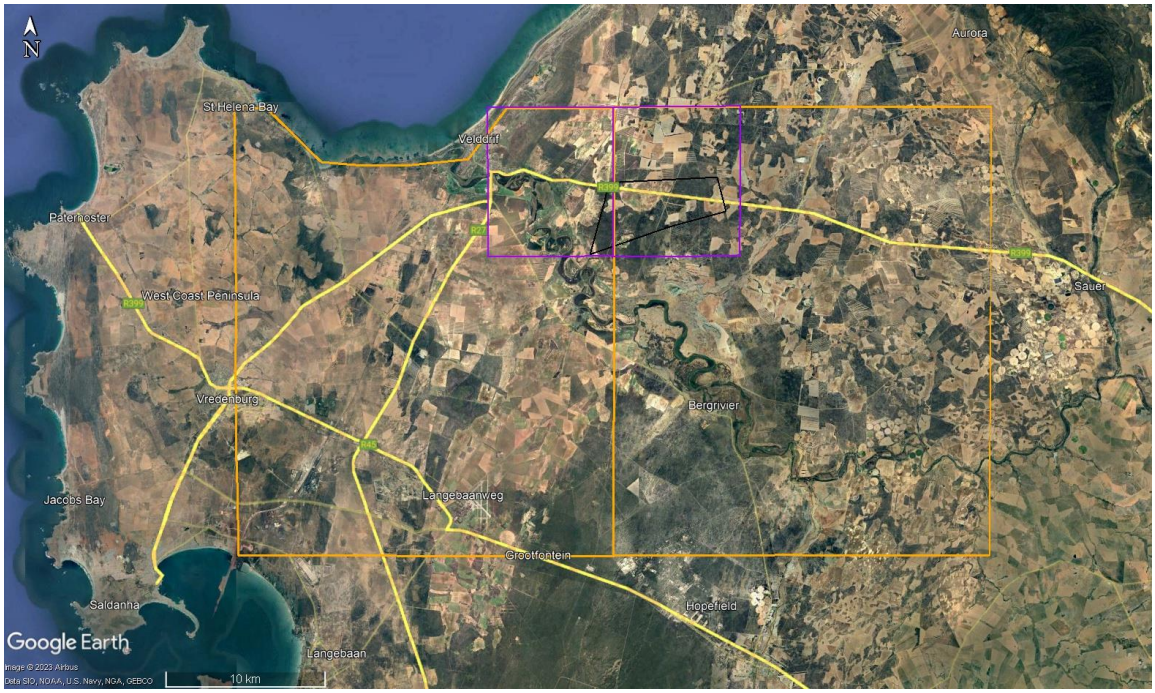


Figure 3.1: QDS 3218CC and 3218CD (orange) in relation to the project options

[1] QDS: A spatial reference mapping system that divides longitude latitude square cells into smaller squares (quarters) for ease of locational reference, effectively, forming a system of geocodes.

4.2. Faunal habitats and species recorded in the project area

Four faunal habitats were recorded during the field survey, namely, Strandveld, wetland/ponds, agricultural fields and transformed areas with trees. Animal species observed within these habitats, during the field survey, include Steenbok (n=2), Angulate Tortoise (n=4) and shells (n=2), Marbled Leaf-toed Gecko (n=3), Mole-rat mounds, spoor of a Mongoose, Porcupine burrow, tadpoles and subsurface tunnel of a Golden Mole species. Since two Golden-mole species have a distribution which includes the project area (the Cape Golden Mole (LC) and the Grant's Golden Mole (VU)), the precautionary principle has been applied and it is assumed that both occur within the project area[2].

Within the project area, stocked animals include sheep, cattle and ostrich and in the game section, south of the project area, the landowner reported Sable, Roan and Buffalo are kept. He also confirmed that Caracal and Jackal are present throughout the PAOI.

4.3. Fauna SCC distribution in relation to the project area

Faunal species of conservation concern are those listed as threatened, near-threatened and/or are endemic or range restricted. The Western Cape hosts several terrestrial vertebrate species of conservation concern (Turner & Villiers, 2017) of which four have a distribution range which includes the project area. This includes one amphibian species, one reptile species and two mammal species (Table 4.1). An additional three reptile and one mammal SCC are worth mentioning given the proximity of their distribution to the project area (Table 4.2).

The likelihood of these species occurring in the project area was assessed in Table 4.3 below. Three species, the Cape Caco (*Cacosternum capense*), Kasner's Dwarf Burrowing Skink (*Scelotes kasneri*) and Grant's Golden Mole (*Eremitalpa granti*) have a high likelihood of occurrence, two a moderate likelihood of occurrence and three a low likelihood of occurrence.

Table 4.1: Faunal SCC that have a distribution which includes the project area.

Taxon	Common name	Species	Threat status	Likelihood of Occurrence	Importance of project area to SCC
Amphibian	Cape Caco	*Cacosternum capense*	NT	High	Medium
Reptile	Kasner's Dwarf Burrowing Skink	*Scelotes kasneri*	EN	High	Medium
Mammal	Grant's Golden Mole	*Eremitalpa granti*	VU	High	Medium
	African Clawless Otter	*Aonyx capensis*	NT	Low	Low

Table 4.2: Faunal SCC whose distribution does not include the project area but occur near-by.

Taxon	Common name	Species	Threat status	Likelihood of Occurrence	Importance of project area to SCC
Reptile	Speckled Dwarf Tortoise	*Chersobius signatus*	EN	Low	Low
	Gronovi's Dwarf Burrowing Skink	*Scelotes gronovii*	NT	Moderate	Low
	Gray's Dwarf Legless Skink	*Acontias grayi*	NT	Moderate	Low
Mammal	Black-footed Cat	*Felis nigripes*	VU	Low	Low

[2] Photographs of the shallow subsurface tunnels that were observed have been placed on iNaturalist (https://www.inaturalist.org/observations/177161114).

Table 4.3: Faunal SCC with a distribution that includes the project area and the likelihood of occurrence within the project area.

*The Species Environmental Assessment Guideline (SANBI, 2020) specifies the likelihood of occurrence as Low, Moderate and High.

*For the purpose of this assessment Low=Unlikely to occur, Moderate=Possible occurrence and High = Probable occurrence.

Species	Threat Status	Distribution includes or partly includes the project area	Preferred habitat available in project area	Species records FrogMAP/ ReptileMAP/ MammalMAP	Likelihood of Occurrence in project area*	Justification
AMPHIBIAN						
Cape Caco *Cacosternum capense*	NT	✓	✓	✓	**High** Wetland/ Impoundment habitat	The project area falls within the known distribution range of this species, suitable, preferred habitat (wetland/impoundment) is present and there are records of this species within the broader project area. As such, the likelihood of occurrence is high within the wetland/impoundment habitat. However, it should be noted that these areas have been delineated and project infrastructure has been placed to avoid these areas and the recommended buffers. As such, impacts on this species will be negligible.
REPTILES						
Kasner's Dwarf Burrowing Skink *Scelotes kasneri*	EN	✓ EOO: 4480 km^2	✓	✓	**High** Strandveld	The project area falls within the known distribution range of this species, suitable, preferred habitat (Strandveld) is present and there are records of this species within the broader project area. As such, the likelihood of occurrence is high.
Gronovi's Dwarf Burrowing Skink *Scelotes gronovii*	NT	X EOO: 7810 km^2	✓	✓ 2017	**Medium** Strandveld	The project area falls just outside of the known distribution range of this species however, suitable, preferred habitat (Strandveld) is present and there are records of this species within the broader project area. As such, the likelihood of occurrence within the project area is medium.
Gray's Dwarf Legless Skink *Acontias grayi*	NT	X EOO: 5040 km^2	✓	✓ 1997	**Medium** Shrubland	The project area falls just outside of the known distribution range of this species however, suitable, preferred habitat (Strandveld) is present and there are records of this species within the broader project area. As such, the likelihood of occurrence within the project area is medium.

Speckled Dwarf Tortoise *Chersobius signatus*	EN	X	X	X	**Low**	The project area falls just outside of the known distribution range of this species and although Strandveld vegetation is present, no rocky habitat such as crevices, boulders or rocky slabs are present and there are no known records of this species within the broader project area. As such, the likelihood of occurrence is low.
MAMMALS						
Grant's Golden Mole *Eremitalpa granti*	VU	✓ EOO: 152000km^2 AOO: 112 km^2	✓	✓	**High** Strandveld	The project area falls within the known distribution range of this species, suitable, preferred habitat (Strandveld) is present, there are records of this species within the broader project area and there were shallow burrows present that belong either to Grant's Golden Mole or the Cape Golden Mole. As such, the likelihood of occurrence is high.
Black-footed Cat *Felis nigripes*	VU	X	X	✓ 1907	**Low**	The project area falls just outside of the known distribution range of this species and suitable habitat (Savanna, Grassland, Desert) is not present. The last known record within the broader project area is from 1907. As such, the likelihood of occurrence is low.
African Clawless Otter *Aonyx capensis*	NT	✓	X	✓ 2018	**Low**	Although the project area falls within the known distribution this species and it has been recorded within the PAOI, the project area DOES NOT contain the preferred habitat for this species. It is likely to utilise the Berg River to the south of the project area. As such, the likelihood of occurrence within the project area is low.

5. PLANT SPECIES THEME

5.1. Floristics

A total of 58 plant species from 30 families were recorded within the project area (Table 5.1) (a full species list has been included in Appendix 1). The Iridaceae had the highest number of species (seven species) followed by the Asteraceae (four species), Aizoaceae, Anacardiaceae, Oxalidaceae and Restionaceae, each with three species. The remaining families each had two or one species.

Table 5.1: Number of families and species recorded within the project site.

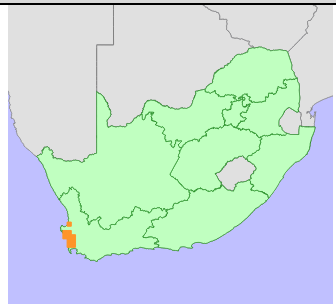
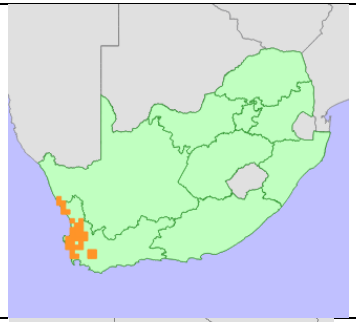
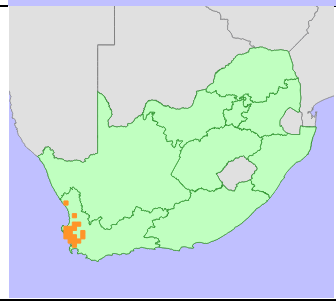
Family	Number	Family	Number
IRIDACEAE	7	APIACEAE	1
ASTERACEAE	4	APOCYNACEAE	1
AIZOACEAE	3	ASPHODELACEA	1
ANACARDIACEAE	3	CACTACEAE	1
OXALIDACEAE	3	CELASTRACEAE	1
RESTIONACEAE	3	FABACEAE	1
AMARANTHACEAE	2	GERANIACEAE	1
AMARYLLIDACEAE	2	HYACINTHACEAE	1
ASPARAGACEAE	2	MELIANTHACEAE	1
EBENACEAE	2	OLEACEAE	1
EUPHORBIACEAE	2	POACEAE	1
LAMIACEAE	2	PROTEACEAE	1
POLYGALACEAE	2	RHAMNACEAE	1
SCROPHULARIACEA	2	THYMELAEACEAE	1
SOLANACEAE	2	ZYGOPHYLLACEAE	1

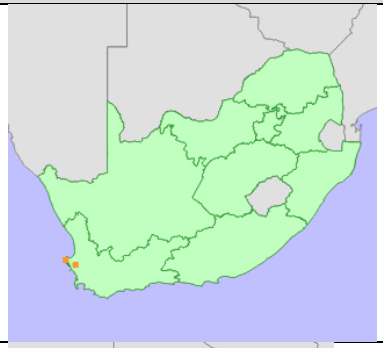
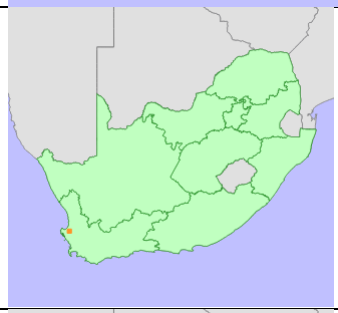
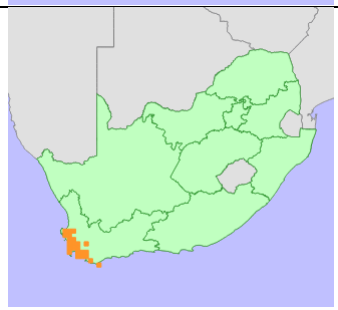
5.2. Species of Conservation Concern

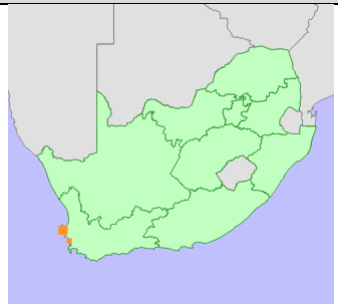
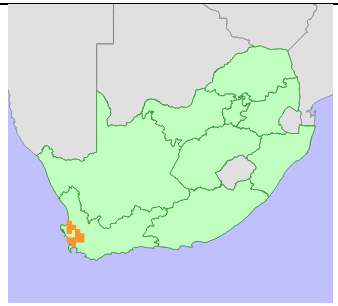
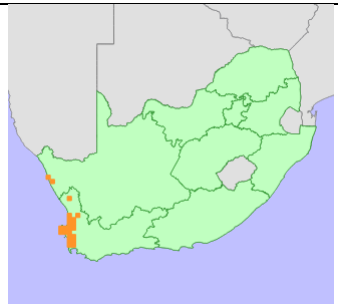
Of the 58 species recorded within the project area, one was listed as Endangered (EN), two as Vulnerable (VU) and one as Near Threatened (NT). These species were present within the near-intact vegetation except for a population of *Leucospermum rodolentum* (VU) which were found to occur within the secondary vegetation, north of the R399. Records of these species have been uploaded to iNaturalist: https://www.inaturalist.org/projects/sunveld

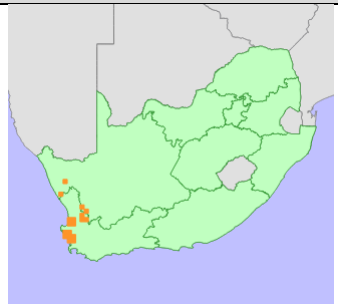
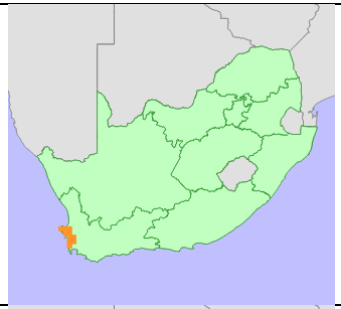
The desktop assessment identified thirty-nine threatened and near threatened species that could occur within the project area. Based on the results of the field survey, it was determined that of these thirty-seven species, four were confirmed to occur in the project area, ten have a high likelihood of occurrence based on suitable available habitat being present, three have a moderate likelihood of occurrence and twenty-four have a low likelihood of occurrence (Table 5.2).

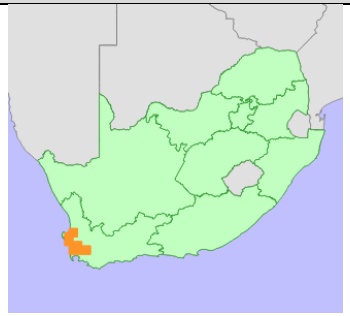
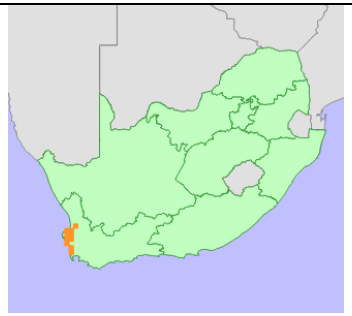
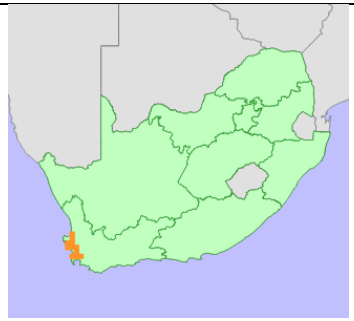
Table 5.2: Assessment of the likelihood of occurrence of SCC identified in the literature as possibly occurring within the project area.

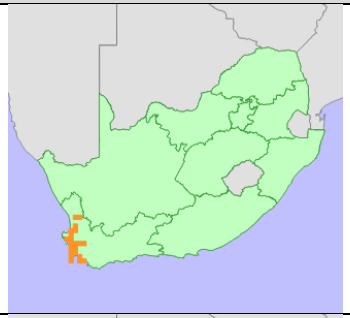
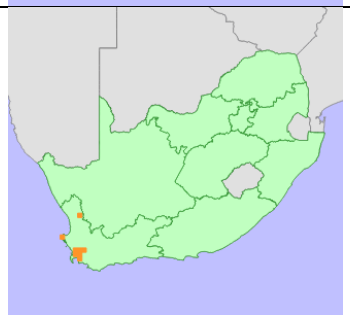
Family	Species	Conservation Status	Range and Habitat	Distribution	Likelihood of Occurrence
-	Sensitive species 878	EN B1ab(i,ii,iii,iv,v)	This species occurs from Milnerton to Vredenburg Peninsula and has an EOO 840-1400 km². It is extinct in the southern part of the range. It occurs in sand plain fynbos and dune strandveld, sandy coastal flats and dunes (von Staden, 2008). There are records of this species on iNaturalist near Hopefield, Langebaan, St Helena Bay and Jacobsbaai. There is also a record north east of the project area.		**Confirmed** This species was recorded within the project area
Proteaceae	*Leucospermum rodolentum*	VU A2c	This species occurs from Namaqualand to the Cape Peninsula. The EOO for this species is not specified. It is associated with sand fynbos on the west coast lowlands, surviving in arid areas by tapping deep water. Saldanha Flats Strandveld is one of the major habitats of this species (Rebelo *et al.*, 2005).		**Confirmed** This species was recorded within the project area
Apiaceae	*Arctopus dregei*	NT (B1ab(i,ii,iii,iv,v))	This species occurs from Koekenaap to Durbanville and is known from 30 to 35 remaining populations. It occurs in sand plain fynbos and shale renosterveld (Helme *et al.*, 2012).		**Confirmed** This species was recorded within the project area

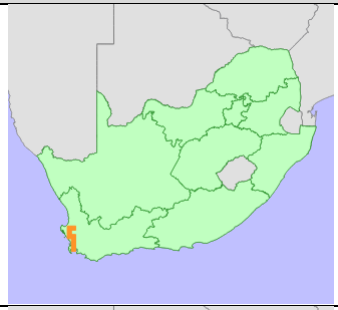
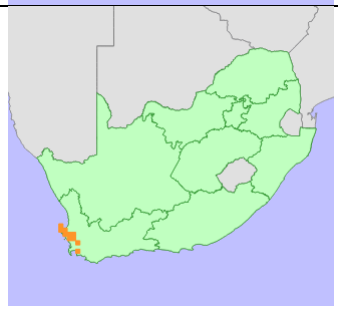
Family	Species	Conservation Status	Range and Habitat	Distribution	Likelihood of Occurrence
Oxalidaceae	*Oxalis suavis*	VU B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	This species occurs from Hopefield to Paternoster and is known from fewer than 10 remaining locations. It occurs in shale soils that transition into acidic sands (Helme *et al*., *2012)*		**Confirmed** This species was recorded within the project area
Amaranthaceae	*Sarcocornia freitagii*	EN B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	This species occurs in Velddrif (Western Cape Province) and has a small EOO of 103 km². It is known from five locations and is associated with heavy sandy, clayey soils possibly derived from calcrete within Saldanha Flats Strandveld (Steffen *et al*., 2014). There are no records of this species in the project area.		**High** Suitable habitat was present.
Fabaceae	*Xiphotheca reflexa*	EN A2bc; B1ab(i,ii,iii,iv,v)	This species occurs from Piketberg to Elim (Western Cape Province) and has an EOO of 2389 km². It is known from seven small, severely fragmented populations and is associated with sandy fynbos. Saldanha Flats Strandveld is one of the major habitats of this species (Victor *et al*., 2005). There is a record of this species on iNaturalist near Langebaan.		**High** Suitable habitat was present.

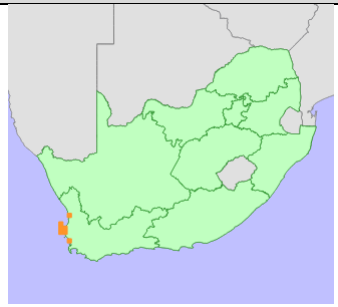
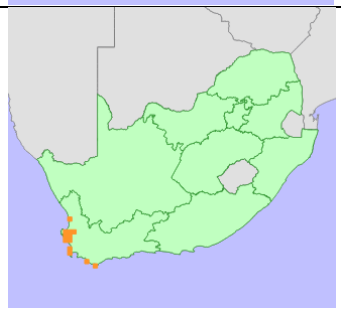
Family	Species	Conservation Status	Range and Habitat	Distribution	Likelihood of Occurrence
Iridaceae	*Ferraria parva*	EN C2a(i)	This species occurs on the Vredenburg Peninsula (Western Cape Province) with a small EOO of 336 km². It is known from eight subpopulations and is associated with deep sandy ground, sand over limestone, and crevices in limestone or calcrete pavement within Saldanha Limestone Strandveld and **Saldanha Flats Strandveld** (von Staden and Claassens, 2012). There are records of this species on iNaturalist near Langebaan and south east of the project area.		**High** Suitable habitat was present.
Proteaceae	*Leucadendron stellare*	EN A2c	This species is endemic to the coastal lowlands of the Western Cape, where it occurs from Aurora to Cape Flats (Western Cape Province). The EOO of this species is not specified. It occurs in level, dry sands over clay, 30-170 m (Rebelo *et al*., 2018). There are records of this species on iNaturalist near Sauer and south of the project area.		**High** Suitable habitat was present.
Fabaceae	*Argyrolobium velutinum*	VU A2c	This species occurs from Namaqualand to the Cape Flats and has an EOO of 29 500 km². It is associated with alkaline coastal sands in Sandveld and sandveld-stranveld ecotones. Saldanha Flats Strandveld is one of the major habitat types of this species (Helme *et al*., 2016). There are records of this species on iNaturalist near Jacobsbaai, south east of the project area.		**High** Suitable habitat was present.

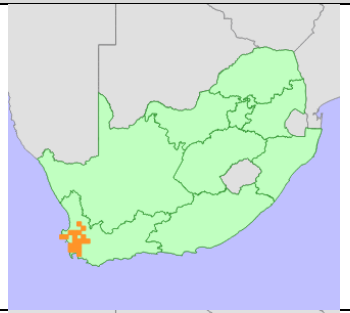
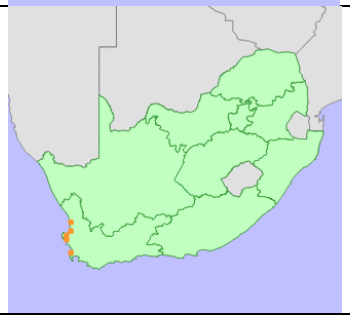
Family	Species	Conservation Status	Range and Habitat	Distribution	Likelihood of Occurrence
Hemerocallidaceae	*Caesia sabulosa*	VU B1ab(ii,iii,iv,v)	This species occurs from Southern Namaqualand, Kotzesrus to the Bokkeveld Plateau and the Cederberg, and southwards along the West Coast coastal plain to Darling. It has an EOO of 2200 km² and is known from less than 10 locations. It is occurs on deep sandy flats (Helme and Raimondo, 2007). There is a record of this species on iNaturalist near Langebaan.		**High** Suitable habitat was present.
Asteraceae	*Cotula duckittiae*	VU B1ab(ii,iii)	This species occurs from Yzerfontein to Bokbaai and has an EOO of 650 km^2. It is known from only 10 locations and is associated sandy flats (Helme, 2006). There is a record of this species on iNaturalist south of the project area.		**High** Suitable habitat was present.
Proteaceae	*Leucadendron foedum*	VU A2c	This species occurs from Piketberg to Hopefield. The EOO for this species is not specified. It is associated with sandy flats at 30-100m (Rebelo *et al*., 2006). There are records of this species on iNaturalist near Hopefield and north of Aurora.		**High** Suitable habitat is present.

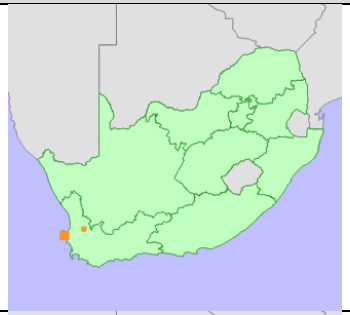
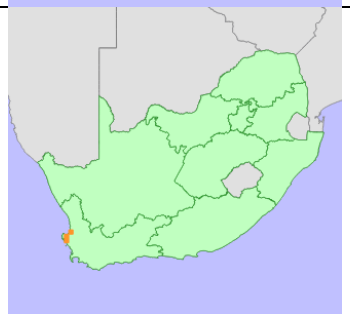
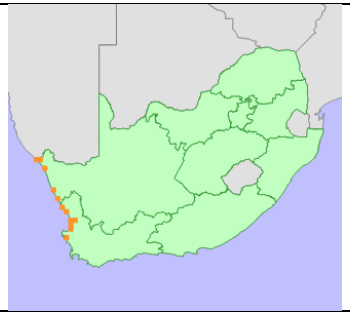
Family	Species	Conservation Status	Range and Habitat	Distribution	Likelihood of Occurrence
Proteaceae	*Leucospermum hypophyllocarpodendron subsp. canaliculatum*	VU A2c	This species occurs from Piketberg to Hopefield, Cape Flats, Riebeek-Kasteel and Breede River Valley. It has an EOO of 4365 km², AOO 426 km² and is only known from six locations. This species occurs on flats with deep sandy soils (0-200 m). There are records of this species on iNaturalist near Hopefield and Langebaan.		**High** Suitable habitat is present.
Asteraceae	*Oncosiphon africanum*	VU B1ab(ii,iii,iv,v)	This species occurs from the Berg River Mouth to the Cape Peninsula It has an EOO of 4800 km² and is known from fewer than 10 locations. It is associated with coastal sands, salt marshes and inland sandy areas (Helme *et al*., 2007). There are records of this species on iNaturalist in Langebaan as well as south and north of the project area.		**High** Suitable habitat is present.
Proteaceae	*Leucadendron cinereum*	VU A2c+3c+4c	This species occurs from the Berg River mouth to Kraaifontein. The EOO for this species is not specified. It is associated with flats within Sand Fynbos. Major habitats include **Saldanha Flats Strandveld,** Swartland Silcrete Renosterveld, Cape Flats Sand Fynbos, Atlantis Sand Fynbos, and Hopefield Sand Fynbos (Rebelo *et al*., 2004). There are records of this species on iNaturalist near Langebaan.		**Moderate** Suitable habitat is present.

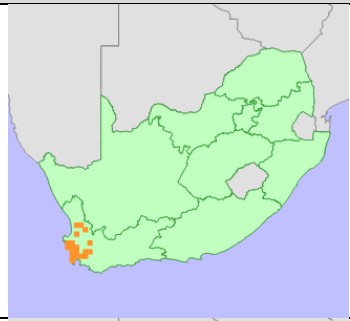
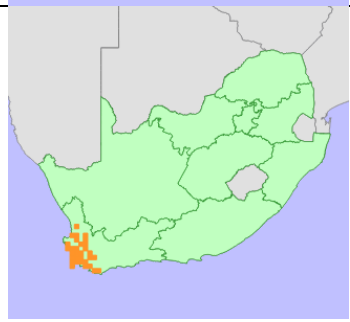
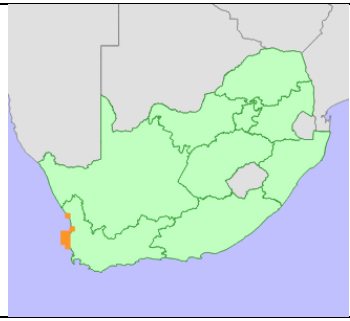
Family	Species	Conservation Status	Range and Habitat	Distribution	Likelihood of Occurrence
Proteaceae	*Protea scolymocephala*	VU A2c	This species occurs from Gifberg to Hermanus. The EOO of this species is not specified. It is associated with sandy flats and coastal lowlands, often near drainage lines (0-400 m) (Rebelo *et al*., 2005).		**Moderate** No suitable habitat present.
-	Sensitive species 222	VU	The range of this species is not specified due to sensitivity of this species but endemic to the Western Cape Province. EOO 12 000 km² and known from less than 10 locations. This species is associated with sandy or clay flats (Helme and Raimondo, 2007).		**Moderate** Although suitable habitat is present, given how few locations remain it is unlikely to be present within the project area.
Aizoaceae	*Lampranthus coccineus*	CR C2a(i)	This species occurs from Graafwater to Saldanha and Darling (Western Cape Province) and has an EOO 1063 km². It is only known from five small, isolated subpopulations and is associated with seasonally moist sandy flats and lowland shale (Klak *et al*., 2016).		**Low** No suitable habitat present.

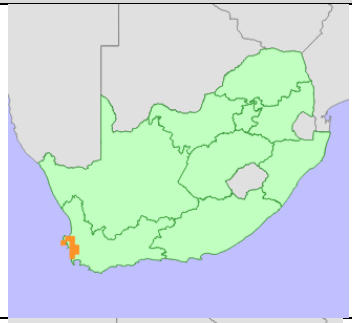
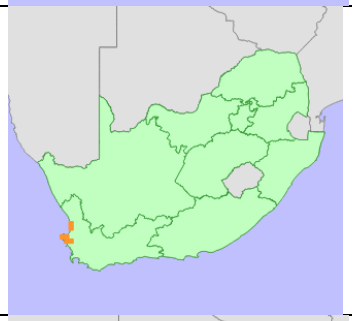
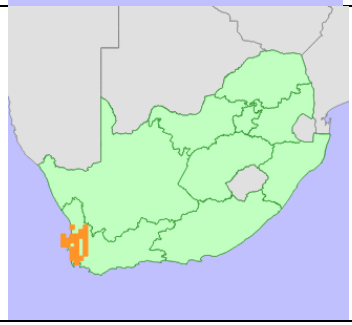
Family	Species	Conservation Status	Range and Habitat	Distribution	Likelihood of Occurrence
Aizoaceae	*Cleretum clavatum*	EN B1ab(i,ii,iii,iv,v)	This species is endemic to the Western Cape Province occurring from Hopefield to Cape Flats with an EOO of 1855 km². Only 3 of 10 known locations remain. It is associated with seasonally wet sands (Klak and Raimondo, 2006).		**Low** No suitable habitat present.
Aizoaceae	*Erepsia brevipetala*	EN B1ab(ii,iii,v)	This species occurs from Piketberg to Hopefield (Western Cape Province) and has an EOO<1000 km². It is only known from three known locations and is associated with white clay slopes near watercourses (Helme *et al*., 2006). There is a record of this species north east of Hopefield.		**Low** No suitable habitat present.
Boraginaceae	*Echiostachys spicatus*	EN B1ab(ii,iii,iv,v)	This species occurs from St. Helena Bay to Somerset West (Western Cape Province) and has an EOO 1700 km². It is known from six severely fragmented subpopulations and occurs in seasonally damp sandy flats overlying clays in Saldanha Flats Strandveld, Swartland Granite Renosterveld, Swartland Silcrete Renosterveld, Cape Flats Sand Fynbos, Atlantis Sand Fynbos, Hopefield Sand Fynbos (Helme and Raimondo, 2007). There are records of this species on iNaturalust near Vredenberg, Langebaan and south of Hopefield.		**Low** No suitable habitat present.

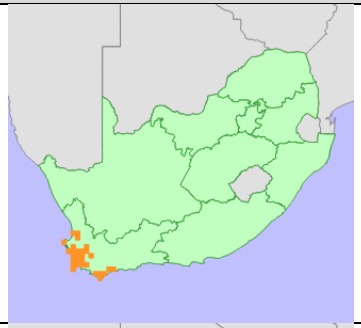
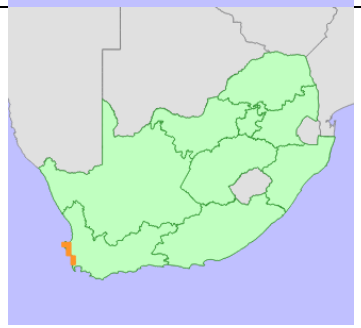
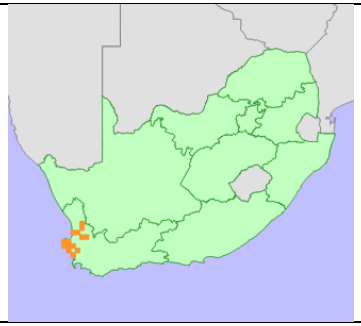
Family	Species	Conservation Status	Range and Habitat	Distribution	Likelihood of Occurrence
Hypoxidaceae	*Empodium veratrifolium*	EN B1ab(ii,iii,iv,v)	This species occurs from Lambert's Bay to Saldanha Bay (Western Cape Province) and has an EOO<500 km². It is known from less than 15 subpopulations and is associated granite boulders but occasionally also on calcrete usually within coastal areas (Helme and Raimondo, 2005). There are record of this species on iNaturalist near Langebaan, Vredenburg, Saldanha and St Helena Bay.		**Low** No suitable habitat present.
Plumbaginaceae	*Limonium depauperatum*	EN B1ab(i,ii,iii,iv)	This species occurs from the Cape Flats up the West Coast and has an EOO<5000 km². It is known from four locations which are all declining. It is associated with river and estuary banks in **Saldanha Flats Strandveld** and Cape Flats Sand Fynbos (Victor and Mucina, 2004).		**Low** Suitable habitat not present within the project area.
Asteraceae	*Cotula eckloniana*	VU B1ab(iii,v)+2ab(iii,v)	This species occurs from Lambert's Bay southwards along the Cape West Coast to the Cape Peninsula and Agulhas Plain. It has an EOO of 8587 - 18 685 km² and AOO of <100 km². It is only known from seven (7) confirmed locations but up to 15 locations possible. It is associated with saline alluvium floodplains, salt pans and sandy coastal flats (Powell *et al.*, 2013).		**Low** Suitable habitat is not present.

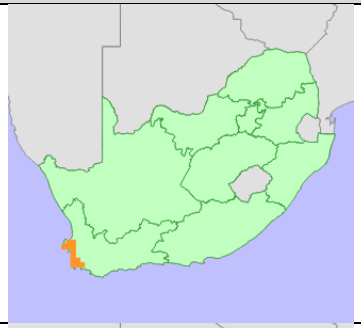
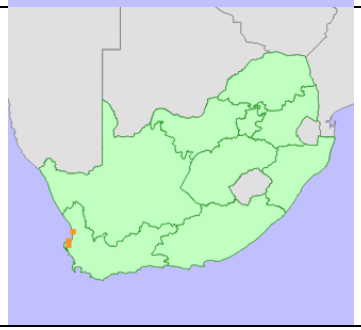
Family	Species	Conservation Status	Range and Habitat	Distribution	Likelihood of Occurrence
Aizoaceae	*Drosanthemum hispifolium*	VU B1ab(ii,iii,iv,v)	This species occurs from Clanwilliam to Koeberg and has an EOO 14 400 km². It is known from eight (8) locations remain and is associated with lowland hills or flats in loamy shale (Klak *et al*., 2006).		**Low** Suitable habitat is not present.
Iridaceae	*Ferraria densepunctulata*	VU C2a(i)	This species occurs from Lambert's Bay to Langebaan and is known from between six and eight remaining subpopulations with less than 1000 mature individuals remaining. It is associated with rocky or calcareous sandy sites near the coast, as well as limestone pavements on the Vredenburg Peninsula (von Staden and Claassens, 2012).		**Low** Suitable habitat is not present.
Aizoaceae	*Galenia crystallina var. maritima*	VU B1ab(iii)	This species occurs from Lambert's Bay to the Cape Peninsula and has an EOO of 3580 km². It is known from between five to ten locations and is associated with damp hollows in silt near the sea (von Staden, 2016).		**Low** Suitable habitat is not present.

Family	Species	Conservation Status	Range and Habitat	Distribution	Likelihood of Occurrence
Iridaceae	*Geissorhiza lewisiae*	VU B1ab(i,ii,iii,iv,v) +2ab(i,ii,iii,iv,v)	This species occurs from Olifants River Valley to the Vredenburg Peninsula and has an EOO of 2 082 km². It is known from between five and nine locations and is associated with granite outcrops, limestone pavements and calcrete soils in Saldanha Flats Strandveld, Saldanha Granite Strandveld, and Citrusdal Shale Renosterveld (von Staden, 2011).		**Low** Suitable habitat is not present.
Asteraceae	*Helichrysum bachmannii*	VU B1ab(iii,iv,v)+ 2ab(iii,iv,v)	This species occurs in a small area between Langebaan, Velddrif and Vredenburg on the West Coast It has a small EOO of 716 km² and is known from four locations although it is suspected that there is a minimum of five more. It occurs on granite outcrops and in sandy soils within Saldanha Granite Strandveld, **Saldanha Flats Strandveld**, and Langebaan Dune Strandveld near the coast (Helme and Raimondo, 2010). There are records of this species on iNaturalist near St. Helena Bay and Jacobsbaai.		**Low** Suitable habitat is not present.
Asteraceae	*Helichrysum dunense*	VU B1ab(ii,iii,v)	This species occurs from Elandsbaai in the Western Cape to the Orange River in the Northern Cape. It has an EOO of 1500 km² and is known from five locations but suspected to be under collected and to occur from around 10 locations. It is associated with coastal calcareous dunes (Helme and Raimondo, 2006).		**Low** Suitable habitat is not present.

Family	Species	Conservation Status	Range and Habitat	Distribution	Likelihood of Occurrence
Thymelaeaceae	*Lachnaea capitata*	VU A2ac	This species occurs from Clanwilliam to the Cape Peninsula, Franschhoek and the Breede River Valley. The EOO for this species is not specified. It is associated with acid sand flats that are often seasonally damp (Beyers *et al*., 2006). There are records of this species on iNaturalist near Hopefield.		**Low** Suitable habitat is not present.
Thymelaeaceae	*Lachnaea grandiflora*	VU A2ac	This species occurs from Swartboskraal in Clanwilliam to the Cape Peninsula and Bredasdorp. The EOO for this species is not specified. It is associated with sandy flats and sandy areas on lower mountain slopes within Fynbos. Saldanha Flats Strandveld is one of the major habitat types of this species (Raimondo and Helme, 2008). There are records of this species on iNaturalist near Hopefield and Grootfontein.		**Low** Suitable habitat is not present.
Plumbaginaceae	*Limonium acuminatum*	VU A2c; B1ab(iii,iv,v)+ 2ab(iii,iv,v); C1	This species occurs from Rocher Pan to Yzerfontein. It has an EOO of 1200 km² and is associated with coastal limestone outcrops and occasionally on calcareous coastal sands in Langebaan Dune Strandveld, Saldanha Limestone Strandveld, **Saldanha Flats Strandveld**, and Saldanha Granite Strandveld (Helme *et al*., 2005).		**Low** No suitable habitat present.

Family	Species	Conservation Status	Range and Habitat	Distribution	Likelihood of Occurrence
Scrophulariaceae	*Manulea corymbosa*	VU B1ab(ii,iii,iv,v)+ 2ab(ii,iii,iv,v)	This species occurs from Velddrif to the Cape Peninsula and has an EOO <1880 km². It occurs on sandy soils near the coast (Turner, 2007). There are records of this species on iNaturalist in the West Coast National Park.		**Low** No suitable habitat present..
Fabaceae	*Otholobium venustum*	VU B1ab(ii,iii,v)+ 2ab(ii,iii,v)	This species occurs from Lambert's Bay to Langebaan and has an EOO and AOO<1000 km². It is known from eight locations. This species is associated with calcareous sands and clays within 3 km of the coast (Helme and Raimondo, 2005).		**Low** No suitable habitat present.
-	Sensitive species 1225	VU A2c	This species occurs from Lambert's Bay to Melkbosstrand, and inland to Citrusdal, Piketberg, Tulbagh and Kalbaskraal. It has an EOO of 17 789 km² and is associated with the coastal lowlands on stony or gravelly clay soil derived from shale or granite on lower slopes and flats within Fynbos (Helme *et al*., 2018).		**Low** Suitable habitat is not present.

Family	Species	Conservation Status	Range and Habitat	Distribution	Likelihood of Occurrence
-	Sensitive species 599	VU A2c	This species occurs from Elandsbaai to the Cape Peninsula and Bredasdorp. It has an EOO of 28 608 km² and AOO estimated <2000 km² and is estimated to occur between 20 and 30 locations. This species is a habitat specialist that occurs on damp sandy flats on wetland margins and floodplains within Fynbos (Helme and von Staden, 2018).		**Low** No suitable habitat present.
-	Sensitive species 816	CR B2ab(ii,iii,iv,v); C2a(i)	This species occurs from Saldanha to Milnerton and has a small AOO of 5 km². Three small, severely fragmented subpopulations each consisting of no more than 50 mature individuals are known. This species is associated with calcareous sands or limestone gravel within coastal scrubs (Goldblatt *et al*., 2006). There are records of this species on iNaturalist near Langebaan and Vredenburg.		**Low** No suitable habitat present.
-	Sensitive species 244	VU B1ab(ii,iii,iv,v)	This species occurs from Lamberts Bay to Yzerfontein and inland to Redelinghuys and Hopefield. It has an EOO of 3500 km² and is known from 10 known locations. It is associated with limestone and granite outcrops (Helme and Raimondo, 2008).		**Low** Suitable Habitat is not present.

Family	Species	Conservation Status	Range and Habitat	Distribution	Likelihood of Occurrence
Asteraceae	*Steirodiscus tagetes*	VU B1ab(ii,iii,iv,v)	This species occurs along the Cape West Coast between St Helena Bay and False Bay. It has an EOO of 5325 km² and is known from six to eight remaining locations. It is associated with sand dunes near the coast (Raimondo *et al*., 2016).		**Low** No suitable habitat present.
Campanulaceae	*Wahlenbergia umbellata*	VU D2	This species is only known from one location in Lambert's Bay. The EOO of this species is not specified. It is associated with coastal sands (Welman and Victor, 2005).		**Low** Project area does not occur in Lamberts Bay where the one known population occurs.

5.3. Alien Invasive Plant Species

Three alien invasive plant species were recorded within the project area (Table 5.3) and were typically found within disturbed sites, such as along road verges or secondary vegetation that was previously disturbed. Of these three species, two are listed Category 1b and one as a Category 2 alien invasive plant species on the National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 0f 2004) and two are listed as a Category 2 species on the Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983).

Under the NEM: BA act, Category 1a an 1b species must be eradicated and under CARA, Category 2 plant species must be removed & destroyed immediately. No trade in these plants is permitted.

Table 5.3: List of exotic plant species recorded on site.

Family	Species	NEM:BA Alien Invasive Species	CARA
AMARANTHACEAE	*Atriplex nummularia*	Category 2	Category 2
CACTACEAE	*Opuntia ficus-indica*	Category 1b	-
FABACEAE	*Acacia cyclops*	Category 1b	Category 2

6. TERRESTRIAL BIODIVERSITY THEME

The DFFE Screening Report classifies the Terrestrial Biodiversity Theme Sensitivity of the project area as VERY HIGH (Table 2.1) due to the following sensitivity features:

- CBA 1 and 2 (refer to section 6.1)
- ESA 1 and 2 (refer to section 6.1)
- Endangered ecosystem – Saldanha Flats Strandveld (refer to section 6.2)

This chapter reviews the spatial planning tools associated with each of these features and provides comment on the implication these features have on development, should the project proceed.

6.1. Western Cape Biodiversity Spatial Plan

The Western Cape Biodiversity Spatial Plan (WCBSP, 2017) maps biodiversity priority areas, including Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) which require safeguarding to ensure the persistence of biodiversity and ecosystems functioning, through a systematic conservation planning process.

CBA's are defined as "*areas of high biodiversity and ecological value and need to be kept in a natural or near-natural state, with no further loss of habitat or species*" (WCBSP Handbook, 2017). The provided map distinguishes between CBA 1 areas, which are those that are likely to be in a natural condition, and CBA 2 areas, which are areas that are potentially degraded or represent secondary vegetation.

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*." ESA's should be maintained in a functional and natural state although some habitat loss may be acceptable. As with the CBAs, a distinction is made between ESA 1 that are areas in a natural, near natural or moderately degraded condition and ESA 2 which are degraded and need to be restored.

According to the WCBSP (2017), portions of the project area occur within a CBA 1, CBA 2 and ESA 1 (Figure 6.1). The applicant has designed the project layout to largely avoid sensitive areas taking into account sensitivities from all specialist reports. The layout largely avoids CBA 1 and CBA 2 areas. Only Solar PV 3 occurs in an area with a two small CBA 1 patches and Solar PV 5 encroaches on very small areas along its western, eastern and northern boundaries. In terms of the ESA, Solar PV 3 and 5 impact some areas designated as ESAs and Solar PV 1 impacts a small portion of an ESA along its southern boundary.

To understand the impact of the project on the CBAs and ESAs, it's important to understand the underlying reason that these spatial planning units were designated as such. The reason layer was therefore consulted and the following reasons for these areas are that they occur in:

- Saldanha Flats Strandveld (EN)
- Watercourse Protection – South Western Coastal Belt

Comment has been provided on how the development will impact the features associated with these portions of the project area being listed as a CBA and ESA.

Table 6.1: CBA and ESA feature and comment.

Feature	Comment
Saldanha Flats Strandveld (EN)	This vegetation type was confirmed to occur within the PAOI and has been mapped based on the results of the field survey (Figure 6.4). This vegetation type is broken up by areas that were cleared for agricultural land with the vegetation present being secondary in nature. The applicant has taken into account the sensitivity of Saldanha Flats Strandveld and has located project infrastructure in areas that are either transformed or are comprised of secondary vegetation. Only Solar PV 5 overlaps a small area (9.1 ha) of Near-intact Saldanha Flats Strandveld along its northwestern boundary and Solar PV 3 overlaps a small patch (15.8 ha) of degraded Saldanha Flats Strandveld along its southern boundary. These areas are both located on the edge of areas that have been transformed and have therefore been subjected to edge effects. Furthermore, 9.1 ha of near-intact Saldanha Flats Strandveld is equivalent to 0.015% of the remaining extent of this vegetation type and 15.8ha is equivalent to 0.027%. The loss of such a small area of this vegetation type is unlikely to significantly impact on its long term persistence and will therefore not affect the functioning of the CBA and ESA that were designated to protect this vegetation type.
Watercourse protection- South Western Coastal Belt	Since this is an aquatic feature, the aquatic specialist must provide comment on how the development will affect this feature.

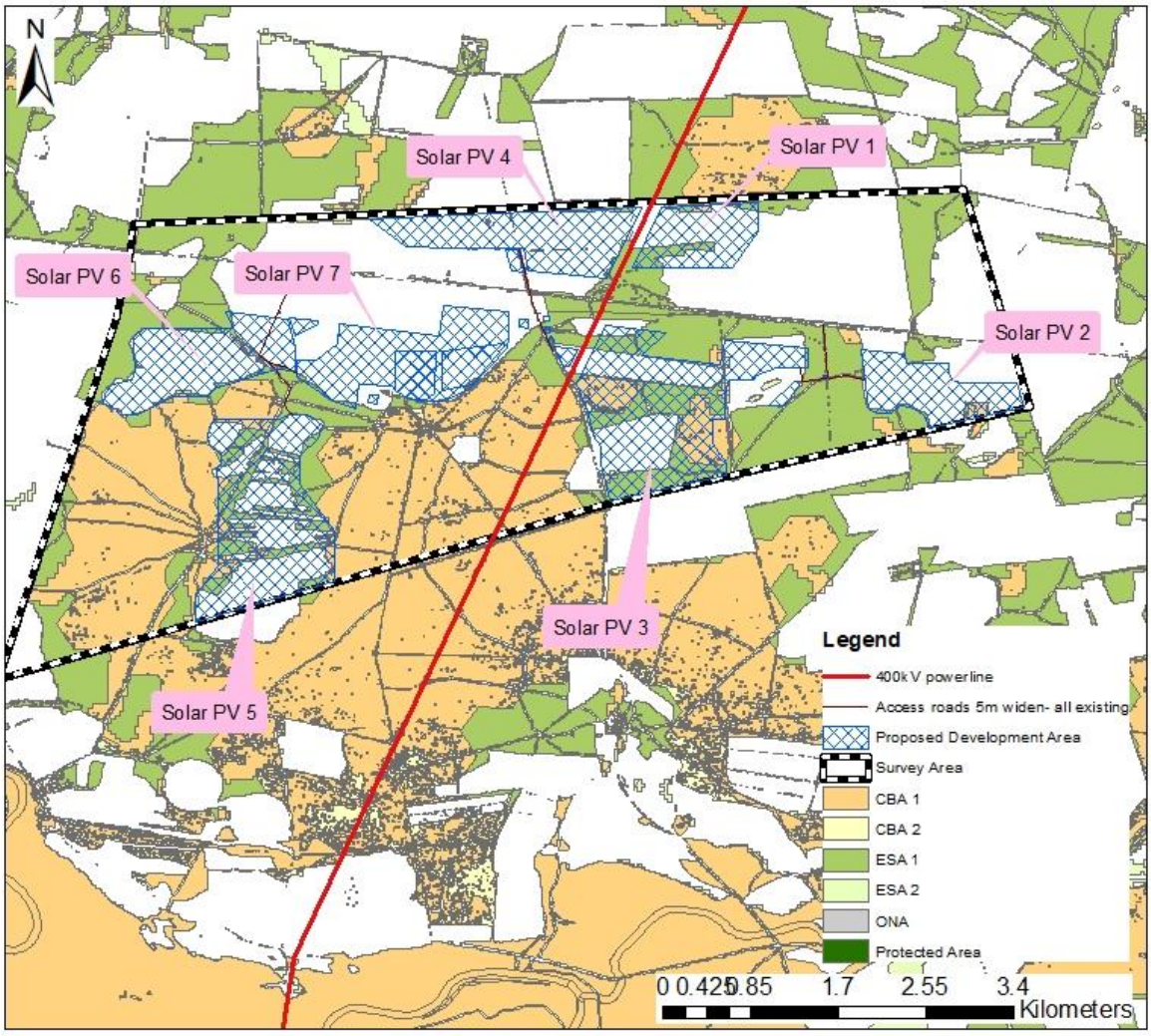


Figure 6.1: The project area in relation to the CBAs and ESAs

6.2. Vegetation Types Present

The national vegetation map presents vegetation types at a course scale. These are then refined based on the results of the site survey which identifies the actual vegetation type present within the project area.

According to the national vegetation map, the project area falls within Saldanha Flats Strandveld (Figure 6.2 and 6.3). This was confirmed by the field survey which identified patches of near-intact and degraded Saldanha Flats Strandveld present within the project area (Figure 6.4) as well as Secondary Vegetation and Transformed areas. Each of these are described in further detail below.

6.2.1. Saldanha Flats Strandveld (Degraded and Near-Intact)

Saldanha Flats Strandveld occurs on extensive coastal flats (altitudes of 0-120 m) from St Helena Bay and the southern banks of the Great Berg River near its mouth in the north, to Saldanha and Langebaan in the south, with the southernmost extension at the coast near Yzerfontein and Rietduin.

This sclerophyllous shrubland is characterised by a sparse emergent and moderately tall shrub layer and an open succulent shrub layer forming the undergrowth. This vegetation type is known for its conspicuous displays of geophytes and herbaceous flora in spring (Rebelo *et al*., 2006) (Figure 6.5).

Within the project area, shrubs such as *Searsia glauca, Olea exasperate, Searsia laevigata, Searsia dissecta, Gymnosporia buxifolia and Euclea tomentosa* formed bush clumps surrounded by smaller shrubs, herbs and restios such as *Eriocephalus racemosus, Zygophyllum morgsana, Struthiola ciliata, Crassothonna cylindrica, Lycium amoena, Asparagus capensis, A. rubicundus, Salvia africana, Salvia lanceolata, Ruschia macowanii, Zygophyllum flexuosa, Gladiolus carinatus, Microloma sagittatum, Euphorbia mauritanica,* a number of *Oxalis, Babiana* and *Lachenalia* species, as well as *Thamnochortus sp.* and *Wildenowia incurvata.*

The patches of degraded Saldanha Flats Strandveld had a lower species diversity than the near-intact patches and were comprised of a higher number of ruderal species.

Saldana Flats Strandveld is classified as Endangered (EN) (B1(i)) due to its narrow distribution and high rates of habitat loss in the past 28 years which has placed this ecosystem type at risk of collapse (DFFE, 2022). Only 36% (591.6 km^2) of the historical extent remains and it is considered poorly protected. The conservation target for Saldanha Flats Strandveld is 24%.

As mentioned above in section 6.1, the applicant has designed project infrastructure to largely avoid Saldanha Flats Strandveld given that this vegetation is listed as EN and is therefore considered highly sensitive. A very small area (9.1 ha or 0.015%) of this vegetation type will be affected by Solar PV 1 and a second small area of degraded Saldanha Flats Strandveld (15.8 ha or 0.0027%) will be affected by Solar PV 3.

6.2.2. *Secondary Vegetation*

A patch of Secondary Vegetation was present in the north eastern corner of the project area (Figure 6.6). This vegetation shows evidence of historical disturbance and was more heavily infested with alien invasive species such as *Acacia cyclops*. Species diversity was lower and comprised of species that were more resilient to disturbance such as annuals. However, a population of *Leucospermum rodolentum,* which is listed as a VU species, was recorded within this area.

Solar PV 1 is located in this vegetation type.

6.2.3. Transformed Areas

The Transformed Areas are characterised by vegetation that has been cleared and the land has been ploughed and used for agricultural purposes (Figure 6.7). These areas are of low ecological significance but have been mapped as they are suitable for development from an ecological perspective. The majority of project infrastructure has been located within these areas.

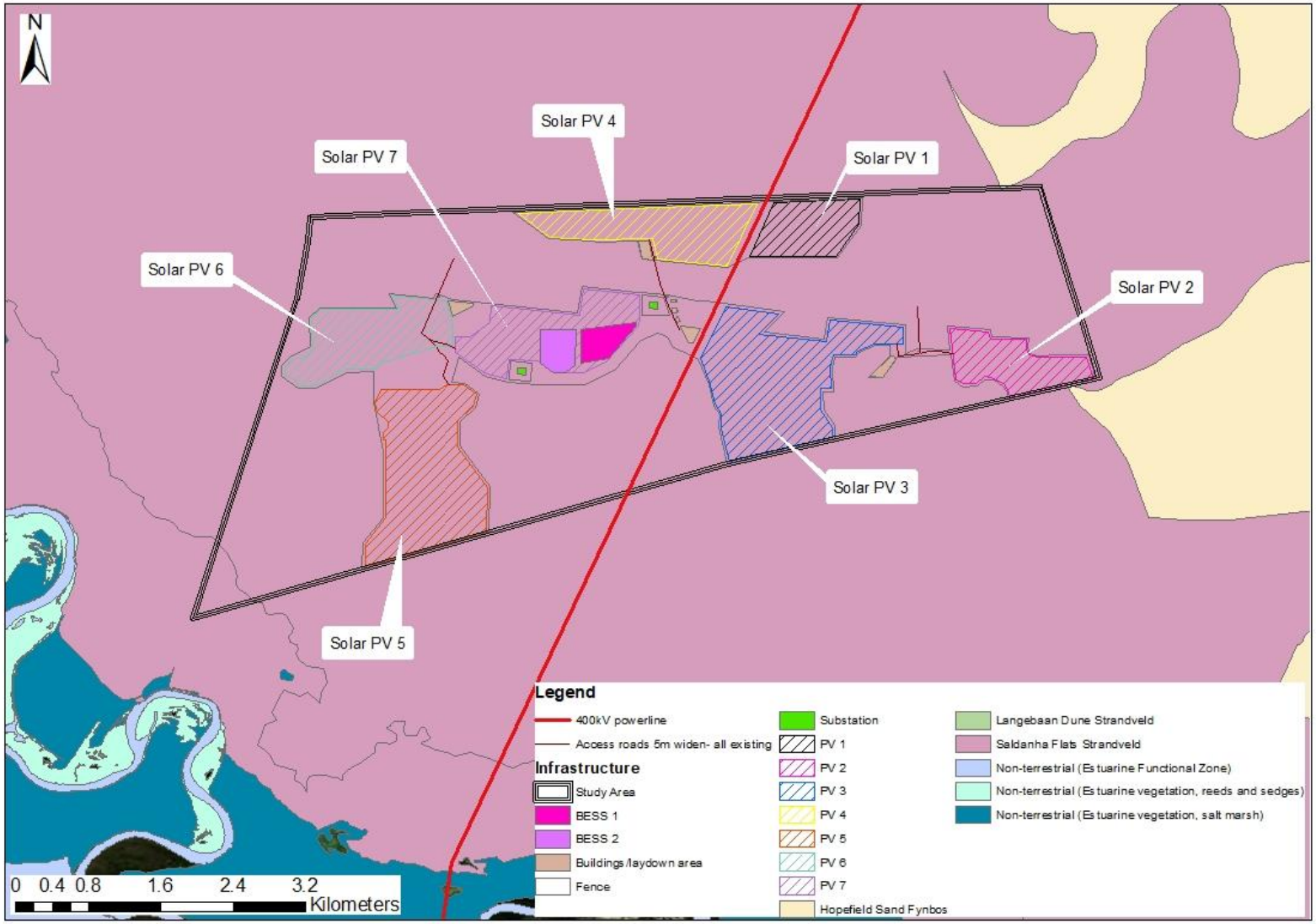


Figure 6.2: National Vegetation Map for the project area.

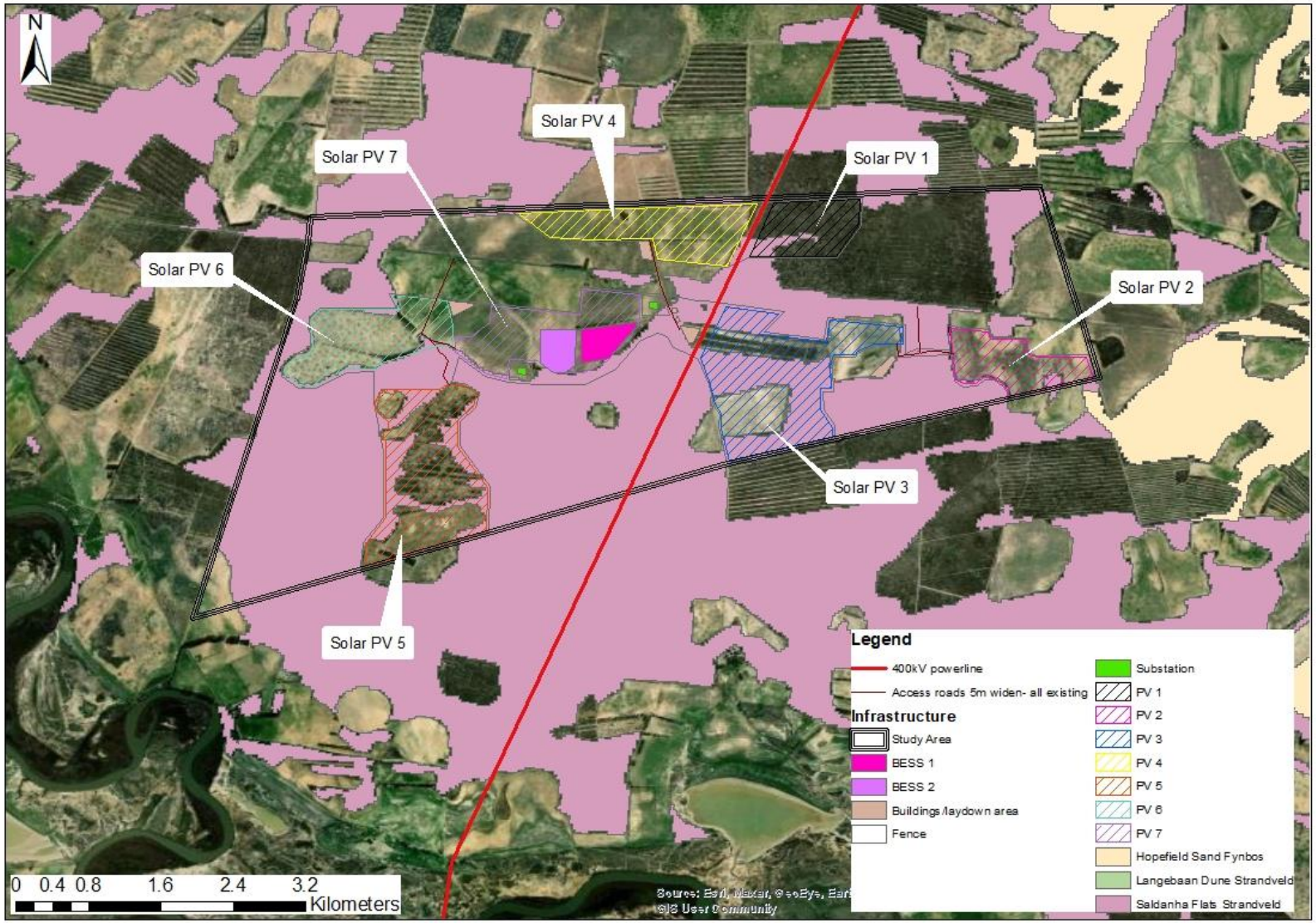


Figure 6.3: Map showing remnant patches of natural vegetation (SANBI, 2021).

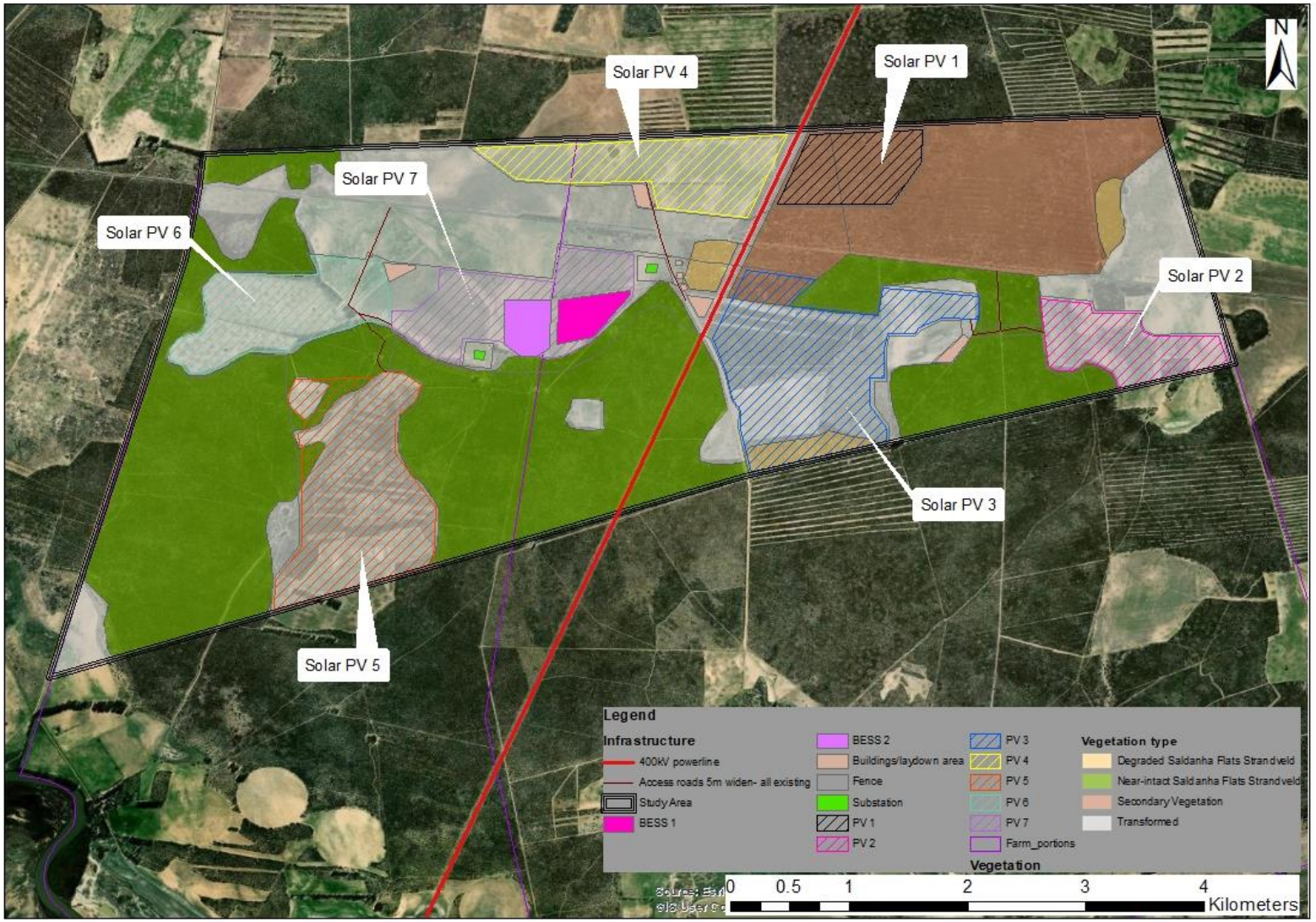


Figure 6.4: Vegetation Map for the project area based on the results of the field survey.

Figure 6.5: Photograph illustrating the near-intact Saldanha Flats Strandveld vegetation community present in the project area.

Figure 6.6: Photograph illustrating the Secondary vegetation present in the project area.

Figure 6.7: Photograph illustrating transformed areas

6.3. Protected Areas and National Protected Area Expansion Strategy

The South African Protected Areas Database (SAPAD) and the South African Conservation Areas Database (SACAD) is a spatial dataset that includes all the protected areas (PA) and conservation areas (CA) within South Africa. Data on privately owned PAs are also included in the dataset which is maintained and updated on a quarterly basis. This dataset therefore provides the most up to date information on protected areas and conservation areas in South Africa. According to SACAD and SAPAD (2023, Q1), the project area does not occur within or near to a protected area. However, the project does occur within the Cape West Coast Biosphere Reserve (Figure 6.8).

Biosphere reserves are 'learning places for sustainable development'. They are sites for testing interdisciplinary approaches to understanding and managing changes and interactions between social and ecological systems, including conflict prevention and management of biodiversity. They are places that provide local solutions to global challenges. Biosphere reserves include terrestrial, marine and coastal ecosystems. Each site promotes solutions reconciling the conservation of biodiversity with its sustainable use.

Biosphere reserves are nominated by national governments and remain under the sovereign jurisdiction of the states where they are located. Biosphere Reserves are designated under the intergovernmental MAB Programme by the Director-General of UNESCO following the decisions of the MAB International Coordinating Council (MAB ICC). Their status is internationally recognized.

The Cape West Coast Biosphere Reserve stretches northward from the Diep River in Cape Town to the Berg River and covers 378 000 ha of coastal lowland plains. It is unique in terms of its natural beauty, biodiversity, history, culture and location. It was proclaimed and supported by all three spheres of government and the formal designation procedure was completed in November 2000. The aim of the Cape West Coast Biosphere Reserve is to foster human development that is ecologically sustainable (cwcbr.co.za).

The proposed project area does not occur within a NPAES Focus Area (2010) or a negotiated Focus Area (2018).

Figure 6.8: 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 SEI for faunal species habitat within the project area was determined to be medium for the wetland/ impoundment habitat and medium for the near-intact and degraded Strandveld habitat, Secondary vegetation and transformed areas (Table 7.1).

Table 7.1: Sensitivity assessment for each faunal habitat type within the project area.

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	BI	Receptor Resilience	SEI
Wetland/ impoundment habitat	**Medium** High likelihood of occurrence within the project area of the Cape Caco which is listed as NT.	**Low** Small wetland/impoundments with almost no habitat connectivity but migrations still possible across modified habitat.	**Low**	**Very Low** The habitat for this species is likely to be removed and therefore this species is unlikely to remain at a site when impact or disturbance is occurring and unlikely to return once impact/disturbance has been removed.	**Medium**
Near-intact Saldanha Flats Strandveld Habitat	**High** High likelihood of occurrence within the project area of the Kasner's Dwarf Burrowing Skink listed as EN.	**High** Large areas with good habitat connectivity and functional corridors with only minor negative ecological impacts and no signs of major past disturbance.	**High**	**High** Species have a high likelihood of returning to site once disturbance or impact has been removed.	**Medium**
Near-intact Saldanha Flats Strandveld, Degraded Saldanha Flats Strandveld.	**High** High likelihood of occurrence within the project area of the Grant's Golden Mole listed as VU.	**High** Large area with good habitat connectivity and potentially functional ecological corridors.	**High**	**High** Species have a high likelihood of returning to site once disturbance or impact has been removed.	**Medium**

7.2. Site Ecological Importance - Flora

The SEI was determined for each vegetation type present within the proposed developable area (Table 7.2). The *Near-Intact Saldanha Flats Strandveld* was determined to have a very high SEI based on the vegetation type being listed as EN and because of the confirmed SCC and SCC with a high likelihood of occurrence within the project area.

Degraded Saldanha Flats Strandveld was determined to have a high SEI, *Secondary Vegetation* was determined to have a low SEI and the *Transformed* vegetation to have a very low SEI.

Management guidelines for each category have been included in section 7.4 below.

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

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	BI	Receptor Resilience	SEI
Near-intact Saldanha Flats Strandveld	Very High >0.1% of Endangered Cape Flats Dune Strandveld is present within the project area and there is one confirmed EN species, two confirmed VU species and one confirmed NT species present.	High >10 ha of an Endangered ecosystem present with good habitat connectivity and functional corridors.	Very High	Medium Habitat will recover slowly (more than ten years) to restore >70% of the original species composition.	**Very High**
Degraded Saldanha Flats Strandveld	Very High >0.1% of Endangered Cape Flats Dune Strandveld is present within the project area and there is one confirmed EN species, two confirmed VU species and one confirmed NT species present.	High >10 ha of an Endangered ecosystem present with good habitat connectivity and functional corridors.	Very High	High Habitat that can recover relatively quickly (5-10 years) to restore >70% of the original species composition.	**High**
Secondary Vegetation	Medium Confirmed VU species (*Leucospermum rodolentum*) listed under Criterion A.	High Large area with good habitat connectivity and potentially functional ecological corridors.	Medium	High Habitat that can recover relatively quickly (5-10 years) to restore >70% of the original species composition.	**Low**

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	BI	Receptor Resilience	SEI
Transformed	Low	Low	Low	Very High	**Very Low**
	No confirmed or highly likely populations of SCC.	Almost no habitat connectivity but migrations are still possible across some transformed landscapes.		Habitat can recover quickly (less than 5 years) to restore >70% of the original species composition.	

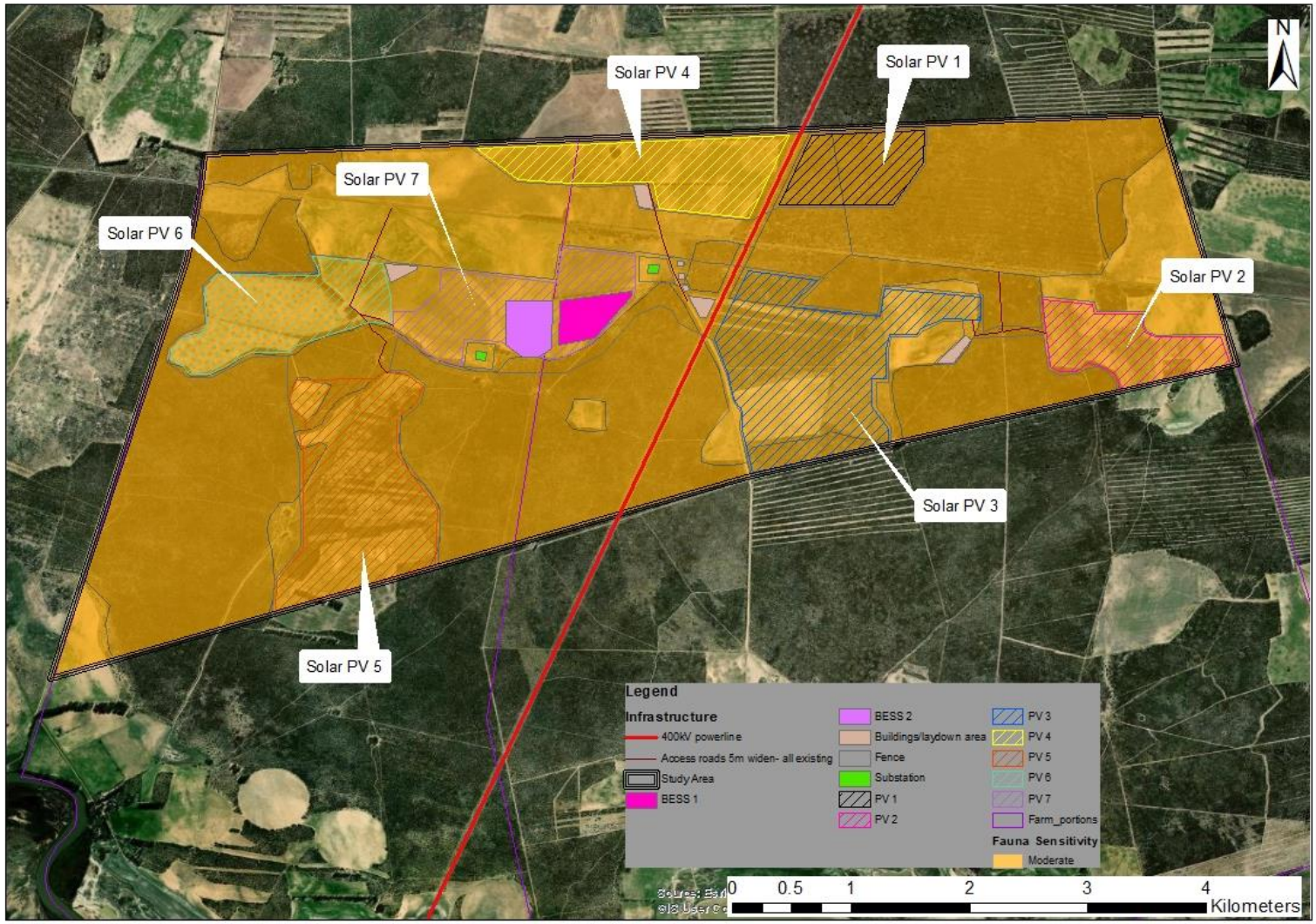


Figure 7.1: Fauna sensitivity map for the project area based on data gathered from the field survey.

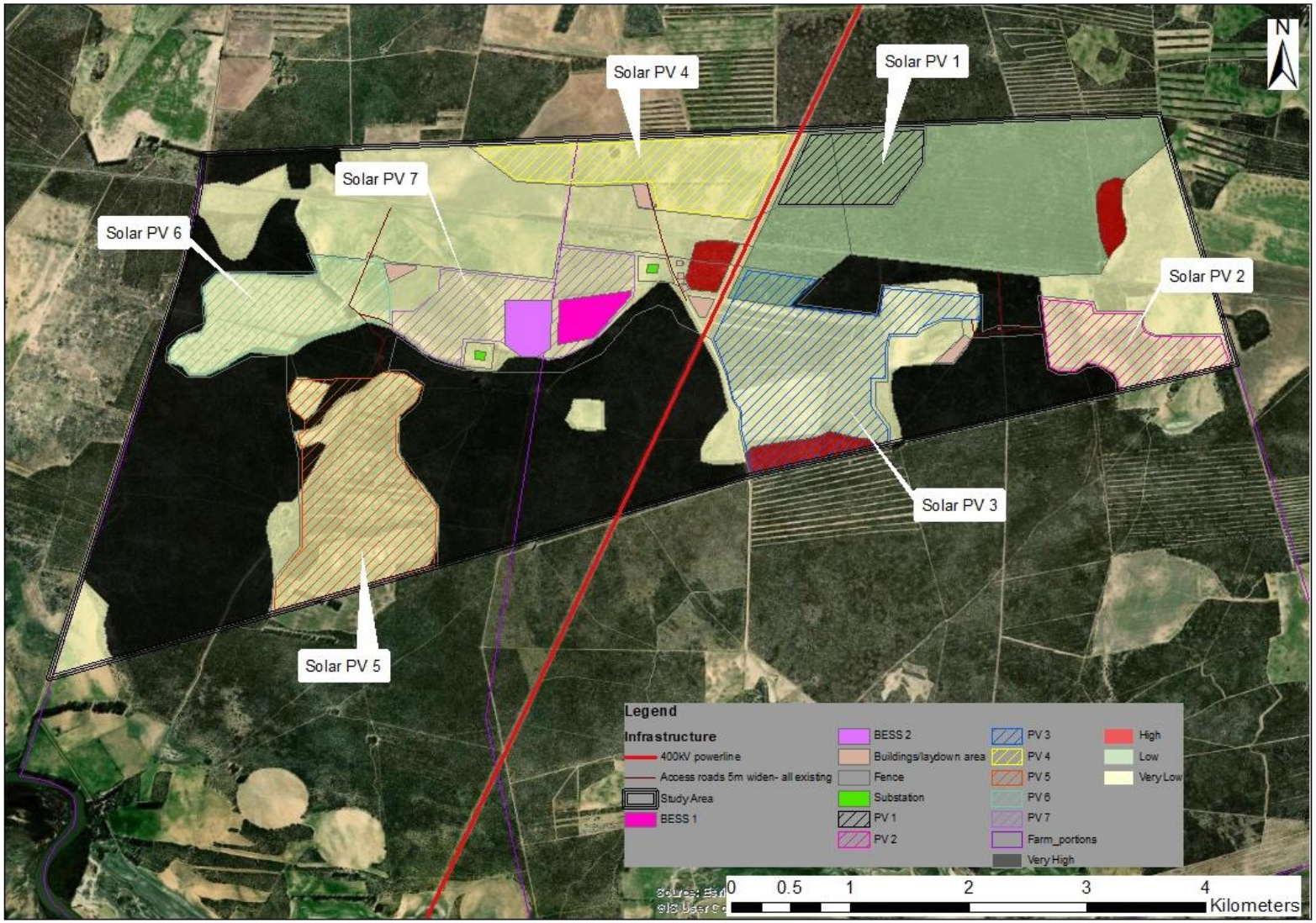


Figure 7.2: Botanical sensitivity map for the project area based on data gathered from the field survey.

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. The overall SEI for the near-intact Saldanha Flats Strandveld is very high, for degraded Saldanha Flats Strandveld is high and for secondary and transformed vegetation is medium (Figure 7.3). Management guidelines for interpreting SEI in the context of the proposed development have been outlined in section 7.4 below.

Table 7.3: Combined overall SEI for each habitat type.

Habitat	Floral SEI	FAUNAL SEI	OVERALL COMBINED SEI
Near-intact Saldanha Flats Strandveld	Very High	Medium	Very High
Degraded Saldanha Flats Strandveld	High	Medium	High
Secondary Vegetation	Low	Medium	Medium
Transformed	Very Low	Medium	Medium

7.4. Management Guidelines

Management guidelines recommend the following:

- For areas with a **very high SEI**, no destructive development activities should be considered. Offset mitigation is not possible and therefore not acceptable for these areas.
- For areas with a **high SEI**, avoidance mitigation must be implemented where feasible and where this is not feasible, minimisation mitigation such as reducing the project footprint. Limited development activities of low impact are acceptable in these areas. Offset mitigation may be required for high impact activities.
- For areas of **medium SEI,** development activities of medium impact are acceptable provided appropriate mitigation and management measures are implemented.
- 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.

Project infrastructure must be designed to avoid areas with a very high SEI. Infrastructure located in areas with a medium, low or very low SEI are deemed acceptable.

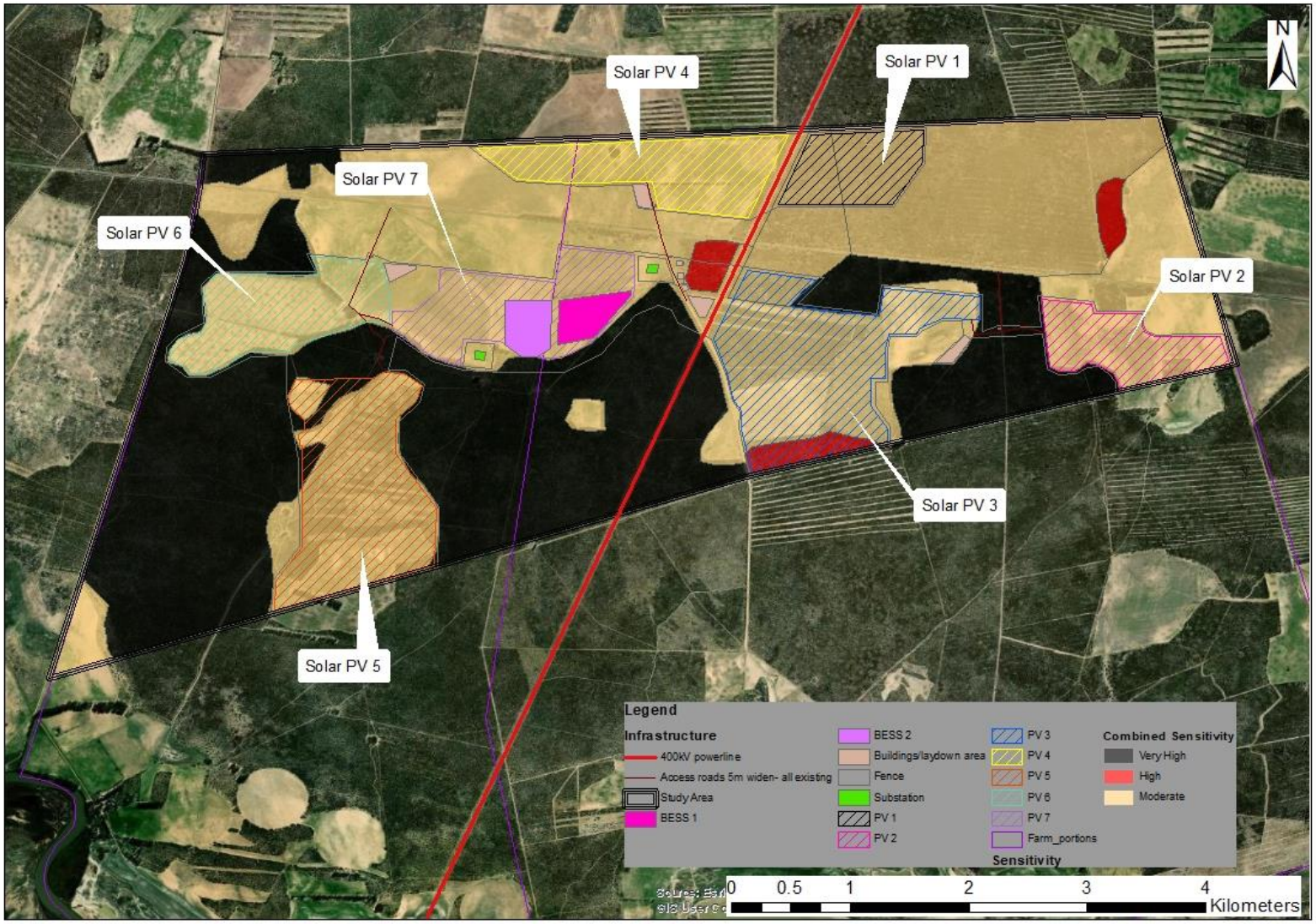


Figure 7.3: Combined sensitivity map for the project area based on data gathered from the field survey.

8. IMPACT ASSESSSMENT

8.1. Identification of Potential Impacts

The clearing of vegetation for the construction of the SEF facilities, access roads and associated infrastructure could result in the following impacts:

8.1.1. Construction Phase

- The direct and permanent loss of vegetation types and associated plant species, including species of conservation concern.
- The direct and permanent loss of faunal habitat.
- Clearing of vegetation resulting in breaks in habitat that will lead to habitat fragmentation and edge effects
- Faunal mortality due to construction activities (e.g., earthworks), roadkill and persecution.
- Disturbance to faunal species due to construction and operation activities that generate noise, dust, vibrations and lighting. This disturbance may cause faunal species to leave the area or disrupt foraging and/or breeding behaviour of those that remain.

8.1.2. Operational Phase

- Clearing of vegetation and subsequent disturbance to the soil, and therefore seed bank, leading to the infestation of alien invasive plant species and other ruderal species. Although disturbance to the soil and seedbank will occur during the construction phase, infestations of alien invasive species may only occur during the operational phase, once construction has ceased.
- Increased mortality of faunal species due to operational activities such as roadkill and persecution.

8.1.3. Decommissioning Phase

- The direct and permanent loss of vegetation types and associated plant species, including SCC.
- Disturbance to faunal species and potential reduction in abundance and mortality of faunal species.

8.1.4. Cumulative Impacts

- Loss of vegetation types and associated plant species, including SCC.
- Loss of faunal habitat.
- Faunal mortality due to roadkill and persecution.

8.2. Rating of potential Impacts

Thirteen impacts have been identified and assessed in Table 8.1 below followed by potential mitigation measures that should be implemented to reduce the significance of the impacts.

Table 8.1: Impacts Assessment Table for the Construction, Operational and Decommissioning Phases

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
Construction Phase											
Impact 1: Loss of Near-Intact Saldanha Flats Strandveld	Preferred	The clearing of vegetation for the construction of project infrastructure will result in the permanent loss of approximately 9.1 ha of near-intact Saldanha Flats Strandveld. This equates to 0.015% of the remaining extent of this vegetation type. Considering the low overall loss of this vegetation type and because it is located on the edge of an area that has already been transformed, the overall impact will be of moderate significance. This impact is difficult to mitigate as the loss of vegetation is definite and permanent and as such the impact will remain of moderate significance even after mitigation measures have been implemented unless degraded areas, that are not being used for project infrastructure, are designated as conservation areas and are rehabilitated to increase species diversity. If successful, the impact can be reduced to one of low significance.	Direct (-)	Permanent	Localised	Definite	**Moderate (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-G0	If the project does not proceed, the properties will continue to be used for grazing livestock, such as sheep and cattle, and this will likely result in the ongoing loss of near-intact Saldanha Flats Strandveld. Impacts under this scenario are low.	Existing (-)	Long-term	Localised	Probable	**LOW (-)**	N/A			**N/A**
Impact 2: Loss of degraded Saldanha Flats Strandveld	Preferred	The clearing of vegetation for the construction of project infrastructure will result in the permanent loss of approximately 15.8 ha of degraded Saldanha Flats Strandveld. This equates to 0.027% of the remaining extent of this vegetation type. Considering the low overall loss of this vegetation type and because it is located on the edge of an area that has already been transformed, the overall impact will be of moderate significance. This impact is difficult to mitigate as the loss of vegetation is definite and permanent and as such the impact will remain of moderate significance even after mitigation measures have been implemented unless degraded areas, that are not being used for project infrastructure, are designated as conservation areas and are rehabilitated to increase species diversity. If successful, the impact can be reduced to one of low significance.	Direct (-)	Permanent	Localised	Definite	**Moderate (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-G0	If the project does not proceed, the properties will continue to be used for grazing livestock, such as sheep and cattle, and this will likely result in the ongoing loss of near-intact Saldanha Flats Strandveld. Impacts under this scenario are low.	Existing (-)	Long-term	Localised	Probable	**LOW (-)**	N/A			**N/A**
Impact 3: Loss of Secondary Vegetation	Preferred	The clearing of vegetation for the construction of project infrastructure will result in the permanent loss of approximately 50.5 ha of secondary vegetation. Given that this vegetation type is secondary in nature, the overall impact will be of low significance before and after mitigation.	Direct (-)	Long-term	Localised	Definite	**LOW (-)**	Reversible	Resource will be partly	Achievable	**LOW (-)**

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
	No-G0	If the project does not proceed, the properties will continue to be used for grazing livestock, such as sheep and cattle, and this will likely result in the ongoing loss of near-intact Saldanha Flats Strandveld. Impacts under this scenario are low.	Existing (-)	Long-term	Localised	Probable	**LOW (-)**	N/A			**N/A**
Impact 4: Loss of Faunal Habitat	Preferred	The clearing of vegetation for the project infrastructure will result in the loss of faunal habitat. Vegetation will be removed, earthworks and heavy machinery will impact microhabitats such as burrows and fallen trees, and rocks will be removed or relocated. The faunal species that may utilise the habitat within the project area will no longer have access to these habitats for the life of the project and are considered negatively impacted by the project. However, project infrastructure has mostly been located in areas that were previously cleared and therefore already offer limited faunal habitat. Furthermore, the areas adjacent to the cleared areas will continue to provide ample suitable faunal habitat for faunal species, and as such the significance of the impact is low.	Direct (-)	Long-term	Localised	Probable	**LOW (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-G0	If the project does not proceed, the properties will continue to be used for grazing livestock, such as sheep and cattle, and this will likely result in the ongoing loss of faunal habitat. Impacts under this scenario are low.	Existing (-)	Long-term	Localised	Probable	**LOW (-)**	N/A			**N/A**
Impact 5: Loss of Plant SCC	Preferred	Two confirmed SCC were recorded within the project area and a further ten species have a high likelihood of occurrence based on there being suitable habitat within the project area. Of the two confirmed species, one population (*Leucospermum rodolentum)* will be impacted by project activities at Solar PV 1. The loss of this small population is unlikely to affect its status of VU however it is recommended that mitigation measures such as conserving the remaining habitat in which it is found are implemented. The other SCC are unlikely to be impacted by project activities as they would typically occur within the near-intact and degraded Saldanha Flats Fynbos rather than the transformed areas that have been ploughed and where the soil has been disturbed.	Direct (-)	Permanent	Study Area	Probable	**MODERATE (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-G0	If the project does not proceed, impacts under this scenario are expected to be low as limited SCC will be lost	Existing (-)	Long-term	Localised	Probable	**LOW (-)**	**N/A**			N/A
Impact 6: Loss of Faunal SCC	Preferred	**Cape Caco (NT)** The Wetland/impoundment habitat within the project area is of medium importance to the Cape Caco (NT) species. Most of the infrastructure avoids this habitat and is project activities are therefore unlikely to significantly impact this species.	Direct (-)	Long-term	Localised	Probable	**LOW (-)**	Reversible	Resource will be partly	Achievable	**LOW (-)**

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
		Kasner's Dwarf Burrowing Skink (EN). The near-intact Saldanha Flats Strandveld habitat within the project area is of medium importance to the Kasner's Dwarf Burrowing Skink (EN) species. Clearing of habitat for the construction of project infrastructure will result in the permanent loss of approximately 15.8 ha (0.0035%) of this species EOO. The loss of habitat for this species is relatively small and as such the impact is of low significance.	Direct (-)	Long-Term	Localised	Probable	**LOW (-)**	Reversible	Resource will be partly lost	Difficult	**LOW (-)**
		Grant's Golden Mole (VU) Near-intact Saldanha Flats Strandveld and Degraded Saldanha Flats Strandveld habitat within the project area is of medium importance to the Grant's Golden Mole (VU). Clearing of habitat for the construction of project infrastructure will result in the permanent loss of approximately 15.8 ha (0.0001%) of this species EOO. The loss of habitat for this species is relatively small and as such the impact is of low significance.	Direct (-)	Long-Term	Localised	Probable	**LOW (-)**	Reversible	Resource will be partly lost	Difficult	**LOW (-)**
	No-G0	If the project does not proceed, impacts under this scenario are expected to be low as limited SCC will be lost	Existing (-)	Long-term	Localised	Probable	**LOW (-)**	N/A			**N/A**
Impact 7: Disruption of Ecosystem Function and Process	Preferred	Fragmentation is one of the most important impacts on vegetation as it creates breaks in previously continuous vegetation, causing a reduction in the gene pool and a decrease in species richness and diversity. This impact occurs when more and more areas are cleared, resulting in the isolation of functional ecosystems, which results in reduced biodiversity and reduced movement due to the absence of ecological corridors. Fragmentation can also prevent the continuation of important ecological processes and drivers such as seed dispersal and fire, which are important for maintaining ecosystem function. Since the applicant has located infrastructure in areas that were previously transformed and have therefore already undergone habitat fragmentation, impacts on ecosystem function and process, as a result of the construction of the proposed project, is classified as low significance prior to mitigation.	Direct (-)	Long-term	Localised	Probable	**LOW (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-G0	Habitat fragmentation and edge effects have occurred within the project area due to clearing of large tracts of land for agricultural purposes. Under the no-go scenario, the impact will be of moderate significance.	Existing (-)	Permanent	Study Area	Definite	**MODERATE (-)**	N/A			**N/A**

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
Impact 8: Disturbance to faunal species and their livelihood activities (shelter, foraging and breeding) due to construction related noise, vibrations, dust, night lighting and obstructions.	Preferred	Construction activities (earthworks, blasting, night lighting) create noise, dust and vibrations that fauna experience for the duration of the construction phase. It is unlikely that animals in the area are habituated to these activities and as such, their livelihood activities are likely to be disturbed to some extent. The construction activities may cause individuals to move away from the immediate area into surrounding areas, increasing competition for food and shelter in those areas, and may even disrupt their current breeding cycle causing them to skip a season. The significance of the impact will be moderate prior to mitigation but can be reduced to low if the recommended mitigation measures are successfully implemented.	Direct (-)	Short-Term	Study Area	Definite	**MODERATE (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-G0	Under the no-go alternative it is unlikely that fauna will be disturbed as the current land use involves livestock farming. As such, the significance of this impact is low.	Existing (-)	Permanent	Study Area	Definite	**LOW (-)**	N/A			**N/A**
Impact 9: Mortality of faunal species due to project related activities	Preferred	Faunal mortalities can occur as a result of the following activities: • Removal of faunal habitat and land levelling machinery may cause mortalities of faunal species sheltering or taking refuge within the habitat, such as reptiles, amphibians and small rodents that shelter in the grass, shrubs and soil. • Contractor vehicles may cause accidental faunal mortalities due to collision. • Species perceived as a threat (e.g. snakes), may be persecuted.	Direct (-)	Short-Term	Study Area	Definite	**MODERATE (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-G0	Under the no-go alternative it is unlikely that faunal mortalities will occur as the current land use involves livestock farming. As such, the significance of this impact is low.	Existing (-)	Permanent	Study Area	Definite	**LOW (-)**	N/A			N/A
Operational Phase											
Impact 10: Infestation of alien invasive plant species	Preferred	If laydown areas and roads are not rehabilitated, these disturbed areas can become places for alien invasive species to become established. If left unmitigated, these species can spread and establish themselves in intact vegetation, resulting in the displacement of indigenous species and possible local extinctions of SCC.	Direct (-)	Long-Term	Study Area	Probable	**MODERATE (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-G0	There was evidence of alien invasive species within the project area, particularly in the secondary vegetation where Solar PV 1 is located. Under the no-go scenario, the infestation is likely to continue and could eventually displace indigenous vegetation if not managed.	Existing (-)	Long-Term	Study Area	Probable	**MODERATE (-)**	N/A			**N/A**

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
Impact 11: Mortality of faunal species due to operational project related activities	Preferred	Maintenance vehicles and project operation related monitoring may cause accidental faunal mortalities due to collision, especially at night.	Direct (-)	Long-term	Study Area	Probable	**MODERATE (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-G0	The site is currently utilised for livestock farming. As such, under the no-go alternative faunal mortalities may still occur as a result of farming activities. However, the instance of faunal mortalities is lower in comparison to the increased access associated with the maintenance and operation of the proposed project. As such, the no-go alternative is classified as low.	Existing (-)	Permanent	Study Area	Definite	**LOW (-)**	N/A			**N/A**
Decommissioning Phase											
Impact 12: Loss of indigenous vegetation and species of conservation concern	Preferred	The decommissioning of the facility will require laydown areas and will disrupt vegetation that has re-established around the areas that were disturbed during the construction phase. The loss of vegetation will be similar to the construction phase impacts. Given that the majority of the infrastructure is already located in areas that have been transformed, the impact is likely to be low.	Direct (-)	Short-term	Localised	Probable	**LOW (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
Impact 13: Disturbance to faunal species and potential reduction in abundance and mortality of faunal species	Preferred	As with the construction phase, the decommissioning phase will also require heavy machinery and result in the disruption of faunal species that have re-inhabited the area during operation. Impacts will therefore be similar to that of the construction phase disturbance.	Direct (-)	Short-Term	Study Area	Definite	**MODERATE (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**

8.3. Recommended Mitigation Measures

8.3.1. Plants and Terrestrial Biodiversity

- Impacts on near-intact Saldanha Flats Strandveld must be avoided as this area has an SEI of very high. There is a small area of 9.1ha of near-intact vegetation and 15.8ha of degraded vegetation that will be impacted by project infrastructure. To account for this loss, areas within the study area, that will not be affected by project infrastructure, must be identified and set aside as conservation areas. Areas of secondary vegetation that have been identified by the bird specialist as important habitat for the Black Harrier are good areas to consider for restoration. East of PV1 and north of the R399 is a contiguous area of approximately 220 ha of secondary vegetation that will not be developed.
- The loss of a small subpopulation of *Leucospermum rodolentum* must be mitigated by ensuring that the identified set aside areas include this species and that these subpopulations increase in size over time to account for the loss of the subpopulation to Solar PV 1. This species is unlikely to translocate successfully.
- Protected species that can be easily and successfully translocated, should be moved into surrounding undeveloped areas (on the same property) or rehabilitated areas.
- Permits must be obtained prior to the translocation/removal of protected SCC.
- A walkthrough of the final layout must be undertaken by a botanist and if populations of SCC will be impacted, infrastructure should be moved to avoid these areas. Where this is not feasible, a search and rescue plan will be required.
- Construction vehicles and machinery must not encroach into identified 'no-go' areas or areas outside the project footprint.
- Temporary laydown areas must be placed in areas of low or very low sensitivity.
- Topsoil (20 cm, where possible) must be collected and stored in an area of low or very low sensitivity and used to rehabilitate impacted areas that are no longer required during the operational phase (e.g. laydown areas).
- Rehabilitate laydown areas. Only indigenous species must be used.
- Use existing access roads and upgrade these where necessary.
- The site must be checked regularly for the presence of alien invasive species.
- All alien invasive species, that establish as a result of project activities, must be removed and disposed of as per the Working for Water Guidelines.
- Alien invasive plant clearing should be undertaken in line with an Alien Vegetation Management plan, which should be compiled as part of the EMPr and implemented with immediate effect.
- Employees must be prohibited from making open fires during the construction phase.
- 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.

8.3.2. Animals

- Should any mammal, reptile or amphibian SCC be encountered during construction, these must be recorded (photographed, gps co-ord) and placed on iNaturalist.
- Should any slow-moving fauna (e.g. tortoises) occur within the construction footprint during construction, these must be moved to adjacent suitable habitat. The ECO should appoint a member of staff to walk ahead of construction machinery directly prior to vegetation clearance. Any faunal species that may die as a result of construction or operational activities must be recorded (photographed, gps co-ord) and these records uploaded to iNaturalist.

- A snake catcher must be on call during construction to remove and relocate snakes out of harm's way. Emergency protocol must be set up should anyone be bitten by a venomous snake.
- External lighting 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 the development must be minimised.
- The development must consolidate road networks, as far as possible, to minimise the loss of faunal habitat.
- No construction and construction related activities are permitted outside the approved project footprint and a fine system must be put in place for transgressions by the developer and included in contractual agreements with all staff and contractors.
- Speed restrictions must be implemented on all vehicles within the development footprint (40km/h is recommended) to reduced faunal mortalities on the project roads.
- Microhabitats (e.g. rock stacks and logs) within the project footprint where clearing will occur, must be relocated to the same habitat outside of the project footprint but within the project area, preferably 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: "unless the relevant permits are obtained, 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 for SCC.
- 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.
- It is recommended that only infrastructure is fenced rather than the full extent of the project study site.
- Development must be designed to allow unencumbered movement of faunal species, especially of small faunal species. E.g.
    - Internal and external fences/walls (if any) must allow for the movement of small faunal species, such as rodents and reptiles, 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 45° 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 and frogs to move over them. These must be vegetated with plant species that offer cover.

8.4. Cumulative Impacts

Cumulative impacts are defined by the IFC as *"those that result from the successive, incremental, and/or combined effects of an action, project, or activity (collectively referred to as "developments") when added to other existing, planned, and/or reasonably anticipated future ones."*

Two cumulative impacts have been identified for the project area and take into account the proposed powerline as well as other renewable projects within a 30 km radius of the proposed site, which already have an Environmental Authorisation or which have Basic Assessments/Environmental Impact Assessments underway (Figure 8.1).

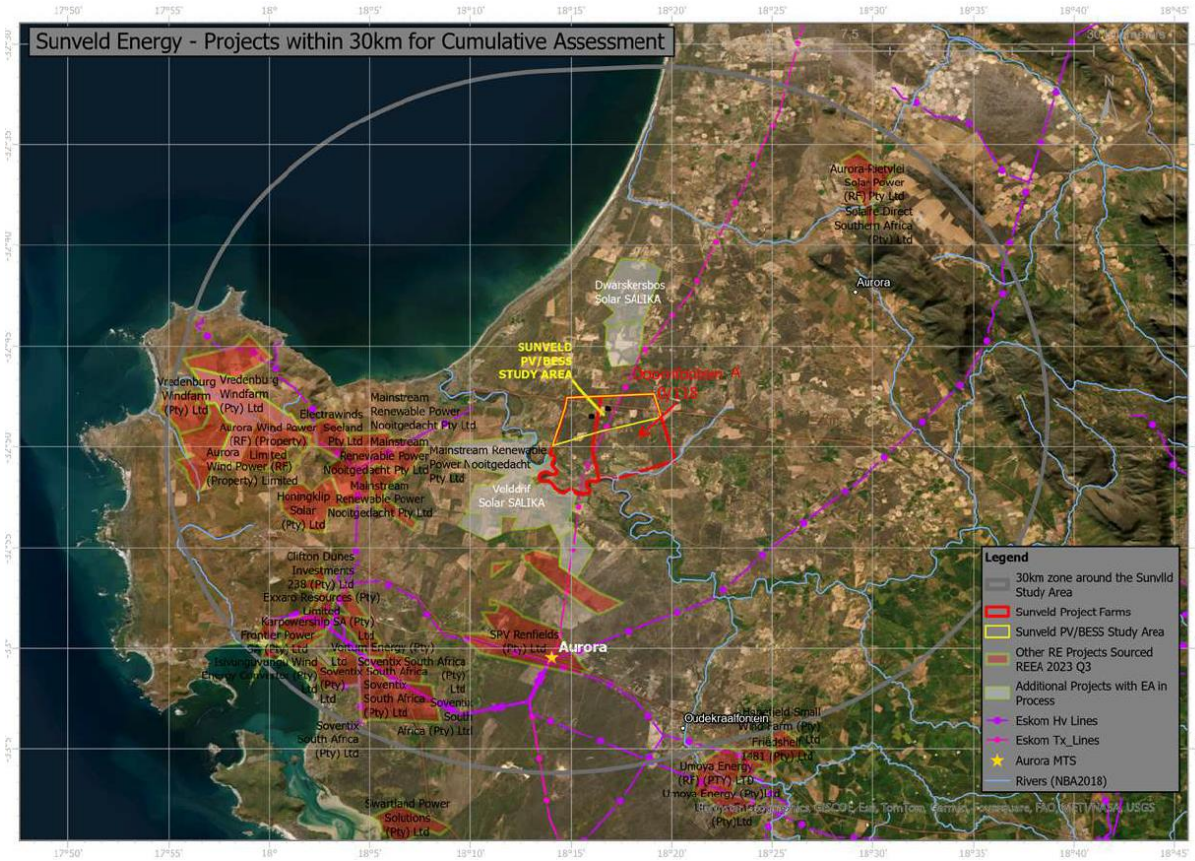


Figure 8.1: Map illustrating other known projects within a 30km radius of the project area

Table 8.2: Cumulative Impacts

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
Cumulative Impacts											
Impact 14: Loss of indigenous vegetation and species of conservation concern	Preferred	The loss of indigenous vegetation and SCC will be compounded by the EGI as well as other projects occurring within the area. However, given that most of the project infrastructure has been located in areas that were transformed or are secondary vegetation, the additive impact of this project is likely to have a cumulative significance of low since the project has been designed to limit the loss of indigenous vegetation and SCC.	Direct (-)	Permanent	Study Area	Definite	**LOW (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
Impact 15: Increased reduction in faunal habitat and increase disturbance of faunal species	Preferred	The impacts associated with this development will be compounded by other projects in the area. This project will add to the loss of faunal habitat by other developments including roads, housing and agriculture. Fauna that are displaced may have to move farther afield causing a displacement knock-on effect. However, given that the majority of project infrastructure is located in areas that have been transformed and therefore offer limited faunal habitat, and assuming that neighbouring projects implement suitable mitigation measures to reduce their impact, the overall significance of the impact will be Low.	Direct (-)	Permanent	Study Area	Definite	**LOW (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**

9. LEGISLATIVE AND PERMIT REQUIREMENTS

In addition to the Environmental Authorisation (EA) required due to the Listed Activities triggered by the proposed SEF in terms of the National Environmental Management Act (NEMA, Act No. 107 of 1998 and subsequent amendments) Environmental Impact Assessment (EIA) Regulations (2014 and subsequent amendments), the Applicant is also required to obtain plant removal permits from the relevant Competent Authority prior to vegetation clearance.

None of the plant species identified on site are protected in terms of the Notice of the List of Protected Tree Species under the National Forests Act, 1998 (Act No. 84 of 1998) or the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004): Publication of Lists of Critically Endangered, Endangered, Vulnerable and Protected Species. As such permits for the removal of these species are not required. However, fourteen plant species identified on site are protected in terms of the Western Cape Conservation Law (2000) (see Appendix 1 of this report). As such, permits for the removal and/or translocation of these species are required and can be obtained from Cape Nature.

Although it is likely that faunal species will move away from the project area during vegetation clearance and construction, should the removal and/or translocation of any protected faunal species be required during any phase of the proposed development, then permits for the removal will need to be obtained from the relevant Competent Authority if these species need to be relocated outside of the project area. Permits are not required if species are relocated on the same property i.e. moved out of the way of construction.

10. CONCLUSIONS

10.1. Conclusions

The DFFE screening report indicates that entire project area is of:

- High Sensitivity for the Animal Species Theme based on the likely presence of four bird species.
- Medium Sensitivity for the Plant Species Theme based on the likely presence of thirty-nine SCC.
- Very High Sensitivity for the Terrestrial Biodiversity Theme based on the project area occurring within a CBA 1, CBA 2, ESA 1, ESA 2 and an Endangered Ecosystem (Saldanha Flats Strandveld).

The DFFE screening report is not always accurate and as such comment has been provided below.

Animal Species Theme
The faunal specialist has assessed the project area for reptile, amphibian and mammal species. The DFFE screener listed bird and invertebrate SCC and these have been assessed by separate specialists in those fields.

Reptile, amphibian and mammal species not picked up in the screening tool have been assessed and included in this report. Based on the results of the field survey and desktop analysis, the SEI for reptile, amphibian and mammal SCC was determined to be medium due to the high likelihood of occurrence of the Cape Caco (NT), Kasner's Dwarf Burrowing Skink (EN), and Grant's Golden Mole (VU) within the PAOI.

Plant Species Theme
Given that three threatened species and one near-threatened species were confirmed to occur within the project area and there is a high likelihood of occurrence of an additional ten species, the specialist disagrees with the rating of medium sensitivity for the plant species theme. It is proposed that the sensitivity for the Plant Species Theme is Very High for near-intact Saldanha Flats Strandveld, high for degraded Saldanha Flats Strandveld, low for Secondary Vegetation and Very Low for Transformed areas.

Terrestrial Biodiversity Theme
Based on the results of the field survey and desktop analysis, the specialist disagrees with the rating of Very High Sensitivity for the entire project area.

Areas that are a CBA 1 and overlap the near-intact Saldanha Flats Strandveld should be very high as per the screening report. However, Secondary Vegetation should have a low sensitivity and transformed areas should have a very low sensitivity.

10.2. Summary of Impacts

The mitigation hierarchy was applied to all impacts. For negative impacts that can often not be avoided, the mitigation hierarchy then aims to minimise the impact, and should residual impacts remain, mitigation measures are then applied and in extreme cases offsets may be required. Some impacts will remain the same despite mitigation measures having been applied. However, it should be noted that although a mitigation measure may not reduce the impact significance rating (high, medium and low) they must still be applied because the impact has not been avoided in its entirety and the 'Duty of Care' is placed on the applicant/developer.

Eleven construction phase impacts, two operational phase impacts, two decommissioning phase impacts and two cumulative impacts have been identified for the project area. Of these seventeen impacts, eight were of moderate significance and nine were of low significance prior to mitigation. However, if the mitigation hierarchy is applied and the recommendations outlined in the report implemented, these can be reduced to impacts of low significance (Table 10.1).

Table 10.1: Summary of impacts

Impact		Significance and Ranking	
		Pre-Mitigation	Post-Mitigation
CONSTRUCTION PHASE			
Impact 1	Loss of Near-Intact Saldanha Flats Strandveld	Moderate	Low
Impact 2	Loss of degraded Saldanha Flats Strandveld	Moderate	Low
Impact 3	Loss of Secondary Vegetation	Low	Low
Impact 4	Loss of Faunal Habitat	Low	Low
Impact 5	Loss of Plant SCC	Moderate	Low
Impact 6a	Loss of Faunal SCC: Cape Caco (NT)	Low	Low
Impact 6b	Loss of Faunal SCC: Kasner's Dwarf Burrowing Skink (EN)	Low	Low
Impact 6c	Loss of Faunal SCC: Grant's Golden Mole (VU)	Low	Low
Impact 7	Disruption of Ecosystem Function and Process	Low	Low
Impact 8	Disturbance to faunal species and their livelihood activities (shelter, foraging and breeding) due to construction related noise, vibrations, dust, night lighting and obstructions.	Moderate	Low
Impact 9	Mortality of faunal species due to project related activities	Moderate	Low
OPERATIONAL PHASE			
Impact 10	Infestation of alien invasive plant species	Moderate	Low
Impact 11	Mortality of faunal species due to operational project related activities	Moderate	Low
DECOMMISSIONING PHASE			
Impact 12	Loss of indigenous vegetation and species of conservation concern	Low	Low
Impact 13	Disturbance to faunal species and potential reduction in abundance and mortality of faunal species	Moderate	Low
CUMULATIVE IMPACTS			
Impact 14	Loss of indigenous vegetation and species of conservation concern	Low	Low

Impact 15	Increased reduction in faunal habitat and increase disturbance of faunal species	Low	Low

10.3. Recommendations

10.3.1. Fauna

- The development must consolidate road networks to minimise the loss of faunal habitat.
- Laydown areas must be rehabilitated with specific measures to create fauna habitat.
- Speed restrictions for all vehicles (40km/h is recommended) should be in place to reduce the impact of faunal mortality as a result of road kill.
- Development must be designed to allow unencumbered movement of this species. e.g., trenches with sloped side to allow faunal species to exit.
- Should any faunal SCC be encountered during construction and operation, these must be recorded (i.e. be photographed, GPS co-ordinates taken) and photographs placed on iNaturalist
- Any faunal species that may die as a result of construction activities must be recorded (i.e. be photographed, GPS co-ordinates taken) and these records placed on iNaturalist.
- 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, especially for SCC.

10.3.2. Botanical

- The remaining vegetation within the property should remain intact so that it can continue to function as an ecological corridor for species movement.
- All necessary plant permits must be obtained prior to the commencement of any construction activities.
- Where feasible, laydown areas must be placed in previously disturbed sites.
- A walkthrough of the final layout must be undertaken by a botanist and if populations of SCC will be impacted, infrastructure should be moved to avoid these areas. Where this is not feasible, a search and rescue plan will be required.
- If any SCC are to be impacted, these must be relocated to nearest appropriate habitat unless they are unlikely to transplant successfully.
- 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 sensitivity and used to rehabilitate impacted areas that are no longer required during the operational phase (e.g. laydown areas).
- Employees must be prohibited from collecting any plants.
- Alien invasive plant clearing should be undertaken in line with an Alien Vegetation Management plan, which should be compiled as part of the EMPr and implemented with immediate effect.
- Only indigenous plant species typical of the local vegetation and approved by a botanist should be used for the rehabilitation of natural habitat.

10.4. Ecological Statement and Opinion of the Specialist

Project infrastructure has been designed to largely avoid sensitive features such as near-intact and degraded Saldanha Flats Strandveld. Further to the above, impacts on the terrestrial plant species and faunal habitats can be reduced to acceptable levels through the implementation of mitigation measures (refer to section 8.3 and 10.3). The specialist is therefore of the opinion that the development can proceed provided the recommendations contained in this report are implemented.

11. REFERENCES

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APPENDIX 1: SPECIES LIST OF PLANTS RECORDED IN THE PROJECT AREA

Family	Species	Red List	Conservation Law (2000)	NEM:BA Alien Invasive Species	CARA
AIZOACEAE	*Cleretum bellidiforme*	Least Concern	Schedule 4		
AIZOACEAE	*Conicosia pugioniformis*	Least Concern	Schedule 4		
AIZOACEAE	*Ruschia macowanii*	Least Concern	Schedule 4		
AMARANTHACEAE	*Salsola sp*				
AMARANTHACEAE	*Atriplex nummularia*	Not Evaluated		Category 2	Category 2
AMARYLLIDACEAE	*Boophone haemanthoides*	Least Concern	Schedule 4		
AMARYLLIDACEAE	*Brunsvigia orientalis*	Least Concern	Schedule 4		
ANACARDIACEAE	*Searsia dissecta*	Least Concern			
ANACARDIACEAE	*Searsia glauca*	Least Concern			
ANACARDIACEAE	*Searsia laevigata*	Least Concern			
APIACEAE	*Arctopus dregei*	Near Threatened			
APOCYNACEAE	*Microloma sagittatum*	Least Concern	Schedule 4		
ASPARAGACEAE	*Asparagus capensis*	Least Concern			
ASPARAGACEAE	*Asparagus rubicundus*	Least Concern			
ASPHODELACEA	*Trachyandra ciliata*	Least Concern			
ASPHODELACEA	*Trachyandra sp*				
ASTERACEAE	*Arctotis hirsuta*	Least Concern			
ASTERACEAE	*Crassothonna cylindrica*	Least Concern			
ASTERACEAE	*Dimorphotheca pluvialis*	Least Concern			
ASTERACEAE	*Eriocephalus racemosus*	Least Concern			
CACTACEAE	*Opuntia ficus-indica*	Not Evaluated		Category 1b	

CELASTRACEAE	*Gymnosporia buxifolia*	Least Concern			
EBENACEAE	*Diospyros glabra*	Least Concern			
EBENACEAE	*Euclea tomentosa*	Least Concern			
EUPHORBIACEAE	*Euphorbia caput-medusae*	Least Concern			
EUPHORBIACEAE	*Euphorbia mauritanica*	Least Concern			
FABACEAE	*Acacia cyclops*	Not Evaluated		Category 1b	Category 2
GERANIACEAE	*Pelargonium sp*				
HYACINTHACEAE	*Lachenalia bulbifera*	Least Concern			
IRIDACEAE	*Babiana ambigua*	Least Concern	Schedule 4		
	Sensitive species 878	Endangered	Schedule 4		
IRIDACEAE	*Babiana confusa*	Least Concern	Schedule 4		
IRIDACEAE	*Ferraria sp*		Schedule 4		
IRIDACEAE	*Gladiolus carinatus*	Least Concern	Schedule 4		
IRIDACEAE	*Melasphaerula graminea*	Least Concern	Schedule 4		
IRIDACEAE	*Romulea tabularis*	Least Concern	Schedule 4		
LAMIACEAE	*Salvia africana*	Least Concern			
LAMIACEAE	*Salvia lanceolata*	Least Concern			
MELIANTHACEAE	*Melianthus comosus*	Least Concern			
OLEACEAE	*Olea exasperata*	Least Concern			
OXALIDACEAE	*Oxalis luteola*	Least Concern			
OXALIDACEAE	*Oxalis pes-caprae*	Least Concern			
OXALIDACEAE	*Oxalis suavis*	Vulnerable			
POACEAE	*Cynadon dactylon*	Least Concern			
POLYGALACEAE	*Muraltia scoparia*	Least Concern			
POLYGALACEAE	*Muraltia spinosa*	Least Concern			

PROTEACEAE	*Leucospermum rodolentum*	Vulnerable	Schedule 4		
RESTIONACEAE	*Staberoha cf distachyos*	Least Concern			
RESTIONACEAE	*Thamnochortus sp*				
RESTIONACEAE	*Willdenowia incurvata*	Least Concern			
RHAMNACEAE	*Trichocephalus stipularis*	Least Concern			
SCROPHULARIACEA	*Zaluzianskya villosa*	Least Concern			
SCROPHULARIACEAE	*Manulea altissima*	Least Concern			
SOLANACEAE	*Solanum linnaeanum*	Least Concern			
SOLANACEAE	*Lycium amoenum*	Least Concern			
THYMELAEACEAE	*Struthiola ciliata*	Least Concern			
ZYGOPHYLLACEAE	*Zygophyllum flexuosa*	Least Concern			
ZYGOPHYLLACEAE	*Zygophyllum morgsana*	Least Concern			

APPENDIX 2: IMPACT ASSESSMENT METHODOLOGY

The rating scale developed by Coastal and Environmental Services, in accordance with the requirements outlined in Appendix 1 of the NEMA EIA Regulations (2014 and subsequent 2017 & 2021 amendments), was applied to ensure a balanced and objective approach to the assessment of potential impacts associated with the proposed development. The criteria used to assess the potential impacts is outlined below.

Impact significance pre-mitigation

This rating scale adopts six key factors to determine the overall significance of the impact prior to mitigation:

1. **Nature of impact:** Defines whether the impact has a negative or positive effect on the receiving environment.
2. **Type of impact:** Defines whether the impact has a direct, indirect, or cumulative effect on the environment.
3. **Duration:** Defines the relationship of the impact to temporal scales. The temporal scale defines the significance of the impact at various time scales as an indication of the duration of the impact. This may extend from the short-term (less than 5 years, equivalent to the construction phase) to permanent. Generally, the longer the impact occurs the greater the significance of any given impact.
4. **Extent:** Describes the relationship of the impact to spatial scales i.e. the physical extent of the impact. This may extend from the local area to an impact that crosses international boundaries. The wider the spatial scale the impact extends, the more significant the impact is considered to be.
5. **Probability:** Refers to the likelihood (risk or chance) of the impact occurring. While many impacts generally do occur, there is considerable uncertainty in terms of others. The scale varies from unlikely to definite, with the overall impact significance increasing as the likelihood increases.
6. **Severity or benefits:** The severity/beneficial scale is used in order to scientifically evaluate how severe negative impacts would be, or how beneficial positive impacts would be on the receiving environment. The severity of an impact can be evaluated prior and post mitigation to demonstrate the seriousness of the impact if it is not mitigated, as well as the effectiveness of the mitigation measures. The word 'mitigation' does not only refer to 'compensation', but also includes concepts of containment and remedy. For beneficial impacts, optimization refers to any measure that can enhance the benefits. Mitigation or optimisation should be practical, technically feasible and economically viable.

For each impact, the duration, extent and probability are ranked and assigned a score. These scores are combined and used to determine the overall impact significance prior to mitigation. They must then be considered against the severity rating to determine the overall significance of an activity. This is because the severity of the impact is far more important than the other three criteria. The overall significance is either negative or positive (Criterion 1) and direct, indirect or cumulative (Criterion 2).

Table A2.1: Evaluation Criteria.

Duration (Temporal Scale)		
Short term	*Less than 5 years*	
Medium term	*Between 5-20 years*	
Long term	*Between 20 and 40 years (a generation) and from a human perspective also permanent*	
Permanent	*Over 40 years and resulting in a permanent and lasting change that will always be there*	
Extent (Spatial Scale)		
Localised	*At localised scale and a few hectares in extent*	
Study Area	*The proposed site and its immediate environs*	
Regional	*District and Provincial level*	
National	*Country*	
International	*Internationally*	
Probability (Likelihood)		
Unlikely	*The likelihood of these impacts occurring is slight*	
May Occur	*The likelihood of these impacts occurring is possible*	
Probable	*The likelihood of these impacts occurring is probable*	
Definite	*The likelihood is that this impact will definitely occur*	
Severity Scale	*Severity*	*Benefit*
Very Severe/ Beneficial	An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated.	A permanent and very substantial benefit to the affected system(s) or party(ies), with no real alternative to achieving this benefit.
Severe/ Beneficial	Long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming, or some combination of these.	A long-term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these.
Moderately severe/Beneficial	Medium to long term impacts on the affected system(s) or party (ies), which could be mitigated.	A medium to long term impact of real benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are equally difficult, expensive and time consuming (or some combination of these), as achieving them in this way.
Slight	Medium- or short-term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary.	A short to medium term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are easier, cheaper and quicker, or some combination of these.
No effect/don't or can't know	The system(s) or party(ies) is not affected by the proposed development.	In certain cases, it may not be possible to determine the severity of an impact.

** In certain cases, it may not be possible to determine the severity of an impact thus it may be determined: Don't know/Can't know.*

Table A2.2: Description of Overall Significance Rating

Significance Rate		*Description*
Don't Know		*In certain cases, it may not be possible to determine the significance of an impact. For example, the primary or secondary impacts on the social or natural environment given the available information.*
NO SIGNIFICANCE		*There are no primary or secondary effects at all that are important to scientists or the public.*
LOW NEGATIVE	***LOW POSITIVE***	*Impacts of low significance are typically acceptable impacts for which mitigation is desirable but not essential. The impact by itself is insufficient, even in combination with other low impacts, to prevent the development being approved. These impacts will result in negative medium to short term effects on the natural environment or on social systems.*
MODERATE NEGATIVE	**MODERATE POSITIVE**	*Impacts of moderate significance are impacts that require mitigation. The impact is insufficient by itself to prevent the implementation of the project but in conjunction with other impacts may prevent its implementation. These impacts will usually result in a negative medium to long-term effect on the natural environment or on social systems.*
HIGH NEGATIVE	***HIGH POSITIVE***	*Impacts that are rated as being high are serious impacts and may prevent the implementation of the project if no mitigation measures are implemented, or the impact is very difficult to mitigate. These impacts would be considered by society as constituting a major and usually long-term change to the environment or social systems and result in severe effects.*
VERY HIGH NEGATIVE	***VERY HIGH POSITIVE***	*Impacts that are rated as very high are very serious impact which may be sufficient by itself to prevent the implementation of the project. The impact may result in permanent change. Very often these impacts are unmitigable and usually result in very severe effects or very beneficial effects.*

Impact significance post-mitigation

Once mitigation measures are proposed, the following three factors are then considered to determine the overall significance of the impact after mitigation.

1. **Reversibility Scale**: This scale defines the degree to which an environment can be returned to its original/partially original state.
2. **Irreplaceable loss Scale:** This scale defines the degree of loss which an impact may cause.
3. **Mitigation potential Scale:** This scale defines the degree of difficulty of reversing and/or mitigating the various impacts ranges from very difficult to easily achievable. Both the practical feasibility of the measure, the potential cost and the potential effectiveness is taken into consideration when determining the appropriate degree of difficulty.

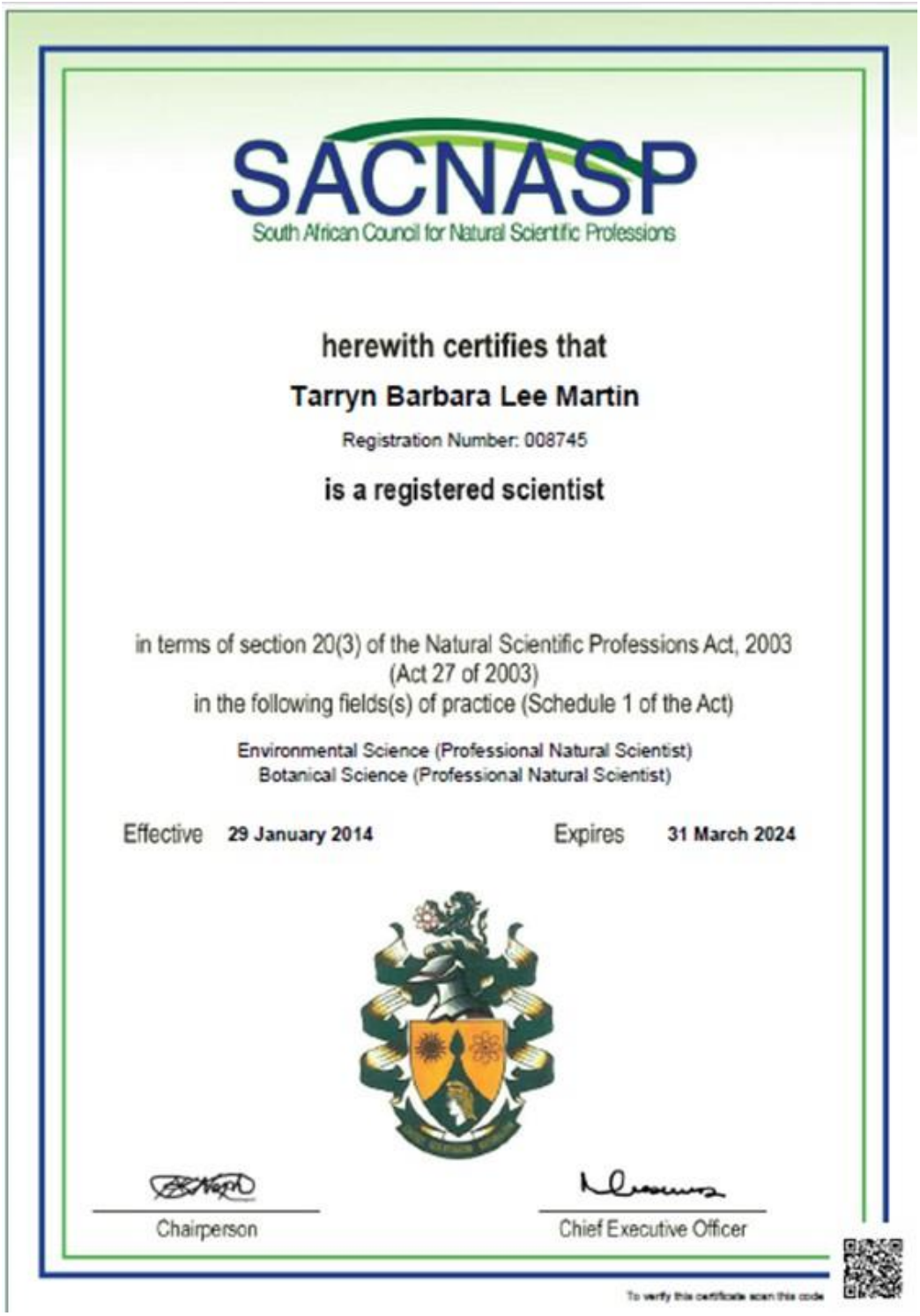
Table A2.3: Post-mitigation Evaluation Criteria

Reversibility	
Reversible	*The activity will lead to an impact that can be reversed provided appropriate mitigation measures are implemented.*
Irreversible	*The activity will lead to an impact that is permanent regardless of the implementation of mitigation measures.*
Irreplaceable loss	
Resource will not be lost	*The resource will not be lost/destroyed provided mitigation measures are implemented.*
Resource will be partly lost	*The resource will be partially destroyed even though mitigation measures are implemented.*
Resource will be lost	*The resource will be lost despite the implementation of mitigation measures.*
Mitigation potential	
Easily achievable	*The impact can be easily, effectively and cost effectively mitigated/reversed.*
Achievable	*The impact can be effectively mitigated/reversed without much difficulty or cost.*
Difficult	*The impact could be mitigated/reversed but there will be some difficultly in ensuring effectiveness and/or implementation, and significant costs.*
Very Difficult	*The impact could be mitigated/reversed but it would be very difficult to ensure effectiveness, technically very challenging and financially very costly.*

The following assumptions and limitations are inherent in the rating methodology:

- Value Judgements: Although this scale attempts to provide a balance and rigor to assessing the significance of impacts, the evaluation relies heavily on the values of the person making the judgment.
- Cumulative Impacts: These affect the significance ranking of an impact because it considers the impact in terms of both on-site and off-site sources. This is particularly problematic in terms of impacts beyond the scope of the proposed development. For this reason, it is important to consider impacts in terms of their cumulative nature.
- Seasonality: Certain impacts will vary in significance based on seasonal change. Thus, it is difficult to provide a static assessment. Seasonality will need to be implicit in the temporal scale, with management measures being imposed accordingly (e.g. dust suppression measures being implemented during the dry season).

APPENDIX 3: 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

Hugh Amoore

Registrar

APPENDIX 4: 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