Biodiversity Impact Assessment Report

Proposed Hopefield PV Solar Energy Facility in Hopefield, Saldahna Bay Local Municipality, Western Cape Province

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Declaration of Independence by Specialist

- I, **Ntando Kumalo**, hereby declare that I acted as the independent specialist in this application.
- I do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of NEMA and the Environmental Impact Assessment Regulations, 2017.
- I have and will not have a vested interest in the proposed activity proceeding.

Signed: .....  **Date:** .....06 February 2024

Details of Author

The relevant experience/s of specialist team members involved in the compilation of this report are briefly summarized in the table below. Detailed CVs of the specialist team can be made available on request.

Specialist	Role	Details
Ntando Kumalo Senior Environmental Specialist	Field work, author & project management	Ntando has more than 10 years' experience and is competent in data collection, analysis and report writing related to biodiversity assessments. Also has experience in conducting biodiversity rehabilitation plans, wetland assessment and rehabilitation plans. Ntando has a BSc (Hon) in Forest Resources and Wildlife Management and is a registered Professional Natural Scientist in the field of Environmental Science. He oversaw successful implementation of the project.

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Disclaimer

The accuracy of this Report is subject to the information provided to the specialist (Aim360 Pty Ltd) by its Client and site conditions existing during the time of assessment. Whilst Aim360 has undertaken due dliligence as practically possible in establishing the accuracy of the available information, we do not accept any material liability arising from commercial decisions or actions arisinig from the findings. Aim360 reserves the right to update findings based on the availabilty of new information.

1 Introduction and Project Description

1.1 Introduction

Aim360 Environmental Solutions (Aim360) (PTY) Ltd was appointed by Beyond Green Environmental Services (BGES) (PTY) Ltd, the independent Environmental Assessment Practitioner (EAP), to undertake the specialist biodiversity impact assessment study (inclusive of fauna, avifauna, flora and reptiles) to inform the environmental processes associated with the proposed project.

1.2 Project Location

The proponent intends to establish a 1.6GW generating Power Voltaic (PV) Solar Energy Facility at Hopefield which is located in the Saldahna Bay Local Municipality, Western Cape Province.

Hopefield is a small town situated in a semiarid agricultural region where wheat farming, sheep raising and honey production are the predominant commercial activities. It is located on the R45 between Malmesbury and Vredenburg. The town is approximately 120km north of Cape Town CBD.

A locality map showing the study site in relation to surrounding areas is provided as **Figure 1-1** below. The location of the proposed PV Solar site is largely within Quarter Degree Grid Square 3318AB. The majority of the project will be located within Remainder 167 of Farm Portugeese Fontyn, Portion 02 Remainder 167 of Farm Portugeese Fontyn and Farm Theewatervlei 315.

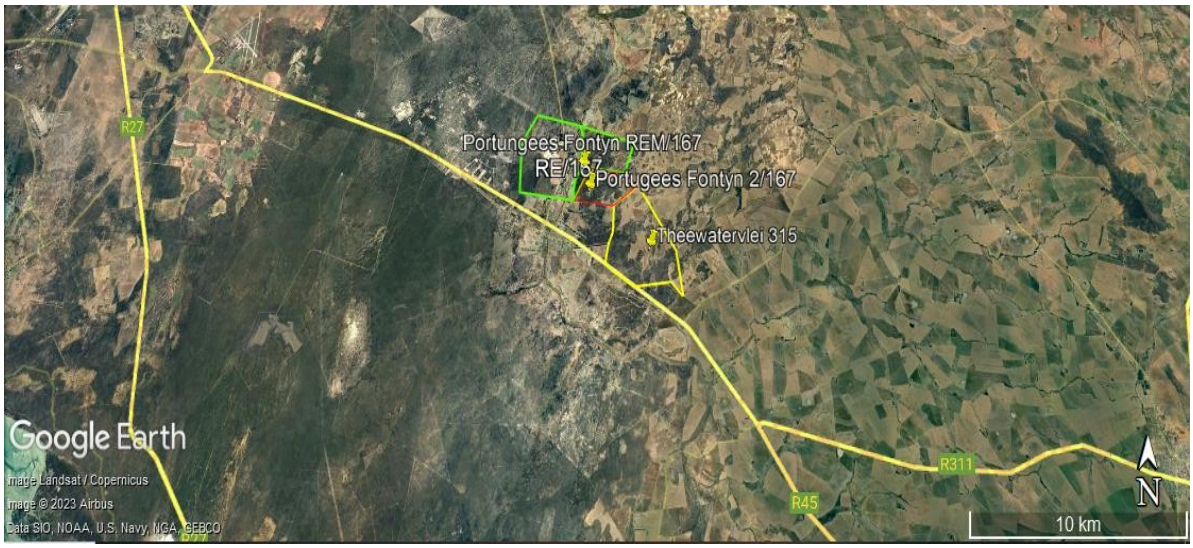

Figure 1-1: Aerial spatial map showing the site location in relation to the project area (Source: Google Earth™, October 2023)

2 Project scope and Methodology

2.1 Scope of the project

The overarching objective of this study is to compile a Biodiversity Impact Assessment Report that contextualises the proposed project in relation to the biodiversity (flora, faunal, avifauna and reptiles) that characterises the study site.

In terms of GN 320 (20 March 2020) and GN 1150 (30 October 2020) of the NEMA EIA Regulations of 2014 (as amended), prior to the commencement of a specialist assessment, a site sensitivity verification must be undertaken to confirm the current land use and environmental sensitivity of the proposed project areas as identified by the Screening Tool. However, this information was not readily available to the specialist at the time of the assessment.

The report provides for the identification of impacts that are anticipated from project-related activities on the biodiversity and recommend appropriate mitigation measures as applicable. Specific intended outcomes of the study are outlined below:

- Terrestrial Ecological Assessment:
  - Determine the terrestrial ecological diversity of the study site in terms of plants, animals, birds and reptiles.
  - Identify and assess all sensitive terrestrial ecological habitats or features.
  - Determine the present ecological condition and sensitivity of identified terrestrial ecological habitats.
  - Assess conservation status of plant, birds, reptiles and animal species.
  - Compile a species inventory for species on site and to recommend necessary actions in case of occurrence of Red Data species (endangered, vulnerable or rare) or any Species of Conservation Concern (SCC).
- Impact Assessment and Mitigation:
  - Identify and undertake a risk assessment of anticipated project-related impacts on the taxa and/or habitats.
  - Recommend feasible mitigation measures for implementation, including but not limited to the recommendation of minimum buffers.

2.2 Methodology

The methodology carried out for this study is presented in **Appendix A** of this report.

2.3 Study limitations and assumptions

Please note that the following limitations and assumptions are applicable to this assessment:

- The Global Positioning System (GPS) device used is only accurate to 5m. Therefore, the boundary of delineated features (which were subsequently plotted digitally) may be offset by at least five meters to either side.
- Vegetation descriptions provided are not comprehensive but an indication of dominant species of interest.
- Although not all of the study site could be sampled in detail given its large extent, the study site is considered to have been well-covered and it is highly unlikely that there are any significant vegetation features that were overlooked during the study.
- Some plants species flower during specific seasons and are difficult to identify without inflorescence, therefore inconspicuous plant species may have been missed.

- The assessment was based on one day's dry season (spring) survey only which was conducted early November 2023, and information provided should be interpreted accordingly. Site visits should ideally be conducted over differing seasons in order to better understand the surrounding ecological habitat and faunal species.
- Ecology is dynamic and complex, certain aspect may have been overlooked. However, it is expected that the biodiversity at the study site has been accurately assessed, based on consideration of available existing studies and data.
- Faunal behaviour cannot be entirely reduced to formulas that will hold true under all circumstances. Therefore, conclusions presented hereto considered the documented behavioural patterns of similar species in different parts of South Africa.
- Some faunal species of conservation importance (Red Data Species) are elusive and difficult to observe even during intensive field surveys.

3 Relevant legislation

3.1 National legislation

3.1.1 National Environmental Management Act (Act 107 of 1998)

The National Environmental Management Act (NEMA) (Act 107 of 1998) and the associated Regulations (No R. 324, No R. 325 and No R. 326) as amended (April 2017), states that prior to any regulated activity takes place within a sensitive habitat, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment Report (BAR) process or the Environmental Impact Assessment (EIA) process depending on the type and location of the proposed activity.

3.1.2 National Environmental Management: Biodiversity Act (Act 10 of 2004)

The National Environmental Management: Biodiversity Act (10 of 2004), (NEMBA) provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities. Certain activities, known as Restricted Activities, are regulated on listed species using permits by a special set of regulations published under the Act. Restricted activities regulated under the act are keeping, moving, having in possession, importing and exporting, and selling of listed species.

3.1.3 The National Forest Act (84 of 1998)

The National Forest Act (84 of 1998) aims to meet the following objectives:

- Promote the sustainable management and development of forests for the benefit of all.
- Create the conditions necessary to restructure forestry in South Africa.
- Provide special measures for the protection of certain forests and protected trees.
- Promote the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes.
- Promote community forestry.
- Promote greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination.

3.1.4 Conservation of Agricultural Resources Act (Act 43 of 1983)

This act regulates the utilisation and protection of watercourses, soil conservation and all matters relating thereto; control and prevention of veld fires, control of weeds and invader plants, the prevention of water pollution resulting from farming practices and losses in biodiversity.

3.1.5 The White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity (1997)

The policy comprises part of the broader context wherein national environmental policy has been formulated. It further sets the agenda for defining the strategy for conservation of South Africa's biodiversity.

3.1.6 Western Cape Biodiversity Spatial Plan (WCBSP) (2017)

The WCBSP was developed in 2017 to safeguard the continued existence and functioning of species and natural ecosystems within the province of Western Cape, including the delivery of ecosystem services across terrestrial and freshwater habitats.

4 Biophysical description of the study area

This section contains dataset accessed as part of the desktop assessment and are presented below. It is important to note that although all datasets used provide useful and often verifiable high-quality data, the various database repositories and literature sources used do not always provide site specific information at the scale required to inform the environmental authorisation process. However, this baseline information can be extrapolated to contextualise the biophysical setting of the study. Thus, data and background literature were used as guideline to inform the assessment and to focus on areas and aspects of increased conservation importance.

The results of the desktop investigation, carried out at a broader spatial scale of the study area, indicated that the study area is characterised by the biophysical conditions presented in **Table 4-1** below.

Table 4-1: Desktop results of the biophysical attributes of the study area.

Biophysical Attributes	
Terrain	Coastal sand plains, flat to undulating, and also including localised inland dune fields.
Vegetation	Vegetation is characterised by moderately tall shrubland and dense herbs. Fynbos is extensive and also occurs in seeps and along watercourses
Elevation	20-150 a.m.s.l.
MAP (Schulze, 1997)	400mm
Mean Annual Temperature	18 ^{0}C
Geology (Council of Geoscience, 2008)	Quaternary quartz sand of the Springfontein Formation and Limestone and Calcrete of the Langebaan Formation.
Soil Erodibility Score (K-factor) (Schulze, 2007	0.62 (medium)
Water Management Area	Berg
Sub Water Management Area	Lower Berg
Soil (National Soils Layer)	Deep, acid, tertiary sands, generally grey regic sands, sometimes pale yellow to reddish brown.

4.1 Benchmark vegetation

The National South African Vegetation Map (Mucina & Rutherford, 2006) describes the region as represented by the Fynbos Biome. According to Scott-Shaw & Escott (2011), at a broader spatial scale, the following vegetation types are modelled as overlying the study area:

- **Hopefield Sandy Fynbos (FFd 3)**
- **Swartland Shale Renosterveld (FRs 9)**

The general attributes of the above vegetation types are presented below:

4.1.1 Hopefield Sandy Fynbos (FFd 3).

The Hopefield Sandy Fynbos is characterised by both asteraceous and restioid fynbos, although proteoid fynbos is also extensive. Ericaceous fynbos sometimes occurs in watercourses. Hopefield Sand Fynbos (which is largely representative of the project area) has all three typical fynbos elements, where extensive stands of Leucadendron foedum, Leucospermum rodolentum and Serruria fucifolia

are dominant, Scott-Shaw & Escott (2011). The vegetation type modelled as overlying the study site is mapped as **Figure 4-1** overleaf.

Conservation Status

The Hopefield Sandy Fynbos has been assigned a provincial threat status of **Vulnerable** and is considered as **Hardly Protected** in terms of its protection status. More than 40% has been transformed through cultivation of cash crops (wheat) and livestock grazing (mainly sheep farming). Probably the greatest threat to the remaining natural areas of this unit is the proliferation of alien vegetation. Increased occurrence of aliens such as Acacia saligna, A. cyclops as well as various species of Pinus and Eucalyptus is of concern. A very small percentage of the vegetation type is statutory conserved, including an additional 2% in Hopefield and Jakkalsfontein Nature Reserves.

4.1.2 Swartland Shale Renosterveld (FRs 9)

This Swartland Shale Renosterveld vegetation type is characterised by tall, open shrubland growing over undulating valleys and plains. It usually grows in clay soils that are derived from the Malmesbury Group Shales. Termite mounds create large, round hummocks that are a prominent feature of this vegetation type, appearing as pale spots on the landscape. Indigenous trees and older thicket often occur around these features.

Conservation Status

In terms of its conservation status, the Swartland Shale Renosterveld is considered **Critically Endangered**. The vast majority of Swartland Shale Renosterveld has been lost (90% is already completely transformed for farming). Remnants survive in tiny isolated patches within farmland, usually only on rougher, steeper ground that cannot be cultivated. Only a few pockets are actually protected, and most surviving areas are threatened by invasive alien plants such and a variety of other invasive trees, grasses and herbs. The vegetation type is **Hardly Protected** in terms of its protection status. The threatened ecosystem status of the above vegetation types is presented as **Figure 4-2**.

(Contrary to the above desktop findings obtained from reviewed datasets, the infield assessment conducted in November 2023 did not confirm the presence of any vegetation communities bearing affinities to Swartland Shale Renosterveld at the study site).

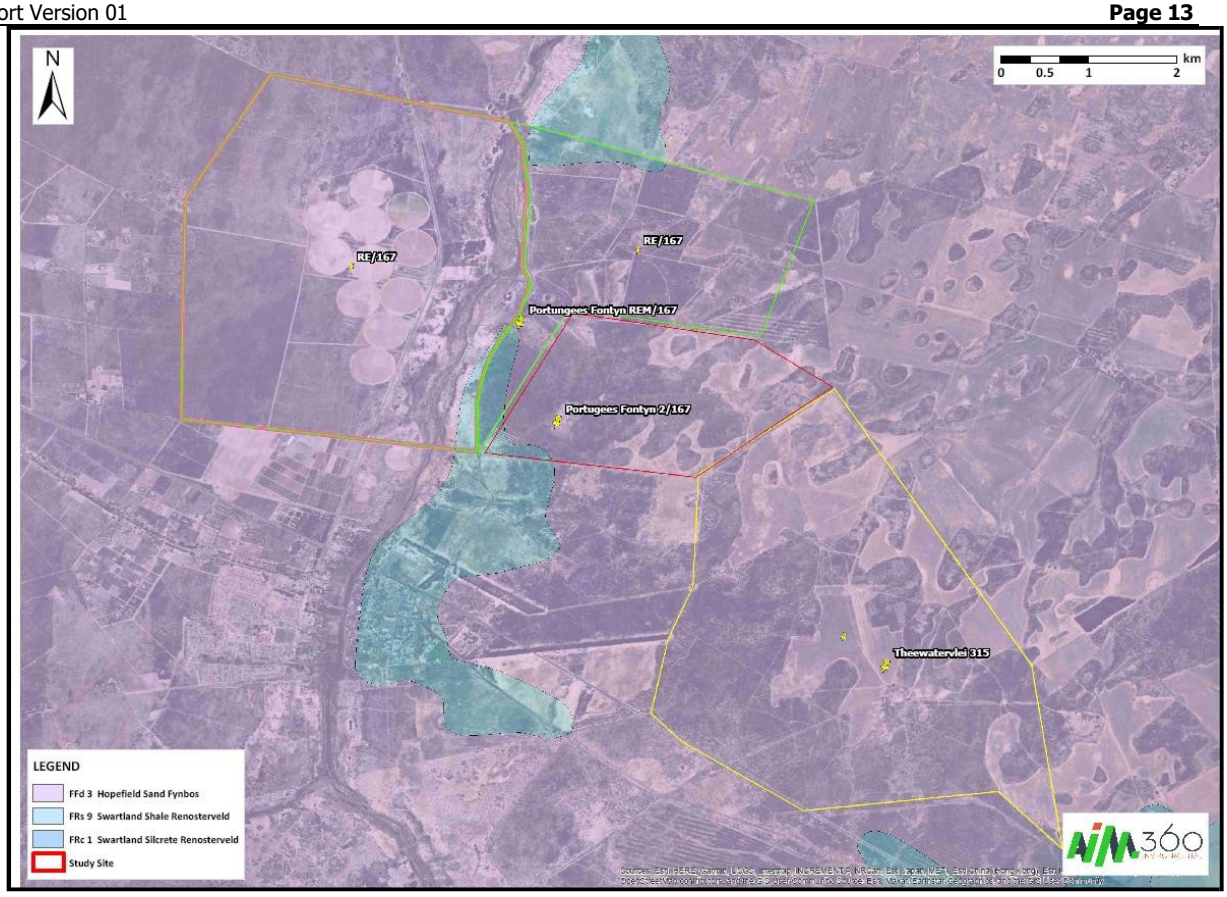

Figure 4-1: Extent of the vegetation types overlaying the study site.

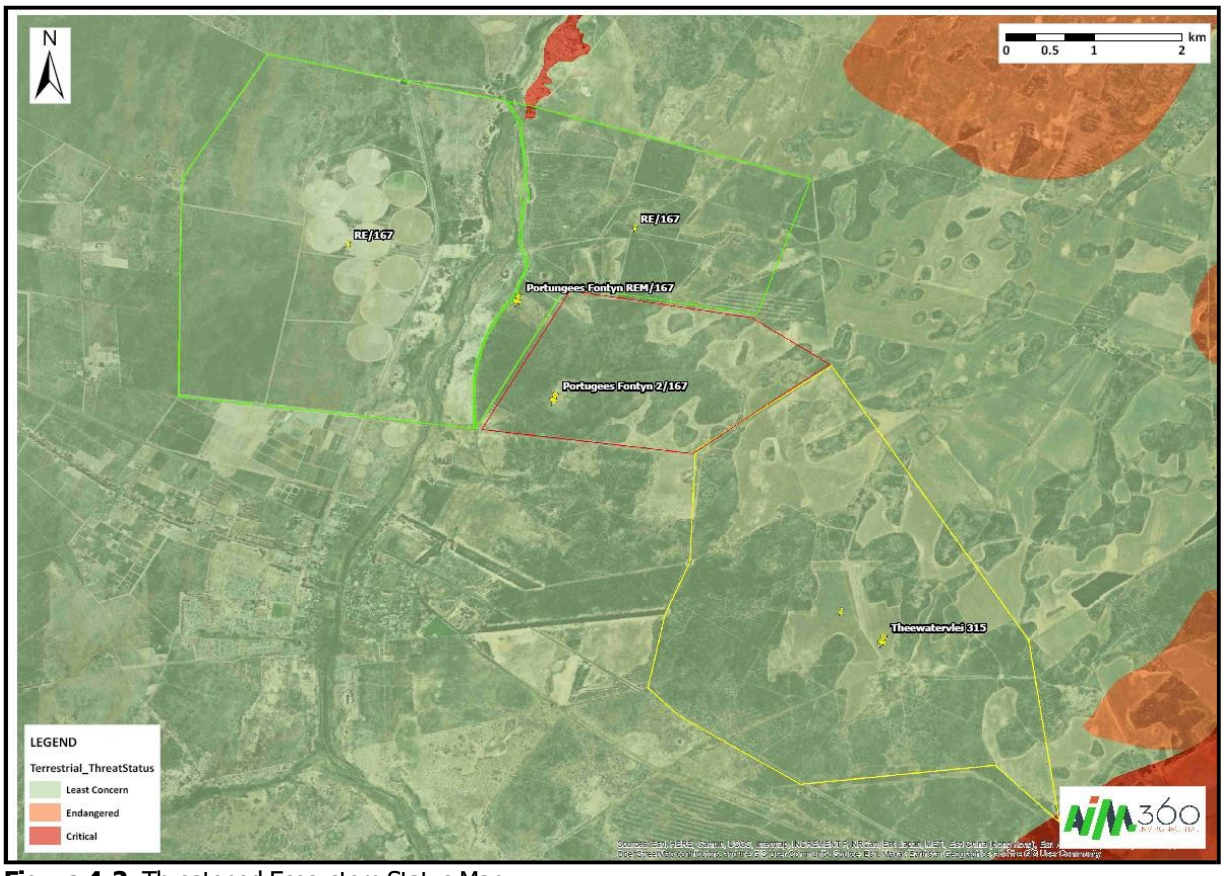

Figure 4-2: Threatened Ecosystem Status Map.

4.2 Biodiversity Conservation Context.

4.2.1 National Biodiversity Assessment 2018 (NBA)

The purpose of the NBA is to assess the state of South Africa's biodiversity based on best available science, with a view to understanding trends over time and informing policy and decision-making across a range of sectors. The NBA deals with all three components of biodiversity: genes, species and ecosystems; and assesses biodiversity and ecosystems across terrestrial, freshwater, estuarine and marine environments. The two headline indicators assessed in the NBA are:

- Ecosystem Threat Status – indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition.

- Ecosystem Protection Level – indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems.

4.2.2 Protected areas:

South Africa Protected Areas Database (SAPAD) (DEA, 2021) – The (SAPAD) Database contains spatial data for the conservation of South Africa. It includes spatial and attribute information for both formally protected areas and areas that have less formal protection. SAPAD is updated on a continuous basis and forms the basis for the Register of Protected Areas, which is a legislative requirement under the National Environmental Management: Protected Areas Act, Act 57 of 2003.

National Protected Areas Expansion Strategy (NPAES) (SANBI, 2010) – The NPAES provides spatial information on areas that are suitable for terrestrial ecosystem protection. These focus areas are large, intact and unfragmented and therefore, of high importance for biodiversity, climate resilience and freshwater protection.

4.2.3 Western Cape Biodiversity Spatial Plan

The Western Cape Biodiversity Spatial Plan (WCBSP) is the product of a systematic biodiversity planning assessment that delineates, on a map (via a Geographic Information System (GIS)), Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) which require safeguarding to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services, across terrestrial and freshwater realms.

Upon examination of the WCBSP dataset in relation to the study site it was found that:

1. The western portion of the study site (>30%) was determined as within three (3) CBA 1 Subcategories, namely: terrestrial, wetland and river. The implication that these area in a natural condition required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure, consequently the management objective is to maintain in a natural or near-natural state, with no further loss of natural habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.
2. Two (2) ESA subcategories (aquatic and terrestrial) were modelled within the study area. The management objective of the area is identified as: Restore from other land use.
3. The West Coast National Park is modelled as situated within a 5km and 10km radius of the study site.

4.2.4 Important Bird and Biodiversity Areas (IBAs) (Birdlife South Africa, 2015)

IBAs constitute a global network of over 13 500 sites, of which 112 sites are found in South Africa. IBAs are sites of global significance for bird conservation, identified through multi-stakeholder processes using globally standardised, quantitative and scientifically agreed criteria.

4.2.5 South African Inventory of Inland Aquatic Ecosystems (SAIIAE) (Van Deventer et al., 2018)

A SAIIAE was established during the NBA of 2018. It is a collection of data layers that represent the extent of river and inland wetland ecosystem types and pressures on these systems.

Figure 4-3: Critical Biodiversity Area (CBA) status of the study site.

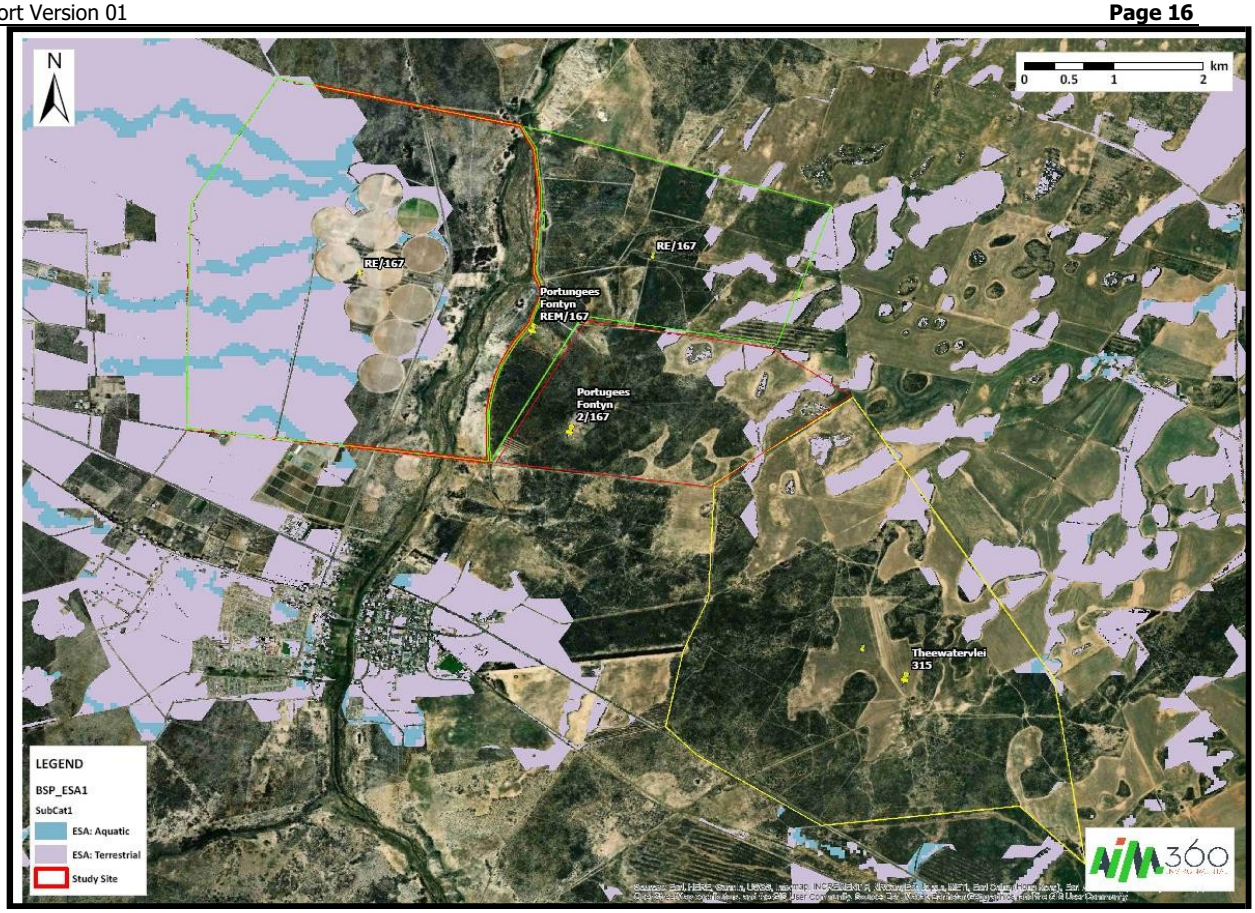

Figure 4-4: Ecological Support Area (ESA 1) status of the study site

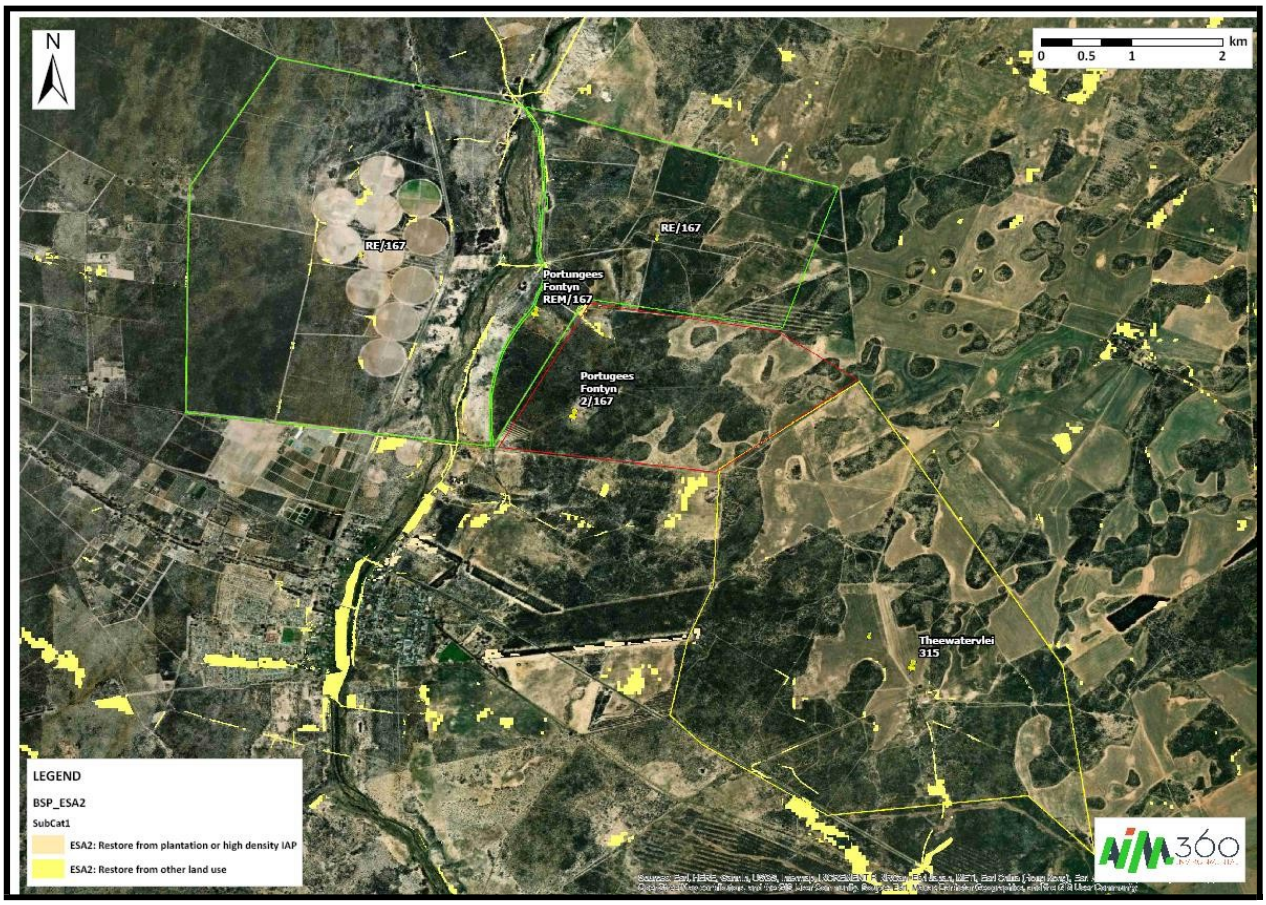

Figure 4-5: Ecological Support Area (ESA 2) status of the study site

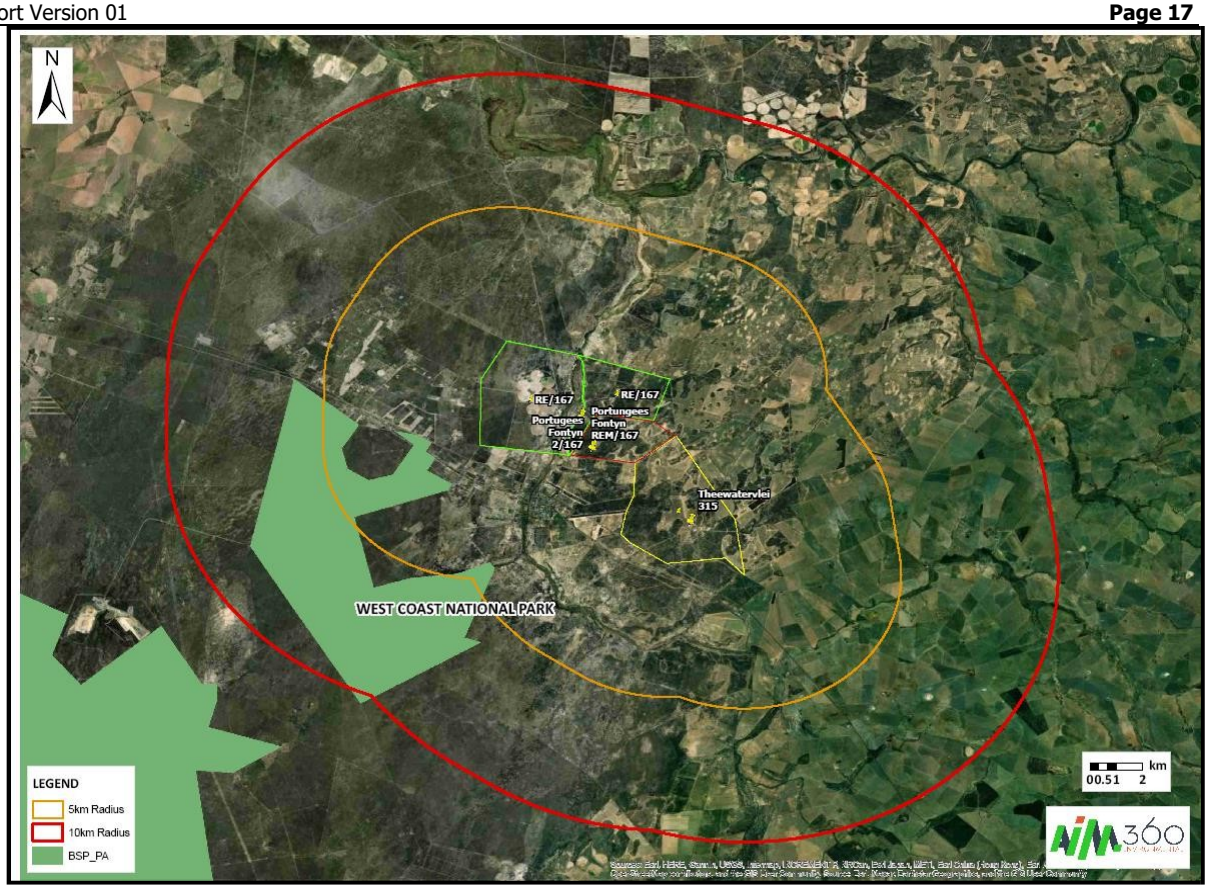

Figure 4-6: Protected Areas within a 5km and 10km radius of the study site

4.3 Freshwater Ecosystem Priority Areas (NFEPA)

Examination of the National Freshwater Ecosystem Priority Areas (NFEPA) databases was undertaken for the proposed project to contextualise the watercourse setting. Detailed site assessment was not conducted.

The NFEPA project aims to produce maps which provide strategic spatial priorities for conserving South Africa's freshwater ecosystems and supporting sustainable use of water resources. These strategic spatial priorities are known as Freshwater Ecosystem Priority Areas, or FEPAs. FEPAs are determined through a process of systematic biodiversity planning and involved collaboration of over 100 freshwater researchers and practitioners. They are identified based on a range of criteria dealing with the maintenance of key ecological processes and the conservation of ecosystem types and species associated with rivers, wetlands and estuaries (Macfarlane et al., 2009). The results from examination of the NFEPA datasets are summarised on **Table 4-2**.

Table 4-2: NFEPA results for the proposed project

Conservation Guideline	Results / Findings	Implication on the Project
National Freshwater Ecosystem Priority Areas (NFEPA)	The proposed development occurs within sub-quaternary catchment No.8287 identified as a non-prioritised catchment which means it is not critical for the conservation of aquatic resources (Figure 4-4). One (1) prioritised FEPA wetland (Unit ID 227888) was identified within the 500m regulated area	This project does not compromise the conservation of aquatic resources and associated biota.

	(Figure 4-4). The wetland is classified a floodplain wetland along the Sout River. The Sout River is a system with ephemeral flows, located within Reach Code G10L. The PES condition of the river is determined as within the C-Category which implies that it is in a Largely Modified condition.	

5 INVESTIGATION RESULTS –Terrestrial Ecological

5.1 Flora

5.1.1 Desktop Study Results

The proposed project is located within 3318AB Quarter Degree Grid Square (QDGS) in South Africa. Review of SANBI's POSA database indicated that a total of 185 plant species are modelled as present within 3318AB grid cell, results are presented as Table 5-1 below:

Table 5-1: Desktop results for plant species modelled as present within 3318AB grid cell

No.	Scientific Name	No.	Scientific Name
1.	Lebeckia plukenetiana	94.	Thesium repandum
2.	Ballota africana	95.	Lebeckia plukenetiana
3.	Nemesia barbata	96.	Serruria decipiens
4.	Babiana odorata	97.	Moraea ciliata
5.	Serruria rosea	98.	Schotia brachypetala
6.	Nemesia versicolor	99.	Phylica thunbergiana
7.	Merxmuellera arundinacea	100.	Leucospermum tomentosum
8.	Sparaxis parviflora	101.	Protea scolymocephala
9.	Veltheimia capensis	102.	Ehrharta melicoides Thunb.
10.	Oxalis suavis	103.	Polycarena capensis
11.	Aspalathus pinguis subsp. occidentalis	104.	Imperata cylindrica
12.	Diascia capensis	105.	Podalyria sericea.
13.	Babiana tubiflora	106.	Gethyllis ciliaris
14.	Aspalathus lotoides subsp. lagopus	107.	Serruria fucifolia
15.	Metalasia adunca	108.	Euclea racemosa
16.	Lachnaea capitata	109.	Babiana hirsuta
17.	Protea scolymocephala	110.	Protea scolymocephala
18.	Aspalathus ternata	111.	Thesium virgatum
19.	Phylica harveyi	112.	Restio vimineus
20.	Phylica strigosa var. elongata	113.	Thamnochortus punctatus
21.	Leersia hexandra.	114.	Amphithalea ericifolia subsp. erecta
22.	Leucospermum rodolentum	115.	Pseudopentameris macrantha
23.	Oncosiphon africanus	116.	Phylica harveyi
24.	Pterygodium inversum.	117.	Phyllopodium mimetes
25.	Asparagus declinatus	118.	Aspalathus ternata
26.	Lachnaea grandiflora	119.	Polycarena capensis.
27.	Xiphotheca reflexa	120.	Leucospermum rodolentum
28.	Selago psammophila	121.	Phyllopodium capillare
29.	Serruria fucifolia	122.	Leucospermumypo phyllocarpodendron
30.	Cyphia schlechteri	123.	Disperis cucullata Sw.
31.	Echiostachys spicatus	124.	Moraea bellendenii.
32.	Babiana nana sbsp.	125.	Aspalathus ternata
33.	Babiana nana	126.	Hermannia procumbens
34.	Pelargonium longifolium.	127.	Oxalis suavis
35.	Codonorhiza fastigiata	128.	Leucospermum rodolentum
36.	Limeum africanum	129.	Serruria decipiens R.Br.
37.	Cannomois arenicola	130.	Leucospermum rodolentum
38.	Conicosia pugioniformis	131.	Pelargonium graveolens.
39.	Echiostachys spicatus	132.	Hymenogyne glabra .
40.	Babiana angustifolia Sweet	133.	Diosma aspalathoides.
41.	Oxalis suavis	134.	Echiostachys spicatus
42.	Leucospermum rodolentum	135.	Ruschia sarmentosa

43.	Leucadendron foedum	136.	Leucadendron cinereum
44.	Xiphotheca reflexa	137.	Lachenalia bachmannii
45.	Freesia viridis	138.	Babiana tubiflora.
46.	Aspalathus pinguis subsp. occidentalis	139.	Leucadendron stellare
47.	Antimima mucronata	140.	Xiphotheca reflexa
48.	Cotula duckittiae	141.	Leucospermum tomentosum
49.	Echiostachys spicatus	142.	Cysticapnos vesicaria
50.	Serruria kraussii.	143.	Heliophila linearis var. linearifolia
51.	Babiana odorata	144.	Leucadendron foedum
52.	Manulea corymbosa	145.	Leucospermum tomentosum
53.	Babiana tubiflora	146.	Leucospermum rodolentum
54.	Gladiolus caryophyllaceus	147.	Echiostachys spicatus
55.	Leucospermum rodolentum	148.	Drimia exuviata
56.	Serruria decipiens	149.	Lachenalia bachmannii
57.	Polycarena aemulans	150.	Pauridia canaliculata
58.	Nemesia bicornis	151.	Agathosma bisulca.
59.	Aspalathus ternata	152.	Ixia calendulacea
60.	Oxalis suavis	153.	Acacia saligna.
61.	Lobelia setacea	154.	Ehrharta ramosa subsp. aphylla
62.	Babiana angustifolia Sweet	155.	Lachnaea capitata
63.	Babiana angustifolia Sweet	156.	Pentaschistis curvifolia
64.	Pentaschistis curvifolia	157.	Xiphotheca reflexa
65.	Lachnaea capitata	158.	Spiloxene canaliculata
66.	Restio vimineus	159.	Phylica cephalantha
67.	Amphithalea ericifolia	160.	Acacia retinodes
68.	Leucospermum tomentosum	161.	Babiana tubiflora
69.	Diascia capensis	162.	Marasmodes oligocephala
70.	Lebeckia plukenetiana	163.	Aspalathus lotoides
71.	Echiostachys spicatus	164.	Serruria fucifolia
72.	Leucospermum rodolentum	165.	Serruria heterophylla
74.	Echiostachys spicatus	166.	Manulea cheiranthus
75.	Restio impolitus	167.	Echiostachys spicatus
76.	Lampranthus aureus.	168.	Diosma aspalathoides Lam.
77.	Romulea obscura	169.	Diosma aspalathoides Lam.
78.	Leysera gnaphalodes	170.	Tetragonia chenopodioides
79.	Phyllopodium capillare	171.	Phylica plumosa
80.	Hemimeris sabulosa	172.	Helichrysum cochleariforme.
81.	Oxalis suavis	173.	Selago psammophila
82.	Leucospermum rodolentum	174.	Hebenstretia repens
83.	Lachnaea capitata	175.	Serruria decipiens
84.	Crotalaria excisa subsp.	176.	Lebeckia ambigua
85.	Selago psammophila	177.	Helichrysum cochleariforme
86.	Lachnaea grandiflora	178.	Oxalis suavis
87.	Leucospermum rodolentum	179.	Phylica harveyi
88.	Babiana tubiflora	180.	Echiostachys spicatus
89.	Leucospermum rodolentum	181.	Helichrysum revolutum
90.	Serruria fucifolia	182.	Leucospermum hypophyllocarpodendron
91.	Babiana nana	183.	Ehrharta villosa
92.	Babiana tubiflora	184.	Phylica hirta
93.	Helichrysum cochleariforme	185.	Muraltia curvipetala

5.1.2 Red Data Flora

Results from the South African National Biodiversity Institute (SANBI) dataset for 3318AB QDGS (presented on section 5.1.1 above) were further reviewed to determine the availability of potential Red Data plant species or Species of Conservation Concern (SCC).

According to the South African Red data list categories done by SANBI, threatened species are species that are facing a high risk of extinction. Any species classified in the IUCN categories Critically Endangered, Endangered or Vulnerable is a threatened species whereas Species of conservation concern are species that have a high conservation importance in terms of preserving South Africa's high floristic diversity and include not only threatened species, but also those classified in the categories Extinct in the Wild (EW), Regionally Extinct (RE), Near Threatened (NT), Critically Rare, Rare, Declining and Data Deficient - Insufficient Information (DDD). Table 5-2 shows the South African Red Data list categories according to SANBI.

Table 5-2 : Definitions of Red Data Status

Family	Species	Threat Status
CR/ PE	**Critically Endangered (Possibly Extinct)**	Critically Endangered (Possibly Extinct) taxa are those that are, on the balance of evidence, likely to be extinct, but for which there is a small chance that they may be extant. Hence they should not be listed as Extinct until adequate surveys have failed to record the taxon.
CR	**Critically Endangered**	A taxon is Critically Endangered when the best available evidence indicates that it meets any of the five International Union for Conservation of Nature (IUCN) criteria for Critically Endangered, and is therefore facing an extremely high risk of extinction in the wild.
EN	**Endangered**	A taxon is Endangered when the best available evidence indicates that it meets any of the five IUCN criteria for Endangered, and is therefore facing an extremely high risk of extinction in the wild.
VU	**Vulnerable**	A taxon is Vulnerable when the best available evidence indicates that it meets any of the five IUCN criteria for Vulnerable and it is therefore considered to be facing a high risk of extinction in the wild.
NT	**Near Threatened**	A taxon is Near Threatened when available evidence indicates that it is close to meeting any of the five IUCN criteria for Vulnerable and it is therefore likely to qualify for a threatened category in the near future.
D	**Declining**	A taxon is Declining when it does not meet any of the five IUCN criteria and does not qualify for the categories Critically Endangered, Endangered, Vulnerable or Near Threatened, but there are threatening processes causing a continuing decline in the population.

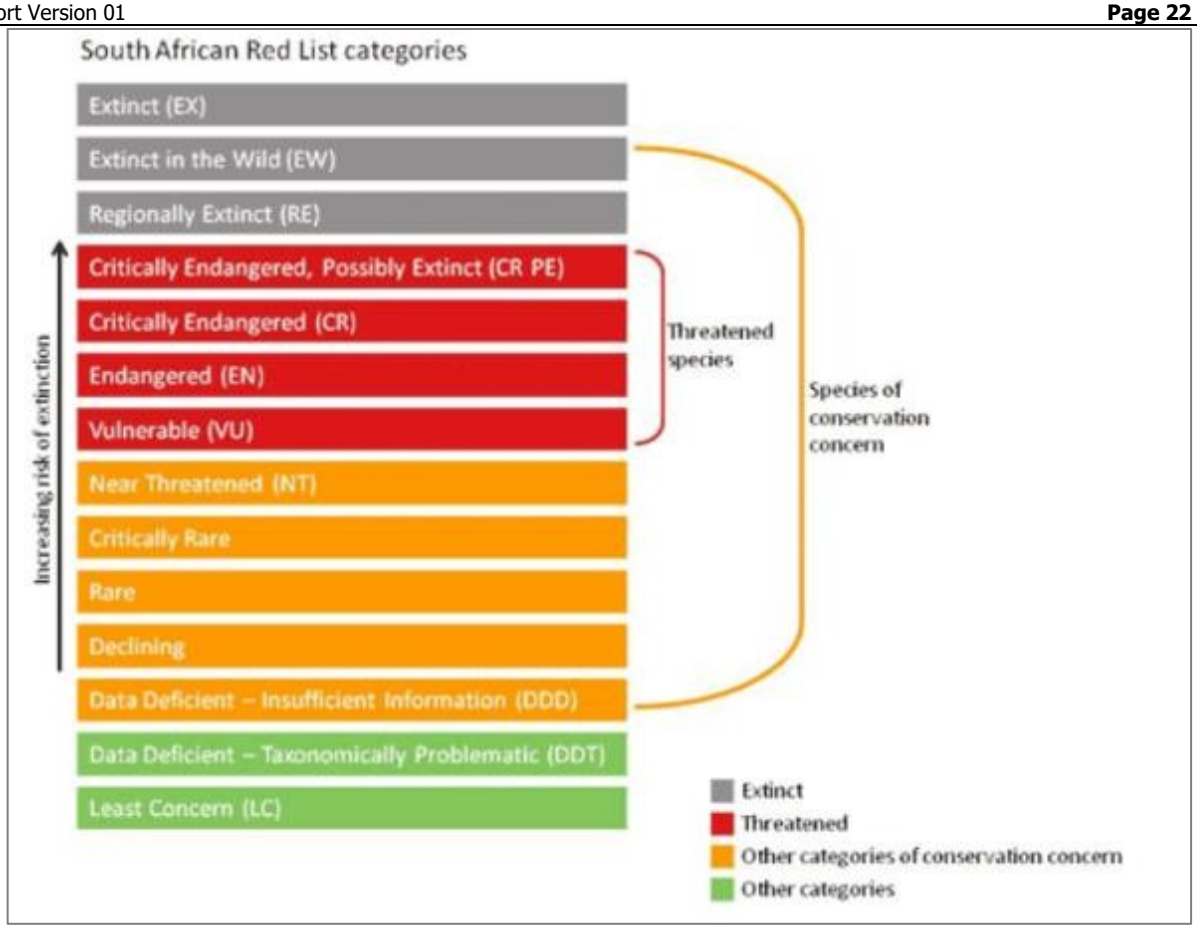

Figure 5-1 South African Red Data list categories according to SANBI Potential of Occurrence

To determine the likelihood of presence of Red Data plants species, a Potential of Occurrence (POC) was used. Habitat suitability was used as the determinant. POC was categorised according to **Table 5-3** below.

Table 5-3: Categorisation of Potential of Occurrence

Potential of Occurrence	Likelihood
Low	Unlikely to occur in such a habitat.
Medium	May occur in the habitat albeit in limited population.
High	Most likely to occur in significant population as the habitat is conducive.

Table 5-4 below highlights all the Red Data plant species which were recorded on 3318AB grid cells and their probability of occurrence.

Table 5-4: Threated plants species potentially occurring within grid cells 3318AB

Species	Threat Status	Suitable Habitat	Potential of occurrence
Leucospermum rodolentum (Sandveld Pincushion)	**VU**	A prominent constituent of sandveld vegetation that grows on the sandy flats, between sea-level and 250 m or rarely 300 m altitude. It occurs only in loose, very often stabilised Tertiary or Quaternary drift sands.	**High**

L.hypophyllocarpodendron ssp. Canaliculatum (Snakestem Pincushion)	**EN**	The plants lives in fynbos and strandvled on sandy flats below 150 m of elevation, but sometimes grows on weathered Table Mountain Sandstone up to 300 m of elevation.	**Moderate**
Leucadendron foedum (Hopefield Cornbush)	**EN**	Commonly found in in sandveld near Hopefield.	**High**
Serruria decipiens (Sandveld Spiderhead)	**NT**	The flower only occurs on the Sandveld, Hopefield, the Cape Flats, Piketberg, and Olifants River Mountains.	**High**
Serruria fucifolia (Northern Spiderhead)	**NT**	It grows in white sandy soils on the flats and on rocky sandstone higher up. Altitude varies between 150 and 920 m. Endemic to the Western Cape and occurs in a band along the western coastline. It occurs in Sand Fynbos at Blaauwberg in the south, the Piketberg, the eastern Cedarberg near Wuppertal, and the northernmost populations occur in the Nardou area.	**Low**
Lachnaea capitate (Lanky Stringbark)	**VU**	The species occurs on sandyveld and lower slopes between Clanwilliam, the Cape Peninsula, Franschhoek and the Breede River valley.	**Low**
Phylica harveyi Sandy Hardleaf	**VU**	Occurs on sandy flats, dunes and grassy slopes. Like most phylicas it prefers exposed comparatively dry, well-drained, acidic soils and a sunny position.	**High**
Phylica thunbergiana (Renoster Hardleaf)	**EN**	Fragmented subpopulations are found within Hills between Paarl and Pont, and near Bergriver; sandy places at the foot of Simonsberg,	**Low**
Metalasia adunca (Crooked Blombush)	**NT**	10-100msl sandy shrubland from Kreefte to Stellenbosch.	**Moderate**
Nemesia strumosa (Nemesia)	**NT**	The plant is found on sandy flats from Hopefield to Melkbos.	**High**
Lampranthus explanatus (Sandveld Brightfig)	**NT**	This plant is naturally restricted to the coastal dune Strandveld vegetation	**Low**
Relhania rotundifolia (Roundleaf Felt Perdekaroo)	**EN**	Grows in seasonally moist or wet sand or clay associated with sparse Restio vegetation, at altidudes between 100-150 m. Also on brackish flats and depressions.	**Low**
Oxalis suavis (Oxalis)	**VU**	Hopefield and Vredenburg. Granite and sandy slopes and flats.	**Moderate**
Metalasia capitate (Ball Blombush)	**VU**	10-100msl sandy shrubland from Kreefte to Stellenbosch.	**Low**

5.1.3 Findings of the infield investigation

Infield investigation was conducted on 02 November 2023 to verify the presence of Red Data Listed plant species and plants of conservation significance in terms of national and provincial legislation. A walk-over survey was conducted along random longitudinal transects and points of interests were collected using a Dakota 20 handheld GPS. The infield assessment was limited to the footprint of the proposed study site and the immediate corridor of the proposed facility from the boundary of the site.

The investigation highlighted the presence of a terrain characterised by south-west facing slopes. However, the broader landscape is generally flat and characterised by farmlands. Whereas the study site is uncultivated, the majority of the surrounding project area is characterised by wheat land and sheep keeping. Sheep keeping is the predominant land use around the study site.

In terms of soils, the study site is underlain by sands that are yellowish in colour. The A-horizon layer is characterised by deep acidic sands with very low organic matter content. Onsite assessment of soils indicate low susceptibility to erosion due to a relatively flat landscape.

At a broad spatial level, vegetation is typically dominated by dense sand fynbos and interspersed by a mosaic of secondary grassland. The findings are generally congruent with the national vegetation mapping and classification published in 2006 (Mucina and Rutherford, 2006). An attempt to provide a more detailed local classification was thus conducted based on the type of substrate and the topography of the land units.

Photo 1 below show a typical representative view of the sand fynbos and **Photo 2** shows a representative view of the secondary grassland interspersed by a sub-community sandy fynbos.

Photo 1: Representative view of the landscape associated with the study site. Note the dense inpenetratable shrub layer. The fynbos vegetation is widespread and exhibit high species diversity (richness and composition).

Photo 2: Representative view of interspersed secondary grassland.

At a site based level, the study site is primarily represented by two (2) terrestrial habitats/ vegetation communities that can be categorised in terms of structure, vegetation composition and condition. The following communities (including their extent) were identified and assessed:

- **Disturbed Hopefield Sand Fynbos (HoSF) – (60-70%)**
- **Secondary Grassland (SG) – (30-40%)**

In general, the study site and its immediate surrounding area was evaluated and determined as – widespread medium-tall sized Sand Fynbos (on flat terrain) mixed with secondary grassland. Infield findings of the delineated vegetation communities are presented as a spatial distribution map, See **Figure 5-2** below.

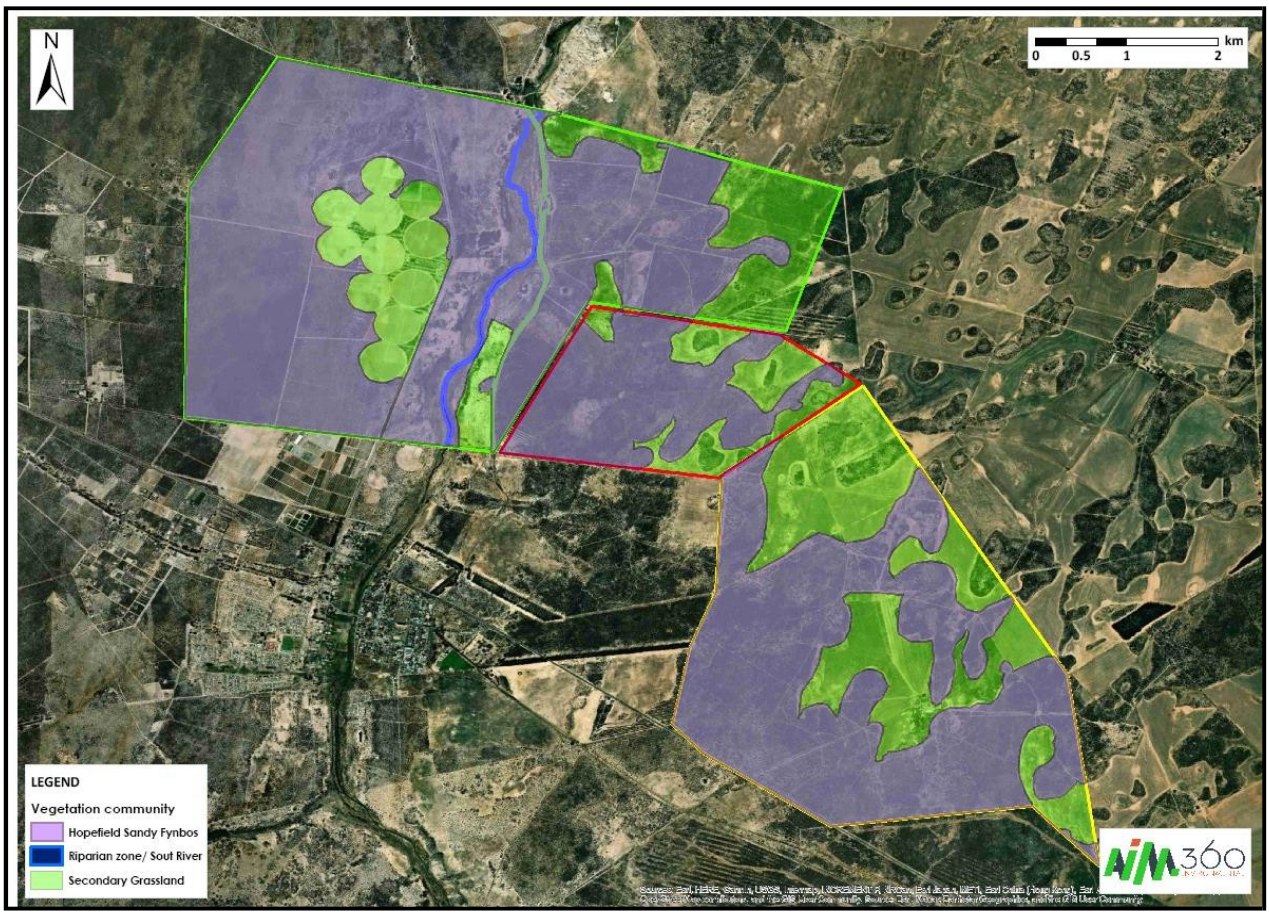

Figure 5-2: Delineated vegetation communities in relation to the study site.

5.1.4 Disturbed Hopefield Sand Fynbos (HoSF)

Disturbed Hopefield Sand Fynbos (HoSF) vegetation is generally widespread and accounts for the majority of the study site, approximately 60-70%. Tall trees are noticeably absent and limited to inpenetratable shrub layers. The vegetation community is underlain by yellowish sandy acidic soils. Leucadendron sps. is the dominant indicator plant species (30%). **Photos 3A and 3B** below shows representative photographs of the Hopefield Sand Fynbos.

Photo 3A: Representative view of the Disturbed Hopefield Sand Fynbos at the study site. (North facing view)

Photo 3B: Further representative view of the Disturbed Hopefield Sand Fynbos at the study site. (South-east facing view)

Dominant plant species associated with the HoSF vegetation community are highlighted below:

Grass:

Graminoids recorded within the study site included: Cannomois parviflora, Cynodon dactylon, Ehrharta villosa, Elegia tectorum, Staberoha cernua, Thamnochortus erectus, T. punctatus, Willdenowia incurvata, Elegia verreauxii. Ehrharta calycina.

Herbs:

Geissorhiza purpurascens, Lachenalia reflexa, Romulea obscura and Zantedeschia aethiopica

Shrubs

Leucadendron foedum, Leucospermum rodolentum, Leucadendron pubescens, Putterlickia pyracanth, Diosma hirsuta, Phylica cephalantha, Anaxeton asperum, Anthospermum spathulatum, Aspalathus lotoides, A. ternata, Erica mammosa, E. plumosa, Leucadendron cinereum, L. salignum,

Leucospermum hypophyllocarpodendron, Metalasia capitata, Pharnaceum lanatum, Phylica harveyi, Serruria decipiens, S. fucifolia, Trichocephalus stipularis. Euphorbia muirii.

Disturbances on the vegetation community

Noticeable disturbances that were recorded on the vegetation community included: (i) cultivated farm lands (ii) informal access roads (ii) proliferation of alien plants and (iv) poor vegetation management resulting in vegetation pressure.

Photo 4 below shows some of the disturbances noted within the above vegetation community.

Photo 4:Spread of invasive alien plants was recorded throughout the study site, Acacia mearnsii (black wattle).

5.1.5 Secondary Grassland

The Secondary Grassland vegetation community was mostly encountered west of the study site, predominantly within farm property RE/167 and along access roads. Widespread vegetation clearance within the study area has subsequently resulted in the emergence of a secondary grassland community. Nested within the grassland was a sub-community of shrubs which are remnants from the Sand Fynbos. **Photo 5** below shows the photographic evidence of the secondary grassland.

Photo 5: Representative view of the secondary grassland vegetation community.

Dominant plant species associated with the grassland vegetation community are highlighted below:

Grass:

Graminoids recorded within the study site included: Cynodon dactylon, Ehrharta calycina, Ehrharta villosa, Elegia tectorum, Staberoha cernua, Thamnochortus erectus, T. punctatus, Willdenowia incurvata, Elegia verreauxii.

Disturbances on the vegetation community

Noticeable disturbances that were recorded on the vegetation community included: (i) informal access roads (ii) proliferation of alien plants (iii) cultivated farm lands.

5.1.6 Species of conservation significance, Threatened Species and medicinal plants

The National Environmental Biodiversity Act (Act 10 of 2004) (as amended) and Western Cape Nature Conservation Ordinance 19 of 1974 place an emphasis on conserving biodiversity in each province and as such all indigenous resources must be sustainably utilised. Additionally, legislation exists at both national and provincial level for the conservation of plant species with medicinal properties.

Medicinal plants

Plants recorded within the study site with medicinal value include inter alia: Zantedeschia aethiopica, Aspalathus lotoides, A. ternata,

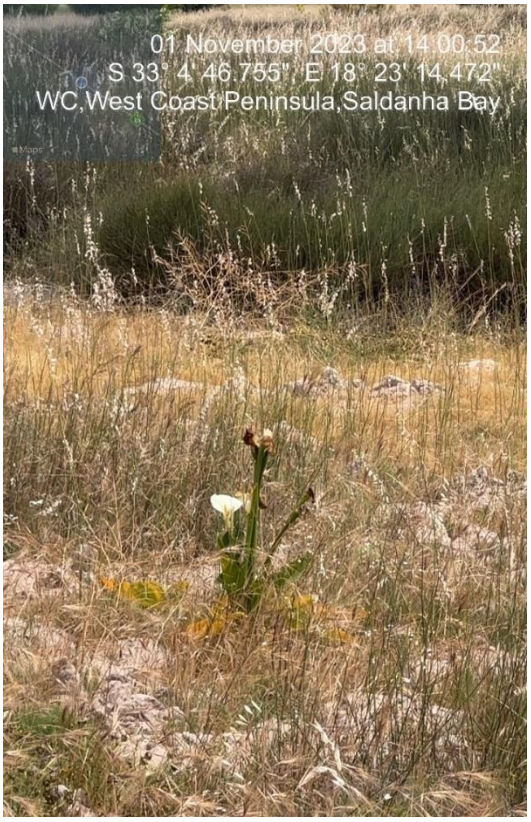

Photo 6: Zantedeschia aethiopica (Arum liilly).

Conservation significant plants and threatened species

Plants of conservation significance, as protected by the Western Cape Nature Conservation Ordinance 19 of 1974, that were encountered within the study site include the following: Leucadendron foedum, Leucospermum rodolentum, A. ternata, Leucospermum hypophyllocarpodendron, Metalasia capitata, Phylica harveyi, Serruria decipiens, S. fucifolia.

5.1.7 Habitat associated with species of conservation significance

The main components of a habitat are shelter, water, food, and space. A habitat is said to have a suitable arrangement when it has the correct amount of all of these. Sometimes, a habitat can meet some components of a suitable arrangement. For a plant, a good habitat must provide the right combination of light, air, water, and soil.

The Hopefield Sand Fynbos (Ho-SF) vegetation community provided the optimal habitat for sheltering plants of conservation significance listed in section 5.1.6 above.

5.1.8 Alien Invasive Plants

Invasive alien plants are described as species which are 'non-indigenous' to an area and which have been introduced from other countries either intentionally (for domestic/ornamental or commercial use) or accidentally; furthermore, they have the ability to reproduce and spread without the direct assistance of people into natural or semi-natural habitats and are destructive to biodiversity and human interests.

Notice 3 of the National Environmental Management: Biodiversity Act 2004 (Act No, 10 of 2004) lists 379 plant species that are legally declared invasive species (See **Table 5-6**). Each species is assigned to one of three categories based on the level of threat posed by the species and the legal status assigned to each:

Table 5-5: NEMBA Category for invasive plant species

Category 1a	Plant species that must be combatted or eradicated.
Category 1b	Plant species that must be controlled.
Category 2	Plant species that must not be allowed to spread outside any property.
Category 3	Plant species that when occurring in riparian areas must be considered to be category 1b Listed Invasive Species and must be managed according to regulation 3 of NEM:BA, 2014

Alien Invasive Plants that were identified and widespread within the study site included: Scattered Rooikrans / Red Eye (Acacia cyclops), Acacia mearnsii (black wattle), Eucalyptus camaldulensis (red river gum), and Arundo donax (giant reed). **Photo 7** below shows giant reed encountered along watercourses within the study site.

Photo 7: Arundo donax (Giant Reed) was widely encountered along watercourses.

5.2 Fauna

The survey focused on the current status of threatened faunal species with a potential of occurrence (POC) within the proposed study area. During the site visit faunal presence was largely verified by visual sightings and photographic images collected.

5.3 Mammals

5.3.1 Desktop Study Results

According to distribution maps, six (6) terrestrial mammals may potentially occur within the proposed study area (Skinner and Chimimba 2005). However, given the disturbed nature of the study area due to agriculture activities, most of the species may not have resident populations within the study area. No mammal species of conservation significance were modelled as present within the study area. **Table 5-7** below shows the mammal species potentially occurring within the grid cells 3318AB.

Table 5-7: Mammal species potentially occurring within grid cells 3318AB

Species	Red List	Suitability of Habitat	Potential of Occurrence
Otocyon megalotis (Bat-eared Fox)	**Least Concern**	Prime habitat is short-grass plains and areas with bare ground, but they are also found in arid/semi-arid scrubland, and savanna.	Moderate
Bathyergus suillus (Cape Dune Mole-rat)	**Least Concern**	Its natural habitat is sandy shorelines and river banks dominated by veldt grassland, sedges, and herbs.	Moderate
Ictonyx striatus (Striped Polecat)	**Least Concern**	Savannahs, grasslands, shrubland, rocky areas, woodlands, forests, and even deserts.	High
Raphicerus campestris (Steenbok)	**Least Concern**	Wide variety of habitats from open plains, open woodland and thickets, stony savannah, open grassland or even semi-desert areas.	Moderate
Vulpes chama (Cape Fox)	**Least Concern**	Primarily occupies in arid and semi-arid areas, but also found in sections, such as the fynbos biome of the western Cape, the species reaches areas of higher rainfall and denser vegetation.	High
Felis silvestris (African Wild Cat)	**Least Concern**	Has a very broad habitat tolerance and is found from deserts, semi deserts, savannahs, scrub grassland to open forests in hilly and rocky terrain as well as in mixed forests.	High

5.3.2 Mammals recorded along the study site

The study site has undergone significant habitat alteration and transformation as a result of widespread agricultural land use and poor vegetation management. Disturbances related to historic crop cultivation and livestock keeping in particular have resulted in loss of optimal habitat and subsequently in diminished mammal pollutions.

Spoor and dung encountered at the eastern boundary fence of the site indicated the presence of a small sized mammal. There is a likelihood of Ictonyx striatus (polecats) residing in the vicinity of the disturbed grasslands, most likely using the area for foraging and habitat. The disturbed grasslands

are particularly favourable for polecats due to high diversity of insects, bulbs and fruits. Watercourses (stream and wetland) located proximal to the site are also likely to provide an abundancy of food for small sized mammals as wells. No signs for the presence of large antelopes were recorded.

5.3.3 Mammal species of conservation significance

No Red Data listed mammals were recorded within the study area associated with the project and the likelihood of any threatened mammal species being encountered within the area is considerably low. The majority of large mammals are likely to have been eradicated or displaced as a result of increased anthropogenic activity such as hunting, as well as habitat modification and degradation. Smaller mammals may have been exposed to predation by feral cats and dogs.

5.3.4 Habitats available for species conservation

To establish the suitability of the study area in relation to the availability of faunal species, it is necessary to look at the habitats available. The habitat is determined by a combination of vegetation type, topography, land use, food sources and other various intrinsic factors.

Watercourses

The watercourses (stream and wetlands) recorded with the study site, particularly the Sout River, are noteworthy as movement corridors for terrestrial faunal species, especially those with a preference for temperate conditions such as small rodent species and may be connected to other more suitable areas for foraging and roosting. The watercourses could also provide suitable habitat for sensitive and non-sensitive fauna species including amphibians. Furthermore the wetlands could provide breeding, foraging and roosting areas for a variety of fauna species.

5.4 Avifaunal

5.4.1 Desktop study results

According to results obtained from reviewing the Southern African Bird Atlas Project (SABAP**)** for 3300_1820 pentad, a total of 181 bird species have been recorded within the study site. Results of the desktop assessment are presented below.

Common_species	Common group	Genus	Species
Bokmakierie	-	Telophorus	zeylonus
Neddicky	-	Cisticola	fulvicapilla
Ruff	-	Calidris	pugnax
Bar-throated	Apalis	Apalis	thoracica
Pied	Avocet	Recurvirostra	avosetta
Acacia Pied	Barbet	Tricholaema	leucomelas
Cape	Batis	Batis	capensis
European	Bee-eater	Merops	apiaster
Southern Red	Bishop	Euplectes	orix
Yellow	Bishop	Euplectes	capensis
Little	Bittern	Ixobrychus	minutus
Southern	Boubou	Laniarius	ferrugineus
Cape	Bulbul	Pycnonotus	capensis
Cape	Bunting	Emberiza	capensis
Lark-like	Bunting	Emberiza	impetuani
Ludwig's	Bustard	Neotis	ludwigii
Common	Buzzard	Buteo	buteo
Jackal	Buzzard	Buteo	rufofuscus
Black-headed	Canary	Serinus	alario
Brimstone	Canary	Crithagra	sulphurata
Cape	Canary	Serinus	canicollis
White-throated	Canary	Crithagra	albogularis
Yellow	Canary	Crithagra	flaviventris
Ant-eating	Chat	Myrmecocichla	formicivora
Familiar	Chat	Oenanthe	familiaris
Sickle-winged	Chat	Emarginata	sinuata
Grey-backed	Cisticola	Cisticola	subruficapilla
Levaillant's	Cisticola	Cisticola	tinniens
Zitting	Cisticola	Cisticola	juncidis
Red-knobbed	Coot	Fulica	cristata
Reed	Cormorant	Microcarbo	africanus
White-breasted	Cormorant	Phalacrocorax	lucidus
Burchell's	Coucal	Centropus	burchellii
Black	Crake	Zapornia	flavirostra
Blue	Crane	Grus	paradisea
Long-billed	Crombec	Sylvietta	rufescens
Pied	Crow	Corvus	albus
Diederik	Cuckoo	Chrysococcyx	caprius
Klaas's	Cuckoo	Chrysococcyx	klaas
African	Darter	Anhinga	rufa

Cape Turtle	Dove	Streptopelia	capicola
Laughing	Dove	Spilopelia	senegalensis
Namaqua	Dove	Oena	capensis
Red-eyed	Dove	Streptopelia	semitorquata
Rock	Dove	Columba	livia
Fork-tailed	Drongo	Dicrurus	adsimilis
White-faced Whistling	Duck	Dendrocygna	viduata
Yellow-billed	Duck	Anas	undulata
African Fish	Eagle	Haliaeetus	vocifer
Black-chested Snake	Eagle	Circaetus	pectoralis
Booted	Eagle	Hieraaetus	pennatus
Spotted	Eagle-Owl	Bubo	africanus
Little	Egret	Egretta	garzetta
Western Cattle	Egret	Bubulcus	ibis
Lanner	Falcon	Falco	biarmicus
Peregrine	Falcon	Falco	peregrinus
Southern	Fiscal	Lanius	collaris
Greater	Flamingo	Phoenicopterus	roseus
African Dusky	Flycatcher	Muscicapa	adusta
African Paradise	Flycatcher	Terpsiphone	viridis
Fairy	Flycatcher	Stenostira	scita
Fiscal	Flycatcher	Melaenornis	silens
Spotted	Flycatcher	Muscicapa	striata
Grey-winged	Francolin	Scleroptila	afra
Egyptian	Goose	Alopochen	aegyptiaca
Spur-winged	Goose	Plectropterus	gambensis
African	Goshawk	Accipiter	tachiro
Cape	Grassbird	Sphenoeacus	afer
Little	Grebe	Tachybaptus	ruficollis
Common	Greenshank	Tringa	nebularia
Helmeted	Guineafowl	Numida	meleagris
Hartlaub's	Gull	Chroicocephalus	hartlaubii
Kelp	Gull	Larus	dominicanus
Black	Harrier	Circus	maurus
African	Harrier-Hawk	Polyboroides	typus
Black-crowned Night	Heron	Nycticorax	nycticorax
Black-headed	Heron	Ardea	melanocephala
Goliath	Heron	Ardea	goliath
Grey	Heron	Ardea	cinerea
Purple	Heron	Ardea	purpurea
Eurasian	Hobby	Falco	subbuteo
Greater	Honeyguide	Indicator	indicator
Lesser	Honeyguide	Indicator	minor
African	Hoopoe	Upupa	africana
African Sacred	Ibis	Threskiornis	aethiopicus
Glossy	Ibis	Plegadis	falcinellus
Hadada	Ibis	Bostrychia	hagedash
Rock	Kestrel	Falco	rupicolus
Giant	Kingfisher	Megaceryle	maxima

Malachite	Kingfisher	Corythornis	cristatus
Pied	Kingfisher	Ceryle	rudis
Black-winged	Kite	Elanus	caeruleus
Yellow-billed	Kite	Milvus	aegyptius
Southern Black	Korhaan	Afrotis	afra
Blacksmith	Lapwing	Vanellus	armatus
Crowned	Lapwing	Vanellus	coronatus
Cape Clapper	Lark	Mirafra	apiata
Karoo	Lark	Calendulauda	albescens
Large-billed	Lark	Galerida	magnirostris
Red-capped	Lark	Calandrella	cinerea
Cape	Longclaw	Macronyx	capensis
Banded	Martin	Riparia	cincta
Brown-throated	Martin	Riparia	paludicola
Rock	Martin	Ptyonoprogne	fuligula
Common	Moorhen	Gallinula	chloropus
Red-faced	Mousebird	Urocolius	indicus
Speckled	Mousebird	Colius	striatus
White-backed	Mousebird	Colius	colius
Fiery-necked	Nightjar	Caprimulgus	pectoralis
Western	Osprey	Pandion	haliaetus
Common	Ostrich	Struthio	camelus
Western Barn	Owl	Tyto	alba
Indian	Peafowl	Pavo	cristatus
Great White	Pelican	Pelecanus	onocrotalus
Speckled	Pigeon	Columba	guinea
African	Pipit	Anthus	cinnamomeus
Kittlitz's	Plover	Charadrius	pecuarius
Three-banded	Plover	Charadrius	tricollaris
Southern	Pochard	Netta	erythrophthalma
Karoo	Prinia	Prinia	maculosa
Common	Quail	Coturnix	coturnix
African	Rail	Rallus	caerulescens
Cape	Robin-Chat	Cossypha	caffra
Namaqua	Sandgrouse	Pterocles	namaqua
Common	Sandpiper	Actitis	hypoleucos
Curlew	Sandpiper	Calidris	ferruginea
Wood	Sandpiper	Tringa	glareola
Karoo	Scrub Robin	Cercotrichas	coryphoeus
Streaky-headed	Seedeater	Crithagra	gularis
South African	Shelduck	Tadorna	cana
Cape	Shoveler	Spatula	smithii
Cape	Sparrow	Passer	melanurus
House	Sparrow	Passer	domesticus
Southern Grey-headed	Sparrow	Passer	diffusus
Black	Sparrowhawk	Accipiter	melanoleucus
African	Spoonbill	Platalea	alba
Cape	Spurfowl	Pternistis	capensis
Common	Starling	Sturnus	vulgaris

Pied	Starling	Lamprotornis	bicolor
Red-winged	Starling	Onychognathus	morio
Wattled	Starling	Creatophora	cinerea
Black-winged	Stilt	Himantopus	himantopus
Little	Stint	Calidris	minuta
African	Stonechat	Saxicola	torquatus
Black	Stork	Ciconia	nigra
White	Stork	Ciconia	ciconia
Cape	Sugarbird	Promerops	cafer
Malachite	Sunbird	Nectarinia	famosa
Orange-breasted	Sunbird	Anthobaphes	violacea
Southern Double-collared	Sunbird	Cinnyris	chalybeus
Barn	Swallow	Hirundo	rustica
Greater Striped	Swallow	Cecropis	cucullata
Pearl-breasted	Swallow	Hirundo	dimidiata
White-throated	Swallow	Hirundo	albigularis
African Black	Swift	Apus	barbatus
African Palm	Swift	Cypsiurus	parvus
Alpine	Swift	Tachymarptis	melba
Common	Swift	Apus	apus
Little	Swift	Apus	affinis
White-rumped	Swift	Apus	caffer
Cape	Teal	Anas	capensis
Red-billed	Teal	Anas	erythrorhyncha
Caspian	Tern	Hydroprogne	caspia
Spotted	Thick-knee	Burhinus	capensis
Water	Thick-knee	Burhinus	vermiculatus
Karoo	Thrush	Turdus	smithi
Olive	Thrush	Turdus	olivaceus
Cape	Wagtail	Motacilla	capensis
African Reed (Old, Use Common Reed Warbler)	Warbler	Acrocephalus	baeticatus
Chestnut-vented	Warbler	Curruca	subcoerulea
Common Reed	Warbler	Acrocephalus	scirpaceus
Lesser Swamp	Warbler	Acrocephalus	gracilirostris
Little Rush	Warbler	Bradypterus	baboecala
Willow	Warbler	Phylloscopus	trochilus
Common	Waxbill	Estrilda	astrild
Cape	Weaver	Ploceus	capensis
Southern Masked	Weaver	Ploceus	velatus
Capped	Wheatear	Oenanthe	pileata
Cape	White-eye	Zosterops	virens
Pin-tailed	Whydah	Vidua	macroura
Cardinal	Woodpecker	Dendropicos	fuscescens

5.4.2 Red Data Birds

Only six (6) bird species were classified as Red Data listed within the 3300_1820 pentad. Red Data species with a reporting rate of ≤ 1% were not included in the study as the likelihood of being present

within the study site is very low. Reporting rates are an indication of the relative density of a species on the ground in that it reflects the number of times that a species was recorded relative to the total amount of cards that were completed for the pentad.

Table 5-8 below highlights Red Data bird species potentially found within the study area and the suitable habitat that is predominantly associated with Red Data bird species. However it is worth noting that the movement of the Red Data bird species is not limited to such habitat, but can be encountered throughout the study area.

Table 5-8: Red Data bird species potentially occurring within 2725_3100 pentad (SABAP 1) (Harrison et al. (1997), Barnes (2000), SABAP2, and Tarboton et al. 1987).

Common Name	Red List Category	Suitable habitat	Potential of Occurrence
Lanner Falcon	Vulnerable	Lives in a wide variety of habitats from sea level to 7,500 feet. It can live in deserts, forests, woods, plains, and savannas, but needs rocky crags and cliffs nearby for nesting.	Medium
Blue Crane	Near Threatened	Dry grassy uplands, usually the pastured grasses of hills, valleys, and plains with a few scattered trees. They prefer areas in the nesting season that have access to both upland and wetland areas, though they feed almost entirely in dry areas.	Low
Greater Flamingo	Near Threatened	Found in a variety of saltwater habitats including salt or alkaline lakes, estuaries, shallow coastal lagoons and mudflats. Rarely inhabits areas of freshwater other than using freshwater inlets for bathing and drinking.	Low
Great White Pelican	Vulnerable	Found in the swamps, freshwater lakes, brackish lakes, marshes and deltas.	Low
Black Stork	Vulnerable	Wooded areas than the better-known white stork, and breeds in large marshy wetlands with interspersed coniferous or broadleaved woodlands, but also inhabits hills.	Low
Caspian Tern	Vulnerable	Prefers large lakes, coastal waters, beaches, bays. Found on both fresh and salt water, favouring protected waters such as bays, lagoons, rivers, lakes, not usually foraging over open seas.	Low

5.4.3 Fieldwork results

During the site visit a total of 37 bird species were recorded within the study site (Table 5-9). The most commonly recorded species were species often associated with anthropogenically modified landscapes (c. 36.11%). Thirteen (13) of the recorded bird species are common residents around settlements and have a generalist diet. This coupled with their generalist habitat requirements facilitates their presence within this disturbed environment. Approximately twelve (12) bird species (c.33%) are associated with disturbed grasslands. Approximately 25% of the bird species showed an affinity for freshwater habitat.

Photo 8: The Sout River had the highest productivity with regards to bird species recorded.

Photo 9: Numida meleagris (Helmeted Gunieafowl) feathers recorded at the study site.

Photo 10: Feather of Scleroptila afra (Grey winged Francolin) encountered within the secondary grassland vegetation community.

Photo 11: Swallows perched on one of the fenced associated with the study site.

Table 5-9 below lists the birds that were recorded at the study site during the assessment.

Table 5-9: Bird species recorded along the study site.

Scientific name	Common name
Colius striatus	Speckled Mousebird
Columbia guinea	Speckled Pigeon
Anthus cinnamomeus	African Pitpit
Anthus nicholsoni	Nicholson's Pipit
Lamprotornis bicolor	Pied Starling
Phylloscopus trochilus	Willow warbler
Ploceus subaureus	Yellow Weaver
Bubulcus Ibis	Cattle Egret
Streptopelia capicola	Cape Turtle-Dove
Trochocercus cyanomelas	Blue-mantled Crested-flycatcher
Myrmecocichla formicivora	Ant-eating Chat
Streptopelia semitorquata	Red-eyed Dove
Apus apus	Common Swift
Apus affinis	Little Swift
Cisticola juncidis	Zitting Cisticola
Dicrurus adsimilis	Fork-tailed Drongo
Corvus albus	Pied Crow
Euplectes orix	Southern Red Bishop

Numida meleagris	Helmeted Guineafowl
Hirundo cucullata	Greater Striped Swallow
Cecropis abyssinica	Lesser Striped Swallow
Lagonosticta senegala	Red-billed Firefinch
Plectropterus gambensis	Spur-winged Goose
Apus apus	Common Swift
Streptopelia senegalensis	Laughing Dove
Passer domesticus	House Sparrow
Ploceus velatus	Southern Masked Weaver
Malaconotus blanchoti	Grey-headed Bush-shrike
Lybius torquatus	Black-collared Barbet
Vidua paradisaea	Long-tailed Paradise-whydah
Vidua macroura	Pinned-tailed Whydah
Ardea cinerea	Grey Heron
Passer Diffussus	Southern Grey-headed Sparrow
Pycnonotus tricolor	Dark-capped Bulbul
Bubulcus ibis	Western Cattle Egret
Quelea queluea	Red Billed Quelea
Scleroptila afra	Grey winged Francolin

5.4.4 Habitat Associated with Red Data bird species

It must be emphasised that avifauna will, by virtue of their mobility, utilise almost any area in a landscape from time to time. However, certain habitats (such as the riparian area of a watercourse) may present foraging opportunities and therefore are likely to harbour a high avian species diversity.

Watercourses

The watercourses (such as the Sout River) proximal to the study site were observed to have the highest species richness and abundance of bird species within the study area; surrounding ecosystems and habitats closest to the study site such as the Hopefield residential areas and disturbed agricultural lands were noted to be least productive. Avian species recorded closest to the riparian zone included: Southern Red Bishop, Spur-winged Goose, Yellow Weaver, Laughing Dove, Helmeted Gunieafowl, Cape Turtle-Dove, Grey-headed Bush-shrike, Long-tailed Paradise Whydah, Grey Heron and Dark-capped Bulbul.

No threatened species (Red Data species) were recorded within the study site during the survey. The increased levels of anthropogenic disturbance and associated habitat transformation and degradation, has likely resulted in the displacement of specialist avian species as well as threatened species. In most cases these are species sensitive to habitat disturbances and display secretive behaviour characteristics. However, the occurrence of Lanner Falcon (Falco biarmicus) were projected as moderate the study area.

5.5 Reptiles

All reptilian species are sensitive to habitat modification and fragmentation. Due to the site having undergone modification and adjacent to a highway with high traffic flow, it is anticipated that mortalities of reptilian populations within the study area may have occurred to a certain degree. This was confirmed during the site investigation (See Photo 12A and 12B).

5.5.1 Results of Desktop Study

According to the SARCA (South African Reptile Conservation Assessment) database, only fourteen (14) reptiles have been recorded within the 3318AB Quarter Degree Grid Cell (SARCA, IUCN, 2014). No species of conservation significance were modelled as present within the study area. Table 5-9 below show the reptiles modelled as present within the study area.

Table 5-9: Reptiles found within the 3318AB Quarter Degree Grid Cell

Scientific name	Common name	Red List Category
Agama atra	Southern Rock Agama	Least Concern (SARCA 2014)
Crotaphopeltis hotamboeia	Red-lipped Snake	Least Concern (SARCA 2014)
Dasypeltis scabra	Rhombic Egg-eater	Least Concern (SARCA 2014)
Dispholidus typus typus	Boomslang	Least Concern (IUCN 2021
Cordylus cordylus	Cape Girdled Lizard	Least Concern (SARCA 2014)
Goggia incognita	Southern Striped Pygmy Gecko	Least Concern (IUCN 2022)
Pachydactylus geitje	Ocellated Gecko	Least Concern (SARCA 2014)
Meroles knoxii	Knox's Desert Lizard	Least Concern (SARCA 2014)
Pseudaspis cana	Mole Snake	Least Concern (SARCA 2014)
Acontias meleagris	Cape Legless Skink	Least Concern (SARCA 2014)
Trachylepis capensis	Cape Skink	Least Concern (SARCA 2014)
Trachylepis homalocephala	Red-sided Skink	Least Concern (SARCA 2014)
Chersina angulata	Angulate Tortoise	Least Concern (SARCA 2014)
Homopus areolatus	Parrot-beaked Tortoise	Least Concern (SARCA 2014)

No reptile species of conservation significance were modelled as present within the study area.

5.5.2 Field work results

The Field Guide for Snakes and Reptiles of Southern Africa (Brach, 2001) and South African Red Data Book for Reptiles (Branch, 1988) were used during the field survey. Agricultural activities and road networks within the study area have resulted in increased habitat fragmentation and transformation. The densification of residential areas and road traffic (See Photo 12 below) has further compounded the decline of suitable habitat for reptiles. As such, these impacts have resulted in the decline of reptile populations. Furthermore, it is anticipated that the indiscriminate killing of snakes, that is associated with human presence has resulted in the mortality of some species from the site.

Table 5-10 below indicates reptile species recorded in the proposed study area.

Table 5-10: Reptiles recorded within the study area.

Genus	Species	Common name
Pseudaspis cana	Mole Snake	**Least Concern (SARCA 2014)**

The majority of terrestrial habitats associated with the study site were relatively unproductive with regards to sighting of reptiles. However, two Mole Snakes (Pseudaspis cana) that had been run over by vehicles were encountered at the edge of the road, see **Photo 12A and B** below.

Photo 12A: Mole Snakes (Pseudaspis cana) killed by road trafffic at the edge of the road.

Photo 12B: Further evidence of dead Mole Snakes (Pseudaspis cana).

5.5.3 Habitat Associated with Red Data reptile species

The probability of occurrence of Red Data Species along the proposed project site is projected as very low due to anthropogenic disturbances that have occurred, however the fynbos vegetation community and watercourses associated with the study site may provide suitable habitat for some reptiles due to an abundancy of frogs and rodents.

6 Ecological Habitat Condition and Sensitivity Analysis

6.1 Ecological Habitat Condition and Sensitivity Analysis

After identifying vegetation communities and delineating their respective boundaries, the various vegetation communities defined for the study site were further assessed qualitatively in terms of their ecological condition in order to estimate relative habitat sensitivity.

Ecological functionality describes the structural and functional integrity of the vegetation communities/habitats which support the faunal communities. It also refers to the degree of ecological connectivity between the identified vegetation communities/habitats and other systems within the landscape (such as a combination of species composition; structural intactness and existing levels of anthropogenic disturbance, woody encroachment, etc.).

Systems with a high degree of landscape connectivity amongst each other are perceived to be more sensitive and may be considered as conservation important.

The matrix on **Table 6-1** below was used to determine the ecological condition of the vegetation communities/ ecological habitat.

Table 6-1: Generic matrix used for the estimation and rating of vegetation/habitat ecological condition (using joint consideration of species composition and structural intactness).

		SPECIES COMPOSITION			
		Natural	Good	Fair	Poor
		Representative of reference vegetation type	>75% of expected species occur compared with an undisturbed site in a comparable vegetation type	<75% of expected species occur compared with an undisturbed site in a comparable vegetation type	<25% of expected species occur compared with an undisturbed site in a comparable vegetation type
Structural Intactness	Contiguous (reference)	Natural	Good	Fair	Poor
	Clumped	Good	Good	Fair	Poor
	Scattered/patchy cover	Fair	Fair	Poor	Poor
	Sparse	Poor	Poor	Poor	Very Poor

The generic matrix in **Table 6-2** below was used for the assessment of vegetation/habitat sensitivity. The results are presented in **Table 6-3.**

Table 6-2. Generic matrix used for the estimation of habitat sensitivity (based on the joint consideration of habitat condition and threat status of the vegetation type).

		HABITAT/VEGETATION CONDITION				
		Natural	**Good**	**Fair**	**Poor**	**Very Poor/ Transformed**
THREAT STATUS	**CRITICALLY ENDANGERED**	**High**	**High**	**High**	Moderate	Low
	Endangered	**High**	**High**	**High**	Moderate	Low
	Vulnerable	**High**	**High**	Moderate	Low	Low
	Near Threatened	Moderate	Moderate	Moderate	Low	Low
	Least Threatened	Moderate	Moderate	Low	Low	Very Low

Table 6-3. Summary of the ecological condition and sensitivity assessment for the various terrestrial vegetation communities and habitat types.

Vegetation Community	Condition	Threat Status	Ecological Sensitivity
1. Hopefield Sandy Fynbos	Good	**Vulnerable**	High
2. Secondary Grassland	Poor	**Least Concern**	Low

The ecological sensitivity of the various terrestrial habitats identified during the study is represented as a spatial distribution map below, see **Figure 6-1.**

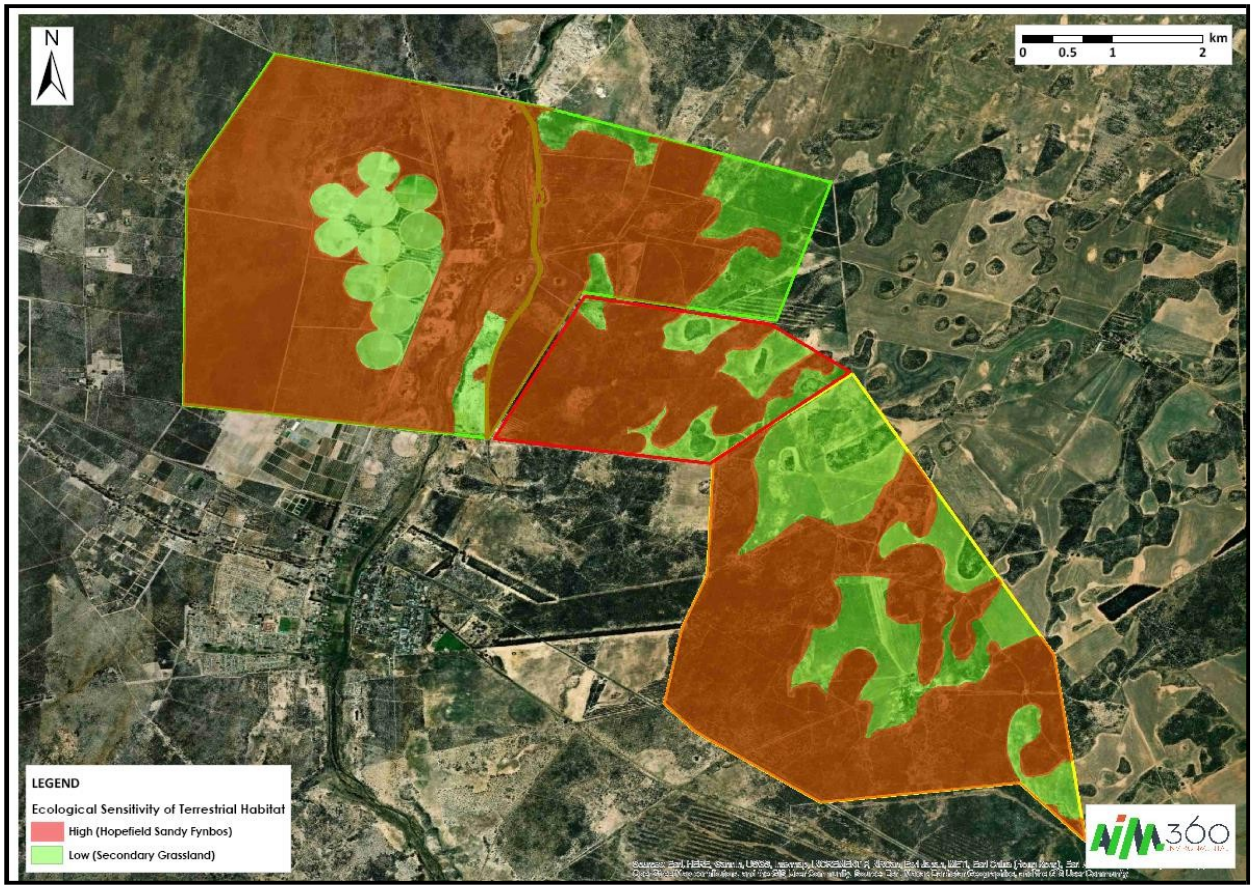

Figure 6-1: Ecological sensitivity of the various terrestrial habitats in relation to the study site.

7 IMPACT ASSESSMENT & MITIGATION

Any development/power generation activity within a natural system has a potential to impose an impact in that particular environment as well as the surrounding. In most instances the associated impact to development activity are negative. The main aim of this phase of study is to identi fy and asses the significance of the potential impacts which may be a result of the project and to provide a description of the mitigation measures required so as to restrict the identified impacts on the natural environment. Significance scoring both assesses and predicts the significance of environmental impacts through evaluation of the following factors; probability of the impact; duration of the impact; extent of the impact; and magnitude of the impact. The significance of environmental impacts is then assessed taking into account any proposed mitigations. The significance of the impact "without mitigation" is the prime determinant of the nature and degree of mitigation required. Each of the above impact factors have been used to assess each potential impact using ranking scales (Table 7-1).

Unknown parameters are given the highest score (5) as significance scoring follows the Precautionary Principle

Table 7-1: Significance scoring used for each potential impact.

	Score	Label	Criteria
Duration	1	Very short term	0 -1 years
	2	Short term	2 – 5 years
	3	Medium term	5 – 15 years
	4	Long term	>15 years
	5	Permanent	Permanent
Extent	1	Minor	Limited to the immediate site of the development
	2	Local	Within the general area of the town, or study area, or a defined Area of Impact
	3	Regional	Affecting the region, municipality, or province
	4	National	Country level
	5	International	International level
Magnitude	0	Negligible	Very small to no effect on the environment
	2	Minor	Slight impact on the environment
	4	Low	Small impact on the environment
	6	Moderate	A moderate impact on the environment
	8	High	The impacts on the environment are large
	10	Very high	The impacts are extremely high and could constitute a fatal flaw
Probability	1	Very improbable	Probably will not happen
	2	Improbable	Some possibility, but low likelihood
	3	Probable	Distinct possibility
	4	Highly probable	Most likely
	5	Definite	The impact will occur

Significance Points = (Magnitude + Duration + Extent) x Probability.

The maximum value is 100 Significance Points.
Potential Environmental Impacts are rated as high, moderate or low significance as per the following:

Table 7-2: Significance weighting.

Score	Label	Motivation
<10	Negligible	The impact is very small to absent
10-20	Low	where this impact would not have a direct influence on the decision to develop in the area
20-50	Medium	where the impact could influence the decision to develop in the area unless it is effectively mitigated
50 -70	High	where the impact must have an influence on the decision process to develop in the area
>70	Very high	Where the impact may constitute a fatal flaw for the project

Table 7-3: Possible significance scores based on Effect and Likelihood ratings.

Likelihood	Effect																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Very improbable (1)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Improbable (2)	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
Probable (3)	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
Highly probable (4)	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
Definite (5)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

Each impact was assessed based on the methodology above, and a table produced, indicating the scores and the overall significance rating both without and with mitigation. Where relevant, mitigation measures are recommended.

7.1 Loss of faunal habitat and Red Data species

The development of the Proposed Hopefield PV Solar Facility is anticipated to pose a number of potential negative impacts such as, habitat degradation and/or fragmentation, loss of faunal and avifaunal habitats and mortality of fauna or avifauna within the study site.

Impacts on faunal habitat particularly relate to the complete removal or partial destruction/disturbance of existing vegetation by machinery and workers, impacting directly on the ecological condition of natural vegetation and habitat availability. These activities will have an impact on foraging, breeding and roosting ecology of faunal species. Loss of vegetation generally affects nutrient cycles, removes the organic litter layer and results in habitat fragmentation and destruction of wildlife corridors.

It is not envisaged that any Red Data faunal species will be displaced by the habitat transformation that will take place as a result of proposed activity, considering that the corridor associated with the development is characterised by the presence of:

- Existing renewables projects (i.e. wind turbines within the neighbouring property that is west of Farm Theewatervlei 315).
- Disturbance by agricultural activities.
- Spread of alien vegetation.
- Poor veld management and grazing pressure.
- Major road networks (R45)

The impact on smaller, non-Red Data species that are potentially breeding in the area, such as any Cape Dune Mole Rat and Pole Cat, will be local in extent, in that it will not have a significant effect on regional or national populations. **Table 8-4** below provides recommendation measures for the above impact.

Table 8-4: Loss of faunal habitat and red data species

<table>
<tr><th colspan="10">Faunal impacts</th></tr>
<tr><td colspan="2">Potential Impact</td><td colspan="8">Recommended Mitigation</td></tr>
<tr><td colspan="2">Loss of habitat and red data species</td><td colspan="8">• All construction activities must be carried out according to the generally accepted environmental best practice and the temporal and spatial footprint of the power plant must be kept to a minimum. In particular, care must be taken in the vicinity of the sandy fynbos vegetation community and existing roads must be used for access.
• All ‘High’ ecological habitats (Hopefield Sandy Fynbos) and associated buffer zones are to be avoided as far as possible. Offset mitigation may be required for high impact activities within these areas.
• The boundaries of the construction activity, including stockpiling areas, are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area. No activities are to infringe outside the designated construction footprint.
• Compile and implement a rehabilitation plan from the onset of the project.
• Rehabilitate areas as soon as they are no longer impacted by construction.
• The rehabilitated areas must be revegetated with indigenous vegetation Progressive rehabilitation will enable topsoil to be returned more rapidly, thus ensuring more recruitment from the existing seedbank. Surplus rehabilitation material can be applied to other others in need of stabilisation and vegetation cover.
• Any natural areas beyond the footprint of the PV solar plant, that have been disturbed, must be rehabilitated using indigenous plant species.
• Indigenous vegetation to be maintained under the solar panels to ensure biodiversity is maintained and to prevent soil erosion. Environmental Officer (EO) to provide supervision and oversight of vegetation clearing activities.
• Education and awareness campaigns on faunal species and their habitat are recommended to help increase awareness, respect and responsibility towards the environment for all staff and contractors.</td></tr>
<tr><th colspan="10">Construction Phase</th></tr>
<tr><td colspan="2">Probability</td><td colspan="2">Duration</td><td colspan="2">Extent</td><td colspan="2">Magnitude</td><td rowspan="2">Significance (without mitigation)</td><td rowspan="2">Significance (with mitigation)</td></tr>
<tr><td>without</td><td>with</td><td>without</td><td>with</td><td>without</td><td>with</td><td>without</td><td>with</td></tr>
</table>

5	3	3	3	1	1	8	4	**6o (high)**	**24 (medium)**
Operational Phase									
Probability		Duration		Extent		Magnitude		Significance (without mitigation)	Significance (with mitigation)
without	with	without	with	without	with	without	with		
5	3	1	1	1	1	8	4	**50 (medium)**	**18 (low)**

7.2 Spread of alien vegetation

Any disturbances of the indigenous vegetation communities within the study site will provide opportunity for alien invasive species encroachment. This will result in the negative impact on the functionality of the vegetation community within the study site. Alien species generally out-compete indigenous species for water, light, space and nutrients as they easily adapt in changing environmental conditions and with this special adaptation, they have they easily invade a wide range of ecological niches (Bromilow, 2010). Alien invader plant species pose an ecological threat as they alter habitat structure, lower biodiversity variation and quality of species, change nutrient cycling and productivity and modify food webs (Zedler, 2004). Some alien plants were noted within the study site, therefore disturbances may result in proliferation. However, the spread of alien plants may be cured provided an Alien Invasive Programme is implemented.

Additionally, given that the study site is modelled as situated with three (3) CBA 1 Subcategories (namely: terrestrial, wetland and river), this implication suggests that the degradation of vegetation due to the development of the PV project is likely to impact on the conservation targets of the study area. Coupled with the verification of the presence of sensitive Hopefield Sand Fynbos, the impact significance of the project is anticipated to be high should vulnerable vegetation communities be lost due to proliferation of opportunistic alien invasive plants.

Table 8-5: Alien vegetation

Alien Vegetation	
Potential Impact	**Recommended Mitigation**
Spread of alien vegetation	• In accordance with the requirements of the National Environmental Management: Biodiversity Act (10/2004): Alien and Invasive Species Regulations, the Applicant/Contractor must ensure Alien invasive species and noxious weeds are effectively controlled by implementing a site specific Alien Invasive Eradication Programme. • Vegetation clearing should be kept to a minimum, and this should only occur where it is absolutely necessary and the use of a brush-cutter is highly preferable to the use of earth-moving equipment. • Rehabilitate all disturbed areas as soon as the activities associated with mining are completed within the study site. • Ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm and this can be achieved through provision of appropriate awareness to all personnel.

	• Construction activities must not be conducted within sensitive habitats. • The location of the site office and Contractor's camp must be situated outside environmental sensitive areas in agreement with the ECO.

Site Establishment Phase									
Probability		Duration		Extent		Magnitude		Significance (without mitigation)	Significance (with mitigation)
without	with	without	with	without	with	without	with		
5	3	1	1	1	1	8	4	**50 (medium)**	**18 (low)**
Operation Phase									
Probability		Duration		Extent		Magnitude		Significance (without mitigation)	Significance (with mitigation)
without	with	without	with	without	with	without	with		
5	3	3	3	1	1	6	4	**5o (medium)**	**18 (low)**

7.3 Direct faunal and avifaunal impacts

Activities involving the clearing/harvesting of natural vegetation will result in the loss of faunal species. Faunal diversity within all habitat units have been negatively impacted as a result of historic and on-going disturbances associated with agricultural activities and general anthropogenic activities. It is not envisaged that any Red data species will be present on the site and thus directly impacted. The proposed project may lead to a further loss of faunal diversity. During the operation phase, a further loss of faunal diversity and ecological integrity will occur due to the increase in human activity and potential poaching.

However, in terms of impacts on avifauna, PV plants generally pose significant impacts which include the following:

- **Displacement of bird species due to habitat transformation**. Habitat transformation is likely to result from vegetation clearance of the development site in preparation for the installation of PV panels and associated infrastructure. The displacement of bird species could either be completely or partially (reduced densities) due to resulting habitat loss, it is highly likely that reduced avifaunal densities and possible changes in densities and composition favouring grassland species will manifest itself at the proposed PV facility due to the altered vegetation structure. In addition, raptors are also likely to be impacted by the habitat transformation, as it will result in reduced prey availability and accessibility.
- **Mortality of priority bird species due to collision with solar panels-** This impact refers to collision-related fatality resulting from the direct contact of the bird with a project structure(s). This type of fatality has been occasionally documented at solar projects of all technology types. In some instances, the bird is not killed outright by the collision impact, but succumbs to predation later, as it cannot avoid predators due to its injured state. Birds that are likely to be impacted include the Lanner Falcon and Cisticola.

Table 8-6: Direct faunal and avifaunal impacts

Direct faunal impacts	
Potential Impact	**Recommended Mitigation**

Direct faunal and avifaunal impacts	• Any bird nests that are found during the construction period must be reported to the Environmental Control Officer (ECO). • A 200m solar panel free buffer zone must be implemented around dams, wetlands, and drainage lines. • All internal medium voltage lines must be marked with Eskom approved Bird Flight Diverters according to the latest official Eskom Engineering Instruction. • No trapping or hunting of fauna and avifauna is to take place. Access control must be implemented to ensure that no illegal trapping or poaching takes place. • Any fauna threatened by the construction activities should be removed safely by an appropriately qualified environmental officer or removal specialist. • It is recommended that the speed limit of 30km/hr is implemented on all roads within the study area during all phases in order to minimise risk to fauna from vehicles. • Should any Red Data faunal species be noted within the project area, these species must be relocated to similar habitats within the vacant land with the assistance of a suitably qualified Ecologist. • Any fauna directly threatened by the mining activities must be removed to a safe location by the ECO or qualified Ecologist. • All staff and contractors must undergo an environmental induction course held by the ECO as well as faunal education and awareness programmes. • Any holes/deep excavations must done in a progressive manner on a needs basis only. No holes/excavations may be left open overnight. In the event holes/excavations are required to remain open overnight, these areas must be covered to prevent fauna falling into these areas and subsequently inspected prior to backfilling. • Where possible, work should be restricted to one area at a time and be systematic. This is to reduce the number and extent of on-site activities, allowing fauna to move off as the Project progresses. This will give the smaller birds, mammals and reptiles a chance to weather the disturbance in an undisturbed zone close to their natural territories. • Considering that some of the mammal fauna recorded within the project area are nocturnal, no construction activity is to occur at night.

Site Establishment Phase									
Probability		Duration		Extent		Magnitude		Significance (without mitigation)	Significance (with mitigation)
without	with	without	with	without	with	without	with		
5	3	1	1	5	5	8	4	**75 (very high)**	**30 (medium)**
Operation Phase									
Probability		Duration		Extent		Magnitude		Significance (without mitigation)	Significance (with mitigation)
without	with	without	with	without	with	without	with		
5	3	3	3	5	5	8	4	**80 (Very high)**	**36 (medium)**

7.4 Direct impacts on watercourses and habitat

Based on the proposed location of the mining activity, the project may have negative impacts, albeit to a lesser extent, on the wetland associated with the Sout River. These impacts include, but not limited to alteration of surface and subsurface flows, increase is pollutants and potentially sedimentation. For example, waste from blasting or excavations activities and use of hazardous chemicals could result in these substances entering and polluting wetland habitat, either directly through surface runoff during rainfall events, or via subsurface water movement. An increase in pollutants will lead to changes in the water quality of the wetland and affecting its ability to harbour aquatic biota. As such, mitigation measures are therefore key to limiting these impacts.

Table 8-7: Impacts on watercourses and habitat

Impacts on watercourses and habitat	
Potential Impact	**Recommended Mitigation**
Deterioration of watercourse health and loss of functionality	• Construction phase related activities are modelled to have a medium to high level of significance even after implementation of mitigation measures, as such these necessitate that the project pursue water use authorisation. • Unauthorised access of vehicles through the any identified watercourses is strictly prohibited as it may result in adverse impacts on the hydrology and soil structure of these areas; • All activities must be conducted outside the recommended buffer width for the wetland. • The recommended buffer width, which aims to protect areas of ecological importance and high sensitivity, must be considered as no-go areas and accordingly incorporated into the final design layout of the project. • Emergence contingence plans must be readily available on site and training of contactors and employees must be carried out regularly on how to manage spills, leaks and other impacts to the aquatic systems; • All soil and stockpiles must be placed outside the wetland habitat. • Any soil contaminated by hydrocarbons (fuel and oils) must be removed and the affected area rehabilitated immediately. • Chemical toilets must be provided to workers during the establishment phase. A single chemical toilet must be provided for every 10 employees. • Chemical toilets must be serviced regularly by a registered service provider and waybills must be retained as proof of servicing. • Fuel must be stored in a bunded structure with a roof. The bund must be able to contain at least 110% of the volumes of fuel. • Mixing and/or decanting of all chemicals and hazardous substances must take place on a tray, shutter boards or on an impermeable surface. • Drip trays must be utilised at all dispensing areas. • A chemical spill kit must be present onsite at all times and once used it must be disposed of at a registered hazardous landfill site. **Stormwater Management Recommendations** • The stormwater management plan must be designed such that unpolluted water is confined to a clean water system and water from dirty areas (stockpiles,

	construction area etc.) in confined to a dirty water system. The two systems must be kept separate. • The dirty water system must be designed, constructed, maintained and operated such that it is not likely to spill into any clean water system more than once in 50 years. • The entire dirty area must be bunded.

Site Establishment Phase									
Probability		Duration		Extent		Magnitude		Significance (without mitigation)	Significance (with mitigation)
without	with	without	with	without	with	without	with		
5	3	1	1	1	1	8	6	**50 (medium)**	**18 (low)**
Operation Phase									
Probability		Duration		Extent		Magnitude		Significance (without mitigation)	Significance (with mitigation)
without	with	without	with	without	with	without	with		
5	3	2	1	2	1	8	6	**60 (high)**	**24 (medium)**

8 Conclusions

Infield assessment was conducted on 2nd November 2023 to verify the presence of Red Data listed species and Species of Conservation Concern (SCC). With regards to vegetation, findings from the infield assessment determined that the vegetation type overlaying the study area is primarily characterised by two vegetation communities: (i) Hopefield Sandy Fynbos (FFd 3) and (ii) Secondary Grassland. Contrary to datasets interrogated for the study site which modelled the presence of Swartland Shale Renosterveld (FRs 9), this vegetation type was not confirmed during the assessment. The Hopefield Sandy Fynbos vegetation type has been assigned a provincial threat status of **Vulnerable** and is considered as **Hardly Protected** in terms of protection status. Evaluation of the Hopefield Sandy Fynbos determined that the vegetation community has an ecological sensitivity that is categorised as High.

Given that the study is categorised as located with a Critical Biodiversity Area, this implies that any degradation of vegetation resulting from the development of the PV project is likely to impact negatively on conservation targets.

Although infield assessment was unproductive with regards to finding plants of conservation significance, the following plants have a high potential of occurrence within the study site: Leucadendron foedum, Leucospermum rodolentum, Aspalathus ternata, Leucospermum hypophyllocarpodendron, Metalasia capitata, Phylica harveyi, Serruria decipiens, S. fucifolia, A plant search and rescue must be conducted by an ecological specialist prior to vegetation clearance to earmark any protected plants that maybe located along the development footprint.

In terms of watercourses within the study area, the proposed development occurs within sub-quaternary catchment No. 8287 identified as a non-prioritised catchment which means it is not critical for the conservation of aquatic resource. One (1) prioritised FEPA wetland (Unit ID 227888) was identified within the 500m regulated area. The wetland is classified a floodplain wetland along the Sout River. The Sout River is a system with ephemeral flows, located within Reach Code G10L. No further assessments were undertaken with regards to Present Ecological State (PES) and Ecological Important and Sensitivity (EIS) of watercourses.

According to distribution maps, six (6) terrestrial mammals may potentially occur within the proposed study area (Skinner and Chimimba 2005). Infield assessment did not highlight the presence of any Red Data fauna. A majority of the species may been displaced due to increased anthropogenic disturbances relating to agricultural activities and increased vehicular traffic within the study area.

With regards to avifauna, only six (6) bird species were classified as a Red Data species with the 3300_1820 pentad. These include: Lanner Falcon, Blue Crane, Greater Flamingo, Great White Pelican and Black Stock. Some of the bird species may have home ranges close to the West Coast National Park which is situated within the 10km radius of the study site. However no Red Data bird species were encountered during the survey, the majority of avian species recorded during the site visit were those often associated with human dwellings and have generalist habitat and dietary requirements. These are mainly granivorous (seed eating) species and "exploiters" of human areas such as Guineafowls this likely due to anthropogenic disturbances that are taking place within the study site. In general, PV plants generally pose significant impacts which include, but not limited to, the following:

(i) displacement of bird species due to habitat transformation and (ii) mortality of priority bird species due to collision with solar panels.

Low reptile diversity was recorded in the study site primarily due to impacts related to anthropogenic disturbances within the general study area (these are compounded by agricultural activities and increase of alien plants). No Red Data reptile species are modelled as present within the study area. Only two sightings of dead Cape Mole Snake were made during the assessment.

Therefore, after considering the above findings, it is anticipated that the proposed PVC plant will have significant negative impacts on the Hopefield Sand Fynbos vegetation community and birds within the study site. However, should mitigation measures presented in this report be accurately and effectively implemented, the proposed project can be considered acceptable.

All recommended mitigation measures must be included in the EMPr in order to effectively mitigate negative impacts associated with the project.

Kindly contact the undersigned specialist using the contact details provided below for comments or queries pertaining to this report.

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Appendices

Appendix A: Study Methodology

10 METHODOLOGY

10.1 Flora

The flora assessment consisted of two complementary approaches:

- The assessment commenced in 02 November 2023 with a desktop study during which data related to the study area was collected and studied using existing literature, maps and aerial photography and Geographical Information Systems (GIS). During the desktop exercise, floral species and vegetation types of conservation significance with a potential to be affected by the proposed project were identified before field verification. A broad-level desktop analysis was carried out using the following available information:
  - Latest and historic Imagery (Google EarthTM).
  - Aerial photography shapefiles.
  - South African Vegetation Map (Mucina and Rutherford, 2006).
  - 5m Elevation Contours (Surveyor General).
  - Pretoria Computerised Information System (PRECIS).
  - South African National Biodiversity Institute (SANBI) Threatened Species Programme (TSP).
- Infield data was collected in November 2023 during a site survey conducted over two days. A walk through survey was carried out where different habitat units were identified prior to analysis of the composition of floral species. A species inventory list was compiled for each habitat unit. The species list was compared to the expected "benchmark" vegetation to provide an indicator of the ecological integrity and conservation value of each habitat unit.

10.2 Fauna

The presence of observed mammals and indicators (such as spoors and stool) were recorded during a field visit conducted 02 November 2023. The assessment was carried out during the day, no night surveys were conducted. Emphasis was made with regards to determining habitats that may potentially support faunal species. Animal calls, burrow traps and visual observation are some of the methods that were used to establish the presence of faunal inhabitants.

It is improbable that all faunal species could have been identified due to the behaviour (and consequently the availability) of some species being subject to seasonal changes. Breeding and foraging patterns amongst faunal species are determined by the season.

10.3 Avifauna

Desktop analysis to determine birds associated with the habitat systems was carried out using the following:

- Southern African Bird Atlas Project from the University of Cape Town.
- The Eskom Red Data book of birds of South Africa, Lesotho and Swaziland (Barnes, 2000).

Infield investigation was carried out in November 2023. A 10x42 Bushnell Waterproof Binocular was used to visually observe bird species. Bird calls and feathers were also used to identify species associated with the study site. Where required, Sasol Birds of Southern Africa (Sinclair et al. 2002) was used to verify certain bird species.

10.4 Reptiles

The reptile assessment was carried out by examining the habitat types associated with the presence of reptiles. Reptiles were identified by examining burrows, rocky ridges and kopjes. A list of reptiles potentially occurring within the study area was compiled from a Southern African distribution list.

10.5 Risk Assessment and Recommendations

Following the completion of the terrestrial ecological assessment, a risk assessment was conducted and recommendations were developed to address and mitigate impacts associated with the proposed housing development and related activities. These recommendations also include general 'best practice' management measures, which apply to the development and related activities as a whole, and which are presented in the report. Mitigation measures have been developed to address issues in all phases throughout the life of the operation including planning, construction and operation. The detailed site-specific mitigation measures are outlined in Section 6 of this report.

10.6 Impact assessment

Finally, considering the outcome of the above-mentioned assessments, the potential impacts that the proposed development could have during the construction and operational phases of the activity were investigated. Where possible, mitigation and / or management measures were proposed to limit the impact of the proposed development on wetland and other aquatic ecosystems. Rehabilitation or enhancements measures were also recommended where necessary.

Impact rating was carried out for the identified impacts. Different aspects of the impacts, outlined below, can affect the rating. These include the following:

- **Extent**– the area over which the impact will be experienced.
- **Intensity**– the magnitude of the impact in relation to the sensitivity of the receiving environment.
- **Duration**– the time frame for which the impact will be experienced.
- **Probability**– the likelihood of the impact occurring.

The different levels under each of the above aspects that were used in the impacts description are discussed in Section 6 of the report.

Appendix B: Specialist Declaration

Specialist Declaration

I, **Ntandokazulu Kumalo** declare that:

- 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 form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Signature of the specialist:

Date: 06 February 2024

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