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TCE Africa
RENEWABLE ENERGY CONSULTANTS

TERRESTRIAL BIODIVERSITY IMPACT: FAUNA & FLORA

PROPOSED PAARDEVLEI SOLAR IN WESTERN CAPE

DOCUMENT CONTROL

Project title	Terrestrial Biodiversity Impact Assessment for the Proposed Paardevlei Solar Project in the Western Cape, South Africa
Report reference	PSF/ECO1123 (FINAL)
Document prepared for	JG Afrika (Pty) Ltd
Document prepared by	MORA Ecological Services (Pty) Ltd
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SPECIALIST INFORMATION AND LEGAL REQUIREMENTS

National Environmental Management Act, 1998 (Act No. 107 of 1998) and Environmental Impact Regulations 2014 (as amended) Requirements for Specialist Reports (Appendix 6):

The details of -	
○ the specialist who prepared the report; and	Page 7
○ the expertise of that specialist to compile a specialist report including a curriculum vitae;	Page 7
A declaration that the specialist is independent in a form as may be specified by the competent authority;	Page 10
An indication of the scope of, and the purpose for which, the report was prepared;	
○ An indication of the quality and age of base data used for the specialist report;	Page 17
○ A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Page 50
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Page 17
A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Page 17
Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Page 41 & 50
An identification of any areas to be avoided, including buffers;	Page 56
A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Page 41
A description of any assumptions made and any uncertainties or gaps in knowledge;	Page 12
A description of the findings and potential implications of such findings on the impact of the proposed activity, or activities;	Page 41
Any mitigation measures for inclusion in the EMPr;	Page 57
Any conditions for inclusion in the environmental authorisation;	
Any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Page 57
A reasoned opinion-	
○ whether the proposed activity, activities or portions thereof should be authorised;	Page 57
○ regarding the acceptability of the proposed activity or activities; and	Page 57
○ if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Page 57

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SPECIALIST DETAILS, CURRICULUM VITAE AND DECLARATION

The surveys and site assessments were undertaken by suitably qualified field specialists of MORA Ecological Services (Pty) Ltd. The report was drafted by Mokgatla Jerry Molepo, a competent Environmental specialist and Director of MORA Ecological Services (Pty) Ltd.

Curriculum vitae

EDUCATION:

- MSc Zoology, Nelson Mandela University (Percy FitzPatrick Institute of African Ornithology Centre of Excellence)

Research Project Topic: Foraging behaviour and thermal physiology in Cape Sugarbirds: sex-specific responses to temperature.

- BSc Honours in Zoology, University of Limpopo

Research Project Topic: Morphometrics and plumage variation in the South African Fiscal flycatcher *Sigelus silens* Shaw 1809.

- BSc Botany & Zoology, University of Venda
- Grade 12, Marobathota High School

CERTIFICATES:

- SASS5 Aquatic Biomonitoring, GroundTruth
- Hydropedology and Wetland Functioning, Terra Soil Science & Water Business Academy
- Section 21 (c) & (i) Water Use Authorisation Training, Department of Water and Sanitation
- Basic Project Management, Hudisa Business School

PROFESSIONAL MEMBERSHIP:

- South African Council for Natural Scientific Professions (SACNASP) – Professionally registered as Professional Natural Scientist. **Registration number:** 009509
- British Ecological Society (BES). **Membership number**: 1010709
- Zoological Society of Southern Africa (ZSSA). **Membership number**: 691

WORK EXPERIENCE:

- MORA Ecological Services (Pty) Ltd: April 2018 – Current, I am an Environmental Specialist, and my duties include; (i) Conducting Biodiversity, Aquatic Impact Assessments, Rehabilitation (ii) Compilation of specialist reports.
- Arcus Consulting: May - November 2017, I was a subcontracted avifaunal surveyor for the proposed Highlands Wind Energy Farm, Somerset East, Eastern Cape.

- Centre for African Conservation Ecology (ACE), Nelson Mandela University: 2015 - 2016, I was a field guide/ environmental educator. Responsibilities: taking school learners on trial walks inside the Nelson Mandela University Nature Reserve.
- South African National Biodiversity Institute (SANBI): May – December 2014, I was a Zoological Systematics Technician. Responsibilities: (i) Insect identification and curation, and (ii) compiling the animal checklist of South Africa, (iii) Sourcing wildlife crime reports on endangered animals and plants for Barcode of Wildlife Project, (iv) Monitoring the bird population in the Botanical Garden.
- Department of Zoology, University of Venda: 2009 – 2013, I was a Research Assistant under Dr. T.C Munyai who was conducting a long-term research project which monitored the effects of climate change on biota and processes influencing ecosystem functioning and species diversity patterns.
- Percy FitzPatrick Institute of African Ornithology: March – April 2014, I was a Research Assistant under Dr. Rita Covas' Sociable Weaver Research Project. This is a long-term study which looks at the reproductive success of Sociable weavers at Benfontein Nature Reserve in Kimberley.

Relevant projects list

Year	Project	Location:	Role(s)
2022	Avifaunal Impact Assessment for the proposed 132kV for Musina-Makhado Special Economic Zone North Site	Musina, Limpopo	Avifaunal Specialist/Ornithologist
2022	Avifaunal Impact Assessment for the proposed Khauta PV Solar including 44kV and 132kV Powerline	Welkom, Free State	Avifaunal Specialist/Ornithologist
2022	Avifaunal Impact Assessment for the proposed NAOS PV Solar including 132kV Powerline	Free State	Avifaunal Specialist/Ornithologist
2022	Preconstruction Avifaunal Assessment for the proposed Lichtenburg PV Solar including 132kV Powerline	Lichtenburg, North West	Avifaunal Specialist/Ornithologist
2022	Preconstruction Botanical Assessment for the proposed Lichtenburg PV Solar including 132kV Powerline	Lichtenburg, North West	Ecologist

2022	Biodiversity Assessment, Land Capability and Veld Condition Assessment for PPC Cement SA Slurry	Slurry, North West	Ecologist
2021	Avifaunal Impact Assessment for the proposed Upington-Aries 2x 400kV	Upington, Northern Cape	Avifaunal Specialist/Ornithologist
2021	Habitat Assessment Post Rehabilitation for PPC Cement SA Dwaalboom Factory	Dwaalboom, Limpopo	Ecologist
2021	Habitat Assessment Post Rehabilitation for Gibson Bay Wind Energy Farm	Humansdorp, Eastern Cape	Ecologist
2021	Wetland Rehabilitation for the sewer pipeline construction in Daveyton	Ekurhuleni East College Campus, Daveyton, Gauteng	Wetland Ecologist
2021	12 Months Wetland Rehabilitation Supervision for Ekangala Ext F Waterborne Sanitation Project	City of Tshwane Metropolitan Municipality, Ekangala, Gauteng	Aquatic Ecologist

DECLARATION BY THE SPECIALIST

I, Mokgatla Jerry Molepo, 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;

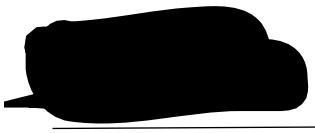
• I will comply with the Act, Regulations and all other applicable legislation;

• 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 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist

MORA Ecological Services (Pty) Ltd

Name of Company

23 November 2023

Date

INTRODUCTION & BACKGROUND

The “applicant” (i.e., the City of Cape Town) is proposing the construction of a Solar Photovoltaic (PV) & Battery Energy Storage System (BESS) on City-owned vacant land within Somerset West, known as Paardevlei. Somerset West is located within the Helderberg District of the City of Cape Town municipal area, southwest coast of South Africa. Briefly, associated infrastructures are an overhead powerline and substation, which comprises land portions owned by the City of Cape Town: Energy Directorate (80 Ha) and the City of Cape Town (Human Settlements Department) (72 Ha) (Figure 1). Solar developments and associated infrastructure can require large tracts of land and currently, South Africa is one of the favourable environments for the development of solar power plants. One of the main critical benefits of developing power plants is that it is renewable, inexhaustible, and requires minimal maintenance. The exponential interest in developing solar plants needs to, however, be sustainable.

The preparation of the Paardevlei Solar PV Facility & BESS project falls under the framework of support where, C40 Cities Finance Facility (CFF)[1] , engages primary and secondary cities worldwide to mobilise financial resources for transformative actions, which significantly reduce their Green House Gas emissions and build climate resilience.

The proposed Paardevlei Solar PV Facility & BESS project will be a 30 to 60 MW facility on City owned land portions (with a total extent of 152 ha) connected directly to an existing 132 kV switching station located near to the site (refer to Figure 1) and owned to the City of Cape Town. Construction is planned to start in the 1st quarter of 2026.

Figure 1: Proposed development layout plan.

Comprehensive list of associated Infrastructure:

The following additional infrastructure is proposed in support of the proposed Paardevlei Solar PV Facility & BESS project.

- Access roads: proposed to use existing roads to access the PV plant and to add internal roads to access the PV Arrays.
- Underground cabling (between and from the PV modules) to tie into inverters and then to switchgears and transformers as well as connection with the proposed BESS and ultimately all will be connected to the new PV plant substation.
- Overhead or underground powerline to connect the PV plant substation to the existing network 132 kV switching station.
- New PV plant substation (to connect to the existing network 132 kV switching station).

MORA Ecological Services (Pty) Ltd was requested by the appointed Environmental Assessment Practitioners, i.e., JG Afrika, hereafter referred to as the "EAP" to conduct a terrestrial biodiversity impact assessment towards their pursuit of obtaining a decision from the Department of Forestry, Fisheries and the Environment (DFFE) for the proposed Solar PV, overhead powerline and substation construction rights by means of transforming land. The current scope entails fauna and flora specialist studies.

Specialist studies are essential for obtaining the requisite environmental authorisations for the proposed project. This report, therefore, after consideration and the description of the ecological integrity of the proposed development area, should guide the EAP, regulatory authorities and the applicant, by means of the presentation of results and recommendations, as to the ecological viability of the proposed development activities.

REPORTING REQUIREMENTS

According to the Protocol for Specialist Assessment and Minimum Reporting Content Requirements for Environmental Impacts on Terrestrial Biodiversity (GN R. 320 of 2020) and Terrestrial Animal and Plant Species (GN R. 1150), before starting a specialist assessment, the current land use and potential environmental sensitivity of the site must be confirmed through a site sensitivity verification, as identified by the screening tool. The results of this screening tool, combined with the site sensitivity verification, determine the minimum content required in the report. If the site sensitivity verification shows a 'low' sensitivity, contrary to the screening tool's designation of 'very high' or 'high', a

Compliance Statement must be submitted. However, if the site sensitivity verification aligns with the screening report's findings, a comprehensive Terrestrial Biodiversity Impact Assessment must be included in the Application for Environmental Authorisation (EA).

TERMS OF REFERENCE

Considering the requirements of national legislation and the Species Environmental Assessment Guideline (GN R. 320 of March 2020 and GN R1150 of 30 October 2020), the purpose of this report is to make provision of substantial information in advising the outcome of the application with respect to the ecological viability of the proposed Solar Photovoltaic (PV) Facility & Battery Energy Storage System (BESS) project. The objectives of this report are, therefore, to:

- Describe the baseline receiving environment;
- Identify and describe terrestrial plants and animal species sensitivities within the area and the manner in which these sensitive receptors may be impacted upon;
- Identify priority ecological, botanical and faunal features within the proposed boundaries such as species that are either protected (TOPS and PNCO) or considered threatened (CR, EN, VU) on the South African Red Data List;
- Assess the SEI of the proposed project boundary with the use of the sensitivity analysis outlined in the Species Environmental Assessment Guideline (SANBI, 2020);
- Evaluate the extent of site-related impacts;
- Conduct a risk assessment for the proposed development footprint of preference; and
- Provide Specialist prescription of mitigation measures and recommendations for identified risks.

ASSUMPTIONS, LIMITATIONS, UNCERTAINTIES AND GAP ANALYSIS

The following limitations should be noted for this assessment:

- The findings, results, observations, conclusions and recommendations provided in this report are based on the author’s best scientific and professional knowledge as well as available information regarding the potential impacts of Solar PV, overhead power line and substation construction on the terrestrial environment;

- The assessment of impacts was based on the current state of the primary receiving environment at the time of the assessment;
- For a terrestrial impact assessment, surveys were conducted during the spring season and in summer i.e. on 22 September, 07 October and 06 December 2023. Report findings of this assessment should suffice for obtaining the requisite environmental authorisations. However, the developer should appoint a Specialist to conduct a preconstruction walkthrough prior to site establishment;
- This assessment includes only plants, mammals (excluding bats), amphibians and reptiles. It does not include birds and bats. A separate avifaunal specialist was conducted. Similarly, the bat specialist study should be conducted independently by an experienced Bat Specialist.
- Despite these limitations, a comprehensive desktop study was conducted, in conjunction with the detailed results from the surveys, and as such, there is a high level of confidence in the information provided.

PROJECT AREA

The proposed development area for the Solar PV, overhead powerline and substation construction is shown in Figure 2 below. The delineated development footprint is located in the Western Cape Province of South Africa, within the City of Cape Town Metropolitan Municipality, Ward 83. The Western Cape Province is the fourth largest of the nine provinces in South Africa, covering an area of 129 449 square kilometers. Geographically, the Western Cape Province falls near the coastline, bordering the Indian and Atlantic oceans. For ease of spatial reference, the central geographic coordinates of the Paardevlei boundary are 34° 4'29.28"S (latitude) and 18°47'47.63"E (longitude). The proposed boundary can be accessed either using the N2 national route, west of Somerset Ridge, or the R102 highway. The proposed Paardevlei Solar and BESS Project area is 152 Ha.

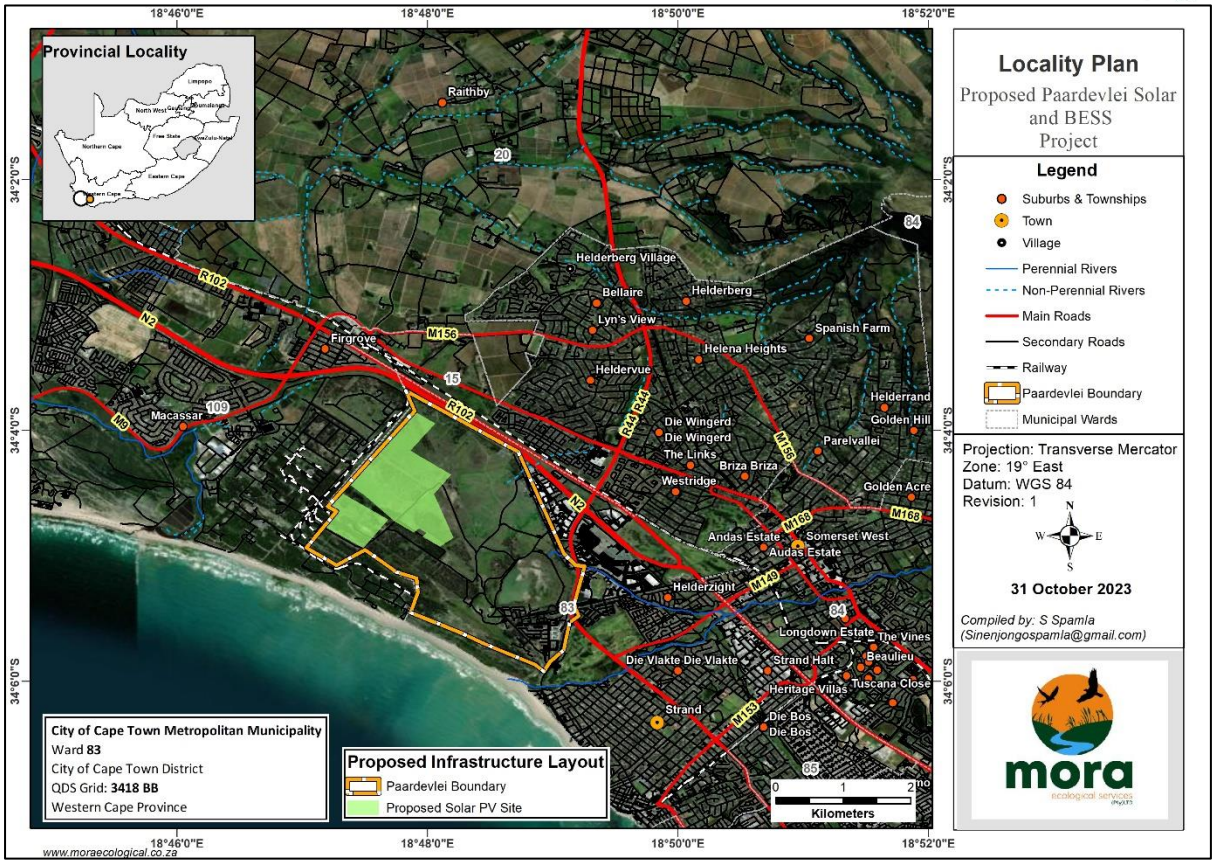


Figure 2: Project area location map relative to South Africa

KEY LEGISLATIVE REQUIREMENTS

International law and conventions

The importance of sustainable development and the protection of environmental resources have globally become a driving factor in the construction of new legislation governing industrial practices and their impact on the environment. South Africa has signed and ratified several global treaties, protocols and conventions, agreeing to implement the policies, which endorse sustainable development and promote a positive environmental legacy for future generations. A considerable international convention to which South Africa agrees within signatory is namely the Convention on Biological Diversity (CBD). The CBD is notably the key international convention for sustainable development. The CBD has three main objectives which lead and encourage a sustainable future. These are:

- The conservation of biological diversity;
- The sustainable use of its components; and
- The fair and equitable sharing of the benefits from the use of genetic resources.

The convention covers all possible domains that are directly or indirectly related to biodiversity and its role in development, ranging from science, politics and education to agriculture, business and culture.

South African Constitution

The foundation of South Africans Environmental law is set in the Constitution of the Republic of South Africa (1996), specifically "Chapter 2- The Bill of Rights: section 24". This has allowed for the rapid development of environmentally based legislations which guard, enforce and guide all parties to maintain the human rights granted in the Constitution. These rights include:

- The right to an environment that is not harmful to their health or well-being; and
- To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

National Environmental Management Act (NEMA), as amended

The National Environmental Management Act (NEMA), Act 107 of 1998 is the fundamental environmental legislation which aims to strengthen the rights granted in the South African Constitution. The NEMA Act is the foundation of environmental law in South Africa and has set the framework for additional legislation to build on. The Act establishes principles for decision-making on environmental matters, as well as providing motive for institutions which promote cooperative governance, and which can coordinate environmental action plans. Section 2(4) specifies that sustainable development requires the consideration of all relevant factors. In the regard to biodiversity and South Africa's ecological integrity, development should not result in the disturbance of ecosystems and loss of biological diversity, if not possible, these effects must be minimised and remedied. A low-risk, cautious approach should always be applied, considering limits of current knowledge concerning consequences and actions. Always anticipate possible negative impacts on the environment and people's environmental rights, identified impacts should be prevented and where they cannot be altogether prevented, are minimised and mitigated. Outlined NEMA principles regarding biodiversity are to:

- Prevent pollution and ecological degradation
- Promote conservation; and
- Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

National Environmental Management of Biodiversity Act (NEMBA)

The National Environmental Management of Biodiversity Act (NEMBA) Act 10 of 2004 was designed to provide a management and conservation outline for biological diversity, as drafted under the NEMA. NEMBA focuses on the management and conservation of biodiversity, with its relevant components, which includes the use of indigenous biological resources in a sustainable manner, the fair and equitable sharing of benefits arising from bio-prospecting, cooperative governance in biodiversity management and conservation within the structures of NEMA. The Act, in protecting biodiversity, deals with the protection of threatened ecosystems and species, the control of alien invasive species, genetically modified organisms and regulates bio-prospecting. As with NEMA, NEMBA incorporates and gives effect to international agreements relating to biodiversity. The Act gives the Minister of Forestry, Fisheries and the Environment the power to categorise any process or activity in a listed ecosystem, as a threatening process, thereafter, be regarded as an activity contemplated in Section 24(2) (b) of NEMA which states that: Specified activities may not be commenced without prior authorisation from the Minister or MEC and specify such activities. NEMBA is the most prominent statute containing provisions directly aimed at the conservation of Threatened or Protected Species Regulations, February 2007 (TOPS Regulations). The NEMBA Regulations on Threatened or Protected Species (TOPS, 2007) lists all of the species (including avian) that are threatened with extinction and therefore, nationally protected under an approach to sustainable use and development. Periodically, Red Data books are published, and the data used to update these lists of protected species.

Additionally, NEMBA regulates all invasive organisms in South Africa, including a wide range of fauna and flora. Chapter 5 of the Act relates to species and organisms posing a potential threat to biodiversity. The purpose of Chapter 5 is:

- To prevent the unauthorized introduction and spread of alien species and invasive species to ecosystems and habitats where they do not naturally occur;
- To manage and control alien species and invasive species to prevent or minimize harm to the environment and to biodiversity in particular;
- To eradicate alien species and invasive species from ecosystems and habitats where they may harm such ecosystems or habitats;

According to Section 65 of the Act, "Restricted activities involving alien species":

- A person may not carry out a restricted activity involving a specimen of an alien species without a permit issued in terms of Chapter 7.

Restricted activities include the following:

- Importing into the Republic, including introducing from the sea, any specimen of a listed invasive species.
- Having in possession or exercising physical control over any specimen of a listed invasive species.
- Growing, breeding or in any other way propagating any specimen of a listed invasive species, or causing it to multiply.
- Conveying, moving, or otherwise translocating any specimen of a listed invasive species.
- Selling or otherwise trading in, buying, receiving, giving, donating, or accepting as a gift, or in any other way acquiring or disposing of any specimen of a listed invasive species.
- Spreading or allowing the spread of any specimen of a listed invasive species.
- Releasing any specimen of a listed invasive species.

Conservation of Agricultural Resources Act (Act No. 43 of 1983)

In terms of the amendments to the regulations under this Act, landowners are legally responsible for the control of invasive alien plants on their properties. The schedules provide a list of declared weeds and invaders, which have been divided into three categories, as follows:

- Category 1 plants are prohibited and must be controlled.
- Category 2 plants (commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread.
- Category 3 plants (ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading there of, except within the flood line of watercourses and wetlands.

The Convention on the Conservation of Migratory Species of Wild Animals (CMS)

The Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention) aims to conserve terrestrial, aquatic and avian migratory species throughout their range. It is an intergovernmental treaty, concluded under the aegis of the United Nations Environment Programme, concerned 22 with the conservation of wildlife and habitats on a global scale. Since the Convention's entry into force, its membership has grown steadily to include 117 (as of 1 June 2012)

Parties from Africa, Central and South America, Asia, Europe and Oceania. South Africa is a signatory to this convention.

The African-Eurasian Waterbird Agreement (AEWA)

The African-Eurasian Waterbird Agreement. The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) is the largest of its kind developed so far under the CMS. The AEWA covers 255 species of birds ecologically dependent on wetlands for at least part of their annual cycle, including many species of divers, grebes, pelicans, cormorants, herons, storks, rails, ibises, spoonbills, flamingos, ducks, swans, geese, cranes, waders, gulls, terns, tropic birds, auks, frigate birds and even the South African penguin. The agreement covers 119 countries and the European Union (EU) from Europe, parts of Asia and Canada, the Middle East and Africa.

METHODS

Methodology

Prior to conducting field assessments, a comprehensive literature review of available published and unpublished literature pertaining to the current use of the land and the potential environmental sensitivity of the site was conducted. Site visits were conducted at the beginning of the growing season i.e., September 2023 and in summer i.e., October and December 2023. Site visits were undertaken as all necessary in-field procedures - in assessing the overall terrestrial biodiversity and species composition within the study area. The survey was conducted by competent fieldworkers of MORA Ecological Services (Pty) Ltd, i.e., two senior ecologists (Pr. Sci. Nat.) and an assistant (Junior Specialist, Cand. Sci. Nat). Surveys were conducted on the development footprint area (Figure 2) and the survey time daily was from 08h00 am until 16h00 pm, daily. Due to the extensive surface area of the proposed development footprint, the field survey was conducted over a 5-day period, in an attempt to not miss any important species on site. Figure 3 below is a photographic representation of the development footprint area. Additional images of the receiving environment are shown in Appendix B.

Figure 3: Photographic representation of the assessed development footprint.

Terrestrial assessment

Geographic Information Systems (GIS) Mapping

Existing data layers were incorporated into a GIS software to establish how the proposed project might interact with any ecologically important entities. The guideline provides a spatial overview of threatened ecosystems and guidance on mitigating biodiversity impacts from the different phases of the proposed activity.

Botanical assessment

Vegetation units, flora species composition, plant sensitivity and habitat types

The main objective of the flora assessment was an ecological assessment of habitat types as well as the identification of any Red Data species within the area footprint. Additionally, recording both native and invasive species, identifying sensitive plant communities such as those on rocky outcrops, along riparian zones, or in areas with conservation-priority species, and determining current land use. The survey involved both driving and walking through the project area, and analyzing sample plots to identify the dominant species, any invasive species, and potential species of conservation concern.

The fieldwork methodology included the following techniques;

- A visual inspection of the study area was done before surveys were conducted.
- Different habitat types were identified on site on a broader scale prior to commencing with the sampling.
- During the process of identifying the different habitat types, homogenous vegetation units were identified and subsequently surveyed on foot and by vehicle in order to determine the floristic composition of each unit.
- A plotless sampling method was used to record data.
- Species identification was done following reputable checklists and field guides.
- Identification of floral red-data species.
- Where necessary, plant material was collected and/or photographs taken of specimens for identification purposes.

Each plot was sampled until no new species were found. The vegetation communities were then described based on the dominant species in each type, mapped, and assigned a sensitivity score. The desktop study entailed the use of the Vegetation of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006).

Faunal assessment (Mammals, Reptiles, Amphibians and Invertebrates)

The faunal assessment was done mainly on a desktop level, supported by on-site observations. On-site observations entailed the following:

- Being attentive to animal sounds and calls on site.
- Identifying foot track patterns on site.
- During the daytime, when the sun is at its peak, scouted for basking fauna species. Paying special attention to rocky layers.
- Recording opportunistic encounters.

No faunal trapping or any other quantitative field species data capturing was, however, conducted due to time and budgetary constraints. A cross reference with available habitats of the study area was also conducted in order to establish the faunal potential on site. In assessing species occurrence, their approximate distribution and habitat requirements were firstly considered. Therefore, only animal groups for which distribution data are available have been considered in this assessment.

The desktop study entailed the use of the Animal Demographic Units (ADU) Virtual Museum tool. The ADU is a research unit of the University of Cape Town in the Biological Sciences Department. The ADU

was initiated with the mission to understand animal populations, especially population dynamics, and therefore provide inputs to their conservation. The ADU Virtual Museum is designed to allow Citizen Science inputs for effectively achieving mass participation projects, long-term ecological monitoring, innovative statistical modelling and population-level interpretation of results. Currently, it has achieved approximately 16 million dated and georeferenced records of fauna species.

The ADU was used to identify presence of the following animal groups:

- Mammals
- Reptiles
- Amphibians
- Invertebrates

Additionally, the iNaturalist online social network was used to acquire both flora and fauna species data for the proposed site.

Impacts assessment

The methodology for assessing the impact ratings is included as **Appendix A: Method of Environmental Assessment** at the end of this report. Potential impacts were evaluated against the data captured during the fieldwork to identify relevance to the project area, specifically the proposed Paardevlei Solar development footprint. Impacts were assessed in terms of the construction, operational, decommissioning, rehabilitation and closure phases. The operational phase refers to that phase of the project where the prospecting is being conducted and once complete, the decommissioning phase will begin.

It should be noted that the impacts described are not comprehensive, and more impacts may be identified at a later stage as more project specific information becomes available. Mitigation measures were only applied to impacts deemed relevant based on the impact analysis. The rating rankings for assessing impacts significance are shown in **Table 1**.

Table 1: Impact rating scoring used.

Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.

Points	Impact significance rating	Description
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive effects.

RISK ASSESSMENT & RECOMMENDATIONS

The aim of conducting a risk assessment is to identify the impacts that the current activity, as well as that of the operational phase of which the proposed project will have on the receiving terrestrial environment. If avoidance is not possible, recommendations and practical mitigation measures are mandatory. Only Low Risk Activities located within the regulated area of the receiving environment will qualify for the proposed project. Considering the proposed project, buffer zones were suggested that mitigation techniques will be advised to ensure that threats are kept to a minimum.

RECEIVING ENVIRONMENT

Protected and Conservation Areas

The definition of protected areas used in specialist reports follows the definition of a protected area as defined in the National Environmental Management: Protected Areas Act (Act 57 of 2003). Chapter 2 of the National Environmental Management: Protected Areas Act, 2003 sets out the "System of Protected Areas", which consists of the following kinds of protected areas:

- Special nature reserves;
- National parks;
- Nature reserves;
- Protected environments (1-4 declared in terms of the National Environmental Management: Protected Areas Act, 2003);
- World heritage sites declared in terms of the World Heritage Convention Act;
- Marine protected areas declared in terms of the Marine Living Resources Act;
- Specially protected forest areas, forest nature reserves, and forest wilderness areas declared in terms of the National Forests Act, 1998 (Act No. 84 of 1998); and
- Mountain catchment areas declared in terms of the Mountain Catchment Areas Act, 1970 (Act No. 63 of 1970).

The proposed development area is in proximity of the following protected and conservation area:

1. Helderberg Marine Protected Area

The Helderberg Marine Protected Area (MPA) is a relatively small (24.6 square kilometres) conservation area declared with the aim of protecting marine biodiversity and to enable the integrated management of the marine ecosystem. The Helderberg Marine Protected Area is located south-east of the proposed development footprint and on the north-eastern side of False Bay in the Western Cape province of South Africa. The south-eastern edge of the Helderberg MPA is approximately 967 meters from the proposed Solar PV site.

Vegetation

The proposed development footprint falls on the Fynbos Biome (Figure 4). The Fynbos Biome is South Africa's plant biodiversity hotspot, and is home to a total of six endemic avifauna species. The Fynbos Biome is relatively 85 000 kilometres square in size and is dominated by small leaved and evergreen shrubs that have the ability to regenerate through fire.

Within the Fynbos biome, the proposed development footprint falls mainly on the following vegetation types:

- Boland Granite Fynbos (FFg 2) – Endangered
- Cape Flats Dune Strandveld (FS 6) – Endangered
- Cape Flats Sand Fynbos (FFd 5) – Critically Endangered

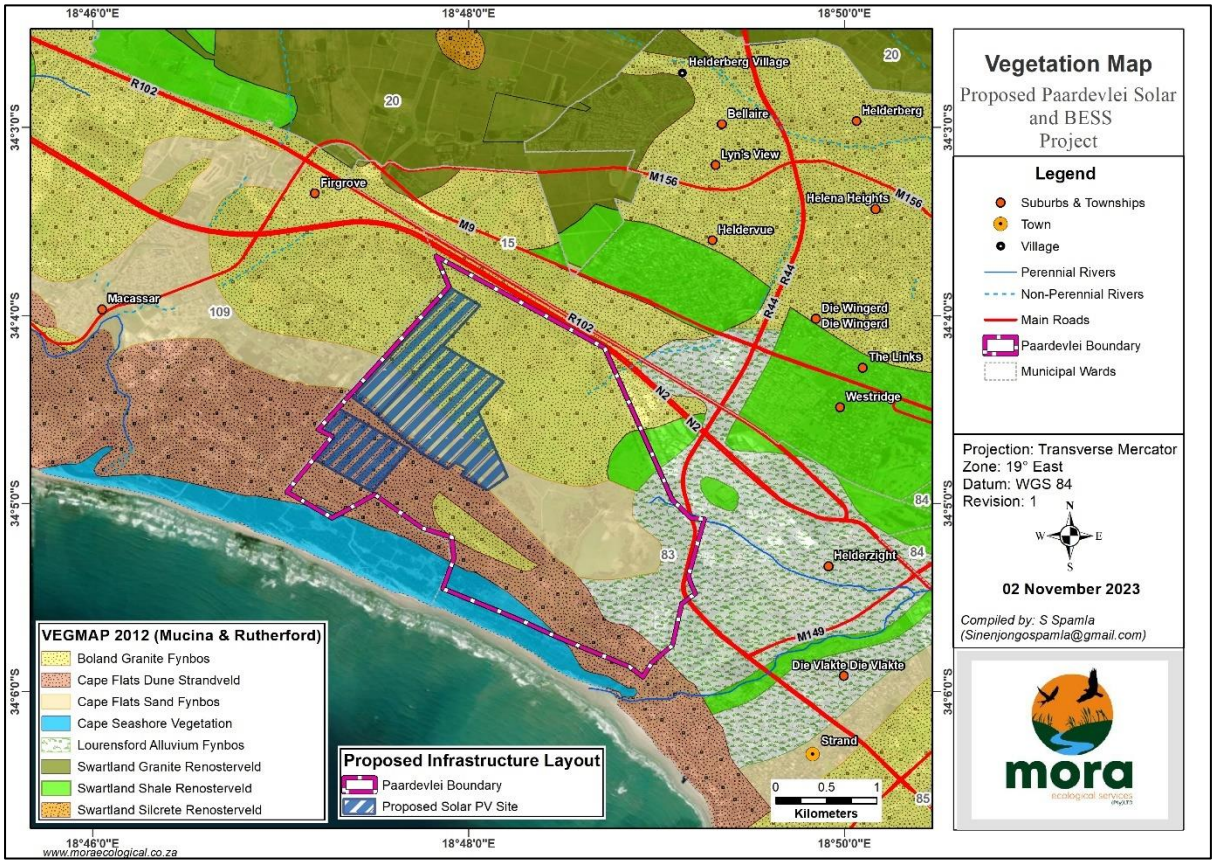


Figure 4: Vegetation map of the proposed development site.

Climate

The study area falls within a Mediterranean climate region, characterised by strong rainfalls during winter. The mean annual precipitation (MAP) of the Fynbos Biome is 480 mm and the maximum and minimum temperatures approximate 28.7°C and –8.9°C (Mucina and Rutherford, 2006).

DESKTOP ASSESSMENT

Flora assessment

Mucina and Rutherford (2006) were consulted at desktop level to understand the habitat types and flora species composition, especially quantifying the presence of Red Data or species of conservation importance with the proposed prospecting area. This assessment considered all vegetation types that will be impacted by the proposed Solar Photovoltaic (PV) Facility & Battery Energy Storage System (BESS) development. Important taxa species in each vegetation type are as follows:

Important taxa occurring in the Boland Granite Fynbos (FFg 2) vegetation type is as follows:

Small Trees:

Protea nitida (d), Brabejum stellatifoliumT, Heeria argenteaT, Leucospermu conocarpodendron subsp. viridum, Podocarpus elongatus.

Tall Shrubs:

Cliffortia cuneata (d), Diospyros glabra (d), Euclea racemosa subsp. racemosaT (d), Leucadendron rubrum (d), Olea europaea subsp. africanaT (d), Protea neriifolia (d), P. repens (d), Putterlickia pyracantha (d), Rhus angustifolia (d), R. laevigataT (d), Cassine schinoides, Chrysanthemoides monilifera, Cliffortia phillipsii, Cunonia capensis, Dodonaea viscosa var. *angustifolia, Euryops abrotanifolius, Gymnosporia buxifolia, Halleria lucidaT, Maytenus acuminataT, Montinia caryophyllacea, Myrsine africana, Passerina corymbosa, Podalyria myrtillifolia, Protea burchellii, Rapanea melanophloeosT, Rhus glaucaT, R. lucidaT, R. tomentosaT, Wiborgia obcordata*

Low Shrubs:

Anthospermum aethiopicum (d), Berzelia lanuginosaW (d), Brunia nodiflora (d), Cliffortia ruscifolia (d), Elytropappus rhinocerotis (d), Erica muscosa (d), E. plukenetii subsp. plukenetii (d), Eriocephalus africanus var. africanus (d), Helichrysum teretifolium (d), Leucadendron salignum (d), Osmitopsis asteriscoidesW (d), Salvia lanceolata (d), Agathosma imbricata, A. serpyllacea, Aspalathus bracteata, A. elliptica, A. lebeckioides, Cliffortia dentata, Clutia pubescens, Erica abietina subsp. aurantiaca, E. hispidula, E. imbricata, E. sphaeroidea, Eriocephalus africanus var. paniculatus, Euclea tomentosaT, Euphorbia genistoides, Euryops thunbergii, Helichrysum zeyheri, Hermannia cuneifolia, H. scabra, Leucadendron daphnoides

Succulent Shrubs:

Aloe perfoliata, Antimima granitica, Lampranthus spiniformis, Tetragonia spicata

Woody Climbers:

Asparagus scandens, Microloma sagit tatum, Secamone alpini, Zygophyllum sessilifolium

Semiparasitic Shrub:

Thesium funale

Herbs:

Annesorhiza macrocarpa, Corymbium scabrum, Galium mucroniferum, Gazania ciliaris, Helichrysum crispum, Knowltonia vesicatoria, Lichtensteinia obscura, Mairia burchellii

Geophytic Herbs:

Aristea capitata (d), Pteridium aquilinum (d), Blechnum australe, Bobartia indica, Cyphia phyteuma, Lachenalia aloides, Lapeirousia corymbosa, Moraea galaxia, Oxalis bifida, Romulea hirsuta, Rumohra adiantiformis, Spiloxene serrata, Trachyandra filiformis, Wachendorfia paniculata, Watsonia borbonica subsp. borbonica, Zantedeschia aethiopica

Herbaceous Climber:

Cynanchum africanum

Graminoids:

Cymbopogon marginatus (d), Ehrharta calycina (d), E. villosa var. villosa (d), Elegia asperiflora (d), Ischyrolepis capensis (d), I. gaudichaudiana (d), Merxmuellera cincta (d), M.rufa (d), M. stricta (d), Restio filiformis (d), Tetraria fasciata (d), Aristida vestita, Cannomois virgata, Ehrhart ottonis, Eragrostis curvula, Ficinia indica, F. nigrescens, F. trichodes, Hyparrhenia hirta, Ischyrolepis sieberi, Neesenbeckia punctoria, Pentaschistis aristidoides, Platycaulosdepauperatus, Schoenoxiphium ecklonii, S. lanceum, Tetraria bromoides, T. burmannii, T. sylvatica, Themeda triandra, Willdenowia incurvata.

Endemic taxa occurring in the Boland Granite Fynbos (FFg 2) vegetation type is as follows:

Tall Shrub:

Leucospermum grandiflorum

Low Shrubs:

Aspalathus cephalotes subsp. cephalotes, A. stricticlada, Erica fausta, E. hippurus, E. lerouxiae, E. setosa, Leucospermum lineare, Lobostemon hottentoticus, Psoralea gueinzii, Pteronia centauroides, Serruriagracilis, Xiphotheca elliptica

Succulent Shrubs:

Erepsia lacera, Lampranthus leptaleon, L. rupestris, Oscularia paardebergensis

Herb:

Argyrolobium angustissimum

Geophytic Herbs:

Babiana noctiflora, Ixia cochlearis, Lapeirousia azurea, Watsoniaamabilis

Succulent Herb:

Conophytum turrigerum

Evidently, flora species data from Mucina and Rutherford (2006) indicate a higher diversity. Considering that a majority of the footprint and associated infrastructure occur on the Least Threatened Boland Granite Fynbos, the flora desktop assessment considers only FFg 2.

Important taxa occurring in the Cape Flats Dune Strandveld (FS 6) vegetation type is as follows:

Important Taxa Tall Shrubs:

Euclea racemosa subsp. racemosa (d), Metalasia muricata (d), Rhus glauca (d), Morella cordifolia, Nylandtia spinosa, Olea exasperata, Rhus crenata, R. laevigata, R. lucida.

Low Shrubs:

Chrysanthemoides monilifera (d), Cullumia squarrosa (d), Pterocelastrus tricuspidatus (d), Salvia africanalutea (d), Cassine peragua subsp. barbara, Chironia baccifera, Eriocephalus africanus var. africanus, E. racemosus, Helichrysum niveum, H. teretifolium, Lessertia fruticosa, Otholobium bracteolatum, Passerina paleacea, Phylica ericoides, Putterlickia pyracantha, Robsonodendron maritimum.

Succulent Shrubs:

Tetragonia fruticosa (d), Cotyledon orbiculata var. spuria, Euphorbia mauritanica, Jordaaniella dubia, Pelargonium fulgidum, Ruschia macowanii, Tylecodon grandiflorus, Zygophyllum flexuosum.

Woody Climbers:

Cissampelos capensis, Solanum africanum.

Semiparasitic Shrubs:

Osyris compressa, Thesidium fragile.

Semiparasitic Epiphytic Shrub:

Viscum capense.

Herbs:

Helichrysum crispum (d), Adenogramma glomerata, Arctotheca calendula, Cineraria geifolia, Galium tomentosum, Helichrysum litorale, Knowltonia capensis, Lyperia tristis, Nemesia versicolor, Senecio elegans, Ursinia anthemoides subsp. anthemoides, Zaluzianskya villosa.

Geophytic Herbs:

Babiana tubulosa var. tubiflora, Brunsvigia orientalis, Chasmanthe aethiopica, Geissorhiza exscapa, Trachyandra ciliata.

Succulent Herbs:

Carpobrotus acinaciformis, C. edulis, Conicosia pugioniformis subsp. pugioniformis, Senecio littoreus.

Herbaceous Climbers:

Astephanus triflorus, Cynanchum afri canum, C. obtusifolium, Didymodoxa capensis, Kedrostis nana.

Graminoids:

Ehrharta villosa var. villosa (d), Ischyrolepis eleocharis (d), Chaetobromus involucratus subsp. dregeanus, C. involucratus subsp. involucratus, Ehrharta calycina, Ficinia lateralis, F. ramosissima, F. secunda, Thamnochortus erectus, Willdenowia teres.

Endemic taxa occurring in the Cape Flats Dune Strandveld (FS 6) vegetation type is as follows:

Succulent Shrub: *Lampranthus tenuifolius.*

Important taxa occurring in the Cape Flats Sand Fynbos (FFd 5) vegetation type is as follows:

Tall Shrubs:

Metalasia densa, Morella cordifolia, M. serrata, Passerina corymbosa, Protea burchellii, P. repens, Psoralea pinnataW, PterocelastrustricuspidatusT , Rhus lucidaT , Wiborgia obcordata.

Low Shrubs:

Diastella proteoides (d), Diosma hirsuta (d), Erica lasciva (d), E. muscosa (d), Phylica cephalantha (d), Senecio halimifolius (d), Serruria glomerata (d), Stoebe plumosa (d), Anthospermum aethiopicum, Aspalathus callosa, A. hispida, A. quinquefolia subsp. quinquefolia, A. sericea, A. spinosa subsp. spinosa, A. ternata, Berzelia abrotanoides, Chrysanthemoides incana, Cliffortia eriocephalina, C. juniperina, C. polygonifolia, Erica articularis, E. axillaris, E. capitata, E. corifolia, E. ferrea, E. imbricata, E. mammosa, E. plumosa, E. pulchella, Eriocephalus africanus var. africanus, Galenia africana, Gnidia spicata, Helichrysum cymosum, Leucadendron floridum, L. salignum, Leucospermum hypophyllocarpodendron subsp. canaliculatum, Metalasia adunca, M. pulchella, Morella quercifolia, Passerina ericoides, Pharnaceum lanatum, Phylica parviflora, Plecostachys polifolia, P. serpyllifolia, Polpoda capensis, Protea scolymocephala, Serruria fasciflora, S. trilopha, Staavia radiata, Stilbe albiflora, Stoebe cinerea, Syncarpha vestita, Trichocephalus stipularis.

Succulent Shrub:

Crassula flava.

Herbs:

Berkheya rigida, Conyza pinnatifida, Edmondia sesamoides, Helichrysum tinctum, Indigofera procumbens, Knowltonia vesicatoria.

Geophytic Herbs:

Watsonia meriana (d), Aristea dichotoma, Geissorhiza tenella, Othonna heterophylla, Pelargonium longifolium, Wachendorfia paniculata, Zantedeschia aethiopicaW.

Succulent Herb:

Carpobrotus acinaciformis.

Herbaceous Climber:

Dipogon lignosus.

Graminoids:

Cynodon dactylon (d), Ehrharta villosa var. villosa (d), Elegia tectorum (d), Restio quinquefarius (d), Sporobolus virginicus (d), Thamnochortus erectus (d), Willdenowia incurvata (d), Calopsis impolita, Elegia juncea, E. microcarpa, E. nuda, Hordeum capense, Hypodiscus aristatus, Ischyrolepis capensis, I. paludosa, Juncus capensis, Restio bifurcus, R. micans, R. quadratus, Willdenowia sulcata, W. teres.

Endemic taxa occurring in the Cape Flats Sand Fynbos (FFd 5) vegetation type is as follows:

Low Shrubs:

Erica margaritacea (d), Aspalathus variegata (probably extinct), Athanasia capitata, Cliffortia ericifolia, Erica pyramidalisW, E. turgida, E. verticillata, Leucadendron levisanus, Liparia graminifolia, Serruria aemula, S. foeniculacea, S. furcellata.

Succulent Shrub:

Lampranthus stenus.

Geophytic Herb:

Ixia versicolor. Graminoids: Tetraria variabilis, Trianoptiles solitaria.

Alien and invasive plants

Invasive alien species have been identified as the second greatest driver of habitat destruction by outcompeting native biodiversity. Biological invasions have deleterious impact on water quality, microclimate, soil nutrients, agricultural economies, and fire regime, listing them amongst the most

prominent influencers of ecological change. Based on the desktop assessment, the jurisdiction of the proposed project area has high infestations in *Pinus pinaster*, *Hakea sericea* and *Acacia saligna* as photographically represented below in Figure 5.

Figure 5A: Invasive alien plant species noted to commonly occur in the proposed development area.

Based on site observations, the most commonly observed invasive alien plant species was the *Echium platagineum* (Patterson's curse), a Category 1b listed invasive species in South Africa. Figure 5B below is a photographic reference of the dominant weed on site.

Figure 5B: Dominant invasive alien plant species within the proposed development site.

Fauna assessment

Based on historical data of the Animal Demographic Units (ADU) Virtual Museum, the following fauna species occur on site:

Table 2: List of mammal, reptile, amphibian and invertebrate species from ADU Virtual Museum records using the 3418 BB Quarter Degree Square.

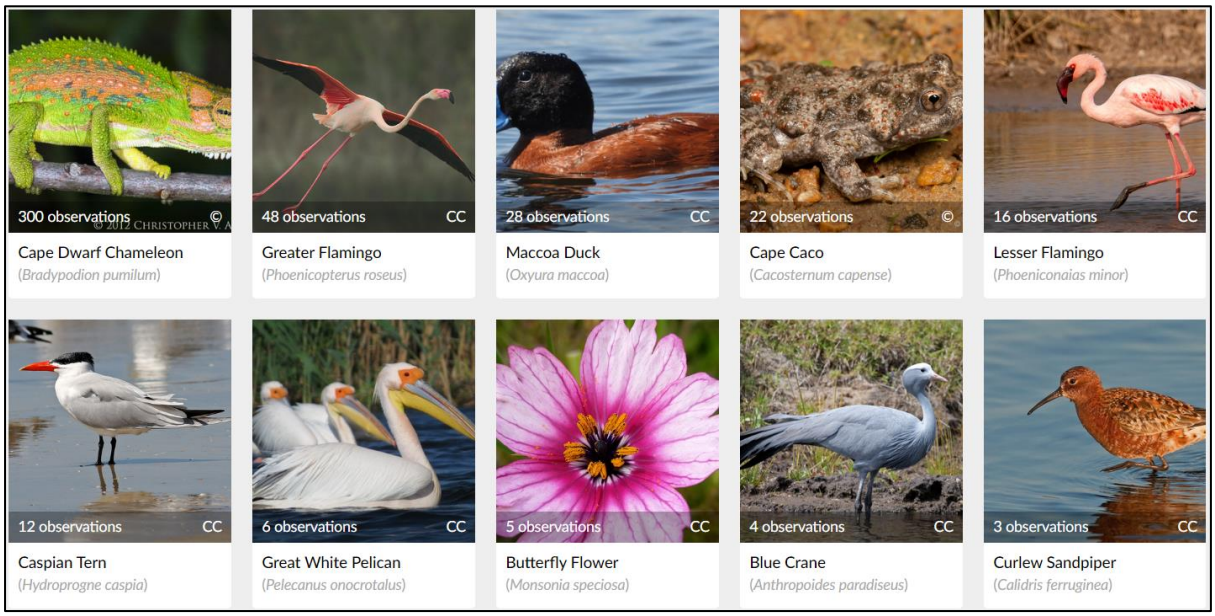
Mammals	Amphibians	Reptiles	Invertebrate
Rhabdomys pumilio	*Strongylopus grayii*	*Stigmochelys pardalis*	*Anax imperator*
Atilax paludinosu	*Sclerophrys capensis*	*Afrogecko porphyreus*	*Pseudagrion sp.*
Georychus capensis	*Hyperolius horstockii*	*Trachylepis capensis*	*Sympetrum fonscolombii*
Chrysochloris (Chrysochloris) asiatica	*Hyperolius marmoratus*	*Homopus areolatus*	*Trithemis arteriosa*
Rhabdomys pumilio	*Amietia fuscigula*	*Stigmochelys pardalis*	*Orthetrum capicola*
Atilax paludinosus	*Breviceps montanus*	*Pseudaspis cana*	*Orthetrum caffrum*
Herpestes pulverulentus	*Heleophryne purcelli*	*Agama atra*	*Crocothemis erythraea*
Genetta tigrina	*Arthroleptella villiersi*	*Bitis arietans arietans*	*Crocothemis sanguinolenta*
Sciurus carolinensis		*Trachylepis homalocephala*	
Canis mesomelas			
Lepus saxatilis			
Lepus capensis			
Crocidura flavescens			
Felis catus			
Hystrix africaeaustralis			

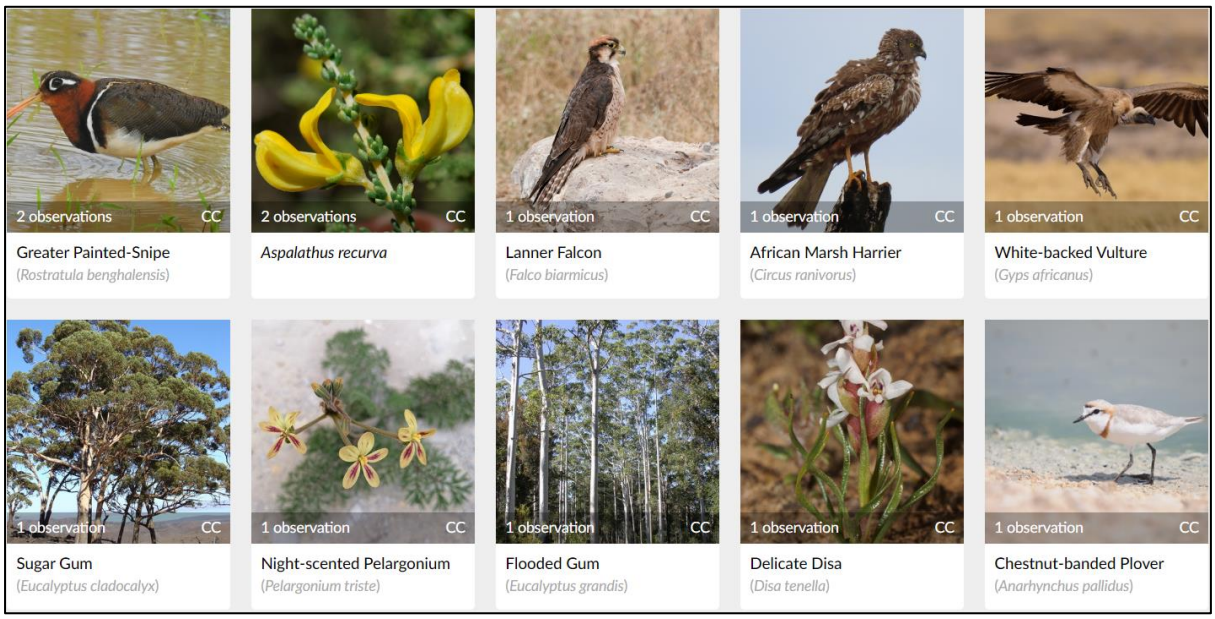
Other mammalia, reptile and amphibian historical species records and their Red Data and/or conservation status at desktop level are listed in Appendix C-E.

Species richness

Species information on the iNaturalist database showed a total of 4981 observations that have been previously captured, with 536 species of fauna and flora. The areas outside the development site are

highly diverse in species richness below are iNaturalist records of sensitive species within the project area.





Sensitivity of receiving environment

The DFFE screening tool was consulted using the proposed development layout boundaries. Table 4 is a summary of the development site environmental sensitivities and to explain the sensitivity rankings, Table 3 gives a detailed description of the site sensitivity ratings used in the screening tool. The terrestrial biodiversity (Figure 6 and 7) was classified as having a Very High Environmental Sensitivity and the Animal theme (Figure 8 and 9) as having a High Environmental Sensitivity. The Plant species category (Figure 10 and 11) is of Medium Environmental Sensitivity.

Table 3: Summary of DFFE screening tool outputs

Theme	Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity
Animal Species		X		
Plant Species			X	
Terrestrial Biodiversity	X			

Table 4: Site sensitivity ratings to species data in the screening tool

Sensitivity Rating	Description of Sensitivity Rating
Very high	Habitat for species that are endemic to South Africa, where all the known occurrences of that species are within an area of 10 km^2 is considered critical habitat, as all remaining habitat is irreplaceable. Typically, these include species that qualify under the CR, EN, or VU criteria of the IUCN or species listed as Critically/Extremely Rare under South Africa's National Red List Criteria. For each species reliant on a critical habitat, all remaining suitable habitat has been manually mapped at a fine scale.
High	Recent occurrence records for all threatened (CR, EN, VU) and/or Rare endemic species are included in the high sensitivity level. Spatial polygons of suitable habitat have been produced for each species by intersecting recently collected occurrence records (those collected since the year 2002) that have a spatial confidence level of less than 250 m with segments of remaining natural habitat. For birds, species distribution models (SDMs) and SABAP2 data (http://sabap2.birdmap.africa/) were combined to delineate the 'high' sensitivity areas
Medium	Medium Model-derived suitable habitat areas for threatened and/or rare species are included in the medium sensitivity level. Two types of spatial models have been included. The first is a simple rule-based habitat suitability model where habitat attributes such as vegetation type and altitude are selected for all areas where a species has been recorded to occur. The second is a species distribution model which uses species occurrence records combined with multiple environmental variables to quantify and predict areas of suitable habitat. The models provide a probability-based distribution indicating a continuous range of habitat suitability across areas that have not been previously surveyed. A probability threshold of 75% for suitable habitat has been used to convert the modelled probability surface and reduce it into a single spatial area which defines areas that fall within the medium sensitivity level.
Low	Low Areas where no species of conservation concern (SCC) are known or expected to occur.

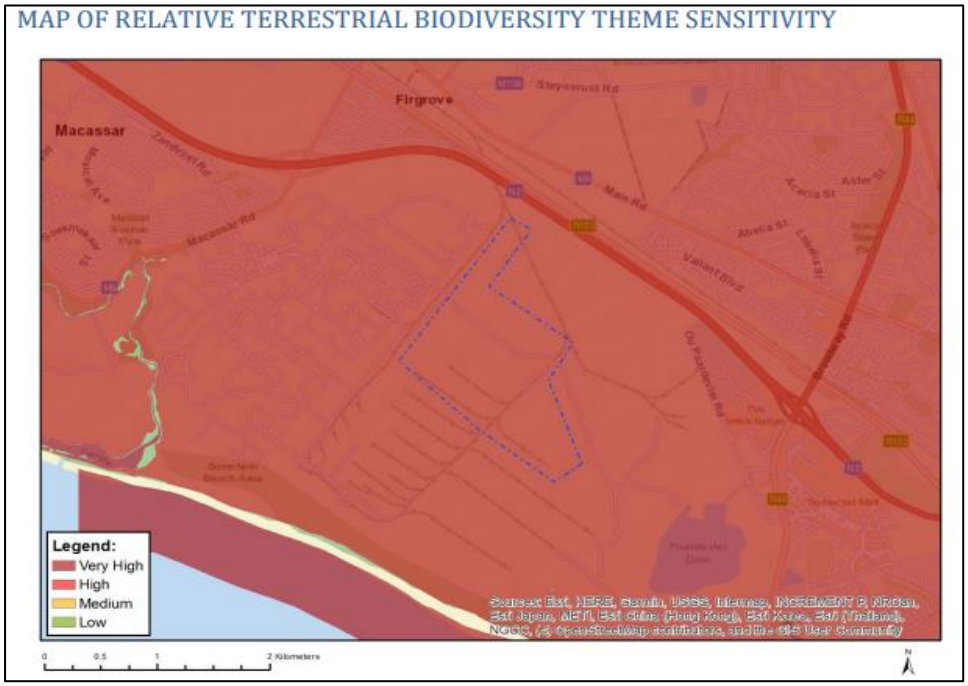


Figure 6: Terrestrial biodiversity sensitivity of Area 1 and 2

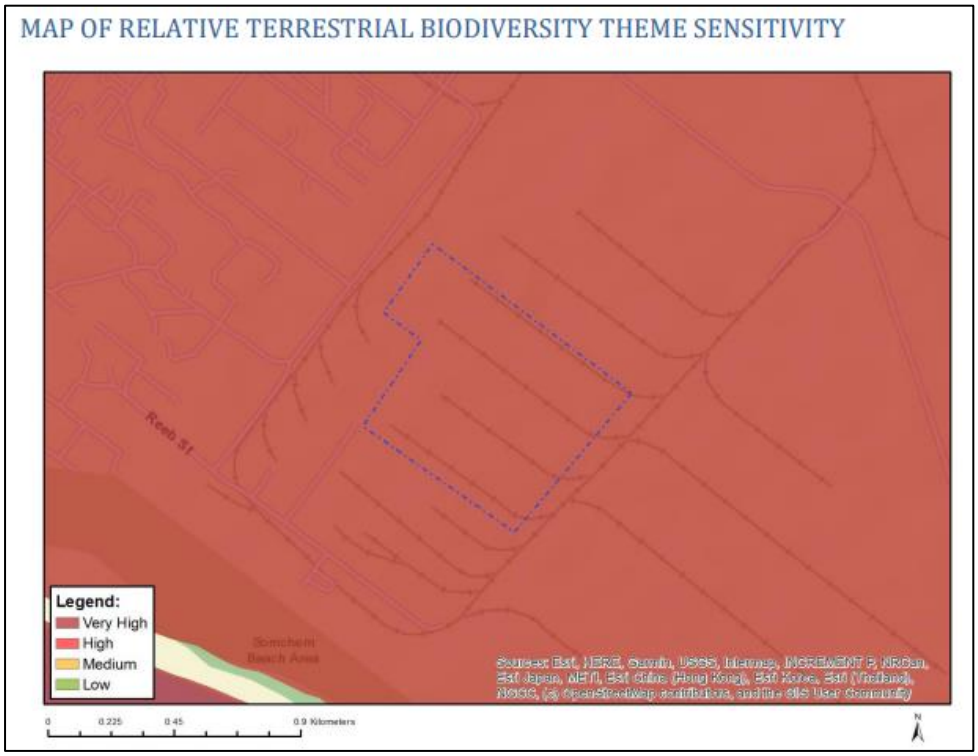


Figure 7: Terrestrial biodiversity sensitivity of Area 3

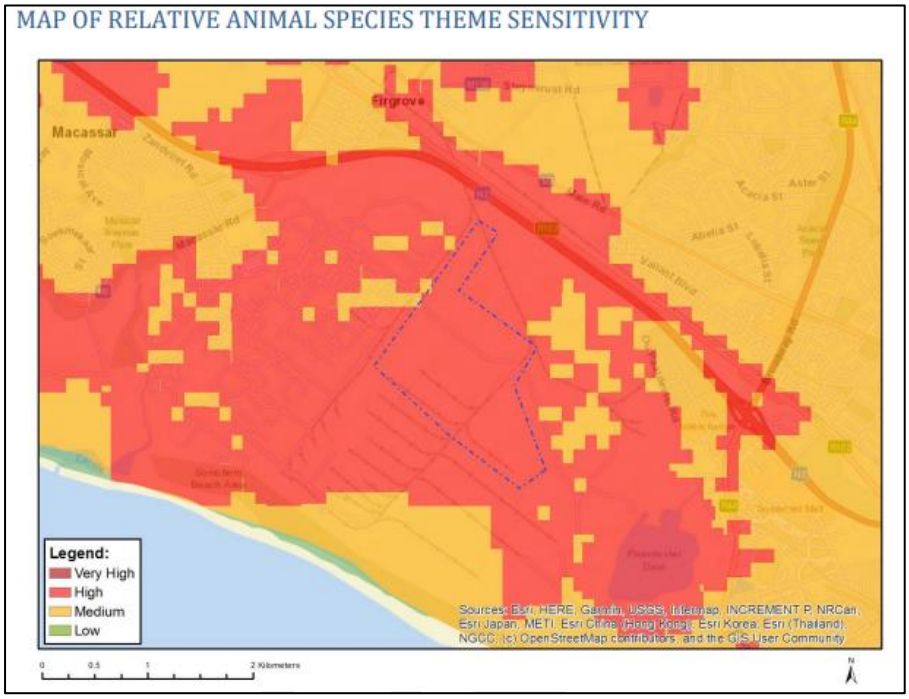


Figure 8: Animal sensitivity outcome of Area 1 and 2

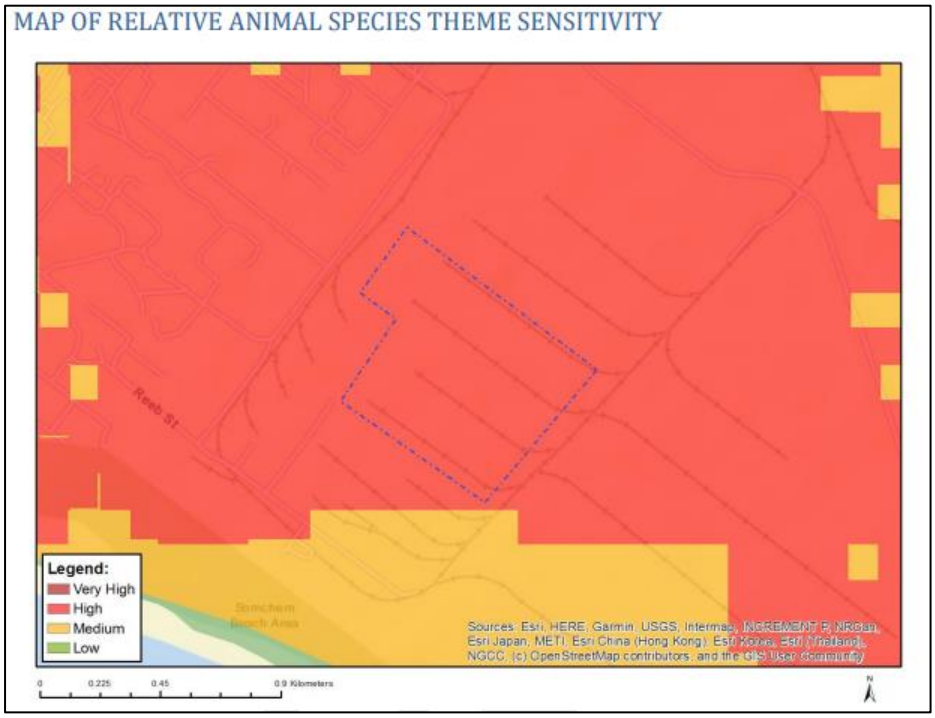


Figure 9: Animal sensitivity outcome of Area 3

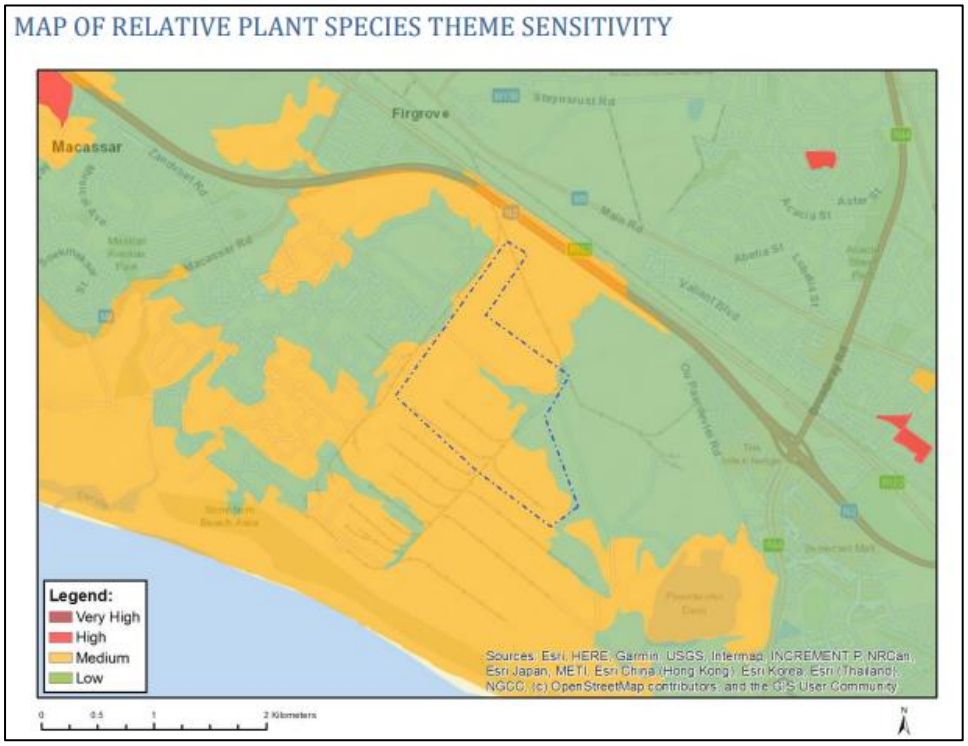


Figure 10: Plant species sensitivity outcome for Area 1 and 2

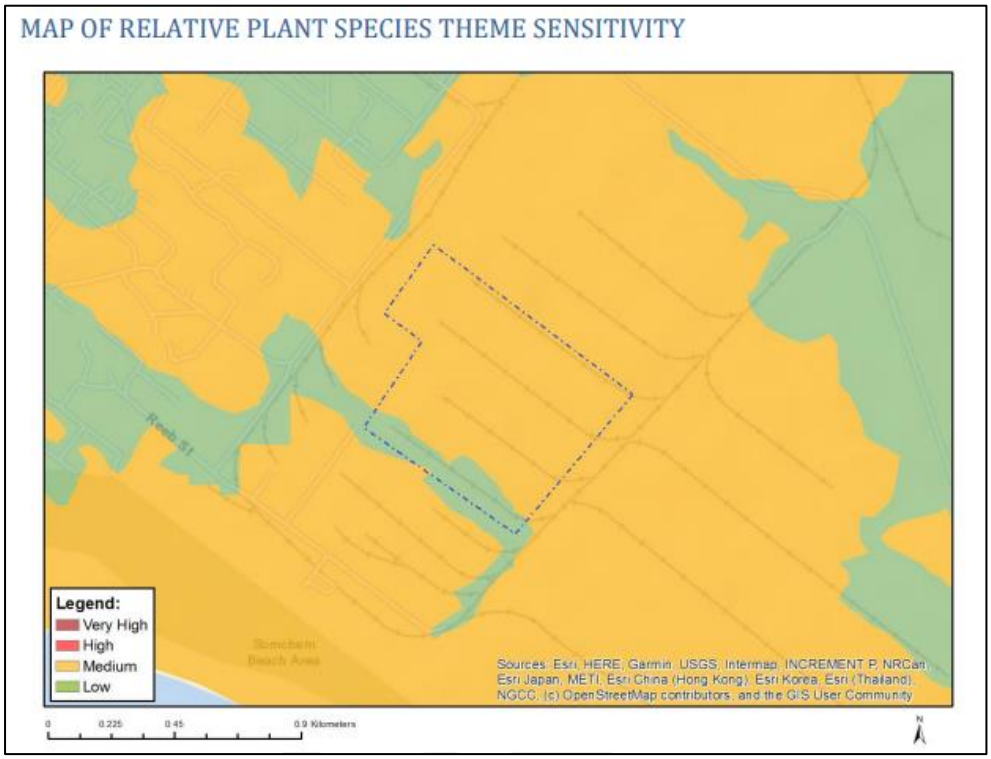


Figure 11: Plant species sensitivity outcome for Area 3

FIELD SURVEYS

Terrestrial assessment

Two broad vegetation units were identified during surveys. Both based on floristic differences of different topographical positions and natural habitat types.

- Vegetation Unit 1: Wetland vegetation (plant community)
- Vegetation Unit 2: Pasture (Fynbos)

Table 5: List of plant species recorded on site.

Scientific name	Common name	Conservation Status
Echium platagineum	*Patterson's curse	Least Concern (Category 1b)
Acacia saligna	*Port Jackson	Least Concern (Category 1b)
Hakea sericea	*Silky hakea	Least Concern (Category 1b)
Eucalyptus camaldulensis	*River red gum	Least Concern (Category 1b)
Nicotiana glauca	*Wild Tobacco	Least Concern (Category 1b)
Ipomoea purpurea	Common morning glory	Least Concern (Category 1b)
Typha capensis	Bulrush	Least Concern
Bolboschoenus maritimus	Sea club-rush	Least Concern
Eragrostis curvula	Cape Love Grass	Least Concern
Avena barbata	Yathero oat	Least Concern
Trifolium angustifolium	Narrow clover	Least Concern
Lagurus ovatus	Hare's tail	Least Concern (Weed)
Sparaxis bulbifera	Harlequin flower	Least Concern (Weed)
Arctotheca calendula	Capeweed	Least Concern (Weed)

*Alien.

Figure 12: Vegetation Unit 1: Wetland vegetation (plant community)

Vegetation Unit 1 is internally draining, therefore, creating a pond that influences the development of wetland vegetation. The plant species composition in Vegetation Unit 1 was mainly comprised of grasses, herbs, and wildflowers of the Fynbos Biome. The *Echium plantagineum*, commonly known as purple viper's-bugloss, and the *Argyrolobium angustissimum* (Endangered), commonly known as the Cape peaflower were plant species recorded as dominantly occuring in this region. As a result, the wetland areas must be conserved. The dominant grass species was the *Eragrostis capensis*. These records were confirmed to be correctly identified by the Specialist on iNaturalist (2023) and the Fynbos Western Cape Plant library.

Figure 13: Vegetation Unit 2: Pasture (Fynbos)

The grassland vegetation occupies the broader area of the development site and is on a lower slope, observed to be grazing land for cattle. The dominant plant species composition in Vegetation Unit 2 is the perennial Weeping love grass (*Eragrostis curvula*). As seen in Figure 13, the *Eragrostis curvula* can be grazed and it is often used as deferred pasture or alternatively made into hay.

Invasive Alien Plants

The development layout footprint is dominated by woody and herbaceous invasive alien plants. Woody species included *Pinus pinaster*, *Hakea sericea* and *Acacia saligna*, as expected, based on the desktop assessment. Herbaceous species included the encroachment of *Echium plantagineum* which was observed across all the grazing areas. Therefore, it should be well ensured that invasive alien plants are controlled prior to reaching the construction phase of the development. This will assist in reducing the propagation of these problematic species across the footprint area. Based on NEMBA and CARA legislation, it is the responsibility of the landowner to manage IAPs.

Fauna assessment

Only Springboks and domestic cattle were observed on site. No reptiles or amphibians were observed on site at the time of the assessment. It is recommended that seasonal fauna monitoring studies are implemented throughout the four stages of the proposed development. Due to the High Sensitivity outcome of the DFFE screening tool, **the development applicant should consider preconstruction walkdown surveys on the authorised footprint**. From a specialist's perspective, the high sensitivity outcome of the screening tool is attributed to the surrounding undisturbed natural environment and protected areas.

Table 6: List of faunal species recorded on site.

Scientific name	Common name	Conservation Status
Antidorcas marsupialis	Springbok	Least Concern

HABITAT ASSESSMENT & ECOLOGICAL IMPORTANCE

Although the vegetation types on a regional level are threatened, the site specific vegetation has been heavily transformed as shown on the habitat map (Figure 15). Areas where there is vegetation along watercourses should be treated as highly sensitive. Bare ground areas have low sensitivity, and the open grasslands have a low-medium sensitivity. The impact assessment, to follow in this report, is in consideration that all constructions are to occur on the low-medium and low sensitivity areas.


South West Elevation
47°NE (T) 34°4'47"S, 18°47'28"E ±4m 9m
Stockpile
Paardevlei Solar
06 Dec 2023, 10:59:34

Figure 14: Site conditions

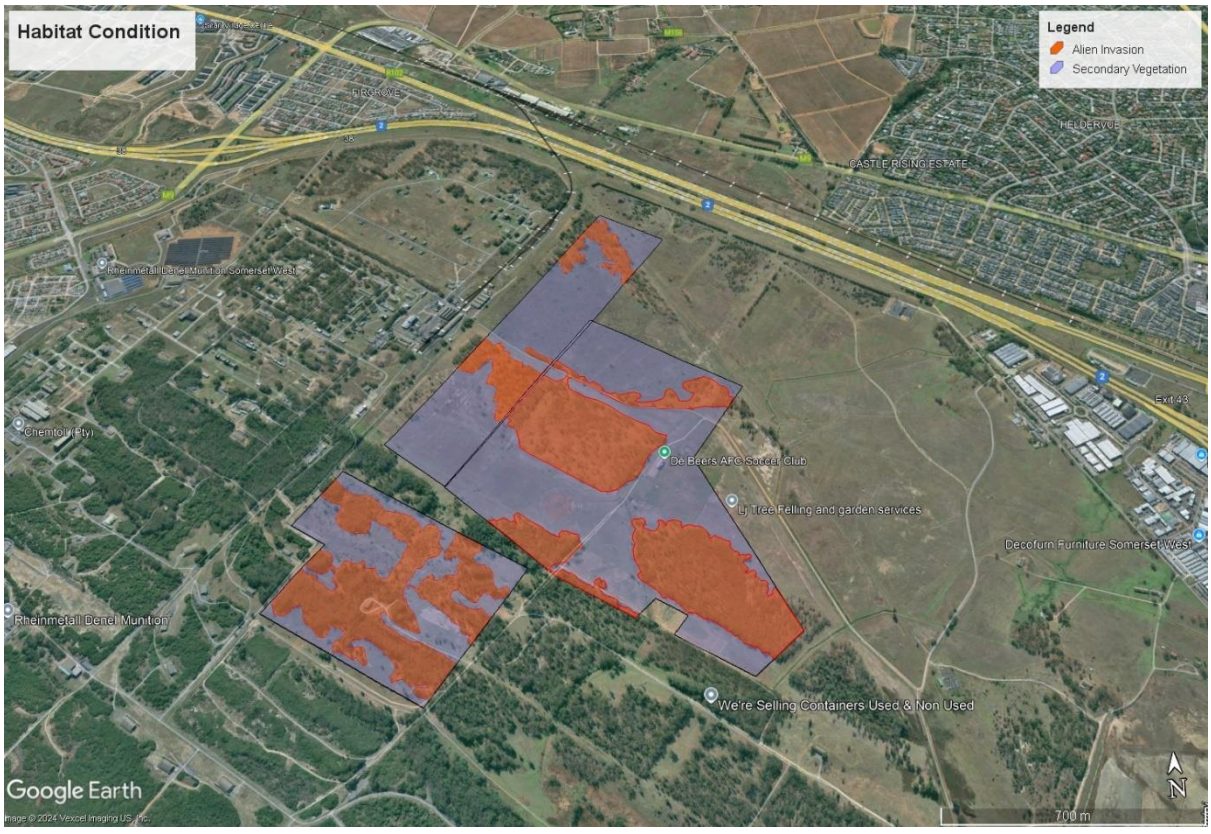


Figure 15: Habitat condition map.

IMPACT ASSESSMENT RATINGS & REQUIRED MITIGATIONS

The impacts assessment ratings will be mostly Negative medium impact to Negative low impact from a specialist perspective. However, considering the conservation status of the footprint bioregion and the recommended mitigations are not implemented, the project will drastically have an overall Negative high impact which should be avoided by the applicant.

Table 5: Impacts assessment matrix

Construction Phase	**Proposed Solar PV, overhead powerline and substation**	
	Before Mitigation	**After Mitigation**
POTENTIAL IMPACTS ASPECTS		
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Loss of priority flora and fauna species from important habitats	Minimise the development footprint and reserve indigenous vegetation wherever possible. The project should be in shortest timeframe and pollution control must be put in place
Magnitude:	3	2
Duration:	2	1
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1
Probability:	3	1
Total SP:	42	16
Significance rating:	Negative medium impact	Negative low impact
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Loss of resident flora and fauna through increased disturbance	Minimise the development footprint and reserve indigenous vegetation wherever possible. The project should be in shortest timeframe and pollution control must be put in place
Magnitude:	3	2
Duration:	2	1
Geographical Extent:	1	1

Loss of Resources:	2	2
Reversibility:	2	1
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	36	16
Significance rating:	Negative medium impact	Negative low impact
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important habitats	Use designated roads to access the site, as much as possible. Minimise the project footprint and reserve indigenous vegetation wherever possible. The project should be in shortest timeframe and control noise pollution. After construction is complete, rehabilitate affected areas with indigenous flora
Magnitude:	3	2
Duration:	3	2
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	45	20
Significance rating:	Negative medium impact	Negative low impact
Operation Phase	**Proposed Solar PV, overhead powerline and substation**	
	Before Mitigation	**After Mitigation**
POTENTIAL IMPACTS ASPECTS		
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important habitats for species	Minimise the development footprint and reserve indigenous vegetation wherever possible. The project should be in shortest timeframe and control pollution
Magnitude:	3	2

Duration:	3	2
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	45	20
Significance rating:	Negative medium impact	Negative low impact
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Loss of resident flora and fauna through increased disturbance	Minimise the development footprint and reserve indigenous vegetation wherever possible. The project should be in shortest timeframe and control pollution. Have a biodiversity protocol and rehabilitation plan that will be implemented during operational phase.
Magnitude:	3	2
Duration:	2	1
Geographical Extent:	1	1
Loss of Resources:	2	2
Reversibility:	2	1
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	36	16
Significance rating:	Negative medium impact	Negative low impact
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Spreading of invasive alien plants from margins. The altered environment will also favour species that are better adapted to disturbed/transformed areas.	Invasive plant material should be disposed by incineration, or alternatively, composting to break down seeds. If seedbank persists, invasive alien plant management and eradication measures should be implemented
Magnitude:	4	3

Duration:	3	3
Geographical Extent:	1	1
Loss of Resources:	2	2
Reversibility:	3	2
Probability:	3	3
Total SP:	50	33
Significance rating:	Negative high impact	Negative medium impact

MITIGATIONS

The development applicant should be responsible for the following mitigations throughout all development stages of the Solar Photovoltaic (PV) Facility and associated infrastructure:

1. Minimise the development footprint and reserve indigenous vegetation wherever possible.
2. All vegetation not required to be removed should be protected against damage.
3. Sensitive areas such as wetlands and drainage lines must be avoided where possible.
4. Existing roads must be used where possible during construction of the project.
5. The project should be executed in a short timeframe, if possible, and pollution control should be implemented.
6. Rehabilitate area with indigenous flora.
7. Have a biodiversity protocol and rehabilitation plan that will be implemented following the construction phase.
8. Invasive plant material should be disposed by incineration, or alternatively, composting to break down seeds. **If seedbank persists, invasive alien plant management and eradication measures should be implemented.**

NO-GO AREAS, BUFFERS AND ALTERNATIVES

As shown in Figure 14 below, the area delineated as a polygon in yellow (4.31 Ha) within Area 1 and 2 of the proposed development footprints is, from an ecological perspective, a No-go area. This is a drainage line that supports aquatic life and is critical to plant root health.

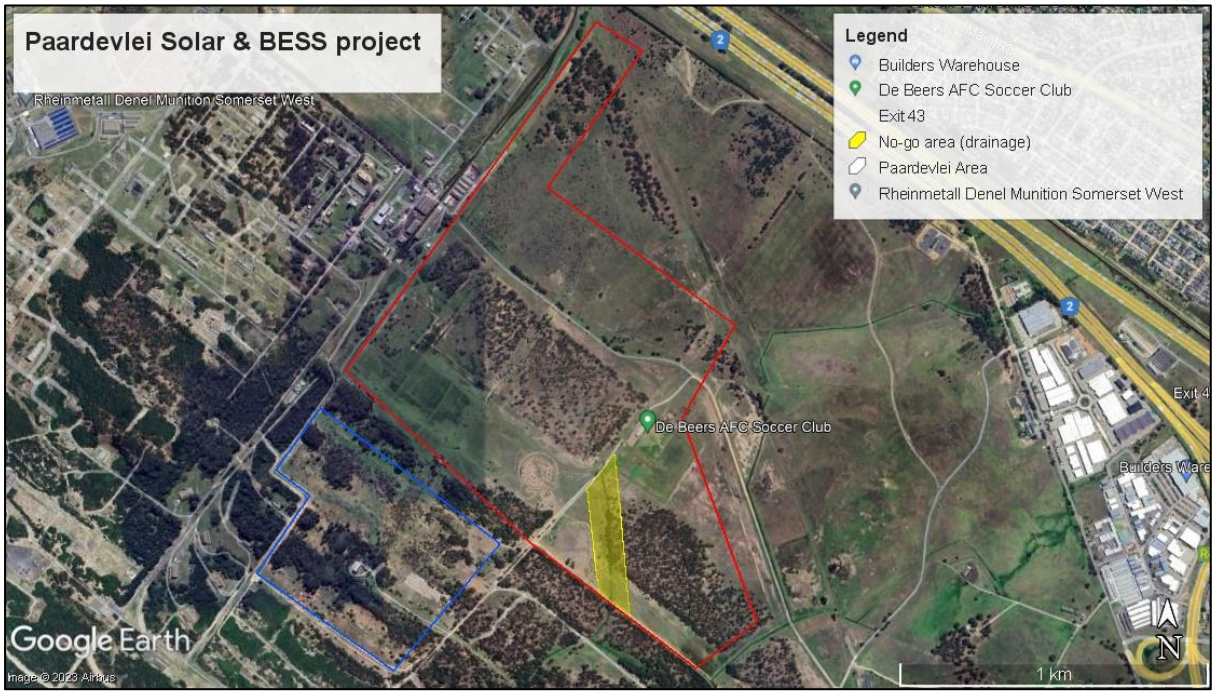


Figure 16: Proposed delineation of the No-go area as per specialist recommendations.

CONCLUSION AND RECOMMENDATIONS

From the survey conducted, majority of the habitats within the project footprint have been highly transformed. This transformation has resulted in high infestation of alien plants, and introduction of secondary vegetation. Although the vegetation types of the project area and Endangered and Critically Endangered, there are no representative of the original vegetation types as a result of the land transformation. The site is currently used for livestock grazing. However, there are patches of aquatic microhabitats that have resulted from this land transformation. These habitats may provide refuge for residential faunal species. The proposed infrastructure should not extend over the delineated drainage line in Figure 16. Any other sensitive aquatic areas will be guided by the aquatic/wetland study. The structures should be aligned in such a way that the drainage line remains in its natural state.

The following recommendations should be considered by the applicant due to sensitivity outcomes of the DFFE screening tool:

<u>Important recommendations for the conservation of the current vegetation structure</u>

- The proponent must be committed to a conservation approach of practice and the actual footprint of disturbance must be kept to a minimum.

- As much of the natural environment must be conserved, there should be minimal vegetation clearing.
- Compile an Alien Management Plan and implement it during construction and operational phases.
- A final walkdown must be undertaken prior to site establishment to assist in the following:
- Relocation of important species (if found), identification and demarcation of specimens and sub habitats not to be disturbed will have to be done beforehand by a specialist.
- An offset implementation plan should be drafted pre-construction.
- Preventative erosion control measures to be put in place.

Important recommendations for conservation of fauna species

- The proponent must be committed to a conservation approach of practice and the actual footprint of disturbance must be kept to a minimum.
- Conduct preconstruction walkdown surveys on the authorised footprint.
- A final walkdown must be undertaken prior to site establishment to assist in the following:
- Relocation of important species, identification and demarcation of specimens and sub habitats not to be disturbed will have to be done beforehand by a specialist.
- Important species (fauna) that will be threatened by the development must be relocated to safer habitats by suitable specialists.
- Preventative erosion control measures to be put in place.

Specific conditions recommended for the EA from a biodiversity perspective

1. Implement mitigation controls during the construction phase as specified in the mitigation requirements. Monitor and report on their effectiveness.

2. Implement mitigation controls during the operational phase as specified in the mitigation. Monitor and report on their effectiveness.

3. Monitoring of implementation of mitigation controls, along with reporting, should be undertaken at least **quarterly** throughout the construction phase, and bi-annually during the operational phase. Monitoring, at the minimum, should consist of a **quarterly** monitoring of the development area;

4. As much of the natural habitat as possible should be preserved during construction and operation to lessen the operational impacts and to reduce the irreversibility of impacts.

5. An ECO should be appointed to be on site at least once a week for the full duration of construction.

Overall, there is no objection for the proposed development to continue. It is the opinion of the specialist that the proposed project be approved by the Competent Authority, provided that the mitigations and recommendations are adhered to.

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APPENDICES

Appendix A: Method of Environmental Assessment

1.1 METHOD OF ENVIRONMENTAL ASSESSMENT

The environmental assessment aims to identify the various possible environmental impacts that could results from the proposed activity. Different impacts need to be evaluated in terms of its significance and in doing so highlight the most critical issues to be addressed.

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

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

1.1.1 Impact Rating System

Impact assessment must take account of the nature, scale and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the project phases:

- planning
- construction
- operation
- decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance should also be included. The rating system is applied to the potential impacts on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each impact, the following criteria is used:

The rating system

NATURE		
Include a brief description of the impact of the environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.
2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
PROBABILITY		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span

		shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite.
INTENSITY/ MAGNITUDE		
Describes the severity of an impact.		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/ component and the quality, use, integrity and functionality of the system or component is severely

		impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
REVERSIBILITY		
This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.

CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.
3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects

SIGNIFICANCE		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity. The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.		
Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.

29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive effects.

Appendix B: Historical Plant Species Records

Family	Genus	Sp1	Author1	Rank1	Sp2	Ecology
Scrophulariaceae	*Hemimeris*	*racemosa*	(Houtt.) Merr.			Indigenous; Endemic
Poaceae	*Prionanthium*	*pholiuroides*	Stapf			Indigenous; Endemic
Fabaceae	*Aspalathus*	*recurva*	Benth.			Indigenous; Endemic
Iridaceae	*Moraea*	*tulbaghensis*	L.Bolus			Indigenous; Endemic
Iridaceae	*Geissorhiza*	*setacea*	(Thunb.) Ker Gawl.			Indigenous; Endemic
Cyperaceae	*Isolepis*	*venustula*	Kunth			Indigenous; Endemic
Asteraceae	*Cullumia*	*squarrosa*	(L.) R.Br.			Indigenous; Endemic
Orchidaceae	*Disa*	*physodes*	Sw.			Indigenous; Endemic
Asteraceae	*Steirodiscus*	*tagetes*	(L.) Schltr.			Indigenous; Endemic
Orchidaceae	*Disa*	*spathulata*	(L.f.) Sw.	ssp.	*spathulata*	Indigenous; Endemic

Appendix C: Historical Reptile Species Records

#	Family	Scientific name	Common name	Red list category	No of records	Last recorded
1	Agamidae	*Agama atra*	Southern Rock Agama	Least Concern (SARCA 2014)	46	06 06 2022
2	Agamidae	*Agama hispida*	Spiny Ground Agama	Least Concern (SARCA 2014)	7	16 04 2018
3	Chamaeleonidae	*Bradypodion pumilum*	Cape Dwarf Chameleon	Vulnerable (SARCA 2014)	78	30 04 2023
4	Cheloniidae	*Caretta caretta*	Loggerhead Turtle	Vulnerable (SARCA 2014)	3	09 08 2006
5	Cheloniidae	*Chelonia mydas*	Green Turtle	Near Threatened (SARCA 2014)	1	15 06 1900
6	Colubridae	*Crotaphopeltis hotamboeia*	Red-lipped Snake	Least Concern (SARCA 2014)	7	25 04 2022
7	Colubridae	*Dasypeltis scabra*	Rhombic Egg-eater	Least Concern (SARCA 2014)	3	15 06 1900
8	Colubridae	*Dispholidus typus typus*	Boomslang	Least Concern (IUCN 2021, sp. level)	4	05 10 2008
9	Cordylidae	*Chamaesaura anguina anguina*	Cape Grass Lizard	Least Concern (SARCA 2014)	5	01 03 2020
10	Cordylidae	*Cordylus cordylus*	Cape Girdled Lizard	Least Concern (SARCA 2014)	67	25 04 2022
11	Cordylidae	*Cordylus oelofseni*	Oelofsen's Girdled Lizard	Near Threatened (SARCA 2014)	25	25 01 2004

12	Cordylidae	*Hemicordylus capensis*	Graceful Crag Lizard	Least Concern (SARCA 2014)	29	21 04 2002
13	Cordylidae	*Hemicordylus nebulosus*	Dwarf Crag Lizard	Vulnerable (SARCA 2014)	7	04 12 1998
14	Cordylidae	*Pseudocordylus microlepidotus microlepidotus*	Cape Crag Lizard	Least Concern (SARCA 2014)	24	30 05 2016
15	Elapidae	*Aspidelaps lubricus lubricus*	Coral Shield Cobra		2	15 06 1959
16	Elapidae	*Hemachatus haemachatus*	Rinkhals	Least Concern (SARCA 2014)	2	27 06 2008
17	Elapidae	*Naja nivea*	Cape Cobra	Least Concern (SARCA 2014)	7	27 11 2022
18	Gekkonidae	*Afrogecko porphyreus*	Marbled Leaf-toed Gecko	Least Concern (SARCA 2014)	71	13 01 2020
19	Gekkonidae	*Lygodactylus capensis*	Common Dwarf Gecko	Least Concern (SARCA 2014)	7	30 04 2023
20	Gekkonidae	*Pachydactylus geitje*	Ocellated Gecko	Least Concern (SARCA 2014)	2	25 04 2022
21	Gerrhosauridae	*Tetradactylus seps*	Short-legged Seps	Least Concern (SARCA 2014)	4	14 09 2019
22	Lacertidae	*Meroles knoxii*	Knox's Desert Lizard	Least Concern (SARCA 2014)	1	20 05 2022
23	Lamprophiidae	*Amplorhinus multimaculatus*	Many-spotted Snake	Least Concern (SARCA 2014)	5	15 09 2005
24	Lamprophiidae	*Duberria lutrix lutrix*	South African Slug-eater	Least Concern (IUCN 2021, sp. level)	23	09 12 2018
25	Lamprophiidae	*Homoroselaps lacteus*	Spotted Harlequin Snake	Least Concern (SARCA 2014)	4	15 06 1900
26	Lamprophiidae	*Lamprophis aurora*	Aurora House Snake	Least Concern (SARCA 2014)	10	10 03 2023
27	Lamprophiidae	*Lamprophis fuscus*	Yellow-bellied House Snake	Least Concern (SARCA 2014)	1	18 01 1979
28	Lamprophiidae	*Lycodonomorphus inornatus*	Olive House Snake	Least Concern (SARCA 2014)	10	06 11 2018
29	Lamprophiidae	*Lycodonomorphus rufulus*	Brown Water Snake	Least Concern (SARCA 2014)	6	17 11 2018
30	Lamprophiidae	*Lycophidion capense capense*	Cape Wolf Snake	Least Concern (SARCA 2014)	3	03 05 1989
31	Lamprophiidae	*Psammophis crucifer*	Cross-marked Grass Snake	Least Concern (SARCA 2014)	5	22 06 1985
32	Lamprophiidae	*Psammophis leightoni*	Cape Sand Snake	Vulnerable (SARCA 2014)	1	17 10 1988
33	Lamprophiidae	*Psammophis notostictus*	Karoo Sand Snake	Least Concern (SARCA 2014)	2	15 06 1900
34	Lamprophiidae	*Psammophylax rhombeatus*	Spotted Grass Snake	Least Concern (SARCA 2014)	14	08 06 2021
35	Lamprophiidae	*Pseudaspis cana*	Mole Snake	Least Concern (SARCA 2014)	9	23 03 2023
36	Leptotyphlopidae	*Leptotyphlops nigricans*	Black Thread Snake	Least Concern (IUCN 2022)	3	15 06 1900
37	Pelomedusidae	*Pelomedusa galeata*	South African Marsh Terrapin	Least Concern (IUCN 2018)	8	30 11 2021

38	Scincidae	*Acontias meleagris*	Cape Legless Skink	Least Concern (SARCA 2014)	1	22 06 2020
39	Scincidae	*Trachylepis capensis*	Cape Skink	Least Concern (SARCA 2014)	13	29 04 2023
40	Scincidae	*Trachylepis homalocephala*	Red-sided Skink	Least Concern (SARCA 2014)	12	08 10 2020
41	Testudinidae	*Chersina angulata*	Angulate Tortoise	Least Concern (SARCA 2014)	9	15 11 2021
42	Testudinidae	*Homopus areolatus*	Parrot-beaked Tortoise	Least Concern (SARCA 2014)	12	19 02 2018
43	Typhlopidae	*Indotyphlops braminus*	Brahminy Blind Snake		1	03 01 2019
44	Typhlopidae	*Rhinotyphlops lalandei*	Delalande's Beaked Blind Snake	Least Concern (SARCA 2014)	4	25 04 2022
45	Viperidae	*Bitis arietans arietans*	Puff Adder	Least Concern (IUCN 2014)	16	06 11 2018

Appendix D: Historical Mammal Species Records

#	Family	*Scientific name*	Common name	Red list category	No of records	Last recorded
1	Balaenopteridae	*Balaenoptera acutorostrata*	Common Minke Whale	Data Deficient	10	21 07 1980
2	Balaenopteridae	*Balaenoptera edeni*	Bryde's Whale	Vulnerable	1	07 06 2020
3	Bathyergidae	*Bathyergus suillus*	Cape Dune Mole-rat	Least Concern (2016)	3	01 01 1980
4	Bathyergidae	*Cryptomys hottentotus*	Southern African Mole-rat	Least Concern (2016)	30	22 11 1988
5	Bathyergidae	*Georychus capensis*	Cape Mole-rat	Least Concern (2016)	5	04 08 2010
6	Bovidae	*Antidorcas marsupialis*	Springbok	Least Concern (2016)	1	
7	Bovidae	*Damaliscus pygargus pygargus*	Bontebok	Vulnerable (2016)	5	29 08 2014
8	Bovidae	*Oreotragus oreotragus*	Klipspringer	Least Concern (2016)	1533	09 11 2020
9	Bovidae	*Pelea capreolus*	Vaal Rhebok	Near Threatened (2016)	65	21 12 2020
10	Bovidae	*Raphicerus campestris*	Steenbok	Least Concern (2016)	67	29 03 2006
11	Bovidae	*Raphicerus melanotis*	Cape Grysbok	Least Concern (2016)	426	17 11 2020
12	Bovidae	*Sylvicapra sp.*	Common Duiker		1	26 07 2017
13	Bovidae	*Sylvicapra grimmia*	Bush Duiker	Least Concern (2016)	627	25 10 2020
14	Canidae	*Canis mesomelas*	Black-backed Jackal	Least Concern (2016)	1	29 10 2011
15	Canidae	*Otocyon megalotis*	Bat-eared Fox	Least Concern (2016)	1	06 12 1976
16	Canidae	*Vulpes chama*	Cape Fox	Least Concern (2016)	10	31 05 2019

17	Cercopithecidae	*Papio ursinus*	Chacma Baboon	LC (IUCN, 2016)	24	26 09 2021
18	Chrysochloridae	*Amblysomus corriae*	Fynbos Golden Mole	Near Threatened (2016)	52	25 11 1988
19	Chrysochloridae	*Chrysochloris (Chrysochloris) asiatica*	Cape Golden Mole	Data Deficient	38	10 09 2011
20	Delphinidae	*Tursiops truncatus*	Bottlenose Dolphin	Least Concern (2016)	1	22 03 2017
21	Felidae	*Caracal caracal*	Caracal	Least Concern (2016)	106	25 11 2020
22	Felidae	*Felis catus*	Domestic Cat	Introduced	1	12 11 2011
23	Felidae	*Felis silvestris*	Wildcat	Least Concern (2016)	5	01 01 1980
24	Felidae	*Panthera pardus*	Leopard	Vulnerable (2016)	136	18 11 2020
25	Gliridae	*Graphiurus (Graphiurus) ocularis*	Spectacled African Dormouse	Least Concern	5	01 01 1980
26	Herpestidae	*Atilax paludinosus*	Marsh Mongoose	Least Concern (2016)	30	14 04 2020
27	Herpestidae	*Herpestes ichneumon*	Egyptian Mongoose	Least Concern (2016)	20	26 12 2017
28	Herpestidae	*Herpestes pulverulentus*	Cape Gray Mongoose	Least Concern (2016)	76	12 12 2020
29	Hystricidae	*Hystrix africaeaustralis*	Cape Porcupine	Least Concern	400	17 12 2020
30	Leporidae	*Lepus sp.*	Hares		1	28 10 2015
31	Leporidae	*Lepus capensis*	Cape Hare	Least Concern	81	09 08 2015
32	Leporidae	*Lepus saxatilis*	Scrub Hare	Least Concern	16	08 03 2019
33	Leporidae	*Pronolagus rupestris*	Smith's Red Rock Hare	Least Concern (2016)	7	12 06 2014
34	Leporidae	*Pronolagus saundersiae*	Hewitt's Red Rock Rabbit	Least Concern (2016)	1	15 10 2020
35	Macroscelididae	*Elephantulus edwardii*	Cape Elephant Shrew	Least Concern (2016)	1	28 07 2006
36	Muridae	*Acomys (Subacomys) subspinosus*	Cape Spiny Mouse	Least Concern	4	25 01 1989
37	Muridae	*Gerbilliscus afra*	Cape Gerbil	Least Concern (2016)	2	01 01 1980
38	Muridae	*Gerbilliscus paeba*	Paeba Hairy-footed Gerbil	Least Concern (2016)	2	11 08 1959
39	Muridae	*Mus (Nannomys) minutoides*	Southern African Pygmy Mouse	Least Concern	2	01 01 1980
40	Muridae	*Myomyscus verreauxi*	Verreaux's Mouse	Least Concern	7	01 01 1980

41	Muridae	*Myomyscus verreauxii*	Verreaux's White-footed Rat	Least Concern (2016)	3	
42	Muridae	*Otomys irroratus*	Southern African Vlei Rat (Fynbos type)	Least Concern (2016)	15	25 09 2013
43	Muridae	*Otomys saundersiae*	Saunders' Vlei Rat	Least Concern	2	22 11 1988
44	Muridae	*Rhabdomys pumilio*	Xeric Four-striped Grass Rat	Least Concern (2016)	35	16 07 2016
45	Mustelidae	*Aonyx capensis*	African Clawless Otter	Near Threatened (2016)	13	19 05 2020
46	Mustelidae	*Ictonyx striatus*	Striped Polecat	Least Concern (2016)	9	16 10 2020
47	Mustelidae	*Mellivora capensis*	Honey Badger	Least Concern (2016)	49	26 12 2020
48	Mustelidae	*Poecilogale albinucha*	African Striped Weasel	Near Threatened (2016)	7	31 07 2017
49	Nesomyidae	*Dendromus melanotis*	Gray African Climbing Mouse	Least Concern (2016)	16	20 11 1943
50	Nesomyidae	*Dendromus mesomelas*	Brants's African Climbing Mouse	Least Concern (2016)	4	20 11 1943
51	Nesomyidae	*Steatomys krebsii*	Kreb's African Fat Mouse	Least Concern (2016)	2	27 08 1934
52	Nesomyidae	*Steatomys pratensis*	Common African Fat Mouse	Least Concern (2016)	1	27 08 1934
53	Otariidae	*Arctocephalus pusillus*	Brown Fur Seal	Least Concern (2016)	2	22 03 2017
54	Otariidae	*Arctocephalus pusillus pusillus*		Least Concern	10	
55	Phocidae	*Lobodon carcinophaga*	Crabeater Seal	Least Concern (2015)	2	26 12 1971
56	Phocidae	*Mirounga leonina*	Southern Elephant Seal	Near Threatened (2016)	2	01 01 1980
57	Physeteridae	*Kogia breviceps*	Pygmy Sperm Whale	Data Deficient (2016)	13	11 06 1983
58	Procaviidae	*Procavia capensis capensis*	Cape Rock Hyrax	LC (IUCN 2015, global sp. level)	119	06 01 2011
59	Rhinolophidae	*Rhinolophus sp.*	Horseshoe Bats		1	02 10 2012
60	Sciuridae	*Sciurus carolinensis*	Eastern Grey Squirrel	Least Concern (IUCN 3.1)	4	12 03 2015

61	Soricidae	*Crocidura sp.*	Shrews		1	04 08 2010
62	Soricidae	*Crocidura cyanea*	Reddish-gray Musk Shrew	Least Concern (2016)	27	26 11 1988
63	Soricidae	*Crocidura flavescens*	Greater Red Musk Shrew	Least Concern (2016)	52	07 12 2012
64	Soricidae	*Myosorex varius*	Forest Shrew	Least Concern (2016)	13	23 11 1988
65	Suidae	*Potamochoerus larvatus*	Bush-pig	Least Concern (2016)	1	25 07 2018
66	Vespertilionidae	*Neoromicia capensis*	Cape Serotine	Least Concern (2016)	60	24 11 1988
67	Vespertilionidae	*Pipistrellus melckorum*	Melcks' Serotine		1	
68	Viverridae	*Genetta sp.*	Genets		1	20 09 1992
69	Viverridae	*Genetta genetta*	Common Genet	Least Concern (2016)	39	28 12 2014
70	Viverridae	*Genetta tigrina*	Cape Genet (Cape Large-spotted Genet)	Least Concern (2016)	55	08 01 2021

Appendix E: Historical Frog Species Records

#	Family	Scientific name	Common name	Red list category	No of Records	Last recorded
1	Brevicipitidae	*Breviceps acutirostris*	Strawberry Rain Frog	Least Concern	6	08 09 2002
2	Brevicipitidae	*Breviceps gibbosus*	Cape Rain Frog	Vulnerable	9	08 09 2002
3	Brevicipitidae	*Breviceps montanus*	Cape Mountain Rain Frog	Least Concern	9	26 11 2003
4	Bufonidae	*Capensibufo sp.*			2	07 09 1994
5	Bufonidae	*Capensibufo magistratus*	Landdroskop Mountain Toadlet	Data Deficient (IUCN ver 3.1, 2017)	1	16 11 1973
6	Bufonidae	*Sclerophrys capensis*	Raucous Toad	Least Concern	17	10 12 2021
7	Bufonidae	*Vandijkophrynus angusticeps*	Sand Toad	Least Concern	9	05 07 1979
8	Heleophrynidae	*Heleophryne purcelli*	Cape Ghost Frog	Least Concern	5	19 05 2004
9	Hyperoliidae	*Hyperolius horstockii*	Arum Lily Frog	Least Concern	2	30 10 2012
10	Hyperoliidae	*Hyperolius marmoratus*	Painted Reed Frog	Least Concern (IUCN ver 3.1, 2013)	21	10 12 2021
11	Pipidae	*Xenopus laevis*	Common Platanna	Least Concern (IUCN 2020)	2	30 01 2016
12	Pyxicephalidae	*Amietia fuscigula*	Cape River Frog	Least Concern (2017)	36	26 09 2021
13	Pyxicephalidae	*Arthroleptella landdrosia*	Landroskop Moss Frog	Near Threatened	3	21 04 2002
14	Pyxicephalidae	*Arthroleptella villiersi*	Villiersdorp Moss Frog	Least Concern	5	02 06 2012

15	Pyxicephalidae	*Cacosternum boettgeri*	Common Caco	Least Concern (2013)	2	25 07 1976
16	Pyxicephalidae	*Cacosternum capense*	Cape Caco	Near Threatened (2017)	5	26 07 1976
17	Pyxicephalidae	*Cacosternum platys*	Flat Caco	Near Threatened (2017)	1	16 03 2014
18	Pyxicephalidae	*Poyntonia paludicola*	Marsh Frog	Near Threatened	2	21 08 1987
19	Pyxicephalidae	*FAMILY Pyxicephalidae*	Unidentified Pyxicephalidae		1	23 11 2010
20	Pyxicephalidae	*Strongylopus bonaespei*	Banded Stream Frog	Least Concern	4	28 08 2001
21	Pyxicephalidae	*Strongylopus grayii*	Clicking Stream Frog	Least Concern	34	25 10 2021
22	Pyxicephalidae	*Tomopterna delalandii*	Cape Sand Frog	Least Concern	3	28 08 1993

Appendix F: Site photos

Old Stockpile

Wild Tobacco

Patterson curse

Isolated swamps with invasive Patterson curse

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