NALA

ENVIRONMENTAL

CONSULTING FIRM

# ENVIRONMENTAL AUTHORISATION (EA) AMENDMENT APPLICATION FOR THE EXTENSION OF VALIDITY PERIOD OF THE EA FOR THE 100 MW LOERIESFONTEIN 3 PHOTOVOLTAIC (PV) SOLAR ENERGY FACILITY (SEF), 33/132KV INDEPENDENT POWER PRODUCER (IPP) PORTION OF THE SHARED ON-SITE SUBSTATION (INCLUDING TRANSFORMER) AND ASSOCIATED INFRASTRUCTURE, NEAR LOERIESFONTEIN, HANTAM LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE – DFFE REFERENCE NUMBER: 12/12/20/2321/2/1/AM1

## DOCUMENT DETAILS

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|---|---|---|
| **Applicant** | : | South Africa Mainstream Renewable Power Loeriesfontein 3 (Pty) Ltd |
| **Title** | : | EA Amendment Application for the Extension of validity period of the EA for the 100 MW Loeriesfontein 3 Photovoltaic (PV) Solar Energy Facility (SEF), 33/132kV Independent Power Producer (IPP) portion of the shared on-site substation (including transformer) and associated infrastructure, near Loeriesfontein, Hantam Local Municipality, Northern Cape Province – DFFE Reference Number: 12/12/20/2321/2/1/AM1 |
| **Author/EAP** | : | Nala Environmental (Pty) Ltd<br>Arlene Singh<br>Norman Chetsanga<br>Justin Jacobs |
| **Purpose of Report** | : | Draft Part 1 Additional Information Report for public comment |
| **Date** | : | January 2023 |

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**Activity (Development)** – an action either planned or existing that may result in environmental impacts through pollution or resource use.

**Alien vegetation** - Alien vegetation is defined as undesirable plant growth (usually of foreign origin) which includes, but is not limited to all declared category 1 and 2 listed invader species as set out in the 1983 Conservation of Agricultural Resources Act (CARA) regulations. Other vegetation deemed to be alien are those plant species that show the potential to occupy in number any area within the defined construction area and which are declared undesirable.

**Alternatives:** – a possible course of action, in place of another, of achieving the same desired goal of the proposed project. Alternatives can refer to any of the following but are not limited to: site alternatives, site layout alternatives, design or technology alternatives, process alternatives or a no-go alternative. All reasonable alternatives must be rigorously explored and objectively evaluated.

**Applicant** – the project proponent or developer responsible for submitting an environmental application to the relevant environmental authority for environmental authorisation.

**Biodiversity** – the diversity of animals, plants and other organisms found within and between ecosystems, habitats, and the ecological complexes.

**Commencement** – the start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

**Construction** – means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity but excludes any modification, alteration or expansion of such a facility, structure or infrastructure and excluding the reconstruction of the same facility in the same location, with the same capacity and footprint.

**Cumulative impacts** – impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities to produce a greater impact or different impacts.

**Decommissioning** – to take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

**Direct impacts** – impacts that are caused directly by the activity and generally occur at the same time and at the same place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally quantifiable.

**'Do nothing' alternative** – the 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

**Endangered species** – taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

**Emergency** – An undesired / unplanned event that results in a significant environmental impact and requires the notification of the relevant statutory body, such as a local authority.

**Emissions** – The release or discharge of a substance into the environment which generally refers to the release of gases or particulates into the air.

**Environment** – In terms of the National Environmental Management Act (NEMA) (Act No 107 of 1998) (as amended), "Environment" means the surroundings within which humans exist and that are made up of:
a) the land, water and atmosphere of the earth;
b) micro-organisms, plants and animal life;
c) any part or combination of (i) of (ii) and the interrelationships among and between them; and
d) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

**Environmental Assessment** (EA) – the generic term for all forms of environmental assessment for projects, plans, programmes or policies and includes methodologies or tools such as environmental impact assessments, strategic environmental assessments and risk assessments.

**Environmental Authorisation** – an authorisation issued by the competent authority in respect of a listed activity, or an activity which takes place within a sensitive environment.

**Environmental Assessment Practitioner (EAP)** – the individual responsible for planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental instrument introduced through the EIA Regulations.

**Environmental impact** – a change to the environment (biophysical, social and/ or economic), whether adverse or beneficial, wholly or partially, resulting from an organisation's activities, products or services.

**Environmental management** - ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

**Environmental management programme** (EMPr) – A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive impacts and limiting or preventing negative environmental impacts are implemented during the life cycle of a project. The EMPr focuses on the construction phase, operation (maintenance) phase and decommissioning phase of the proposed project.

**Fatal Flaw** – issue or conflict (real or perceived) that could result in developments being rejected or stopped.

**General Waste** – household water, construction rubble, garden waste and certain dry industrial and commercial waste which does not pose an immediate threat to man or the environment.

**Hazardous Waste** – waste that may cause ill health or increase mortality in humans, flora and fauna.

**Heritage –** That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

**Incident** - An undesired event which may result in a significant environmental Impact but can be managed through internal response.

**Indigenous** – all biological organisms that occurred naturally within the study area prior to 1800.

**Indirect impacts** – indirect or induced changes that may occur as a result of the activity. These types if impacts include all of the potential impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place as a result of the activity.

**Method statement** – A written submission to the ECO and the site manager (or engineer) by the EPC Contractor in collaboration with his/her EO.

**Mitigate** – the implementation of practical measures designed to avoid, reduce or remedy adverse impacts or enhance beneficial impacts of an action.

**No-Go Option** – in this instance the proposed activity would not take place, and the resulting environmental effects from taking no action are compared with the effects of permitting the proposed activity to go forward.

**Open Space** – environmentally sensitive areas which are not suitable for development and consist of watercourses, buffers, floodplains, steep slopes, sensitive biodiversity and/or areas of cultural or heritage significance.

**Pollution** – A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances.

**Pre-construction** – the period prior to the commencement of construction, this may include activities which do not require Environmental Authorisation (e.g., geotechnical surveys).

**Rare species:** – taxa with small world populations that are not at present Endangered or Vulnerable but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare."

**Red data species** – species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

**Registered Interested and/or Affected Party (I&AP)** – an interested and affected party whose name is recorded in the register opened for that application

**Rehabilitation** – a measure aimed at reinstating an ecosystem to its original function and state (or as close as possible to its original function and state) following activities that have disrupted those functions.

**Significance** – significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. magnitude, intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e. level of significance and acceptability). It is an anthropocentric concept, which makes use of value judgements and science-based criteria (i.e. biophysical, social and economic).

**Stakeholder engagement** – the process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and/or management of proposals or activities.

**Watercourse** – means:
a) a river or spring;
b) a natural channel or depression in which water flows regularly or intermittently;
c) a wetland, lake or dam into which, or from which, water flows; and
d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse
as defined in the National Water Act, 1998 (Act No. 36 of 1998) and a reference to a watercourse includes, where relevant, its bed and banks.

**Wetland** – means land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

**List of Abbreviations**

| | |
|---|---|
| BGIS | Biodiversity Geographic Information System |
| BESS | Battery Energy Storage System |
| CDSM | Chief Directorate Surveys and Mapping |
| CEMP | Construction Environmental Management Plan |
| DEFF | Department of Environment, Forestry and Fisheries |
| NC DAERDLD | Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform |
| DMRE | Department of Mineral Resources and Energy |
| EAP | Environmental Assessment Practitioner |
| EHS | Environmental, Health and Safety |
| EIA | Environmental Impact Assessment |
| EIR | Environmental Impact Report |
| EMPr | Environmental Management Programme |
| GPS | Global Positioning System |
| HIA | Heritage Impact Assessment |
| I&APs | Interested and Affected Parties |
| IDP | Integrated Development Plan |
| IFC | International Finance Corporation |
| IPP | Independent Power Producer |
| KOP | Key Observation Point |
| kV | Kilo Volt |
| LLRC | Low Level River Crossing |
| LUDS | Land Use Decision Support |
| LUPO | Land Use Planning Ordinance |
| MW | Mega Watt |
| NEMA | National Environmental Management Act |
| NEMAA | National Environmental Management Amendment Act |
| NEMBA | National Environmental Management: Biodiversity Act |
| NERSA | National Energy Regulator of South Africa |
| NHRA | National Heritage Resources Act |
| NSBA | National Spatial Biodiversity Assessment |
| NWA | National Water Act |
| PIA | Paleontological Impact Assessment |
| PM | Post Meridiem; "Afternoon" |
| SACAA | South African Civil Aviation Authority |
| SAHRA | South African National Heritage Resources Agency |
| SANBI | South Africa National Biodiversity Institute |
| SANS | South Africa National Standards |
| SDF | Spatial Development Framework |

## SECTION 1 – INTRODUCTION

### 1.1 Background

South Africa Mainstream Renewable Power Loeriesfontein 3 (Pty) Ltd received the original Environmental Authorisation (EA) for the 100MW Loeriesfontein 3 Photovoltaic (PV) Solar Energy Facility (SEF) and Grid Connection infrastructure on 29 October 2012 (DFFE Ref: 12/12/20/2321/2). Further to this, the original EA was amended on 10 July 2014 (DFFE Ref: 12/12/20/2321/2/A1), 27 October 2015 (DFFE Ref: 12/12/20/2321/2/AM2), 04 October 2017 (DFFE Ref: 12/12/20/2321/2/AM3) and 24 September 2019 (DFFE Ref: 12/12/20/2321/2/AM4). In addition, following the 2019 amendment, the EA was subsequently split into two separate EAs (1 for the 100MW PV SEF and 1 for the grid connection infrastructure), both dated 21 May 2021, as follows:

1) **EA for the 100MW Loeriesfontein 3 PV SEF, 33/132kV Independent Power Producer (IPP) portion of the shared on-site substation (including Transformer) and associated infrastructure (DFFE Ref: 12/12/20/2321/2/1) – the subject of this report; and**
2) EA for the 132kV Grid Alignment and 132kV Eskom Portion of the shared on-site substation to service the 100MW Loeriesfontein 3 PV SEF (DFFE Ref: 12/12/20/2321/2/2).

It should be noted that the split EAs for the Loeriesfontein 3 PV SEF (DFFE Ref: 12/12/20/2321/2/1) and Grid Connection infrastructure (DFFE Ref: 12/12/20/2321/2/2) dated 21 May 2021 respectively replaced the original EA dated 29 October 2012, as well as the subsequent amendments.

The validity of the split EA for the 100MW Loeriesfontein 3 PV SEF and associated infrastructure lapsed on 29 October 2022, however, a Part 1 EA Amendment Application to extend the validity of the EA by 5 years (i.e., EA lapses on 29 October 2027) was submitted to the Department of Forestry, Fisheries and the Environment (DFFE) on 26 October 2022. It is important to note that according to Regulation 28(1B) of the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014 (as amended), "*an environmental authorisation which is the subject of an amendment application contemplated in this Chapter remains valid pending the finalisation of such amendment application.*" The Part 1 EA Amendment Application was acknowledged by the DFFE on 07 November 2022 and additional information was requested to be submitted to the DFFE for consideration. Following this, assessments (including specialist input) are to be undertaken to motivate why the Department should extend the validity period of the EA for a further 5 years.

As part of the Part 1 EA Amendment Application, separate comparative assessments are required for:

- 100 MW Loeriesfontein 3 PV SEF, 33/132kV IPP Portion of the Shared On-site Substation (including the Transformer) and associated infrastructure, near Loeriesfontein, Hantam Local Municipality, Northern Cape Province – DFFE Reference Number: 12/12/20/2321/2/1.
- 132kV Grid Alignment (i.e., Overhead Power Line) and 132kV Eskom Portion of the Shared On-site Substation for the 100 MW Loeriesfontein 3 PV SEF near Loeriesfontein, Hantam Local Municipality, Northern Cape Province – DFFE Reference Number: 12/12/20/2321/2/2,

The authorised SEF and 33/132kV IPP portion of the shared on-site substation (including transformer) and associated infrastructure (DFFE Ref: 12/12/20/2321/2/1) (the subject of this report) is located on Portion 1 and Portion 2 of the Farm Aan De Karee Doorn Pan No. 213. The project is located within the Hantam Local Municipality, Namakwa District Municipality, Northern Cape Province.

The 100MW Loerisfontein 3 Solar PV SEF and associated infrastructure will comprise the following (as authorised as part of split EA dated 21 May 2021 with reference: 12/12/20/2321/2/1):

- PV array with a height of between 5-10m on approximately 405.77 hectares;
- Internal cabling network to connect the PV panels to the substation;
- A new substation of approximately 10 800m² and associated transformers (IPP portion of the shared on-site substation);
- Access roads of 6-10m wide which includes an internal road network;
- Temporary construction area; and
- Administration and warehouse building with a maximum area of up to 5000m$^2$.

### 1.2 Purpose of the Motivation Report and Details of the Application for Amendment

Nala Environmental has prepared this Motivation Report in support of the amendment, application on behalf of Mainstream, for the 100 MW Loeriesfontein 3 PV SEF, 33/132kV IPP Portion of the Shared On-site Substation (including Transformer) and associated infrastructure, near Loeriesfontein, Hantam Local Municipality, Northern Cape Province – DFFE Reference Number: 12/12/20/2321/2/1. This report aims to provide details pertaining to the impacts and significance of the proposed extension to the EA validity period for a further 5 years. **A separate motivation report has been prepared for the EA amendment application for the 132kV Grid Alignment and Eskom portion of the shared on-site substation (DFFE Ref:. 12/12/20/2321/2/2)**.

The key motivating factor for the request to amend the validity period of the SEF EA is to ensure that the applicant has a project that is compliant with the requirements of the Department of Mineral Resources and Energy (DMRE) and Renewable Energy Independent Power Producer Procurement (REIPPP) Programme. Planned announcements, roll-out of bidding rounds and various reasons that were outside of the Applicant's control have subsequently resulted in delays and the project not being selected as a preferred bidder, thus the validity period of the EA needs to be extended.

Following the submission of a Part 1 EA Amendment Application to the DFFE, on 26 October 2022, the Applicant has been requested to submit additional information, in terms of Regulation 30(1)(a) of the EIA Regulations, 2014 (as amended), to assess the impacts associated with the proposed extension of validity to the above-mentioned EA (as the original assessment had been undertaken more than 10 years ago). The additional information requested by the DFFE in order to process the application for amendment of the SEF EA (namely the extension of the validity period) is as follows and has been addressed within the following Sections of this report:

**Table 1.1 Summary of additional information requested by the DFFE**

| Additional Information Request | Applicable Section |
|---|---|
| A detailed motivation as to why the Department should extend the commencement period of the authorised development, including the advantages and disadvantages associated with the approval or refusal to the request for extension; | Section 10 and Section 12 |
| The status (baseline) of the environment (social and biophysical) that was assessed during the initial assessment (by the relative specialist, if applicable); | Section 2 |
| The current status of the assessed environment (social and biophysical) (by the relative specialist, if applicable); | Section 3 |
| A review of all specialist studies undertaken, and a detailed assessment, including a site verification report providing an indication of the status of the receiving environment (by the relative specialist, if applicable); | Section 2 and Section 3 |
| The terms of reference for the specialist reports and declaration of interest of each specialist must be provided; | Section 5 |
| The report mentioned above, must indicate if the impact rating as provided in the initial assessment remains valid; if the mitigation measures provided in the initial assessment are still applicable; or if there are any new mitigation measures which need to be included into the EA, should the request to extend the commencement period be granted by the Department | Section 7 |
| An indication if there are any new assessments/guidelines which are now relevant to the authorised development which were not undertaken as part of the initial assessment, must be taken into consideration and addressed in the report | Section 4 |
| A description and an assessment of any changes to the environment (social and biophysical) that has occurred since the initial EA was issued; | Section 3 |
| A description and an assessment of the surrounding environment, in relation to new developments or changes in land use which might impact on the authorised project, the assessment must consider the following: similar developments within a 30km radius; | Section 8 and Section 9 |
| Identified cumulative impacts must be clearly defined, and where possible the size of the identified impact must be quantified and indicated, i.e., hectares of cumulatively transformed land. | Section 9 |
| Detailed process flow and proof must be provided, to indicate how the specialist's recommendations, mitigation measures and | Section 9 and Appendices D – K |

| | |
|---|---|
| conclusions from the various similar developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project. | |
| The cumulative impacts significance rating must also inform the need and desirability of the proposed development. | Section 10 |
| A cumulative impact environmental statement on whether the proposed development must proceed. | Section 11 |
| Consent from all affected landowners (where applicable); | Signed consent submitted with Part 1 Applications |
| The Public Participation Process must be conducted in terms of Chapter 6 of the EIA Regulations, 2014 as amended. | Section 13 |
| A comments and response report. | Appendix C7 |

Various specialists[1] have thus been appointed to assess the current status of the environment assessed as part of the original EIA process (Sivest, 2012) and provide input into the Motivation Reports, which will be made available for review and comment for the proposed extension to the validity period of the Loeriesfontein 3 PV SEF EA (Refer to Table 1).

In terms of Condition 5 of the SEF EA dated 21 May 2021 (DFFE Reference Number: 12/12/20/2321/2/1) (page 6 of EA) and Chapter 5 of the EIA Regulations of December 2014 (as amended on 07 April 2017 and 13 July 2018), it is possible for the holder of an EA to apply for an amendment of the EA with the Competent Authority for a change or deviation from the project description to be approved.

Following receipt of the original EA which was issued on 29 October 2012 (DFFE Ref: 12/12/20/2321/2), and the subsequent split EAs issued on 21 May 2021, both above-mentioned split EAs (i.e. 100MW Loerisfontein 3 PV SEF EA, including the IPP portion of the shared on-site substation - DFFE Ref: 12/12/20/2321/2/1 and the 132kV Grid alignment and Eskom portion of the on-site shared substation EA - DFFE Ref:. 12/12/20/2321/2/2) lapsed on 29 October 2022 and thus need to be extended for a period of five (5) years (i.e., EA lapses on 29 October 2027). A Part 1 EA Amendment Application to extend the validity period of the EAs by 5 years was subsequently submitted to the DFFE on 26 October 2022. As mentioned, according to Regulation 28(18) of the NEMA EIA Regulations of 2014 (as amended), "*an environmental authorisation which is the subject of an amendment application contemplated in this Chapter remains valid pending the finalisation of such amendment application*". No other amendments are being applied for and the layout of the authorised infrastructure remains unchanged. In terms of Condition 5 of the SEF EA dated 21 May 2021 and Regulation 31 of the EIA Regulations of December 2014 (as amended), it is possible for an applicant to apply, in writing, to the competent authority for a change or deviation from the project description to be approved.

This amendment motivation report will be made available to registered interested and affected parties for review and comment for a 30-day period (**from 24 January 2023 to 23 February 2023**). The details on the access to the reports and to registration as an Interested and/or Affected Party (I&AP) has been advertised in "Die Gemsbok newspaper" on 11 January 2023 (Refer to Appendix C2 for proof).

[1] It must be noted that the original specialists who undertook the EIA studies have been used for these assessments as far as possible. However, where the original specialists were not available for whatever reason, suitably qualified and experienced specialists have been used to provide an assessment of the proposed amendments.

The motivation report and associated appendices will be made available for download at https://nalaenvironmental.co.za/projects/part-1-amendment-application-for-the-extension-of-the-validity-period-of-the-ea-for-the-100mw-loeriesfontein-3-pv-solar-energy-facility-northern-cape-province/ and a copy of the report in electronic tablet format will be made available for the full duration of the review and comment period at the **Loeriesfontein Public Library (3 Main/Hoof Road, Loeriesfontein)**. Hardcopies or other forms of digital formats such as CD or USB's can be made available upon request.

### 1.3 Details of the Application for Amendment:

It is requested that Condition 7 of the SEF EA dated 21 May 2021 (12/12/20/2321/2/1) (Page 06) be amended as follows:

From:

"7. This activity must commence within a period of ten (10) years from the date of the first issue of the Environmental Authorisation (i.e., the EA lapses on 29 October 2022). If commencement of the activity does not occur within that period, the authorisation lapses and a new application for Environmental Authorisation must be made in order for the activity to be undertaken".

To:

"7. This activity must commence within a period of fifteen (15) years from the date of the first issue of the Environmental Authorisation (i.e., the EA lapses on 29 October 2027). If commencement of the activity does not occur within that period, the authorisation lapses and a new application for Environmental Authorisation must be made in order for the activity to be undertaken".

As mentioned, **no other amendments are being applied for and the layout of the authorised infrastructure remains unchanged**.

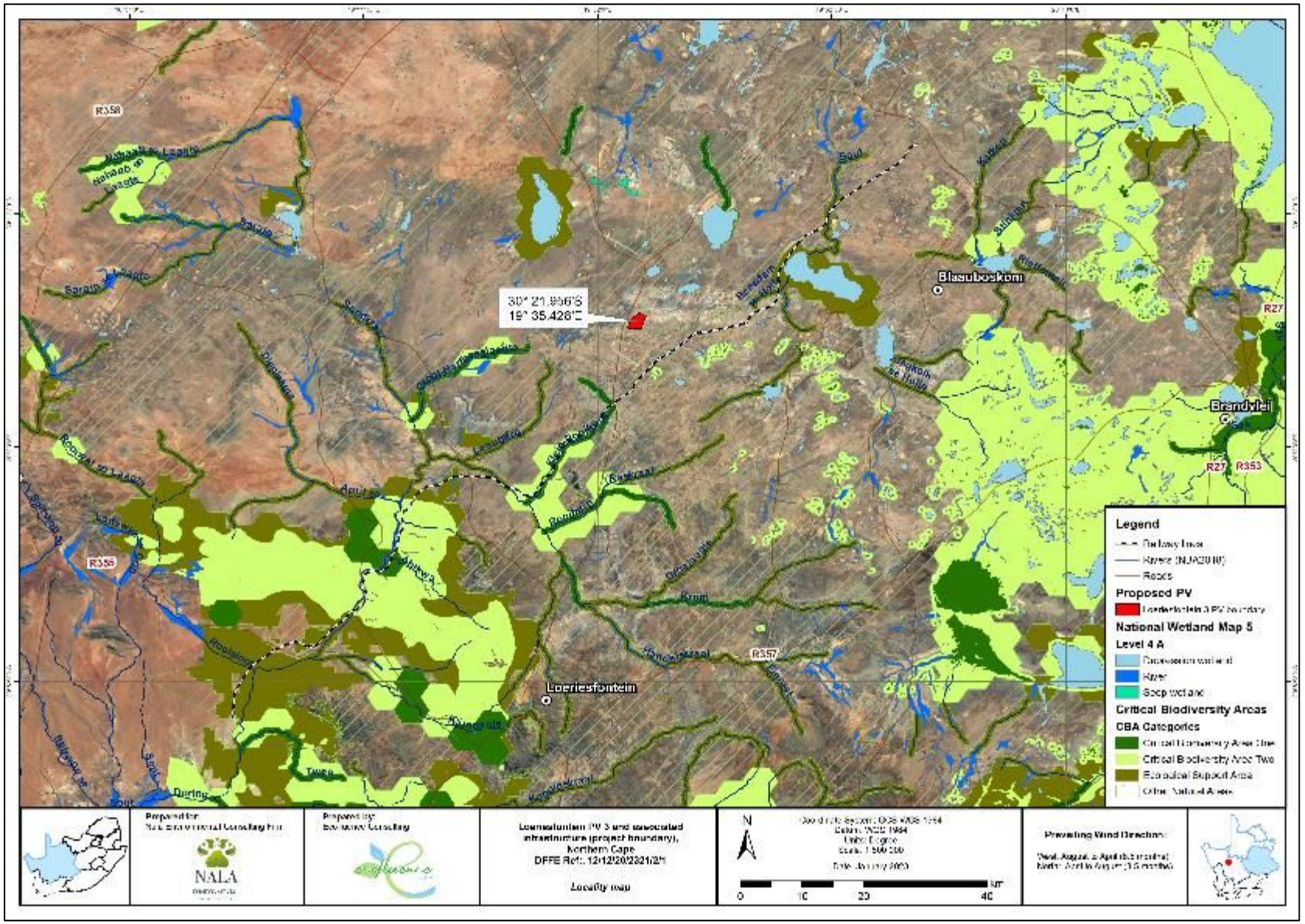



Figure 1. Locality Map of the proposed 100MW Loeriesfontein 3 PV SEF and associated infrastructure (including the IPP portion of the shared on-site substation

## 1.4 Expertise of Environmental Assessment Practitioner (EAP)

Nala Environmental Pty (Ltd) has considerable experience in the undertaking of EAIs, including part 1 and part 2 EA amendment processes. Staff and specialists who have worked on this project and contributed to the compilation of this report are detailed in Table 1 below:

**Table 1.2: Project Team**

| Name and Surname | Organisation | Specialist Study |
|---|---|---|
| **Environmental Assessment Practitioners** | | |
| Arlene Singh | Nala Environmental | Environmental Assessment Practitioner (SACNASP) (EAPASA) |
| Norman Chetsanga | Nala Environmental | Environmental Assessment Practitioner (SACNASP) |
| Justin Jacobs | Nala Environmental | Junior Environmental Consultant |
| Nadeemah Docrat | Nala Environmental | Intern Environmental Consultant |
| Vanessa Zwane | Nala Environmental | Intern Environmental Consultant |
| **Specialists (2023)** | | |
| Albert Froneman/ Chris van Rooyen | Chris van Rooyen Consulting | Avifauna Comparative Assessment (2023) |
| Andrew Husted / Martinus Erasmus | The Biodiversity Company | Biodiversity – Fauna & Flora Comparative Assessment (2023) |
| Brian Colloty | EnviroSci (Pty) Ltd | Aquatic Comparative Assessment (2023) |
| Bryony van Niekerk | Nuleaf Planning and Environmental (Pty) Ltd | Visual Comparative Assessment (2023) |
| Jenna Lavin | CTS Heritage | Heritage and Palaeontology Comparative Assessments (2023) |
| Marine Pienaar | TerraAfrica Consult cc | Soil and Agric Potential Comparative Assessment (2023) |
| Tony Barbour/ Schalk van der Merwe | Tony Barbour Environmental Consulting | Social Statement (2023) |
| Werner Marais | Animalia-consult | Bat Impact Conformation Letter (2023) |
| **Specialists (Sivest, 2012)** | | |
| Liesel Koch | SiVEST | Biodiversity (flora and fauna) Assessment |
| Chris van Rooyen | Chris van Rooyen Consulting | Avifauna Assessment |
| Werner Marais | Animalia-consult | Bat Assessment |
| Paul da Cruz | SiVEST | Surface Water Impact Assessment & Visual Potential |
| Kurt Barichievy | SiVEST | Agricultural Potential |
| Paul da Cruz and Kerry Schwartz | SiVEST | Visual Potential |
| Bernard Casey | Mainstream | Geotechnical Assessment |

| | | |
|---|---|---|
| Johnny Van Schalkwyk | Independent Consultant | Heritage Assessment |
| Nonka Byker | Master Q | Socio-economic Impact Assessment |

The change in the validity period for the SEF EA is not expected to have any effect on the findings of the Geotechnical Assessment undertaken as part of the original EIA process undertaken in 2012 (SiVEST, 2012). Therefore, no Geotechnical Specialist input and Reports have been included as part of this motivation report.

It is important to note that the original EIA report (SiVEST, 2012) included the assessment of a combined wind energy and 100MW PV SEF including all associated grid connection infrastructure, however, the original EA dated 29 October 2012 (DEA Ref: 12/12/20/2321/2) authorises the 100MW PV SEF and associated grid connection infrastructure. This original EA was subsequently split into a SEF EA (DFFE Ref: 12/12/20/2321/2/1) and Grid Connection EA (DFFE Ref: 12/12/20/2321/2/2) in 2021, as described in Section 1.2. of this report. Therefore, although the wind energy facility was originally considered in the original 2012 EIA report (SiVEST, 2012), the **specialist findings related to the WEF are not applicable to authorised PV SEF. Therefore, all findings of this report are specifically related to the authorised PV SEF and associated infrastructure, as per DFFE Ref. 12/12/20/2321/2/1.**

## SECTION 2 – BASELINE STATUS OF THE RECEIVING ENVIRONMENT ASSESSED THROUGH THE EIA PROCESS (EIA REPORT, 2012)

The Northern Cape Province is one of the most suitable regions for the establishment of PV facilities (such as the one under consideration in this report). Accordingly, land portions located outside of Loeriesfontein have been identified as a potential site for the development of a PV SEF and associated infrastructure (including grid connection infrastructure). A general description of the study area is outlined in the sections below. The receiving environment in relation to each specialist's study is also provided.

### 2.1 Locality

Loeriesfontein is a small town in the Northern Cape province of South Africa. It falls within the Hantam Local Municipality, within the greater Namakwa District Municipality, Northern Cape province. Loeriesfontein is within a basin surrounded by mountains, and it is accessed from the N7 highway (north out of Cape Town), turning off on the R27 at Van Rhynsdorp to Nieuwoudtville, then following the R357 to Loeriesfontein (a further 65km north). The proposed site is located on the farm Aan De Karree Doorn Pan No. 213 (Portion 1 and Portion 2), approximately 60km north of Loeriesfontein. The site near Loeriesfontein, falls within the boundaries of the Hantam Local Municipality. The site is approximately 10 400 ha in size, of which a smaller area (approximately 405,77 ha) will be required for the establishment of the proposed 100MW Loeriesfontein 3 PV SEF and associated infrastructure.

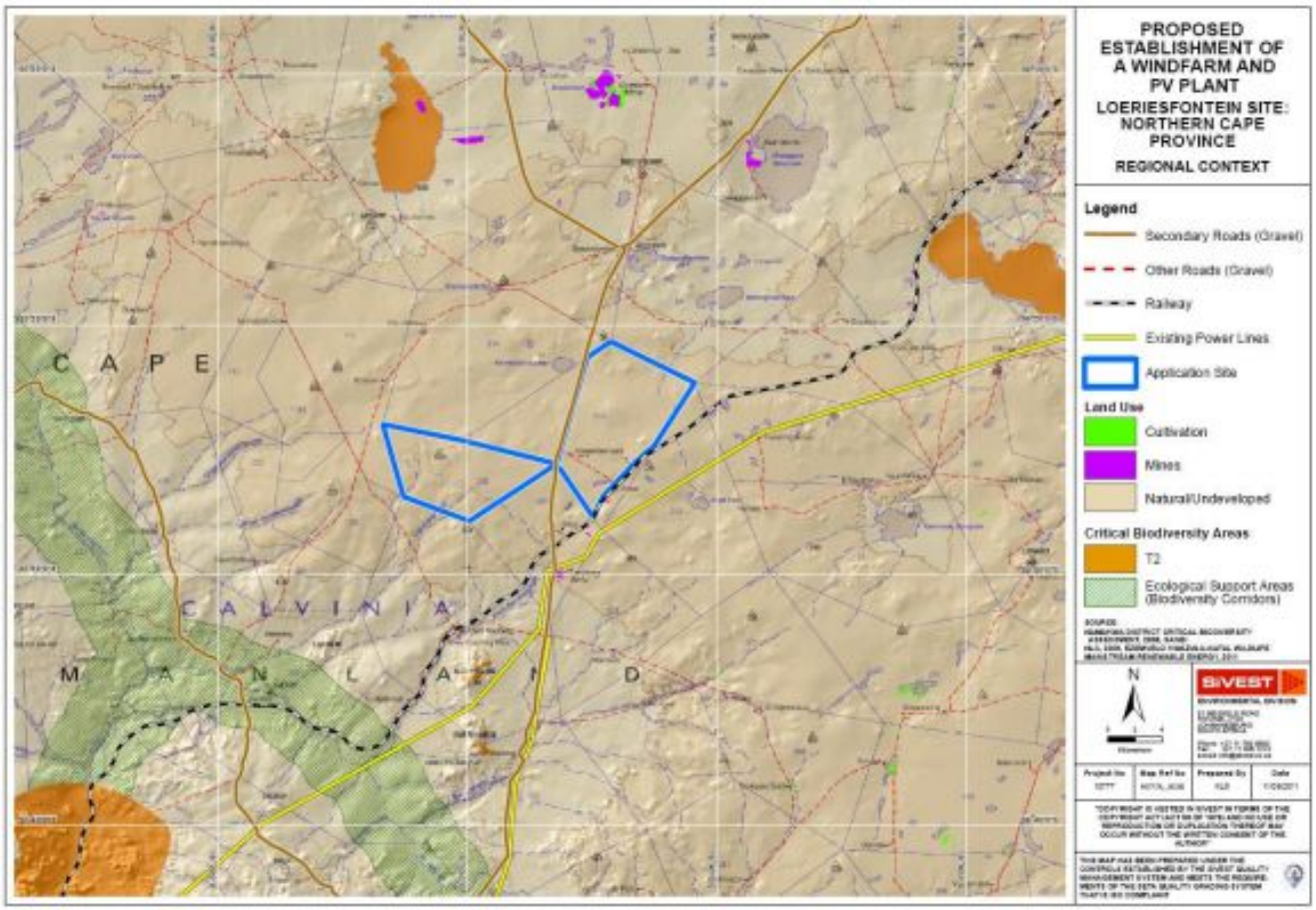



Figure 2: Loeriesfontein Regional Study Area (SiVEST, 2012).

### 2.2 Study area description

The sites that were proposed for the PV SEF, as per the SiVEST 2012 EIA report, are located near the town of Loeriesfontein, on the following farms (Figure 2):

- Portion 1 of the Farm Aan De Karree Doorn Pan No. 213, Calvinia Road, Northern Cape
- Portion 2 of the Farm Aan De Karree Doorn Pan No. 213, Calvinia Road, Northern Cape

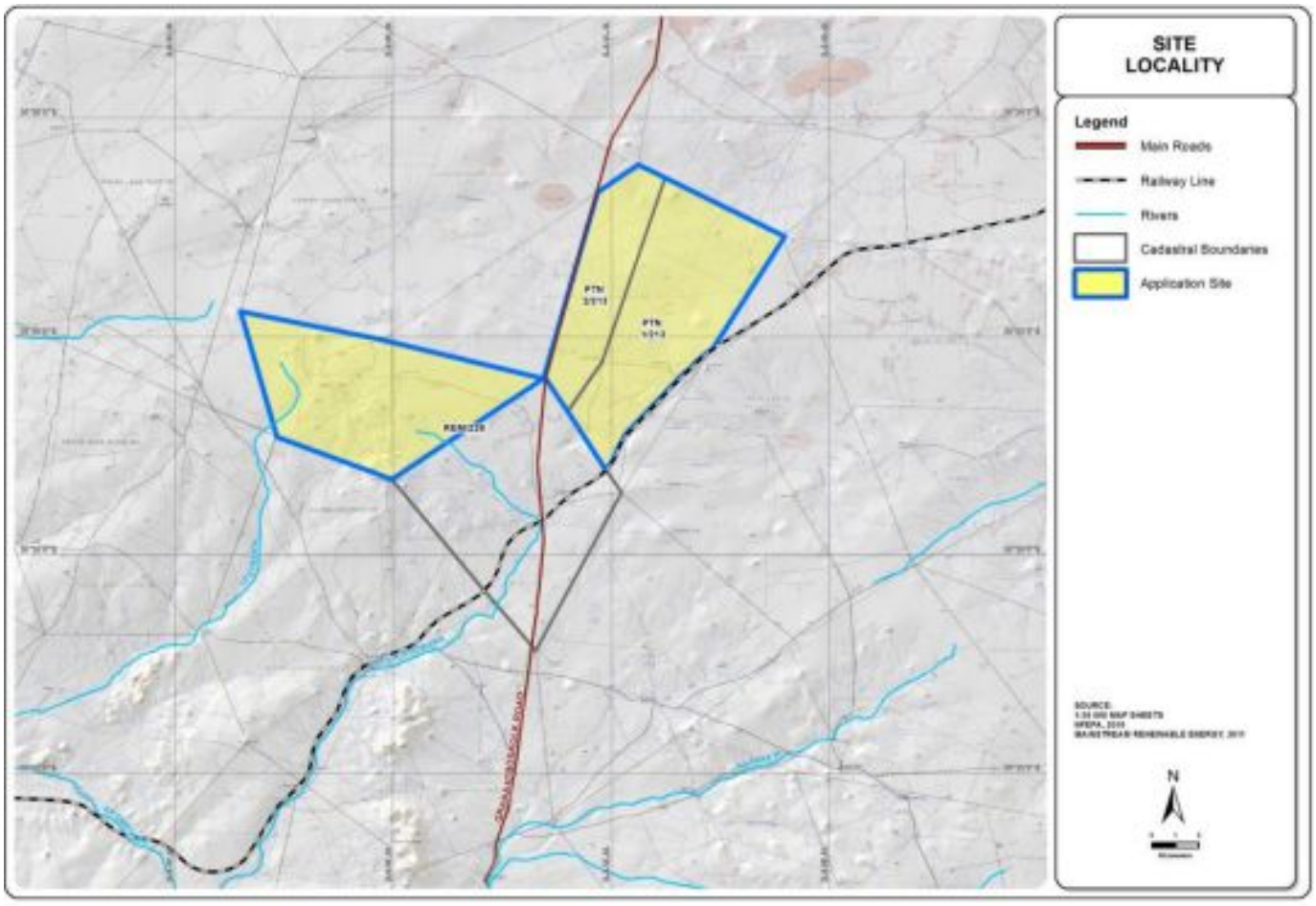



Figure 3: Loeriesfontein Site Locality Map (SiVEST, 2012)

The study area is a natural karoo shrubland, primarily used as general grazing land by low intensity of sheep and wildlife on the site. Subsequently, the human footprint in most of the area is relatively low. Vast grazing land is interspersed with seasonal pans and non-perennial streams. The non-perennial streams are located to the southwest of the site.

The area is characterised by flat and gently sloping topography, which makes it ideal for the proposed development of a PV SEF. The drainage systems situated in the southwest of the site are not anticipated to be impacted upon.

## 2.3 Climate

The study area has an arid Mediterranean type of climate, with winter rainfall regime i.e., most of the rainfall is confined to early autumn and winter. Mean Annual Precipitation (MAP) is approximately 179 mm per year, and without supplementary irrigation natural rainfall is insufficient to produce sustainable harvests (see Table 2 and Figure 3). This is reflected in the lack of dry land crop production within the study area. Average daily temperatures range from 30ºC in summer to 17 ºC in winter.

**Table 2.1: Mean rainfall for Loeriesfontein (Source: South Africa's Rain Atlas)**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Avg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rainfall (mm) | 8.7 | 11.3 | 17 | 20.8 | 23.3 | 21.1 | 18.3 | 14.3 | 11.1 | 9 | 7 | 7 | 14.1 |

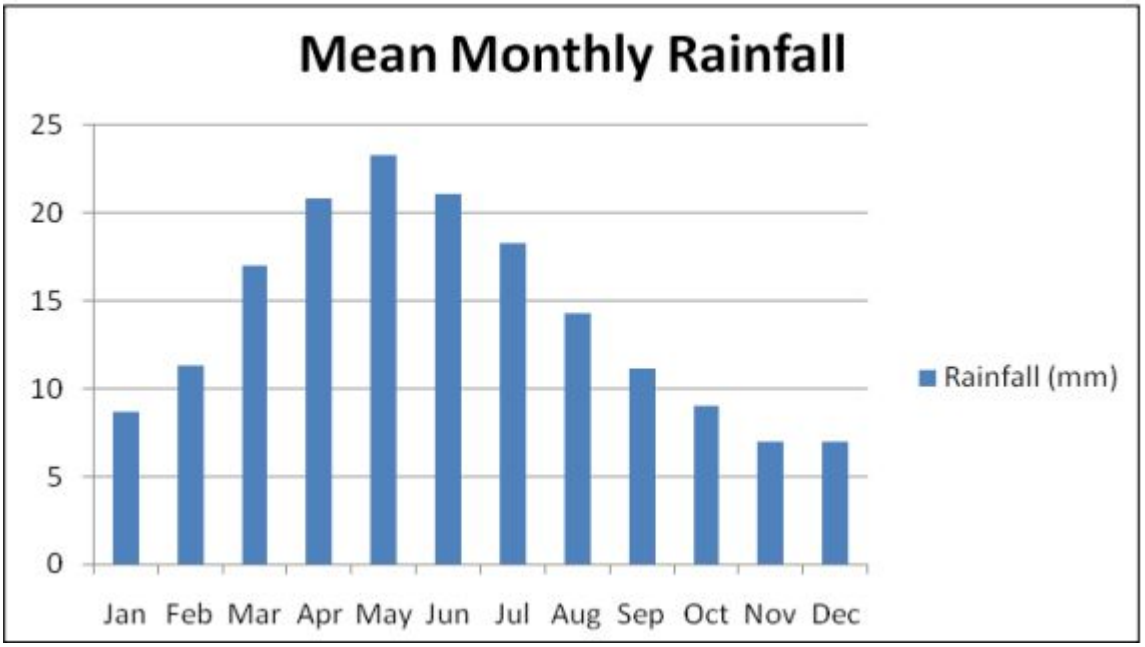



Figure 4: Mean Monthly Rainfall Graph for Loeriesfontein (SiVEST, 2012)

## 2.4 Geology

The entire study area is underlain by a Shale parent material. Shale is a clastic sedimentary rock and is formed by the settling and accumulation of clay rich minerals and other sediments. Due to the settling process, this parent material usually takes the form of parallel rock layers which lithify over time. Non-descript sedimentary geologic materials are located along the western border of the study area, derived from pre-existing rock and sediments.

## 2.5 Biodiversity (Flora and Fauna)

The original Biodiversity Assessment which formed part of the original EIA process in 2012 was previously conducted by SiVEST. The environmental baseline from a biodiversity perspective is presented below.

### 2.5.1 *Flora in the study area*

According to the Namakwa Bioregional Plan (2010), the Hantam Local Municipality has 59 threatened, 9 near threatened and 25 data deficient plant species. The majority of the Municipality is not conserved in any way, including the study area in question. The vegetation type in question has about 10 endemic species.

According to Mucina, *et al,* (2006), the proposed PV site in Loeriesfontein falls within the Bushmanland Basin Shrubland vegetation type (Figure 4) which is classified under the Bushmanland and West Griqualand bioregion of the Nama Karoo Biome (Mucina, *et al.,* 2006). In terms of the conservation status, the Bushmanland Basin Shrubland vegetation type is considered Least Threatened (Mucina, *et al,* (2006).

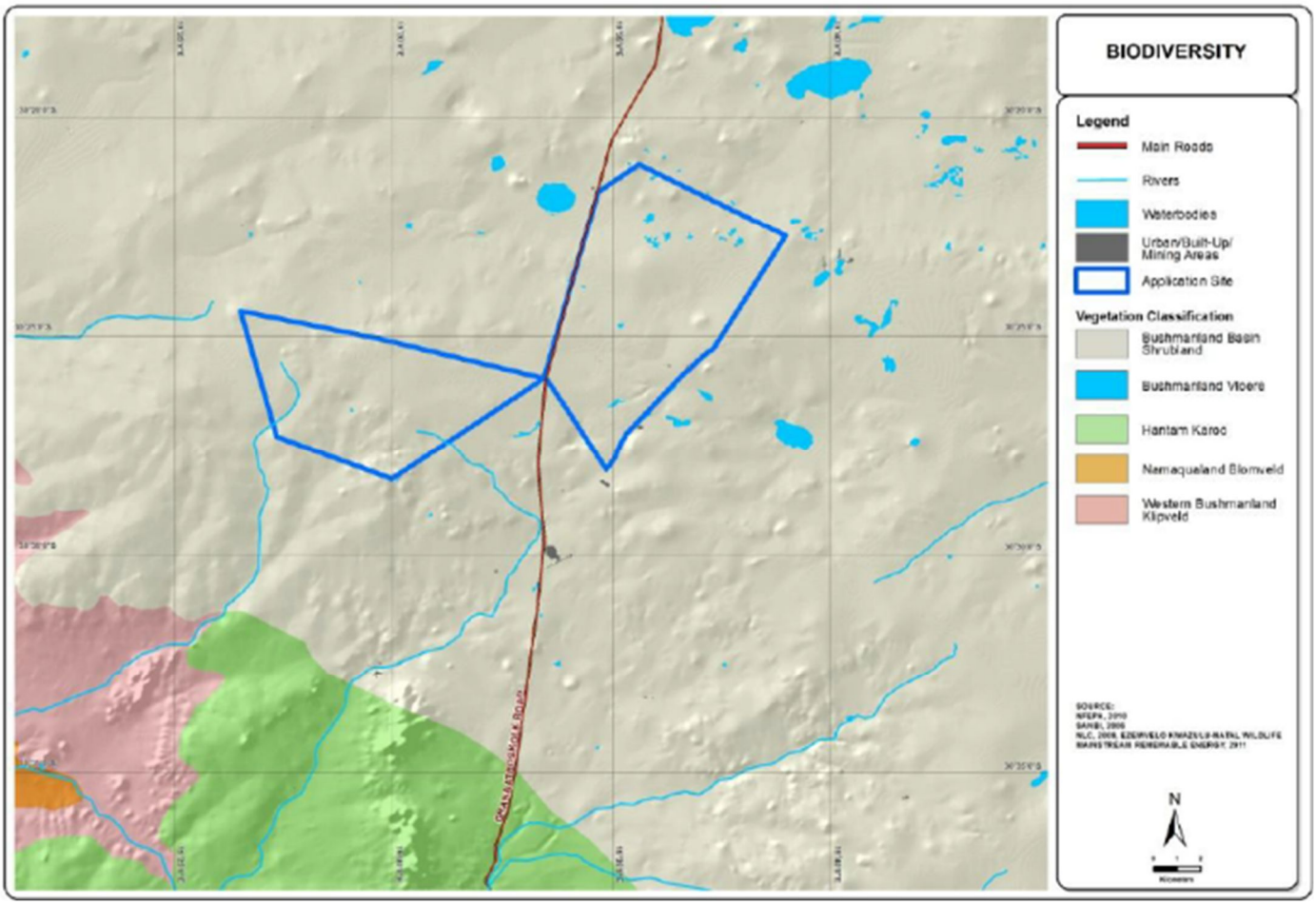



Figure 5. Vegetation of the study area (SiVEST, 2012)

According to Esler, *et al.,* (2006), vegetation cover in the study area ranges from 15% to 20% which is the lowest compared to other parts of the country i.e. the central and eastern parts. Vegetation cover refers to the percentage of soil overshadowed by plants (Esler, *et al.,* 2006).

The vegetation type on the site is described as Bushmanland Basin Shrubland (Figure 5) located in the Nama Karoo Biome.

Figure 6: Sparse vegetation, typical of the Nama Karoo Biome (SiVEST, 2012)

This vegetation type is characterised by low shrubs species which include: *Aptosimum spinescens*, *Hermannia spinosa*, *Pentzia spinescens, Zygophyllum microphyllum* and *Aptosimum elongatum*. The vegetation type is considered to be **Least Threatened** and none of it is conserved in statutory conservation areas (Mucina, *et al,* (2006).

The study area is transformed after good winter rains into a large expanse of wildflowers, however, not as spectacularly as areas further south. This is, however, heavily dependent on the amount of rainfall. The study area does not fall into a Critical Biodiversity Area (CBA) as defined by the Namakwa Bioregional Plan. Species diversity on the site is limited give the aridity of the region.

In terms of endemism, out of about 36 plant species in the study area (within three Quarter Degree Squares (QDS) - 3019AD, 3019BC and 3019DA), only 10 (28%) are endemic (SANBI, 2009). According to Gibbs Russel, (1987), of 2147 species in a central area about 198,000 km² of the Nama Karoo only 377 (16%) were endemic. The above figures imply that the Nama Karoo presents low levels of plant endemism. Endemism refers to an ecological state in which a species or other taxonomic group is restricted to a particular geographic region, owing to factor such as isolation or response to soil or climatic conditions (Allaby, 1994).

However, according to Desmet (2000), an archipelago of mountains within a part of the Nama Karoo ecoregion known as Bushmanland were found to harbor both Nama Karoo and Succulent Karoo type vegetation, as well as a diverse assemblage of succulents endemic to the archipelago (Desmet 2000). Therefore, the wider Bushmanland area may not exhibit such a low level of endemism.

**Table 2.2 Endemic species documented within the study area (SiVEST, 2012).**

| Family | Species | Threat status | SA Endemic |
|---|---|---|---|
| Asteraceae | *Amellus microglossus DC* | LC | Yes |
| Asteraceae | *Eriocephalus spinescens Burch.* | LC | Yes |
| Brassicaceae | *Heliophila arenosa Schltr.* | LC | Yes |
| Chenopodiaceae | *Salsola henriciae I. Verd.* | LC | Yes |
| Fabaceae | *Lotononis leptoloba Bolus* | LC | Yes |
| Iridaceae | *Tritonia karooica M.P. de Vos* | LC | Yes |
| Mesembryanthemaceae | *Psilocaulon junceum (Haw.) Schwantes* | LC | Yes |
| Mesembryanthemaceae | *Aloinopsis luckhoffii (L.Bolus) L.Bolus* | DDT | Yes |
| Scrophulariaceae | *Aptosimum indivisum Burch. Ex Benth.* | LC | Yes |
| Scrophulariaceae | *Nemesia calcarata E.Mey. ex Benth.* | LC | Yes |

A species of concern identified in the study area was *Hoodia gordonii* (Boboejaanghaap), an important medicinal plant which is over harvested in the Northern Cape. **No specimens were however noted during the 2012 specialist's assessments**.

*H. gordonii*, as well as other *Hoodia* species, were listed as protected species under the Environmental Conservation Ordinance No.19 of 1974. No one is allowed to harvest, collect, damage, collect seeds, trade (import or export) or transport any *Hoodia* material without a valid permit from the Permit Section of the Directorate of Conservation Service in the Northern Cape. Trade in any parts and derivatives of Hoodia species is prohibited without a permit.

In terms of GN 1187 published under the National Environmental Management: Biodiversity Act on the 23rd of February 2007, none of the species documented within the study area were considered to be protected in terms of this legislation at the time. The assessment indicated that the study area did not fall into a CBA or Ecological Support Area (ESA), as defined by the Namakwa Bioregional Plan.

### 2.5.2 **Fauna in the study area**

- Mammals

Various mammal species are likely to occur within the study area. Table 4 comprises a list of mammals that are likely to occur in study area, with the assigned level of threat facing each particular species as identified by the assessment undertaken in 2012 (SiVEST, 2012). A map was used to correlate the occurrence of the Red Data species with their approximate occurrence within the study area. According to Friedman and Daly, (2004), the **majority of species within the study area are listed as species of least concern**. As mentioned above, the Honey Badger (*Mellivora capensis*) and the Littledale's Whistling Rat (*Parotomys littledalei*), which are both listed as Near Threatened, are **likely to occur in the study area**. On the other hand, the Black Rhinoceros (*Diceros bicornis bicornis*), which is listed as Critically Endangered (Friedman and Daly, 2004), along with several other recorded mammal species, are **not likely to occur in the study ar**ea due to the anthropogenic activities such as fencing etc. that have taken place.

Table 2.3 below presents mammal species listed in GN 1187, published under the National Environmental Management: Biodiversity Act on the 23rd of February 2007, which potentially occur within the study area.

**Table 2.3: Mammal species listed in GN 1187, published under the National Environmental Management: Biodiversity Act on the 23rd of February 2007 (SiVEST, 2012)**

| Common name | Scientific name | Status under GN 1187 |
|---|---|---|
| Black Rhinoceros | *Diceros bicornis bicornis* | Endangered |
| Leopard | *Panthera pardus* | Vulnerable |
| Black-footed Cat | *Felis nigripes* | Protected |
| Honey badger | *Mellivora capensis* | Protected |
| Cape Fox | *Vulpes Chama* | Protected |

Note that Friedman and Daly, (2004) list Black Rhinoceros as Critically Endangered while GN 1187 lists the species as Endangered.

The specialist determined that majority of these species were **highly unlikely to occur within the study area**, particularly the large mammals due to the anthropogenic activities such as fencing and lack of protected areas.

Results of the Field Assessment (SiVEST, 2012)

During the 2012 field assessments, only two small mammal species were trapped over a three-day survey period. These include the Striped Mouse (*Rhabdomys pumilio*) (Figure 6) and the Round-eared elephant-shrew (*Macroscelides proboscideus*).

Figure 7: Striped Mouse (*Rhabdomys pumilio*) (SiVEST, 2012)

Furthermore, several individuals of yellow mongoose (*Cynictis penicillata*) and scrub hares (*lepus saxatilis*) were spotted within the study area during site surveys. In addition, evidence of Porcupines (*Hysterix africaeaustralis*) (Figure 7) and Aardvark (*Orycteropus afer*) were prominent on the site.

Figure 8: Porcupine (*Hysterix africaeaustralis*) excavation and faeces on the site. (SiVEST, 2012)

Trapping success of small mammals was low generally, perhaps due to the low cover which is typical of the Nama Karoo Biome where although vegetation grows on rich soils, plant growth is limited by climate. Cover is among the most important factors that influence small mammal abundance and richness. This is because unlike open habitats which increase predation risk (Kotler, 1997), habitats with cover provide protection against predators (Asher et al., 2004; Keller & Schradin, 2008). According to Silva et al., (2005), open habitats exhibit low mammal diversity due to reduced cover (which provides food and resources) hence leading to lower fecundity (Grant et al., 1982). Therefore, greater species abundance and richness are expected in areas that exhibit dense cover.

Furthermore, sheep grazing observed within the study area influenced the existence of small mammals in the area. Although in terms of grazing, the farm where the proposed site is situated was well managed in that rest periods were allowed between camps, it was predicated that grazing had an impact on small mammal richness and abundance to some degree. According to Bergstrom (2004), the presence of livestock has a negative effect on both small mammal species richness and abundance. Moreover, small mammals were seen as indicators of environmental conditions (Linzey & Kesner, 1997). This is because changes in the environment due to heavy grazing leads to changes in the habitats for small mammals therefore affecting their abundance, survival and breeding success (Dooley & Bowers, 1996). In the North American rangelands, trampling and grazing have been shown to reduce the lower vegetation cover for small animals, hence increasing their exposure to predators (Grant *et al.,* 1982; Birney et al., 1976; Edge *et al.,* 1995). In addition, trampling may affect the burrowing substrate for the rodents (Bergstrom, 2004).

The mammal species of concern is the bats which are present within the area due to the risks of barotrauma. A separate assessment of this faunal grouping was however undertaken. This faunal grouping is also addressed in a separate study.

- Reptiles

According to the Namakwa Bioregional Plan, the Loeriesfontein has a high reptile species abundance. Several reptile species are present in the study area. According to the current Red Data, **none of these species are currently Red Listed** (McLachlan, 1978). The Red Data book was being updated at the time.

Armadillo Girdled Lizard *(Cordylus cataphractus).* which potentially occurs in the study area (Branch 1998), is a protected species in terms of GN 1187 published under the National Environmental Management: Biodiversity Act on the 23rd of February 2007. The species however **was not observed**.

Results of the field Assessment (SiVEST, 2012)

Habitat for these species was available. A number of reptiles were trapped in pitfall traps during the 2012 field assessments. These include the Namaqua sand lizard, Karoo (*Pedioplanis namaquensis*) and Spotted desert lizard (*Meroles suborbitalis*).

Figure 9: Namaqua sand lizard, Karoo (*Pedioplanis namaquensis*) (SiVEST, 2012)

Namaqua sand lizards are small and slender with an SVL (snout-vent length) of about 53mm and a long tail (Branch, 1998). The species occur in sparsely vegetated sand and gravel flats in karroid veld, arid savannah and semi-desert (Branch, 1998). Their foraging range is wide and they feed on small insects (Branch, 1998).

Figure 10: Spotted desert lizard (*Meroles suborbitalis*)

Figure 11: Sandveld Lizard possibly Western Sandveld Lizard (*Nucras tessellata*) and Endemic species

Apart from *C. cataphractus*, no other species listed in GN 1187 published under the National Environmental Management: Biodiversity Act on the 23rd of February 2007 occured within the study area at the time of the EIA process.

- Amphibians

Results of the Field Assessment

**No amphibian species were recorded** in the study site during the 2012 field surveys. However, Du Preez and Carruthers, (2009) list a number of amphibians that could potentially occur in the study area and are likely to be present near water courses. **All amphibian species previously recorded in the study area are Not Threatened** (Du Preez and Carruthers, 2009). The study area is extremely dry, with very little rainfall and amphibian numbers are expected to be very low. The table below indicates the species that have been previously recorded.

**Table 2.4: Amphibian species in the study area (SiVEST, 2012)**

| Scientific | Common | Category |
|---|---|---|
| *Vandijkophrynus gariepensis* | Karoo Toad | Not threatened |
| *Vandijkophrynus robinsoni* | Paradise Toad | Not threatened |
| *Cacosternum boettger* | Boettger's Caco | Not threatened |
| *Amietia fuscigula* | Cape River Frog | Not threatened |
| *Xenopus laevis* | Common Platanna | Not threatened |

There were **no red data amphibian species recorded in the study area. No species listed in GN 1187 published under the National Environmental Management: Biodiversity Act on the 23rd of February 2007 occur within the study area**.

- Invertebrates

The Namakwa Bioregional Plan indicates that there is a high diversity of invertebrate species associated with the pollination systems associated with all the flowers in the study area.

Results of the Field Assessment

Several invertebrates were trapped in pitfall traps which were randomly placed in the study area, while others were trapped in sweep nets and others recorded around the study area (Table 2.5)

**Table 2.5: List of invertebrates in the study area (SiVEST, 2012)**

| Order: Family | Common name | Scientific name |
|---|---|---|
| Coleoptera: Carabidae | Velvet Ground Beetle | *Graphipterus limbatus* |
| Coleoptera: Scarabaeidae | Wolly Chafer | *Sparrmannia flava* |
| Coleoptera: Tenebrionidae | Long-legged Darkling Beetle | *Stenocara dentana* |
| Coleoptera: Tenebrionidae | Unspecified | *Stenocara longipes* |
| Coleoptera: Tenebrionidae | Unspecified | *Unspecified* |
| Coleoptera: Tenebrionidae | Unspecified | *Unspecified* |
| Coleoptera: Meloidae | CMR Bean Beetle | *Mylabris oculata* |

| | | |
|---|---|---|
| Hymenoptera: Formicidae | Bal-byter | *Camponotus fulvopilosus* |
| Orthoptera: Acrididae | Yellow wings | *Oedaleus* |
| Orthoptera: Pyrgomorphidae | Unspecified | *Ochrophlebia* |
| Orthoptera: Acrididae | Unspecified | *Rhachitopis* |
| Orthoptera: Pamphagidae | Saw-backed locust | *Haplolopha* |

The Velvet Ground Beetle (*Graphipterus limbatus*) which occurs in the study area is a protected species in terms of GN 1187 published under the National Environmental Management: Biodiversity Act on the 23rd of February 2007.

**Apart from the *G. limbatus*, no other species listed in GN 1187 published under the National Environmental Management: Biodiversity Act on the 23rd of February 2007 occurs within the study area.**

It is important to note that invertebrate species are mobile in nature and are not likely to be affected by the construction of the PV facility. In addition, no unique larval habitat is present on the site which could be affected by the proposed development. Mitigation measures to reduce habitat destruction will aid in the preservation of habitat for invertebrate species.

### 2.6 Avifauna

The original Avifauna Assessment was conducted by Chris van Rooyen and the 2012 baseline assessment (SiVEST, 2012) is presented below.

#### 2.6.1 Natural environment

According to Mucina *et al.* (2006), the vegetation at the proposed PV site in Loeriesfontein is classified as Bushmanland Basin Shrubland. However, vegetation structure is more critical in determining bird habitat than actual plant composition (Harrison *et.al.* 1997). Therefore, the description of the habitat presented in this study concentrates on factors relevant to birds, and does not give an exhaustive list of plant species which occur in the study area (for more detail on the vegetation composition and potential impacts, please consult the Biodiversity (Flora and Fauna) Assessment above). The vegetation classification system presented in the Atlas of southern African birds (SABAP1) (Harrison *et.al.* 1997) was used for purposes of the study. The criteria used by the authors to amalgamate botanically defined vegetation units, or to keep them separate were (1) the existence of clear differences in vegetation structure, likely to be relevant to birds, and (2) the results of published community studies on bird/vegetation associations. It is important to note that no new vegetation unit boundaries were created, with use being made only of previously published data.

The proposed PV site is situated in an ecological transitional zone between the Nama Karoo and Succulent Karoo biomes (Harrison *et.al.* 1997). Both Karoo biomes support a particularly high diversity of species endemic to southern Africa. The Karoo avifauna characteristically comprises ground-dwelling species of open habitats, but the many tree-lined watercourses allow penetration of several species characteristic of arid woodland (Harrison *et.al.* 1997), particularly in the Nama Karoo. In comparison with Succulent Karoo, the Nama Karoo has higher proportions of grass and tree cover. The ecotonal nature of the study area is apparent from the presence of typical species of both Succulent and Nama Karoo at the PV site e.g. Karoo Eremomela *Eremomela gregalis* and Red Lark *Calendulauda burra*.

An important feature of the arid landscape where the proposed site is located is the presence of pans. Pans are endorheic wetlands having closed drainage systems; water usually flows in from small catchments but with no outflow from the pan basins themselves. They are of

poorly drained, relatively flat and dry regions. Water loss is mainly through evaporation, sometimes resulting in saline conditions, especially in the most arid regions. Water depth is shallow (<3m) and flooding characteristically ephemeral (Harrison et al. 1997). Although the site itself does not contain any significant pans, there are several large pans situated in a 20km radius around the site. When these pans hold water, waterbird movement between them are likely, including Greater Flamingo *Phoenicopterus roseus* and Lesser Flamingo *Phoenicopterus minor*. Some of that movement might take place over the proposed PV site.

### 2.6.2 Modified environment

Whilst most of the distribution and abundance of the bird species at the PV site are associated with natural vegetation, as this comprises the vast majority of habitat, it is also necessary to examine the modified environment available to birds.

In addition to the natural vegetation, the following avifaunal relevant modifications to the habitat were recorded at the PV site:

- Transmission lines: There are two transmission lines located in close proximity to the site, with one running partially within the boundaries of the site. Transmission lines are important anthropogenic habitat modifications, especially in an arid environment, as they constitute important perching and nesting substrate for raptors and crows.
- Artificial water points: A water trough was recorded on the site. In this highly arid environment, water attracts birds like a magnet. A water trough is a source of surface water that could periodically attract several priority species of raptors and small birds, particularly sandgrouse, larks and seed-eaters

Figure 12 below provides a photographic overview of the bird habitats at the site, indicating important habitat features, and the location of monitoring transects and vantage points for flight observations.


Figure 12: The bird habitat and the location of monitoring transects and vantage points for flight observations at the development area and control area.

It is estimated that at least 76 bird species could potentially occur at the site, of which 60 were recorded during pre-construction monitoring in similar habitat at the adjacent Loeriesfontein wind farm in September 2011 – September 2013. The species potentially occurring at the site can be broadly classified in four groupings, namely large terrestrial species, soaring species, waterbirds and small birds.

- Large terrestrial species: Medium to large birds that spend most of the time foraging on the ground. They do not fly often and then generally short distances at low to medium altitude, usually powered flight. Some species undertake longer distance flights at higher altitudes, when commuting between foraging and roosting areas. At the wind farm site, cranes, bustards and korhaans are included in this category.
- Soaring species: Species that spend a significant time on the wing in a variety of flight modes including soaring, kiting, hovering and gliding at medium to high altitudes. These are mostly raptors.
- Waterbirds: These are species that are generally associated with aquatic habitats, e.g. pans. In the vicinity of solar PV site, these comprise ducks, waders and flamingos.
- Small birds: These are mainly several species of passerines. These species generally spend most of the time on the ground or calling from perches. Sandgrouse undertake long distance flights.

A number of Red Data species could occur at the site. These are listed in Table 2.6:

**Table 2.6. Red Data species potentially occurring at the proposed Loeriesfontein 3 PV site (SiVEST, 2012)**

| Species | *Scientific Name* | Conservation Status (Taylor *et al.* 2015) | Recorded on the Site and immediate environment? |
|---|---|---|---|
| Martial Eagle | *Polemaetus bellicosus* | Endangered | Y |
| Karoo Korhaan | *Eupodotis vigorsii* | Near threatened | Y |
| Lanner Falcon | *Falco biarmicus* | Vulnerable | Y |
| Kori Bustard | *Ardeotis kori* | Near threatened | Y |
| Ludwig's Bustard | *Neotis ludwigii* | Endangered | Y |
| Sclater's Lark | *Spizocorys sclateri* | Near threatened | Y |
| Red Lark | *Certhilauda burra* | Vulnerable | Y |

## 2.7 Bats

The Bat Assessment was conducted in 2012 by Werner Marais of Animalia (Animalia, 2012) and considered the proposed wind energy facility, PV SEF and associated grid infrastructure.

### 2.7.1 Species probability of occurrence at the proposed site

**Table 2.7: Table of species that may be roosting on the study area, the possible site-specific roosts, and their probability of occurrence.**

| Species | Common name | Probability of occurrence | Conservation status | Possible roosting habitat to be utilised on study area |
|---|---|---|---|---|
| *Rhinolophuscapensis* | Cape horseshoe bat | Low | NT | Roosts gregariously in caves, no known caves close to the study site. |
| *Rhinolophusclivosus* | Geoffroy's horseshoe bat | Low | LC | Roosts gregariously in caves, no known caves close to the study site. |
| *Nycteris thebaica* | Egyptian slitfaced bat | High | LC | Cavities, aardvark burrows, and culverts under roads. Any suitable hollows. |
| *Tadarida aegytiaca* | Egyptian free-tailed bat | Confirmed | LC | Crevices, buildings, rock crevices. Very common and adptable |
| *Cistugoseabrae* | Angolan winggland bat | Medium – High | NT | Endemic to West Coast, restricted to arid climates (semi-desert), netted in dry river beds |
| *Miniopterus natalensis* | Natal longfingered bat | Low | NT | Roosts gregariously in caves, no known caves close to the study site. |
| *Neoromiciacapensis* | Cape serotine | Confirmed | LC | Under bark of trees and roofs of buildings. Common and adaptable. |

LC = Least Concern; NT = Near Threatened; V = Vulnerable; DD = Data Deficient (Monadjemet al., 2010).

### 2.7.2 Bat detection and roost scouting

Very few bat calls (5 in total) were recorded during vehicle-based monitoring within the site (Figure 12). The site is mostly void of roosting opportunities (Figure 13) and the specialist did not come across any open water sources during physical scouting of the site. No sources of open water were detected using Google Earth searches of the site. The lack of bat activity during monitoring can therefore probably be attributed to the lack of roosting space and open drinking water. Bat activity is most likely centred around the dams north of the Loeriesfontein site, as insect availability will be much higher here. Roosting space created by trees, rocky outcrops and buildings are also more abundant in this area.

A bat call consists of a series of ultrasonic sound pulses, with each species calling at a characteristic sound frequency (Figure 14). It is used for navigational and hunting purposes, comparable to but more sophisticated than modern sonar. Pulses within a bat call may also vary by means of their sound frequency and characteristics, although this variation is within a certain range restricted to a specific bat

species. Certain call parameters are used to identify a bat species from its echolocation call. These include pulse length, pulse bandwidth, pulse interval and pulse dominant frequency (loudest frequency), of which dominant frequency is the most commonly used parameter. The dominant frequencies of the three loudest pulses recorded were chosen since the loudest pulse is produced when the bat is in close proximity to the bat detector, limiting the ramifications the Doppler Effect has on the results of sound waves emitted by a moving bat. A feeding buzz is the common term used to describe the change in echolocation call when a bat is approaching its prey. A feeding buzz is a series of very short pulses that dramatically become more rapid as the bat is closing in on the insect prey, giving it a clear image of the prey. A feeding buzz is proof of bats actively foraging. Species identification with the use of echolocation is less accurate when compared to morphological identification, nevertheless it is a very certain and accurate indication of bat activity and their presence.


Figure 13: Bat species and activity detected during vehicle monitoring on site, showing very low levels of activity. Orange circles indicate where Egyptian free-tailed bats (*Tadarida aegyptiaca*) were detected and yellow circles indicate where Cape serotine bats (*Neoromicia capensis*) were detected.(SiVEST, 2012)

Figure 14: Typical topography of site showing lack of roosting opportunities for bats. (SiVEST, 2012)

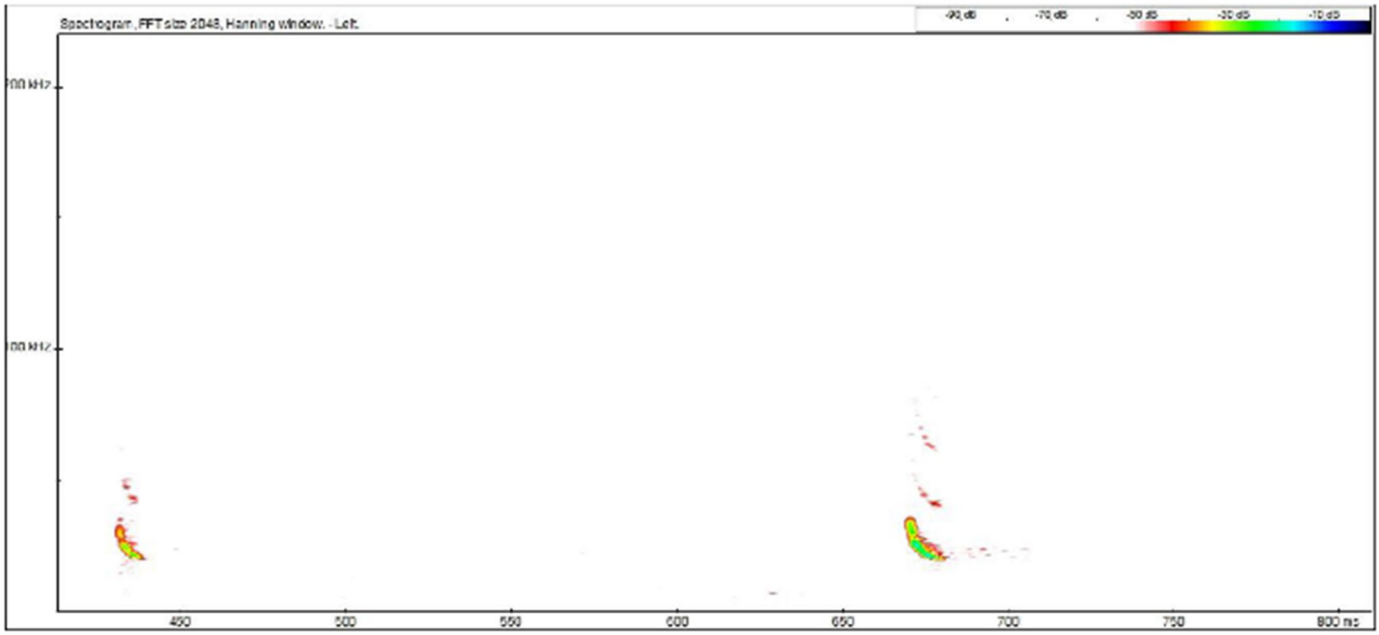



Figure 15: Spectrogram of pulses from *Tadarida aegyptiaca* (Egyptian Free-tailed bat)

As highlighted, the Bat Impact Assessment undertaken by SiVEST in 2012 (Animalia, 2012) considered the development of a wind energy facility, solar PV facility and grid infrastructure. Although the impacts of the PV SEF and associated infrastructure have a relatively low impact on bats and was not highlighted in the DFFE Screening Tool the specialist has provided a statement as per Appendix I.

## 2.8 Surface Water

The Surface Water Assessment for 2012 was conducted by SiVEST (SiVEST, 2012) and the details of the assessment are presented below.

### 2.8.1 Study Area Drainage and Hydrology

In order to understand the drainage and hydrology of the study site, it is best to consult with available literature pertaining to surface water resources in the study area. However, academic or scientific literature is very limited and/or potentially inaccessible. Mucina and Rutherford (2006), however, reports on the general condition of the landscape with respect to the climate, vegetation and landscape features as well as the geology and soils for the bioregion in which the study site is located. Given this information, the drainage context can be elucidated. Accordingly, Mucina and Rutherford (2006) provide the main source of information for this section unless otherwise specified.

The climate of the bioregion depicts a rainfall pattern occurring in late summer and early autumn with the Mean Annual Precipitation (MAP) ranging from about 100-200mm. The Mean maximum and minimum monthly temperatures in Brandvlei are 39.5° C and -4.6° C respectively.

At a more local scale, the area of Loeriesfontein normally receives about 143mm of rain per year and because it receives most of its rainfall during winter it has a Mediterranean climate (www.saexplorer.co.za). The general rainfall pattern in Loeriesfontein indicates that the lowest rainfall is received in January whilst the highest is in June (www.saexplorer.co.za). The monthly distribution of average daily maximum temperatures indicates that the average midday temperatures for Loeriesfontein ranges from 17°C in July to 31.8°C in February (www.saexplorer.co.za). The region is the coldest during July when the mercury drops to 2.4°C on average during the night (www.saexplorer.co.za). The average minimum daily temperatures range from a high in the region of 14° C in February to a low of about 2° C around June (www.saexplorer.co.za).

The landscape of the study site is characterized by slightly irregular plains covered with dwarf shrubland dominated by a mixture of low sturdy and spiny shrubs (*Rhigozum, Salsola, Pentzia, Eriocephalus*) white grasses (*Stipagrostis*) and in years of high rainfall also by abundant annuals such as *Gazania* and *Leysera*. Beneath the vegetation cover, the underlying geology of the study site is predominantly underlain by Mudstones and shales of Ecca Group (Prince Albert and Volkrust Formations) and Dwyka tillites both of early Karoo age. Approximately 20% of rocky outcrops is formed by Jurassic intrusive dolerite sheets and dykes. The overlying soils are made up of shallow Mispah and Glenrosa forms, with lime generally present in the entire landscape and to a lesser extent, red-yellow apedal, freely drained soils with high base status and usually <15% clay are also present. The soil content of the above-mentioned soils is very high.

From the above given information, it has been indicated that the area around Loeriesfontein receives low rainfall primarily during the winter months when it is reasonably cold. With relatively flat areas associated with irregular plains, water accumulation in low lying drainage areas can be anticipated. Due to a relatively shallow soil profile as a result of Mispah and Glenrosa soil forms, very little sub-surface drainage is expected except where deeper soil profiles prevail. However, where deeper soils prevail, the red-yellow apedal soil form is likely to be present which consist of a low percentage of clay and express a freely draining characteristic. Surface water resources (in the way of wetlands specifically) are therefore not expected to be a prominent environmental feature in the landscape of the study site. Instead, any surface water resources are foreseen to be temporary to ephemeral in nature, if any occur in the study site.

### 2.8.2 Findings of Assessment

- Desktop Database Surface Water Features

According to the consulted databases, the study site falls on the divide of the Olifants and Orange primary catchments. At the quarternary catchment level, most of the southern area of Portion 2 of Farm No. 226 and a relatively smaller sub-section of Portions 1 and 2 of Farm No. 213 fall within the quarternary catchment E31C belonging to the Olifants primary catchment. Most of the northern areas of Portions 1 and 2 of Farm No. 213 as well as a relatively smaller area to the north of Portion 2 of Farm No. 226 falls within the quarternary catchment D53F draining into the orange primary catchment.

The occurrence of wetlands and other surface water resources for the greater study area, as per information drawn from the various databases, are displayed in Figure 15. The NFEPA (2011) database particularly is the most comprehensive and updated database as far as wetlands and rivers are concerned for the country and best reflects the occurrence of surface water resources. In terms of the database, a total of 29 wetlands occurs on all the portions constituting the Loeriesfontein study site. More specifically, of the wetlands that occur on the study site in terms of the database, thirteen are depression wetlands, eight are flat wetlands and seven are seep wetlands.

Two priority river systems (NFEPA, 2011) distanced approximately 5km apart from one another, flow to the south of the Loeriesfontein study site. The river systems located to the western most area of the site is identified as the Leeuberg River (Reach number E81). This particular river is classed as a largely natural river system (Class B) according to the Present Ecological State assessment conducted in 1999 (NFEPA 2011). Equally, the river system located in the central southern region of the study site is classed as a largely natural river system (Class B) according to the Present Ecological State assessment conducted in 1999 (NFEPA 2011). This river is identified as the Klein-Rooiberg River (Reach number E61). Numerous associated drainage lines can be evidenced from satellite imagery in addition to these systems.

The results of desktop analysis of the 29 wetlands, 2 rivers and numerous drainage lines were taken into the field for verification and potential further assessment.

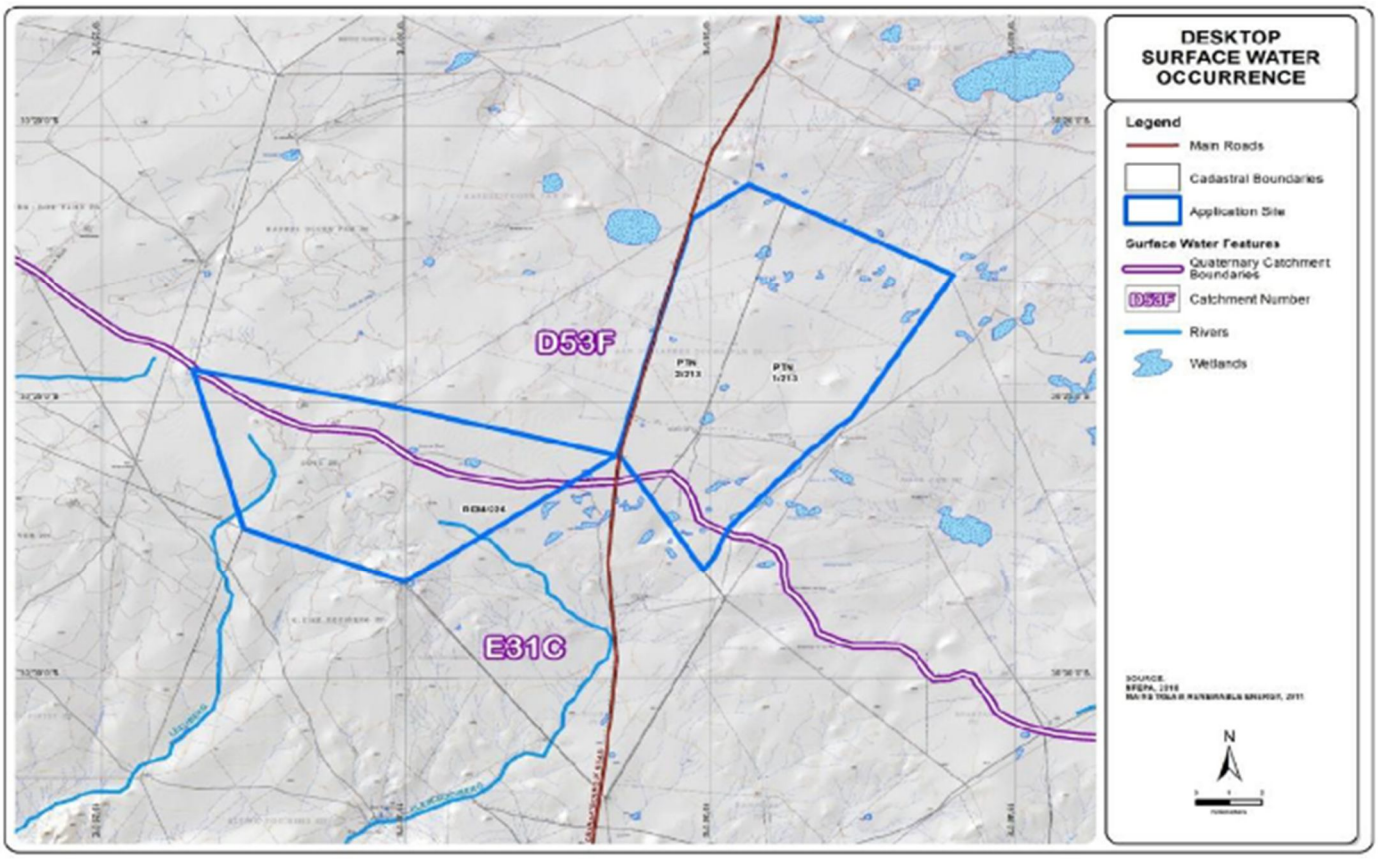



Figure 16: Desktop surface water occurrence within and around the study site.(SiVEST, 2012)

- Field-assessed Wetlands

The **field assessment identified no wetlands, but two priority river systems and 232 drainage lines on the entire study site**. These hydrological features are displayed in Figure 16 below.

- Wetlands

Photographic evidence taken in the field is provided in Plate 1 for the wetlands assessment. Upon site investigation of the various locations where it had been preliminarily identified at a desktop level that wetlands occurred, it was found that only one of the four indicators could be satisfied for the delineation process. This particularly concerns the terrain unit indicator. The areas where it had been identified at a desktop level that wetlands occurred were all located in a depression or valley bottom. These areas were predominantly devoid of vegetation, although some areas did contain sparse vegetation (Photos 1 and 2). Having located the potential areas where the wetlands had been identified at a desktop level to occur, soils samples were drawn from these sites. The soil samples revealed no signs of wetness. Hence, the soil wetness indicator could not be satisfied. The soil samples normally showed a uniform but unconsolidated profile in the top 50-100cm (where possible) bearing soil particles with a fine sandy texture and typically yellow colour. Small lime nodules were present (Photo 3) in addition to carbonate precipitations (Photo 4) in some of the soil samples usually at depths over 30cm. Given these characteristics, the diagnostic soil horizons could be associated with either yellow apedal or neocarbonate soils. The profile therefore could be attributed with the Clovelly and Augrabies Soil Form (McVicar *et al.* 2006). Importantly, these soils forms are not recognised as wetland soil forms.

In terms of vegetation, the areas where wetlands had been identified at a desktop level to occur did not contain any species that could be described as hydrophyllic. As previously mentioned, most wetlands areas were predominantly bare. Where vegetation was present (Photo 5), it comprised mostly of low sturdy (and sometimes succulent) as well as spiny shrubs (Photo 6).

In light of the above, there **was not sufficient evidence to conclude that the supposed wetland areas identified at a desktop level were in fact wetlands**. Instead, it is **surmised that water may likely accumulate in these lower lying depression areas after rainfall events**. However, the characteristics and nature of the soils presumably allow for good drainage thereby preventing surface and sub-surface water retention for periods long enough for hydromorphism to take place and for consequent soil wetness characteristics to develop. Evaporation may also contribute to the loss of surface and sub-surface water accumulation after rainfall events. However, the aforementioned the potential explanation provided here is not definitive and would need to be proven with further studies.

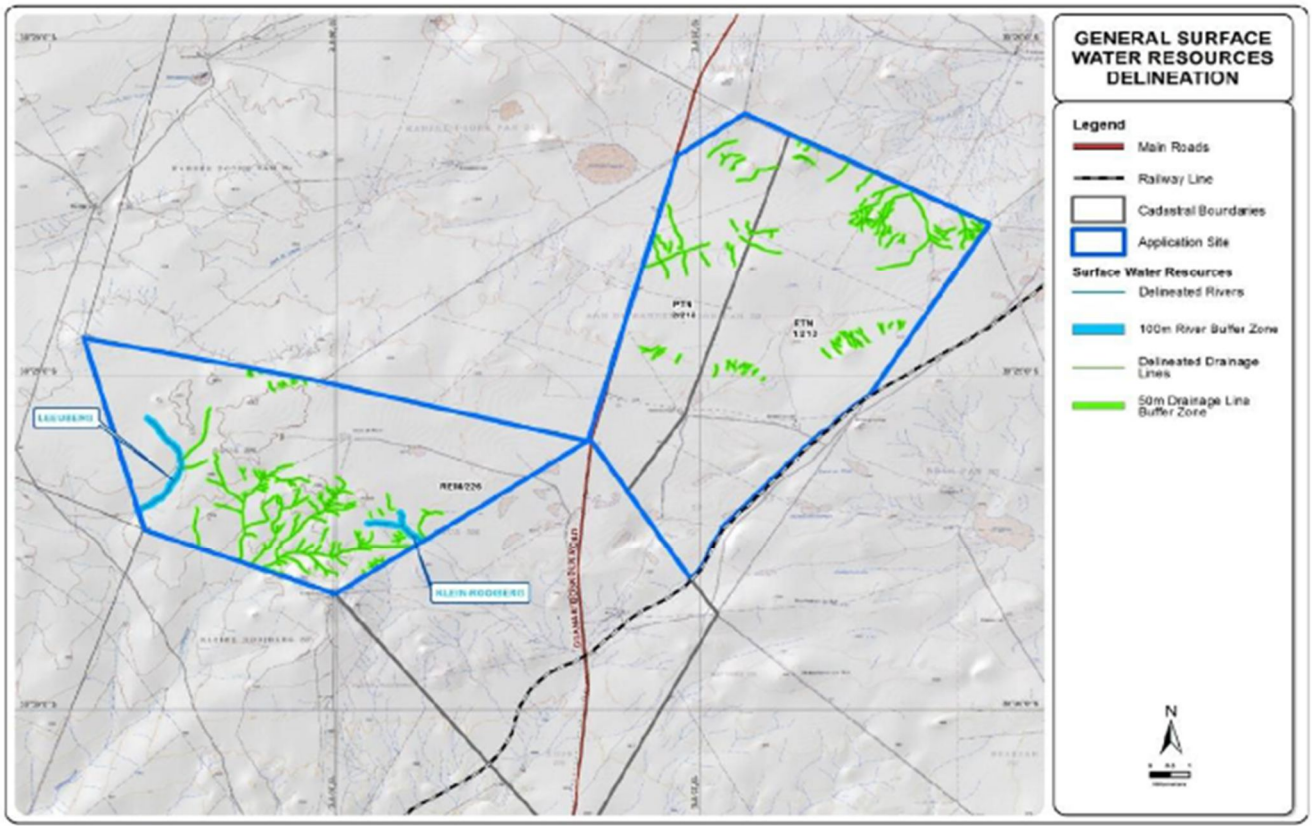



Figure 17: Identified and delineated Priority Rivers and drainage lines in the study site.(SiVEST, 2012)

Plate 1: Photographic evidence of the field verification exercise for the potential wetland areas.(SiVEST, 2012)

| | | |
|---|---|---|
|  <br>Photo 1.<br>Example of one of the bare open areas assessed where potential wetlands had been identified at a desktop level. |  <br>Photo 2<br>Another example of an area where the potential wetlands identified at a desktop level was investigated for actual occurrence. |  <br>Photo 3<br>Soil sample drawn from a location where a wetland had been identified at a desktop level and was investigated. |
|  <br>Photo 4<br>Soil sample showing salt precipitation in the soil profile. |  <br>Photo 5<br>One of the bare open areas that had been investigated for the presence of a wetland that contained vegetation. |  <br>Photo 6<br>Example of the low sturdy and succulent shrubland vegetation identified in one of the areas investigated for the potential occurrence of a wetland. |

- Priority Rivers

Photographic evidence taken in the field is provided in Plate 2 for the priority rivers assessment. The **two Priority Rivers (Leeuberg and Klein-rooiberg rivers) that were identified at a desktop level were identified and verified in the field (Photo 7)**. These two priority rivers could be described as temporary or non-perennial hydrological systems. The in-stream character of these two systems contained vegetation species that could be associated with dry river courses. The main grass species identified within the channel of both river systems were *Stipagrostis namaquensis* (River Bushman Grass – Photo 8). Dense shrubland vegetation lined the channel banks. The actual channel width varied in locations along each of the river lengths. Alluvial deposits (Photo 9) were visibly evident within the respective channels as a consequence of the non-perennial nature of the hydrological systems and the dry climate thereby exposing riverbeds. Each river system was accordingly delineated. A 100-metre buffer was applied to the Priority Rivers due to their significance.

- Drainage Lines

Photographic evidence taken in the field is provided in Plate 2 for the priority rivers assessment. Overall, **233 drainage lines were identified and delineated**. Most of the drainage lines were associated with areas of some relief (Photo 10). These areas were predominantly to the south west of Portion 2 of the Farm 223 as well as the central and northern regions of Portions 1 and 2 of the Farm 213. The drainage lines varied in size (width and length) but most were relatively small (1 to 2 metres in width – Photo 11). Some of the drainage lines also expressed a degree of bedrock influence (Photo 12). A buffer zone of 50 metres was applied to these drainage lines.

Plate 2: Photographic evidence of the wetland assessment of Large Wetland 1.

| | | |
|---|---|---|
|  <br>Photo 7<br>Picture taken from within the channel of the Leeuberg River |  <br>Photo 8<br>*S. namaquensis* was prevalent in the in-stream of the channels for both the Leeuberg and Klein-rooiberg Rivers. |  <br>Photo 9<br>Alluvial deposits in the exposed riverbeds of the Klein-rooiberg River. |
|  <br>Photo 10<br>Example of one of the drainage lines in an area with some relief. |  <br>Photo 11<br>One of the drainage lines where the width is variable but normally between 1 to 2m |  <br>Photo 12<br>Exposed bedrock in one of the drainage lines assessed |

## 2.9 Agricultural Potential

The Agricultural Potential Assessment was conducted by SiVEST in 2012 and the report baseline information is outlined below.

### 2.9.1 Soil Characteristics and Soil Potential

According to the Environmental Potential Atlas of South Africa (ENPAT) database, the site is dominated by mix of Glenrosa and Mispah soil forms (Figure 17). These soils develop where bands of weathering rock are found close to the soil surface. Glenrosa and Mispah soils generally have an inherently low agricultural potential due to a distinct lack of rooting depth (<0.45 m) (Figure 18) and also exhibit moderately high soil erosion hazard ratings; thus soil conservation practices such as minimum tillage and trash blankets should be employed. A mix of red and yellow apedal soil forms are found near the western border of the site are also associated with a shallow effective soil depth of less than 0.45 m.

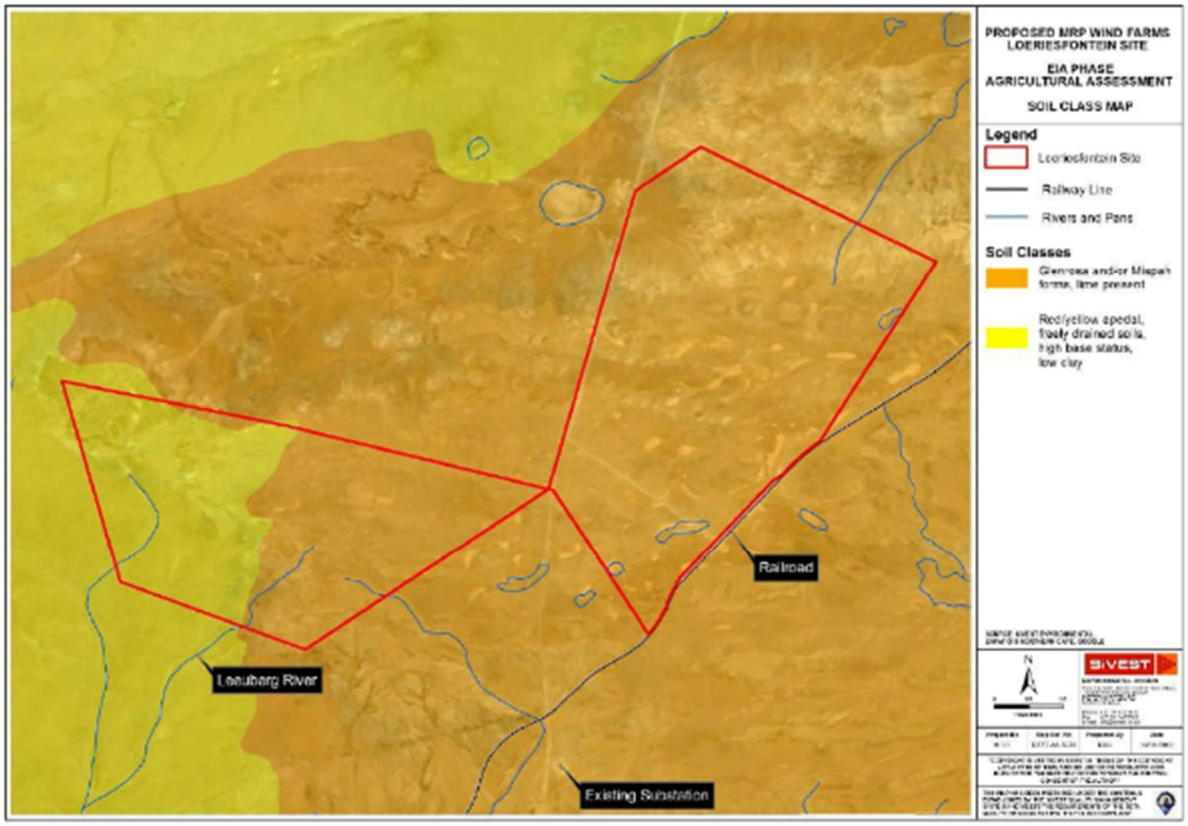



Figure 18: Broad soil type map (SiVEST, 2012)

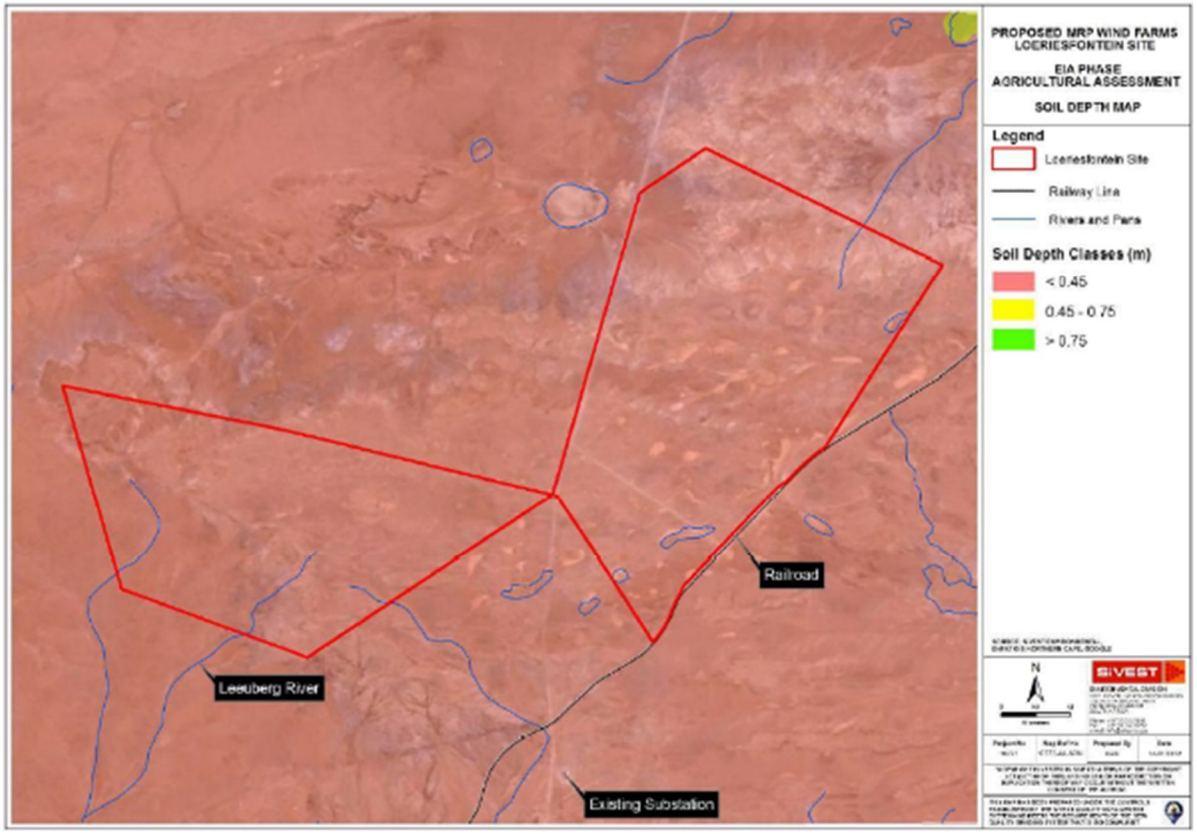



Figure 19: Soil depth map (SiVEST, 2012)

The ENPAT Database also provides an overview of the study areas agricultural potential based on its soil characteristics, it should be noted this spatial dataset does not take prevailing climate into account. Restrictive climate characteristics, due to heat and moisture stress, will further reduce the agricultural potential of the area under assessment. The study area is dominated by soils which are not suited for arable agriculture (Figure 19) but which can still be used as grazing land.

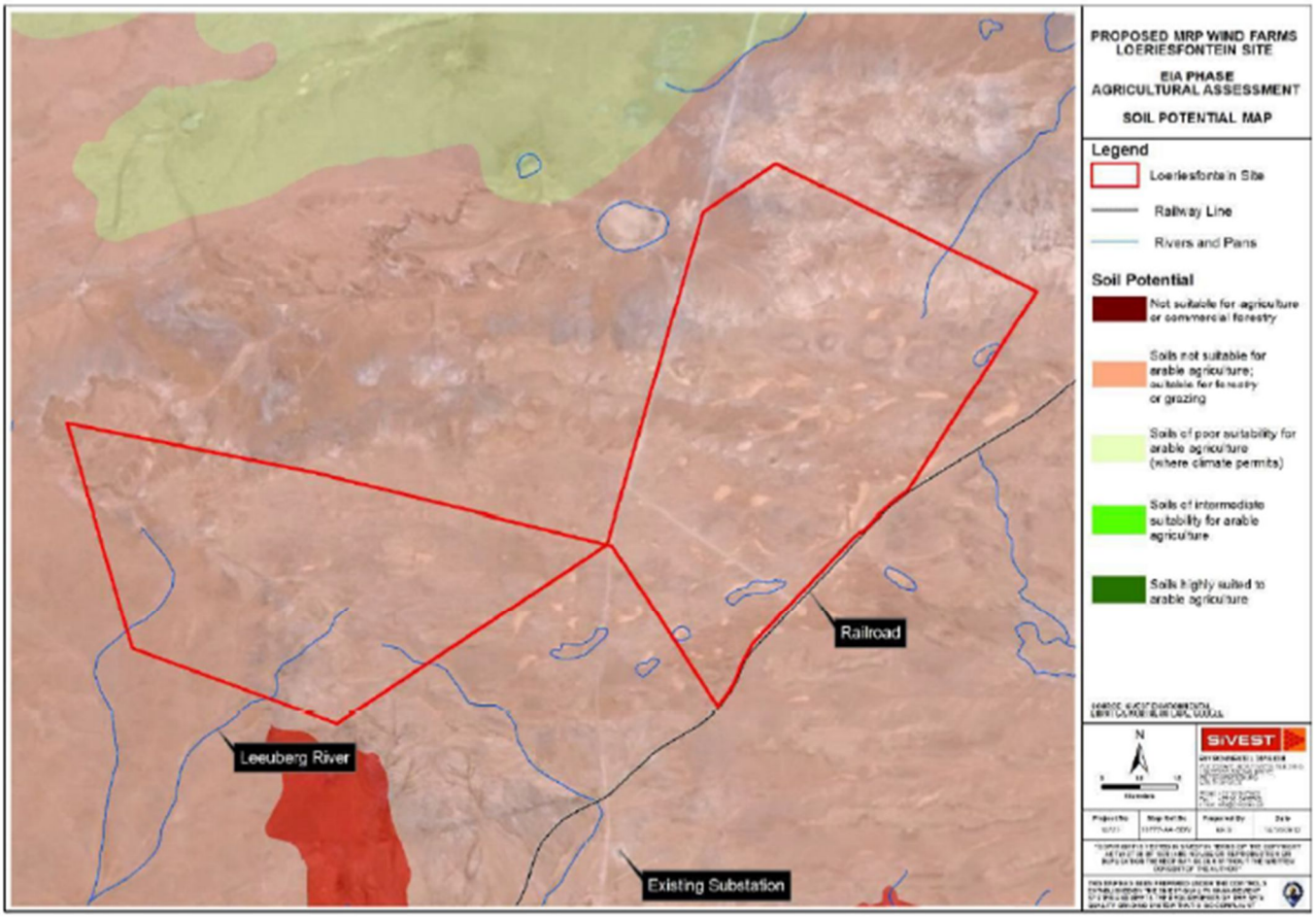



Figure 20: Soil Potential Map (SiVEST, 2012)

### 2.9.2 Desktop Agricultural Assessment: Result Summary

By taking all the site characteristics (climate, geology, land use, slope and soils) into account, the **agricultural potential for the majority of the study area was classified as being extremely low for crop production while moderately low for grazing**. This poor agricultural potential rating was primarily due to restrictive climatic characteristics and soil depth limitations. The site was not classified as high potential nor is it a unique dry land agricultural resource.

### 2.9.3 Soil Survey and Field Verification

Due to the size of the site (10 157 ha), local agricultural activities (unimproved grazing land) and the nature of the proposed activities, an exploratory soil survey was performed. At each survey point the soil was described to form and family level according to "Soil Classification – A Taxonomic System for South Africa" (Soil Classification Working Group, 1991) and the following properties were noted:

- Estimation of 'A' horizon clay content,
- Permeability of upper B horizon,
- Effective rooting depth,
- Signs of wetness,
- Surface rockiness,

- Surface crusting,
- Vegetation cover, and
- Detailed description of the particular area such as slope.

- Soil Descriptions

This Section lists the major soil forms encountered during the soil survey, along with a site-specific description of each soil form. Other soils encountered during the field verification, which were recorded very sparsely across the site and therefore not fully described include:

i. Brandvlei
ii. Augrabies
iii. Mispah Form

Soil Family: Mostly 1200 (Non bleached, Calcareous), limited bleached and/or non-calcareous Diagnostic Horizons and Materials:

i. A-Horizon: Orthic
ii. B-Horizon: Hard Rock

- Site Specific Description:

The Mispah soil form falls within the lithic soil group. Lithic soils are associated with shallow soils where parent rock is found close to the soil surface. The A-horizon varied from brown to ivory in colour and was generally 10-20 cm deep, directly overlying various hard rock materials (Figure 20). The Mispah soil form dominates large areas of the study area and surface rocks are common (Figure 21). Large portions of the site contain non-contiguous bands of shallow rock and Hardpan Carbonate which lead to areas being classified as a Mispah and Coega complex.

- Land Use Capability:

This soil has **low agricultural potential** due to the distinct lack of rooting depth and as such these soils are generally utilised for grazing land. If ripped and cultivated, however, precise irrigation scheduling is imperative. These soils also exhibit high soil erosion hazard ratings thus soil conservation practices such as minimum tillage and trash blankets should be employed.

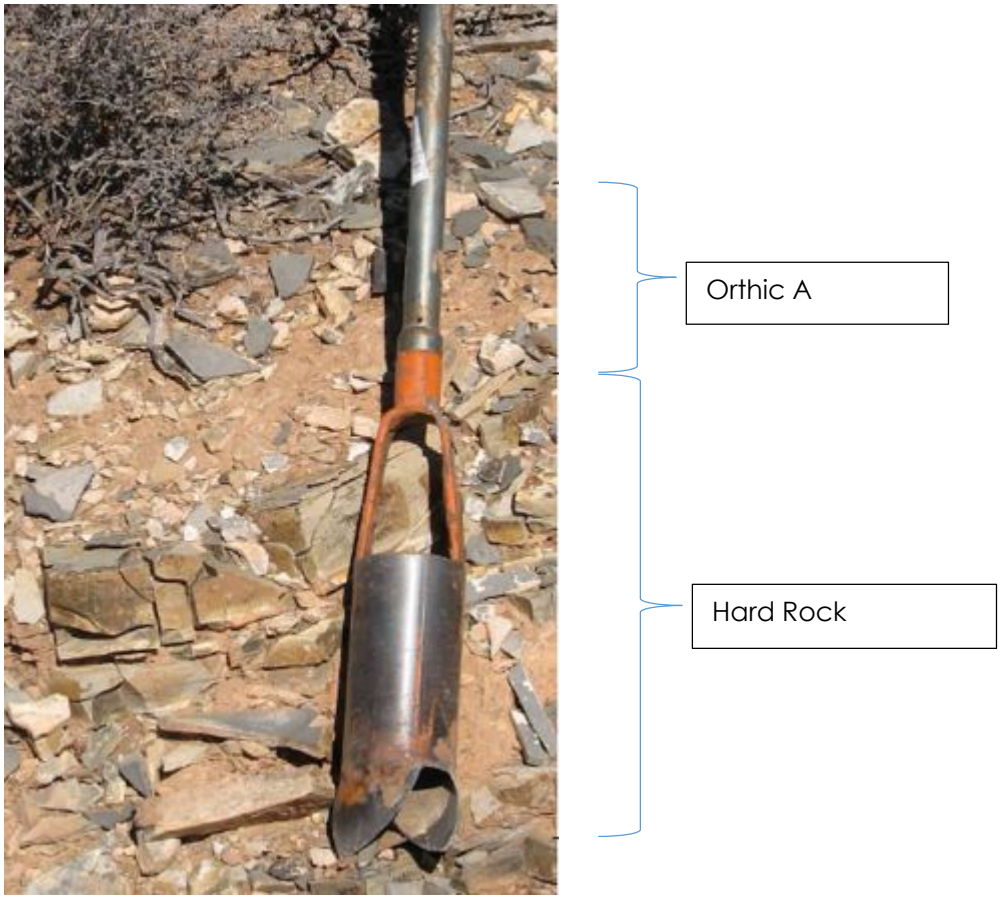



Figure 21: An example of a shallow Mispah Soil Form encountered on the Proposed Development Area (PDA) (SiVEST, 2012)

Figure 22: Shallow, rocky soils dominate large portions the PDA (SiVEST, 2012)

- Coega Form
  Family: 1000 (Calcareous A Horizon)
  Diagnostic Horizons and Materials:
  i. A-Horizon: Orthic
  ii. B-Horizon: Hardpan Carbonate

- Site Specific Description:

The Coega form is a type of calcic soil whose profile contains at least one carbonate-rich horizon. Carbonate retention in the soil profile is a result of an arid climate where evaporation far exceeds rainfall. When encountered on the PDA the A-horizon of this soil form was generally light brown, calcareous and lightly structured. This Orthic A-horizon overlies a hard pan carbonate which was limiting to plant growth. The effective soil depth was generally less than 0.2 m (Figure 22). Large portions of the site contain non-contiguous bands of shallow rock and Hardpan Carbonate which lead to areas being classified as a Mispah and Coega complex (Figure 23).

- Agricultural Potential:

Calcic soils are associated with arid regions and thus the use of these carbonate rich soils in South Africa is limited. Limitations in terms of sustainable agricultural use include shallow rooting depth, high pH, high salinity and low plant Phosphorus availability (Fey, 2010). The distinct lack of rooting depth also reduces the agricultural potential of these soils. Such limitations restrict calcic soils to extensive grazing unless irrigation is available. These soils also exhibit high soil erosion hazard ratings thus soil conservation practices such as minimum tillage and trash blankets should be employed.

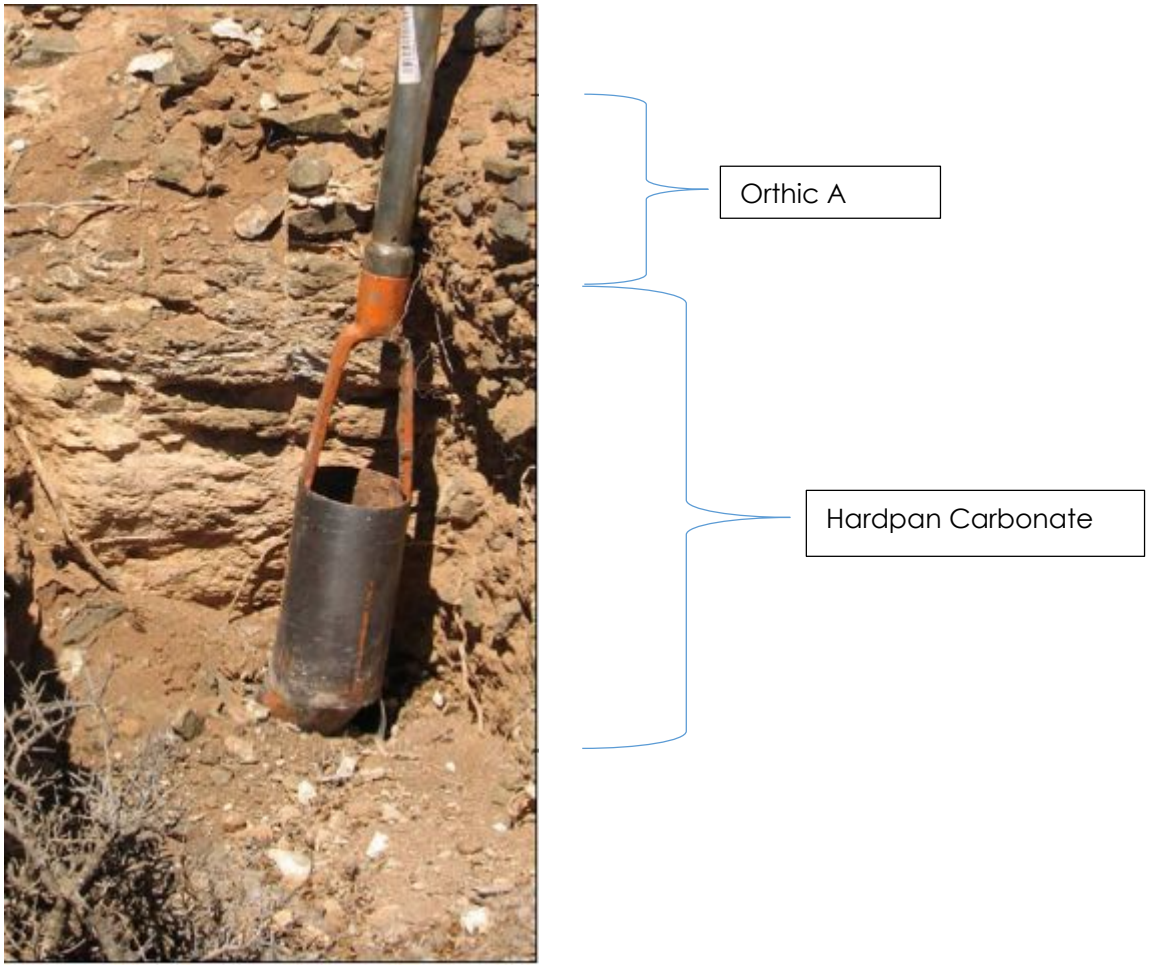



Figure 23: An example of a shallow Coega Soil Form encountered on the PDA (SiVEST, 2012)

Figure 24: Shallow and surface Hardpan Carbonate is common throughout the PDA (SiVEST, 2012)

- Prieska Form

  Soil Family: Generally 1110 (Not bleached, Non-red B, Non Luvic)

  Diagnostic Horizons and Materials:

  i. A-Horizon: Orthic

  ii. B-Horizon: Neocarbonate

  iii. C-Horizon: Hardpan Carbonate

- Site Specific Description

Like the Coega form, the Augrabies soil form falls within the calcic soil group whose defining characteristic is the accumulation of calcium carbonate. Carbonate retention in the soil profile is a result of an arid climate where evaporation far exceeds rainfall. When encountered on the PDA the A-horizon of this soil form was light brown and thin. This Orthic A-horizon overlies a Neocarbonate B-horizon which lacked structure other than the porous micro-aggregates and had a uniform ivory colour (Figure 24). The Neocarbonate B overlies Hard Pan Carbonate which is limiting to plants. The soil form was generally non-luvic and the pedological depth seldom exceeded 0.5 m. The entire profile tested positive to the presence of carbonates when treated with cold 10% hydrochloric acid.

- Land Use Capability:

Calcic soils are associated with arid regions and thus the use of these carbonate rich soils in South Africa is limited. Limitations in terms of sustainable agricultural use include high pH, high salinity, low plant available Phosphorus and other trace elements as well as toxic levels of extractable of Boron (Fey, 2010). Such limitations restrict calcic soils to extensive grazing unless irrigation is available. These soils also exhibit high soil erosion hazard ratings thus soil conservation practices such as minimum tillage and trash blankets should be employed.

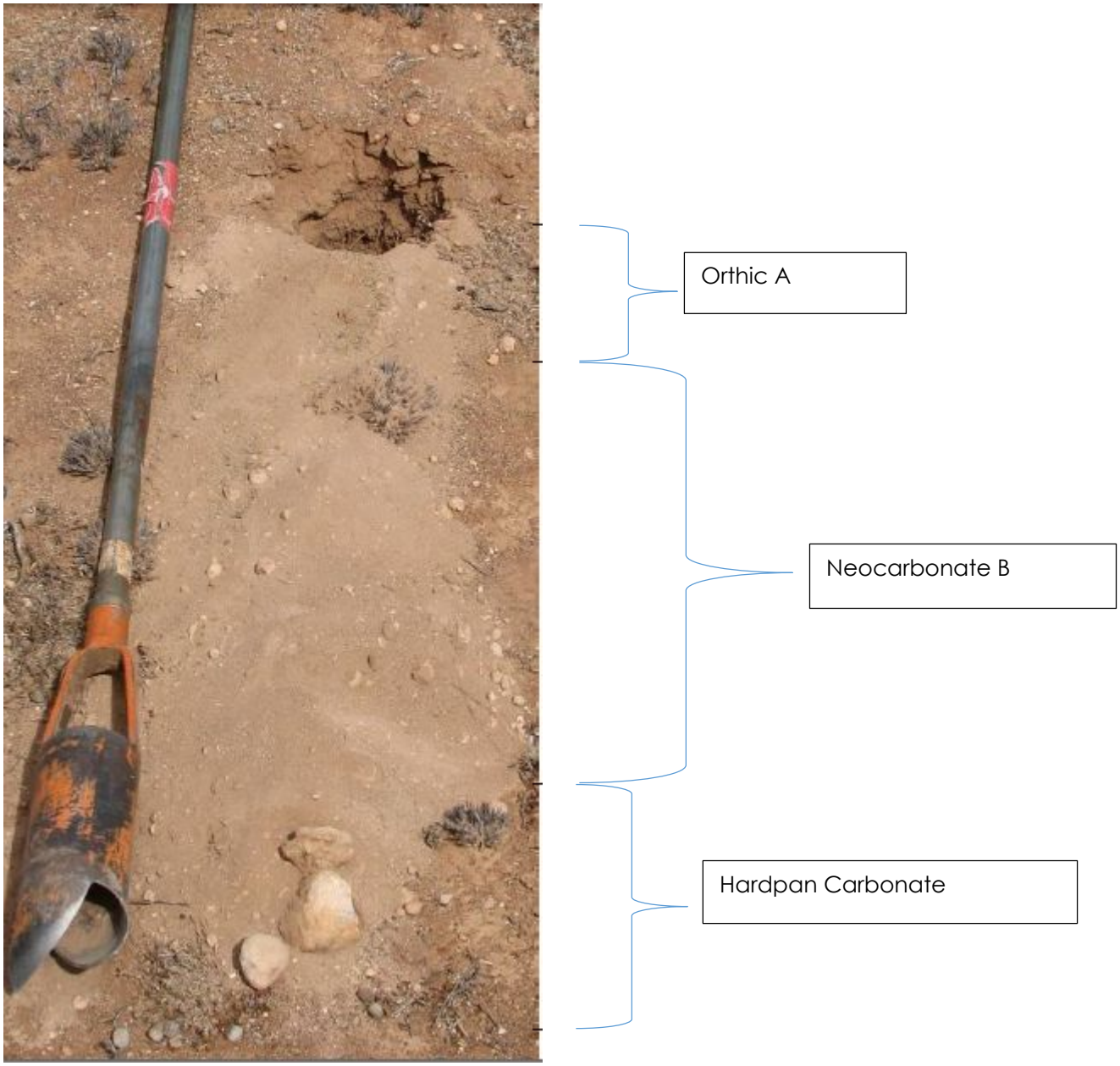



Figure 25: An example of a Prieska encountered the PDA (SiVEST, 2012)

- Soil Summary

The soils identified on the PDA are **predominantly calcic and shallow with a low agricultural potential**. Rocky and shallow calcic soils (Mispah and Coega Form) cover 97% of the surveyed area (Figure 25). Virtually all the soils encountered on site contained at least one layer that was limiting to plant growth and these layers included rock and hard pan carbonate. The soils'properties identified during the field verification reflect the arid climate in which they were formed.

The location and description of the sample were used to create a verified soil map showing homogeneous soil bodies (Figure 27). Combining the effective depth information (i.e. depth to root limiting layer) and Inverse Distance Weighting one is able to obtain a generalised soil depth for the PDA (Figure 31). Soils with an effective depth of greater than 50 cm were rarely observed during the soil survey with most soils exhibiting an effective soil depth of less than 30 cm.

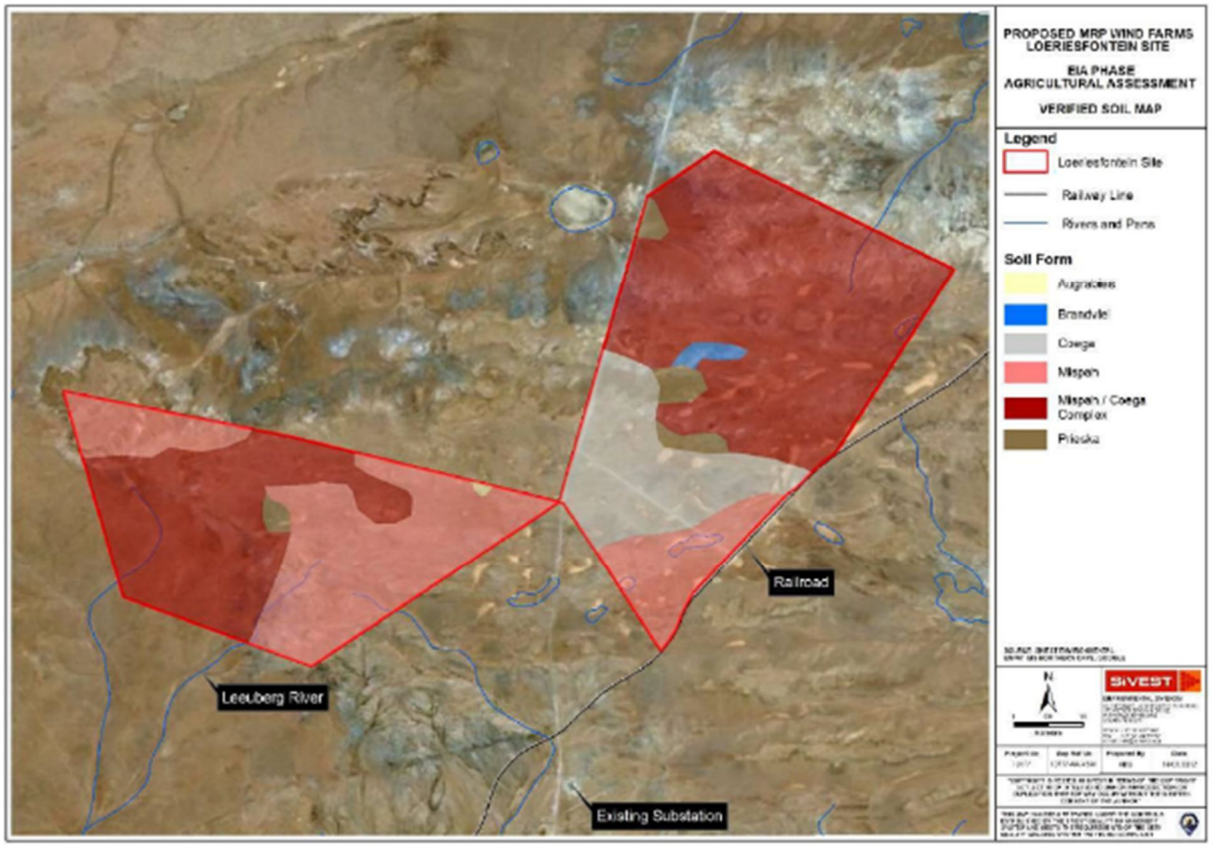



Figure 26: Verified Soil Map for the Plateau East North Site (SiVEST, 2012)

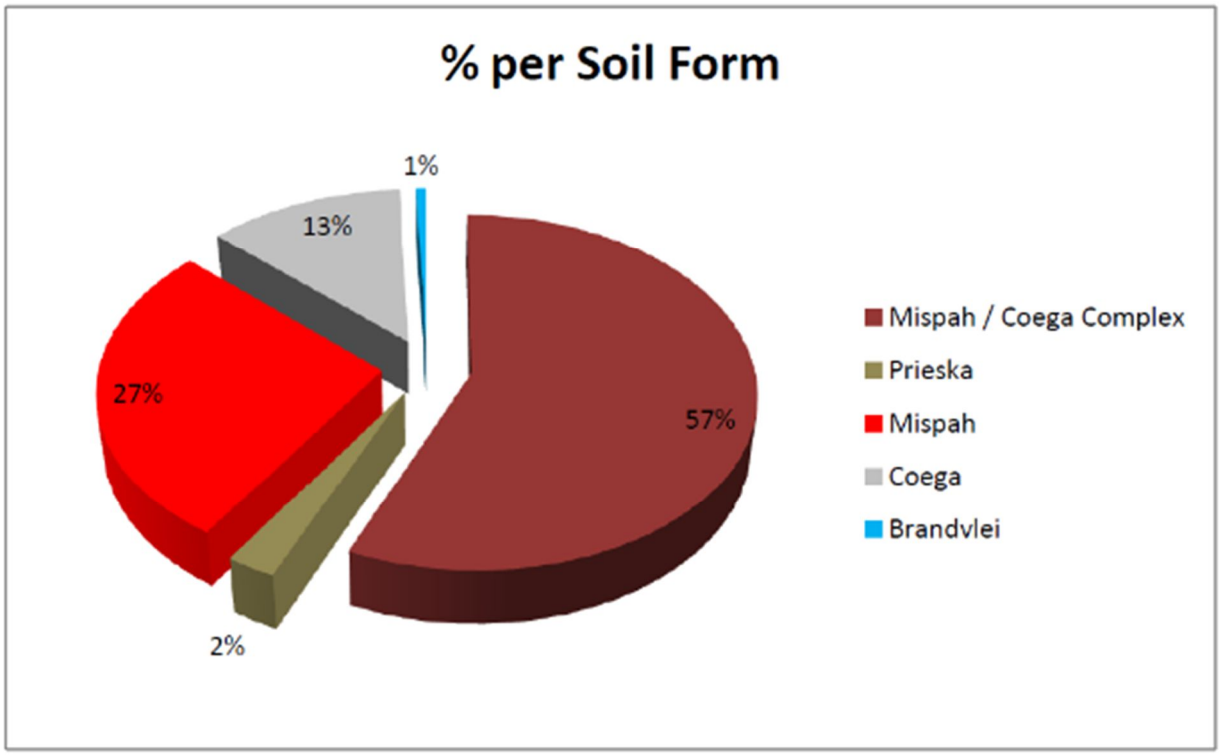



Figure 27: Graph showing the percentage area per soil form for the Plateau East North Site (SiVEST, 2012)

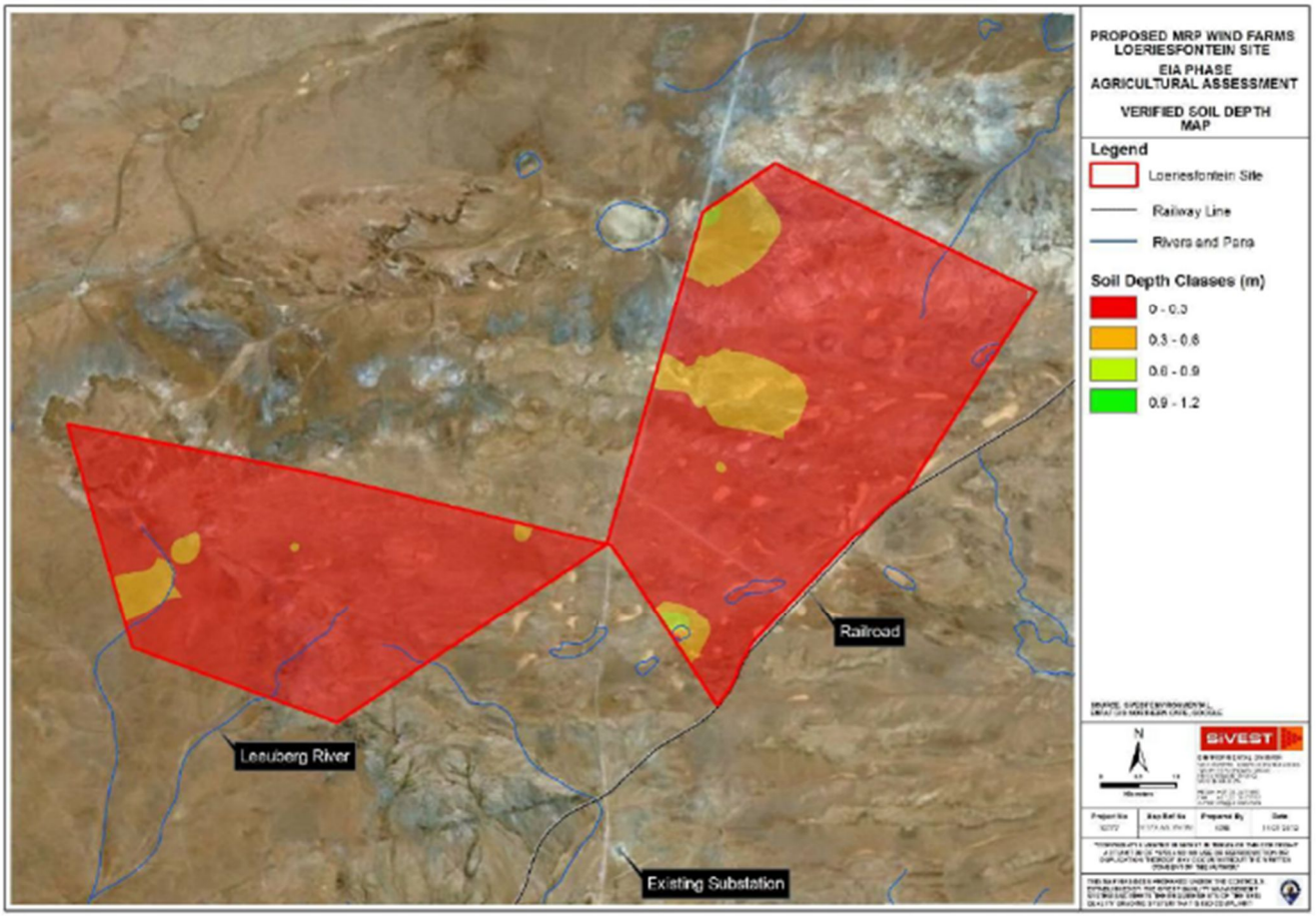



Figure 28: Verified Soil Depth Map (SiVEST, 2012)

## 2.10 Visual

The Visual Assessment was conducted by SiVEST in 2012 and the baseline assessment is presented below.

### *2.10.1 Visual characteristics of the study area*

- Physical Landscape Characteristics

As part of the visual characterisation, the physical landscape characteristics are described in terms the prevailing topography, vegetation cover and land use in the study area.

- Topography

The topography in the immediate vicinity of the site proposed for the PV site is characterised by a flat to gently undulating landscape (typical of much of the Karoo). In the wider area, the Klein and Groot Rooiberg and Leeuberg koppies form an area of localised hilly topography to the south and south-west of the site. Immediately north of the site the presence of a number of large pans signals that the topography is very flat and thus very poorly drained (Figure 28).

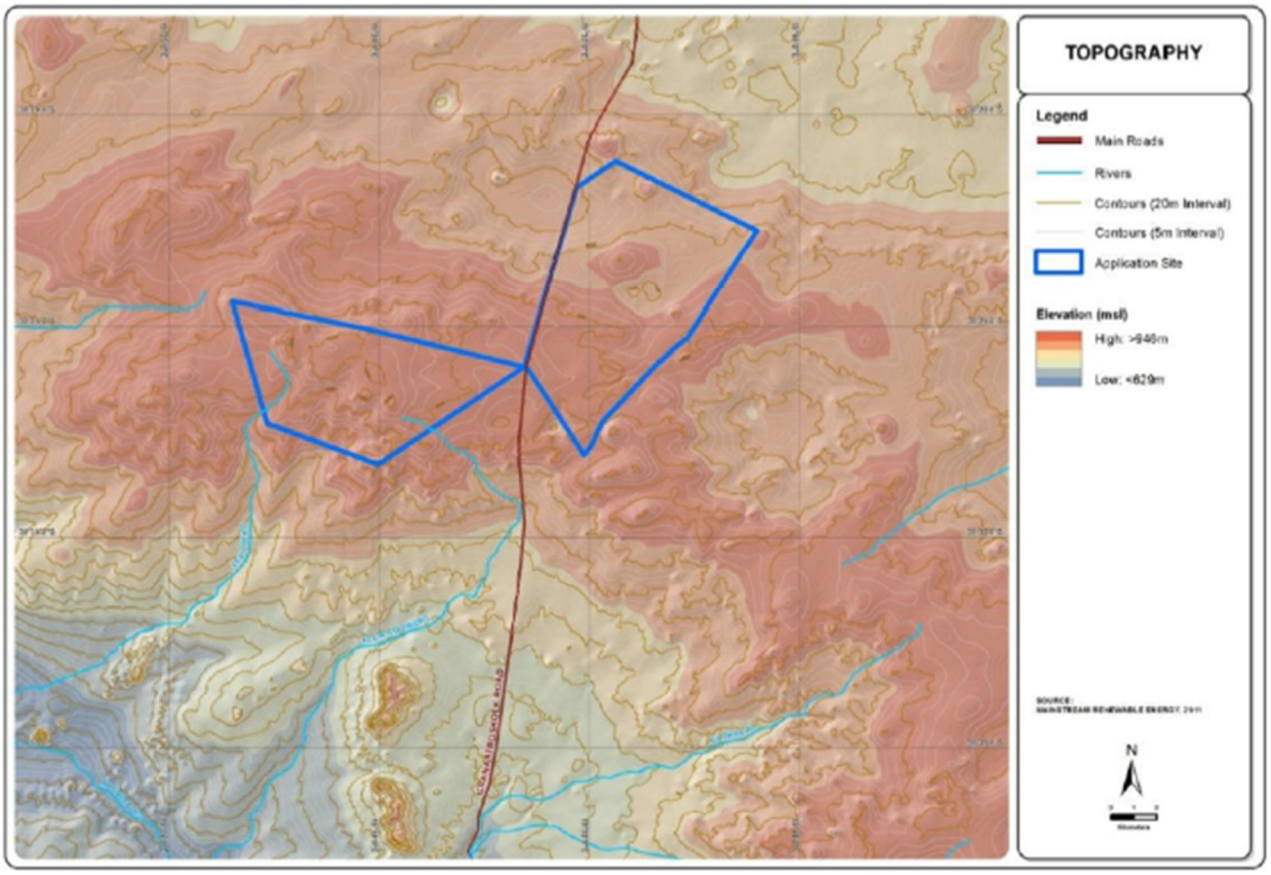



Figure 29: Topography within the study area (SiVEST, 2012)

i. Visual Implications:

The flat terrain that occurs over most of the site results in generally wide-ranging vistas throughout the study area, and the horizon is usually visible across an entire 360° arc of the viewer. The only exception to this flat topography is the range of hills located to the south and south-west of the site, which will constrain the viewshed.

- Vegetation

The site is covered by natural short Bushmanland Basin Shrubland. Due to the aridity of the area the vegetation consists of low shrubs around 30-40 cm in height, distributed uniformly across the landscape, except in areas of disturbance where patches of bare earth occur. In certain areas, man has had an impact on the natural vegetation, especially around farmsteads, where over many years tall exotic trees and other typical garden vegetation have been established.

i. Visual Implications:

The natural short vegetation cover will offer no visual screening. Tall exotic trees may effectively screen the proposed development from farmhouses, where these trees occur in close proximity to the farmhouse and are located directly in the way of views to the site (Figure 29).

Figure 30: View toward the proposed site from a farmhouse (Van der Westhuizen) in Klein Rooiberg. Exotic trees will block out views of the development site from the front porch. (SiVEST, 2012)

- Land Use

The land use in the wider study area is classified natural or undeveloped, as sheep farming dominates the area and the sheep graze on natural vegetation (Figure 30). Activities related to gypsum mining occur along the railway which makes up a part of the site. The nature of the arid climate entails that stocking densities for the sheep are low which has resulted in the properties being relatively large across the area. Therefore, the area is very sparsely populated, and thus little human-related infrastructure exists. Some infrastructure exists in the vicinity of the site in the form of gravel access roads, a railway that runs along a part of the eastern boundary of the site (the railway linking Sishen with Saldanha Bay), and associated railway works warehousing and offices. An electricity transmission substation (Helios Substation) exists to the south of the site, as well as power lines that run to and from this. A very tall microwave tower (communication tower) is also located on the site of the proposed PV plant.

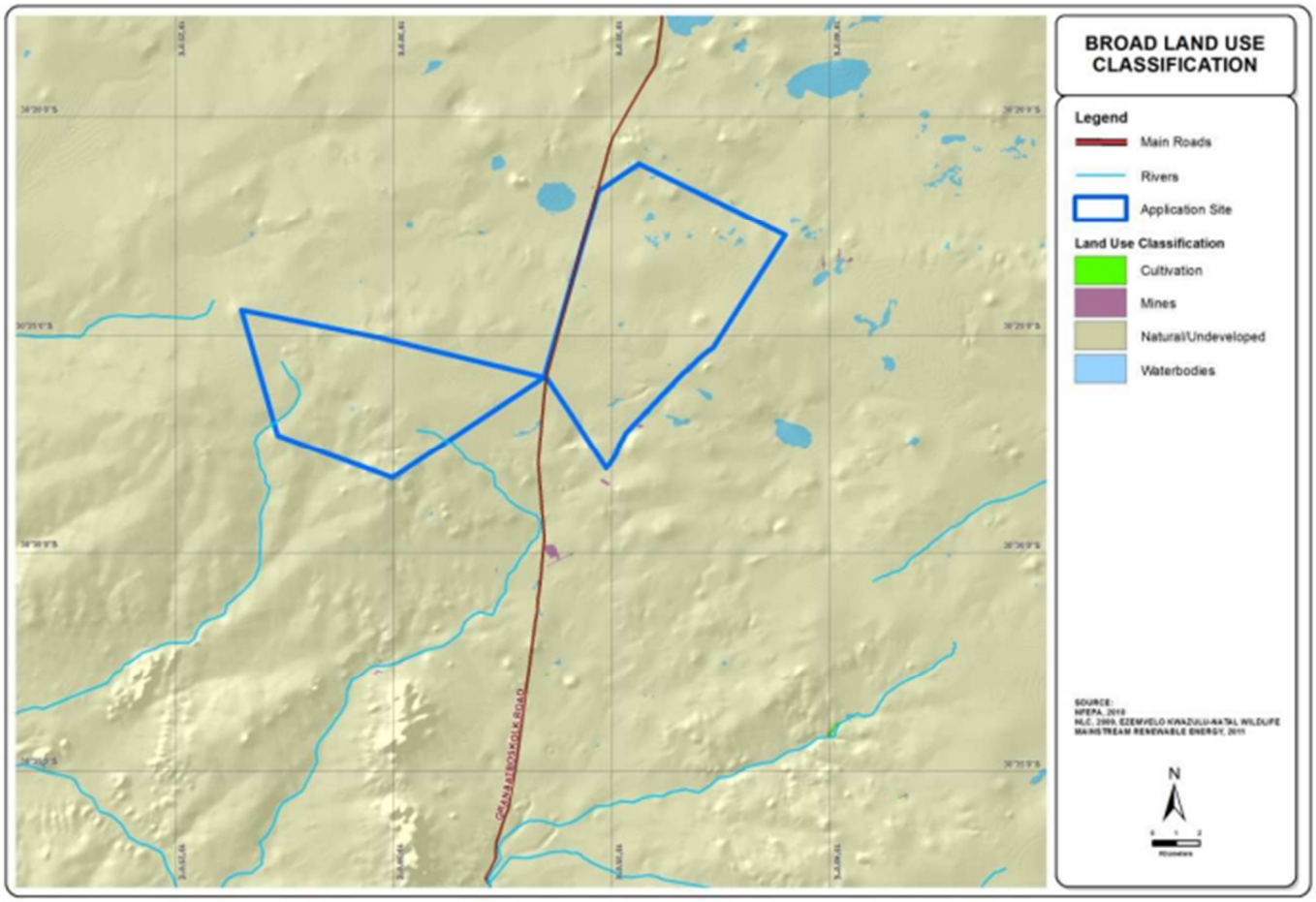



Figure 31: Map showing land use within the study area (SiVEST, 2012)

Except for two farmhouses, the site of the proposed development is mostly vacant. The surrounding area is largely uninhabited and the closest built-up area is the small town of Loeriesfontein approximately 60km to the south of the site.

i. Visual Implications

The generally lack of human habitation and associated human infrastructure, has an obvious impact on the sense of place and thus giving the area a largely natural, rural feel.

- Visual Character

The above physical landscape characteristics as well as the presence of built infrastructure influences the visual character of the study area. Visual character is defined based on the level of transformation from a completely natural setting (little evidence of human transformation), with varying degrees of transformation engendering different visual characteristics.

Most of the study area was considered to have a natural (almost vacant) visual character, as natural shrub land prevails throughout the site and there is minimal human habitation and associated infrastructural footprint (Figure 31). In addition, the predominant land use (sheep farming) had not transformed the natural landscape and the area has thus largely retained its rural natural character. As

mentioned above, built infrastructure within the proposed site is limited to isolated farmhouses, gravel farm roads, the railway line, some electrical infrastructure, farm boundary fences and a microwave (telecommunications) tower.

Figure 32: Typical natural visual character in the study area

The greater area surrounding the proposed development site is an important component when assessing visual character. The area can be considered to be typical of a Karoo or "platteland" landscape that would characteristically be encountered across the high-lying dry western and central interior of South Africa. Much of South Africa's dry Karoo interior consists of wide open, uninhabited spaces sparsely punctuated by widely scattered farmsteads and small towns. Traditionally the Karoo has been seen by many as a dull, lifeless part of the country that was to be crossed as quickly as possible on route between the major inland centres and the Cape coast, or between the Cape and Namibia. However, in the last couple of decades this has been changing, with the launching of tourism routes within the Karoo, and the promotion of tourism in this little visited, but large part of South Africa. In a context of increasing urbanisation in South Africa's major centres, the Karoo is being marketed as an undisturbed getaway, especially as a stop on a longer journey from the northern parts of South Africa to the Western and Eastern Cape coasts. Examples of this may be found in the relatively recently published "Getaway Guide to Karoo, Namaqualand and Kalahari" (Moseley and Naude-Moseley, 2008). The exposure of the Karoo in the national press during 2011, as part of the debate around the potential for fracking (hydraulic fracturing) mining activities, has brought the natural resources, land use and lifestyle of the Karoo into sharp focus. Many potential objectors stress the need to preserve the environment of the Karoo, as well as preserve the 'Karoo Way of Life', i.e. the stock farming practices which are highly dependent on the use of abstracted ground water (e.g. refer to the Treasure Karoo Action Group website http://treasurethekaroo.co.za/).

Typical Karoo landscape can be considered a valuable 'cultural landscape' in the South African context. Although the cultural landscape concept is relatively new, it is becoming an increasingly important concept in terms of the preservation and management of rural and urban settings across the world (Breedlove, 2002).

Cultural Landscapes can fall into three categories (according to the Committee's Operational Guidelines):

i. "a landscape designed and created intentionally by man".
ii. an "organically evolved landscape" which may be a "relict (or fossil) landscape" or a "continuing landscape";
iii. an "associative cultural landscape" which may be valued because of the "religious, artistic or cultural associations of the natural element".

The typical Karoo landscape consisting of wide-open plains, and isolated relief, interspersed with isolated farmsteads, windmills and stock holding pens, is an important part of the cultural matrix of the South African environment. The Karoo farmstead is an important representation of how the harsh arid nature of the environment in this part of the country has shaped the predominant land use and economic activity practiced in the area, as well as the patterns of human habitation and interaction. The presence of small Karoo towns, such as Loeriesfontein, engulfed by an otherwise rural environment, form an integral part of the wider Karoo landscape. As such, the Karoo landscape as it exists today has value as a cultural landscape in the South African context. In the context of the types of cultural landscape listed above, the Karoo cultural landscape would fall into the second category, that of an organically evolved, "continuing" landscape.

The study area, as visible to the viewer, represents a typical Karoo cultural landscape. This is important in the context of potential visual impacts associated with the proposed development of a PV plant, as introducing this type of development could be considered to be a degrading factor in the context of the natural Karoo character of the study area, as discussed further below.

- Visual Absorption Capacity

The visual absorption capacity (VAC) of an area / landscape refers to the ability of the area / landscape to absorb the development without any noticeable intrusion or change to the visual character of the area. It is measured on a scale from high (an area which has a high capacity to absorb the development) to low (an area in which a development would be highly visible). It is a function of topography, land use and land cover, with urban areas having a high VAC and natural areas having a low VAC.

As discussed above, the study area has a natural largely uninhabited visual character typical of a Karoo landscape. In addition, the vegetation cover on the site is short in comparison to other types of natural vegetation (e.g. thornveld or savannah where trees and shrubs are present) and will not impede views toward the renewable energy facility. The visual environment will therefore be characterised by wide open views, due to the mostly flat topography and limited height of the natural vegetation cover. **Based on these characteristics, majority of the study area could be assigned a low VAC value**.

- Visual Sensitivity of the Study Area

Visual Sensitivity is expressed as the sensitivity of an area to a proposed development and the degree to which it is perceived as a visual impact by receptors. It is based on the VAC, presence of existing infrastructure and visual character in an area, but also relates to the spatial distribution of potential receptors and likely value judgement of these receptors based on the perceived aesthetic appeal of an area. It is categorised as **high** (visually intrusive, negatively perceived by receptors), **moderate** (receptors present, limited negative perception) or **low** (little opposition, not negatively perceived). The table below explores in more detail the inputs into categories of visual sensitivity:

**Table 2.8: Environmental factors used to define visual sensitivity classes (SiVEST, 2012)**

| Visual Sensitivity Category | Visual Absorption Capacity | Presence and size of Existing Infrastructure | Presence of Sensitive Receptors | Visual Character | Other factors influencing visual sensitivity |
|---|---|---|---|---|---|
| **High** | Low | Absent or at very low densities | Present | -Natural / largely natural -Rural / pastoral | - Areas of natural vegetation (conserved) -Practice of economic activities (esp. tourism) which place value on the scenic / beauty character of the area |
| **Moderate** | Moderate | Present – not high densities | Present | -Rural / pastoral - Urban | |
| **Low** | High | Present – high densities, often a very large or tall | Mostly absent | -Urban -Industrial | |

As described above, the visual character of the study area is largely associated with the natural and rural characteristics of the area. Within this context, an important factor contributing to the visual sensitivity of the area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape. As described below, very few potentially sensitive receptors are present in the study area. Although **no formal protected areas or leisure / nature-based tourism activities exist within the study area**, the context of the study area as a rural area with a relatively low density of human change and influence in the landscape provides the landscape with a **moderate level of visual sensitivity**. The low density of human infrastructure and low VAC further contribute to the visual sensitivity of the landscape. As such, the potential visual impact of the proposed PV plant on the visual environment in this context should be examined.

- Visually Sensitive Areas on the Site

During the EIR phase, all specialist consultants were requested by the EAP to indicate environmentally sensitive areas within the development site related to their specific field of speciality. This exercise was undertaken to allow a GIS-based spatial analysis of sensitive parts of the site to be undertaken to assist with designing the layout for the PV facility.

**Only two potentially sensitive receptors are located within the development site**. In order to reduce the direct visual impacts of the proposed PV plant, a buffer of 500m was recommended around these two potentially sensitive receptors located on the development site. These buffers should be treated as exclusion zones in which no infrastructure.

An assessment was also undertaken to determine those parts of the site where the locating of PV panels or other infrastructure would be associated with the greatest visual impacts on surrounding area. This assessment revealed that, the relative uniform nature of the flat terrain and short vegetation throughout the site would result in the PVs imposing a typically similar visual impact on the surrounding area from all parts of the site. As such, **other than the 500m buffer areas around the houses, no other areas within the development site are regarded as visually sensitive areas that should be avoided**.

### 2.11 Heritage & Palaeontology

The Heritage Assessment was conducted by Dr. Johnny Van Schalkwyk in 2012 and the excepts from the report (Van Schalkwyk, 2012) are detailed below.

#### 2.11.1 Regional overview

This is a rural landscape where sheep farming dominates. For large sections of the region even this is not a permanent type of settlement, as many farmers move their livestock to different regions (Loeriesfontein) for a couple of months (July to December) every year. It was only with the drilling of bore holes that the possibility of permanent settlement became a reality.

- Stone Age

Information on occupation of the larger region in general and the Stone Age specifically, is very limited. This is probably the result of the fact that no systematic survey or studies has been done in the region.

In open country it is suggested that the most likely places for sites would be close to water points that predate the colonial period. Another potential for archaeological site concentration would be outcrops of raw material used in stone tool production. In mountain areas, rock shelters and caves would be where rock art is found. It seems as if **finds of Early Stone Age material this far to the west is very limited and no report of any such finds in the region of the study area could be found**.

Similarly, information on settlement during the Middle Stone Age time is very limited. With regards to the Middle Stone Age, **a few such tools and flakes were found**. These were mostly of hornfels, although some are of indurated shale. All were found at the foot of a number of hills/outcrops in the southern section of the study area. Occupation of the region seems to have increased during the Later Stone Age (LSA). This is probably the result of an interface between a foraging presence and a pastoralist occupation of the region. However, the latter subsistence regime would only have been possible in a situation of increased open water available for livestock, a fact that would need much more background research to be confirmed. According to local landowners' stone tools are most commonly found in the following places:

- On the rims of freshwater pans or stream beds where water might remain for some time during the rainy season.
- Amongst some of the red sand dunes, where small pans are likely to develop during the rainy season.
- At the base of some of the dolerite hills/outcrops in the southern region

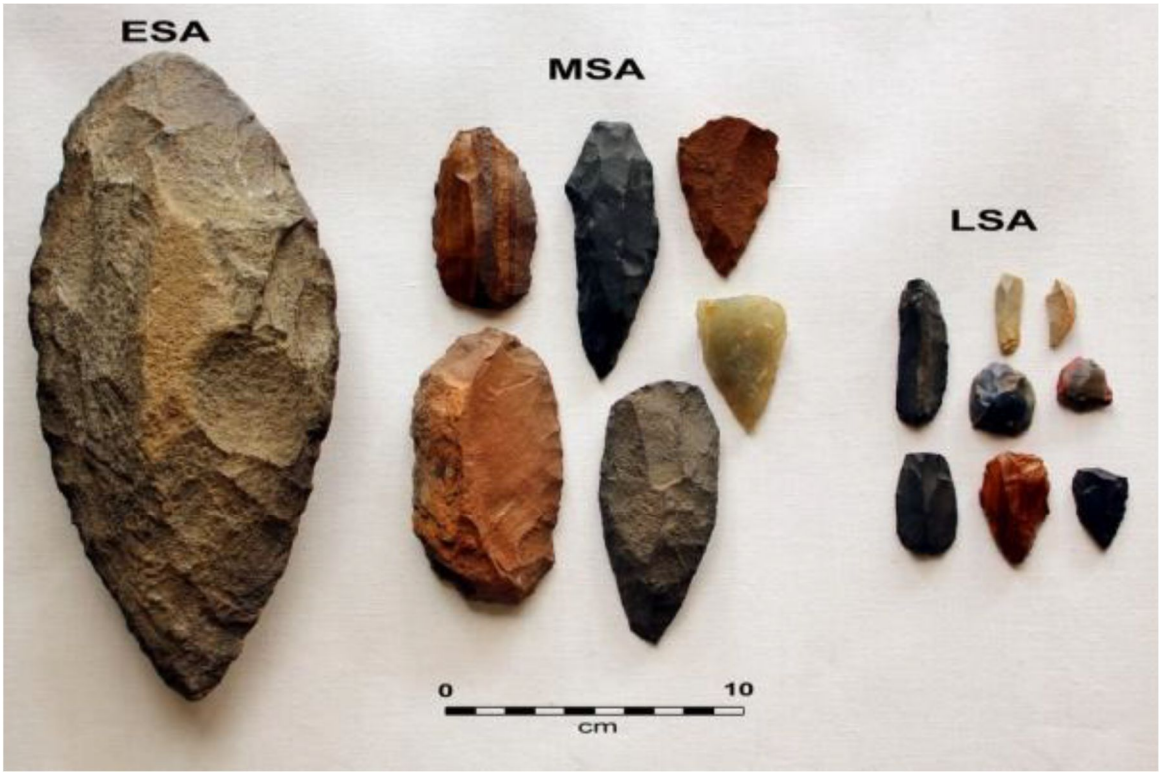



Figure 33: Typical stone tools (These stone tools are not from the region and are only used to illustrate the difference between Early (left), Middle (middle) and Later Stone Age (right) technology) (SiVEST, 2012)

By the early 19th century some Dutch speaking trekboers moved into the region, grazing their stock. As they depended on water for their livestock, these farmers would have stuck close to available water sources and it was only during the wetter parts of the rain season that they might have accessed other areas for short periods of time (Plate 3). Even today, people migrate with their stock on a seasonal basis, moving between winter and summer grazing. In the past this was done by following the sheep by means of wagons and donkey carts, but in recent times this is done by means of trucks.

Plate 3: Photographic evidence of farmsteads and farming related features (sheep dip) in the region (SiVEST, 2012)

Plate 4: Photographic evidence of an isolated grave and a monument on the southern section of the farm Sous (SiVEST, 2012)

An investigation of the Title Deeds of most of the farms under consideration indicated that they were surveyed during the latter part of the nineteenth century, implying that they would have been occupied since then. Both the farms' Sous and Aan de Karree Dorn Pan were first surveyed in 1898. Due to the sparse population, infrastructural development in this part of the world has always been low. The roads are gravel and graded occasionally. As there are no major rivers, river crossings remained informal.

The one industrial activity that is practiced in the region on a commercial basis is the extraction of salt from the various pans in the region. The manner in which the salt is extracted requires a low-level technology, with the result that even if it has taken place over a long period of time at any given place, few structures or features are associated with it. It is probable that the salt pans were exploited in pre-colonial times for obtaining of salt, but this would have been on a very low level of activity. It was only with the more permanent settlement of farmers in the region since the early twentieth century that the salt was exploited on a commercial basis (Plate 5).

Plate 5: Photographic evidence of a typical salt works in the larger region (SiVEST, 2012)

## 2.12 SOCIAL ENVIRONMENT

The Socio-economic Assessment was conducted by Nonka Byker of MasterQ and the details of the report (MasterQ, 2012) are indicated in the paragraphs to follow below.

### 2.12.1 Geographical Processes

Geographical processes relate to the land use patterns and establish and planned infrastructural developments in an area. Land use is defined as "*the human modification of the natural environment or wilderness into a built environment such as fields, pastures, and settlements*." This subsection therefore describes the current and future land use in the project area (baseline profile).

The Hantam Local Municipality (HLM) is located in the Northern Cape Province and forms part of the Namakwa District Municipality (NDM), the only one in The Northern Cape to have access to a coastline. Other Local Municipalities (LMs) in the district are Nama Khoi; Khâi-Ma; Kamiesberg; Karoo Hoogland; Richtersveld; and Namaqualand.

The HLM is bordered in the South and South-West by The Western Cape Province, in the West by The Kamiesberg LM, in the North by the Khâi-Ma LM and Siyanda District, and in the East by both The Pixley ka Seme District and The Karoo Hoogland LM. The LM is large, taking up an area of approximately 27,968 km2 (22% of the area of the district) and is comprised of 5 respective municipal wards.

According to the Hantam Municipality's Integrated Development Plan (IDP), none of the towns within the municipality's area of jurisdiction have official town planning schemes and therefore planning is mostly done on an ad-hoc basis.

At approximately 50km south, Loeriesfontein is the closest town to the proposed site. According to the IDP, the area in the south-western quadrant of the town has been earmarked for housing development. However, much of the area is characterised by rocky outcrops with steep slopes, which makes it unsuitable for further development.

Businesses are found in the eastern quadrant of the town. To the west of town there are also businesses, but these are less ordered and more widely dispersed throughout the area. Land is quite readily available for agricultural purposes but should be substituted with "summer land" to ensure that the land is suitable for grazing throughout the year. The possibility of mining lime in the area is currently being investigated.

The district itself compiled a State of the District Profile Report that identified several issues and challenges. These included:

- The effective maintenance of existing infrastructure;
- Minimising existing infrastructural backlogs;
- Developing additional water sources;
- Increased investment for the maintenance of roads in order to capitalise on the economic benefits that tourism and agriculture offered;
- Increased investment in development projects that were in line with the IDP, the NCPGDS and the NSDP;
- The effective use of resources to assist in development;

- Improving intergovernmental cooperation to ensure that common goals and targets were achieved; and
- Developing human potential within the district in an effort to retain the economically active population within the district.

The sites that are proposed for the PV plant near Loeriesfontein are located on the following farms:

- Portion 1 of the Farm No. 213, Calvinia Road, Northern Cape;
- Portion 2 of the Farm No. 213, Calvinia Road, Northern Cape.

On-site there are 5 structures (located in the vicinity of the red circles), a train station (for industrial goods), two borrow pits and an existing power line. All the structures are located on Portions 1 and 2 of the Farm 213. The on-site sensitivity is reflected in Figure 34 below. However, it should be noted that although these structures have been marked as sensitive, the land will be leased from the landowner(s) and therefore they will be either in agreement with the PV panels in close proximity to their houses or to vacate their houses. The existing power line is required to tap into the Eskom network.


Figure 34: Existing Powerline Infrastructure on Portions 1 and 2 of the Farm 213 (SiVEST, 2012)

A contentious point is the gravel road that passes between the two sites that also leads to the gypsum mine further north of the site. The road will serve as a very good access road to the site but is already used by heavy vehicles travelling up and down to the mine. During a focus group meeting with the Loeriesfontein Agricultural Union held on 21 October 2011, local farmers complained about the state of the road, especially in terms of the amount of dust created by heavy vehicles travelling up and down the road and litter that is thrown out the truck windows. It is therefore important that the state of the road would have to be upgraded and maintained to minimise dust population – this might be done in cooperation with the gypsum mine.

## SECTION 3- CURRENT STATUS OF THE ENVIRONMENT

### 3.1 Biodiversity (Flora and Fauna)

The terrestrial biodiversity comparative assessment was undertaken by The Biodiversity Company in January 2023 (Appendix D), with the findings of the assessment presented below.

A summary of the terrestrial surveys undertaken as part of the Loeriesfontein 3 PV SEF and Grid Connection infrastructure (assessed as part of a separate standalone report) is provided in Table 3.1 and Table 3.2. A sensitivity map can be seen in Figure 35 .

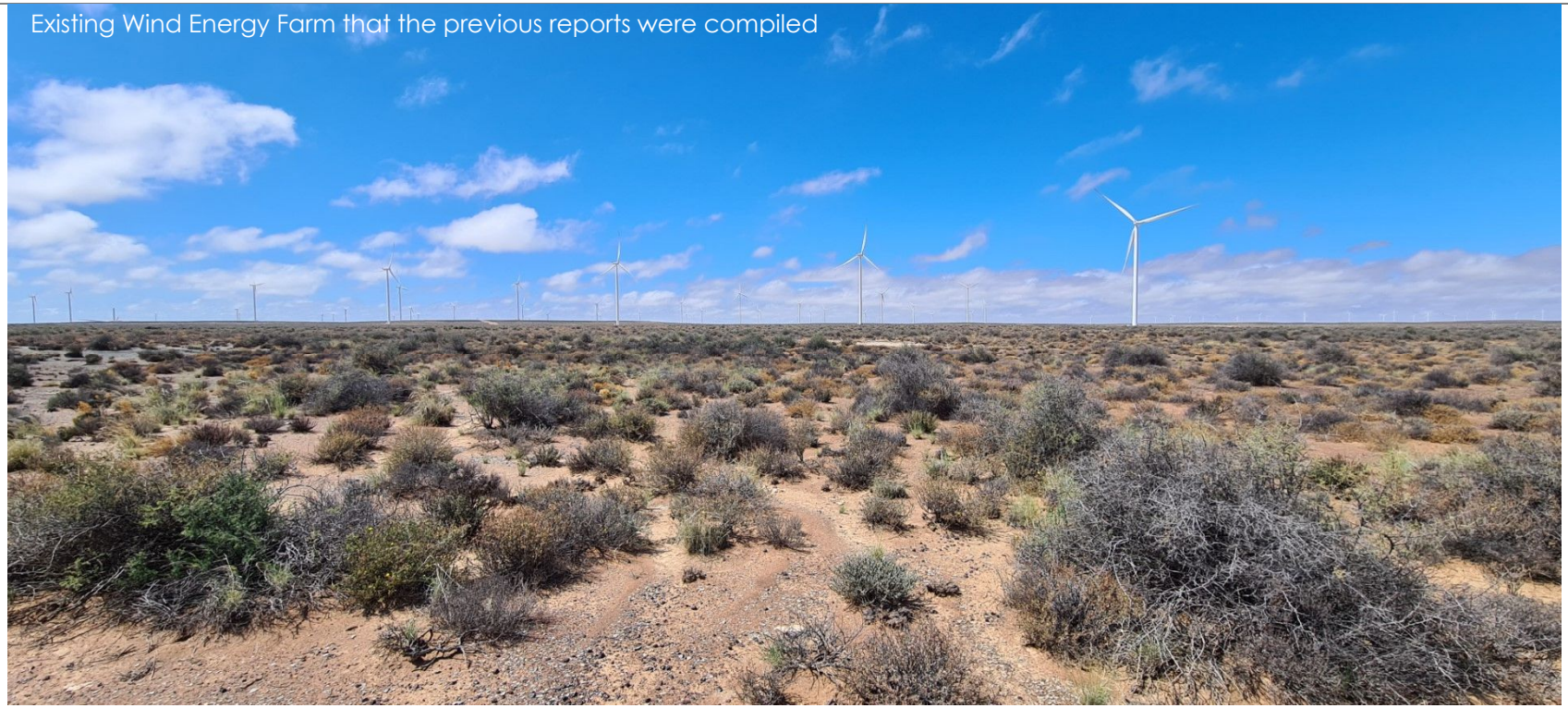
**Table 3.1 Summary of terrestrial desktop survey**

| Desktop Information Considered | Relevant/Irrelevant |
|---|---|
| **Ecosystem Threat Status** | Relevant – The Project area overlaps with a Least Concern ecosystem |
| **Ecosystem Protection Level** | Relevant – The Project area overlaps largely with a Not Protected Ecosystem. |
| **Critical Biodiversity Area** | Relevant – The Project area overlaps mainly with Other Natural Areas and small portions of ESA. |
| **Renewable Energy EIA Application Database (REEA)** | Relevant – The Project area overlaps entirely within an "Approved" area. |
| **South African Inventory of Inland Aquatic Ecosystems** | Irrelevant - The Project area does not overlap with any areas. |
| **National Freshwater Priority Area and Inland Water** | Relevant – The Project area overlaps with two Non-FEPA wetlands |
| **Strategic Water Source Areas** | Irrelevant- The Project area is located 160 km from the closest SWSA |
| **Protected Areas** | Irrelevant – The Project area is 98 km from the closest Protected Area |
| **Renewable Energy Development Zones** | Irrelevant – The PAID doesn't fall within any REDZ. |
| **National Protected Areas Expansion Strategy** | Irrelevant – The closest NPAES is 18km away. |
| **Important Bird and Biodiversity Areas** | Irrelevant – Project area located 70 km from the nearest IBA |
| **Powerline Corridor** | Relevant – The Project area falls within the Western Corridor |

**Table 3.2 Summary of terrestrial field survey**

| Loeriesfontein PV | Sample Date: 4-6 January 2023 |
|---|---|
| **Site photo** | |
| A photo showing the typical vegetation present.  | |

Typical Landscape of the Project Area


Existing Wind Energy Farm that the previous reports were compiled

Rare Plant (Habitat specialist) *Dregeochloa calviniensis* found within the project area.

| | |
|---|---|
| **Habitat state and Vegetation present.** | **The habitats were found in the same ecological state as during the 2012 studies (mainly due to no change in land use)**. The condition of the vegetation is considered semi-natural (degraded) shrubland but slightly disturbed due to the grazing by livestock, mismanagement, and also human infringement. Provides grazing for livestock. Aids in the filtration of water permeating through the soil into drainage lines. Acts as a corridor for fauna dispersion within the landscape. Acts as a greenland that supports viable plant species populations and is also used for foraging by fauna. Succulents were ubiquitous throughout the assessment area and occurred within the community described above. It is important to note that these growth forms (All species of Aizoaceae/ Mesembryanthemaceae, Hyacinthaceae, and Euphorbiaceae) are protected under the Northern Cape Legislation.<br><br>*Dregeochloa calviniensis* is a Rare listed plant that is considered a habitat specialist and is known to occur in localized subpopulations on Limestone outcrops. The species was recorded within the project area during the 2023 surveys, the species was not noted during the 2012 studies. The Species Environmental Assessment Guideline (Sanbi,2020)[2] for Rare species recommends a minimum buffer of 200m around the population.<br><br>Inconspicuous drainage lines occur within the project area and can be regarded as non-perennial and possess surface flow only briefly during and following a period of rainfall (ephemeral), which is a feature of semi-arid/arid regions. These seasonal streams create an ecological link between the stream and its surrounding terrestrial landscape and have the same function albeit on a smaller scale than a river. |

[2] South African National Biodiversity Institute (SANBI). 2020. Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa. South African National Biodiversity Institute, Pretoria. Version 1.2020.

| | | | | | | |
|---|---|---|---|---|---|---|
| **Current Impacts** | Limited impacts within the proposed area, mainly grazing by livestock. | | | | | |
| **Site Ecological Importance[3]** | **Habitat** | **Conservation Importance** | **Functional Integrity** | **Biodiversity Importance** | **Receptor Resilience** | **Site Ecological Importance** |
| | **Limestone** | Medium<br>> 50% of receptor contains natural habitat with potential to support SCC.<br>Supports *Dregeochloa calviniensis* a Rare plant recorded within the habitat. | High<br>Presence of Rare species. | **Medium** | Low<br>Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality | **High** |
| | **Degraded Shrubland** | Medium<br>> 50% of receptor contains natural habitat with potential to support SCC. | Medium<br>Medium semi-intact area for any conservation status of ecosystem type. Mostly minor current negative ecological impacts, with some major impacts and a few signs of minor past disturbance. | **Medium** | Medium<br>Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality | **Medium** |
| | Guidelines for interpreting Site Ecological Importance in the context of the proposed development activities | | | | | |

[3] The different habitat types within the project area were delineated and identified based on observations during the field assessment, and available satellite imagery. These habitat types were assigned Ecological Importance (EI) categories based on their ecological integrity, conservation value, the presence of species of conservation concern and their ecosystem processes, as per the new protocols. Site Ecological Importance (SEI) is a function of the Biodiversity Importance (BI) of the receptor (e.g., SCC, the vegetation/fauna community or habitat type present on the site) and Receptor Resilience (RR) (its resilience to impacts) as follows. BI is a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor. The method can be provided upon request.

| Site Ecological Importance | Interpretation in relation to proposed development activities |
|---|---|
| High | Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high-impact activities. |
| Medium | Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities. |

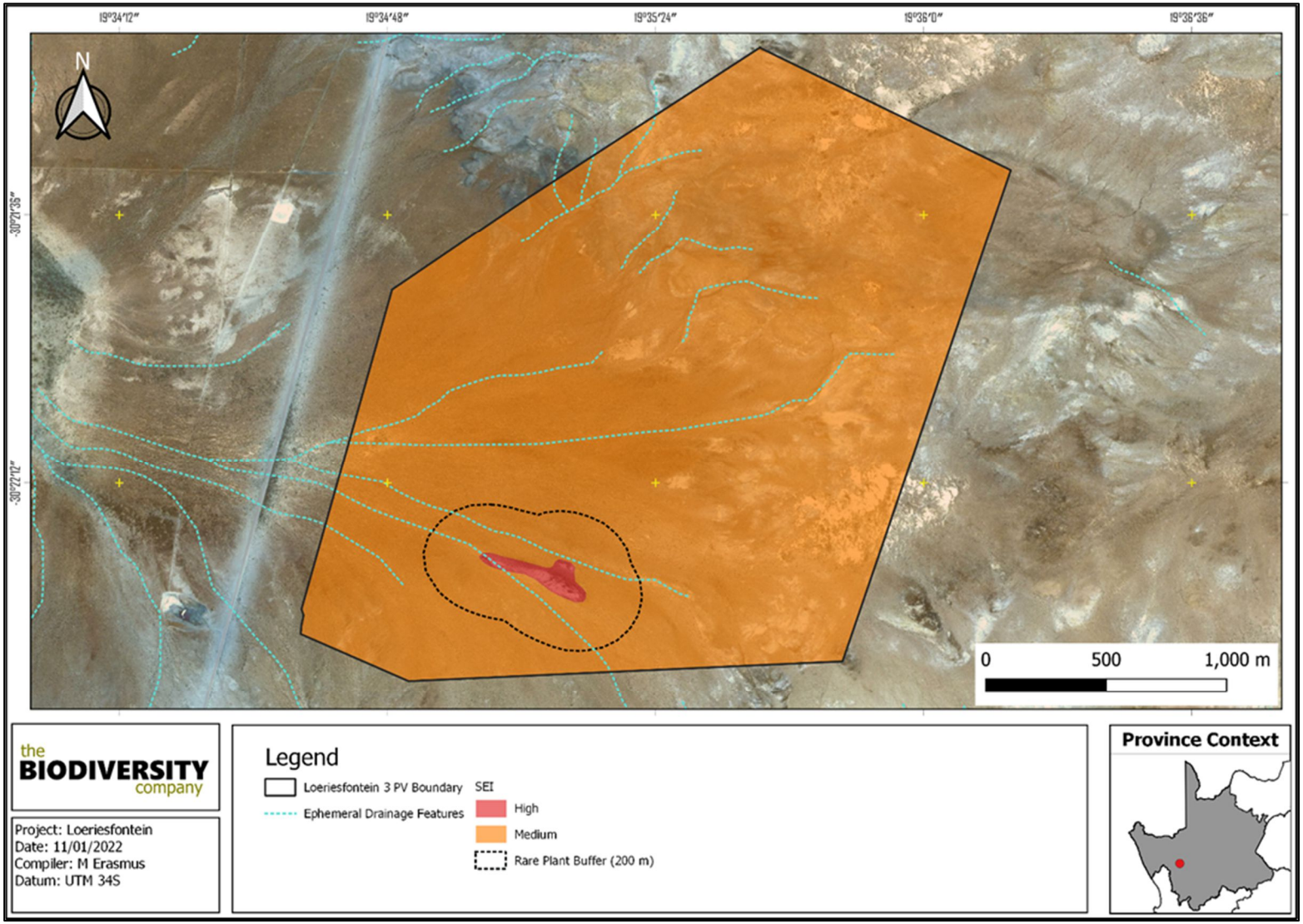



Figure 35: Site Ecological Importance (SEI) of the project area

The terrestrial biodiversity screening theme sensitivity for the area is 'Very High', due to the presence of an Ecological Support Area (ESA) and the Freshwater Ecological Priority Area (FEPA) Sub catchment. The assessment (January 2023) determined the sensitivity of the degraded shrubland habitat to be 'Medium', whereas the Limestone habitat was rated with a High SEI. Thus, the following is concluded: The completion of the terrestrial biodiversity assessment **disputes the very high sensitivity of degraded shrubland habitats that overlap with the screening report, however, corroborates with the screening report regarding the Limestone habitat**.

The **habitats were found in the same ecological state as during the 2012 studies (mainly due to no change in land use)**. The condition of the vegetation is considered semi-natural (degraded) shrubland but slightly disturbed due to the grazing by livestock, mismanagement and also human infringement. The vegetation on site provides grazing for livestock, aids in the filtration of water permeating through the soil into drainage lines, acts as a corridor for fauna dispersion within the landscape, acts as a Greenland that supports viable plant species populations and is also used for foraging by fauna. Succulents were ubiquitous throughout the assessment area and occurred within the community described above. It is important to note that these growth forms (All species of *Aizoaceae/ Mesembryanthemaceae, Hyacinthaceae*, and *Euphorbiaceae*) are protected under the Northern Cape Legislation.

*Dregeochloa calviniensis* is a Rare listed plant that is considered a habitat specialist and is known to occur in localized subpopulations on Limestone outcrops. The species was recorded within the project area during the 2023 surveys, while the species was not noted during the 2012 studies. **The Species Environmental Assessment Guideline (Sanbi,2020) for rare species recommends a minimum buffer of 200m around the population.**

Inconspicuous drainage lines occur within the project area and can be regarded as non-perennial and possess surface flow only briefly during and following a period of rainfall (ephemeral), which is a feature of semi-arid/arid regions. These seasonal streams create an ecological link between the stream and its surrounding terrestrial landscape and have the same function albeit on a smaller scale than a river. Limited impacts were identified within the proposed area, mainly grazing by livestock.

Assuming the High SEI area, as well as the associated 200m buffer, will be avoided; all prescribed mitigation measures and supporting recommendations presented here will help to achieve an acceptable residual impact, as per the previous findings (i.e., no change to the findings of the previous assessment, including impact rating). These **measures and recommendations will remain applicable** for the requested extension of the EA.

As such, considering the review of the 2012 Biodiversity Assessment and associated documentation, and the implementation of the mitigation measures described above and as included in the updated EMPr for this development be implemented, **it is the reasoned opinion of the specialist that the EA for the Loeriesfontein 3 PV SEF may be extended for an additional 5 years (i.e., EA to lapse on 29 October 2027)**.

## 3.2 Avifauna

The avifauna comparative assessment was undertaken by Chris van Rooyen in November 2022 (Appendix H) and findings of the assessment are presented below.

The site was inspected on 21 November 2022 to assess whether the conditions at the site have changed materially from when the original assessment was done in February 2012. The development area was inspected with a 4 x 4 vehicle and on foot for one day. Photographs of the development area were taken to record the habitat and a bird list was compiled.

The habitat in the broader development area is highly homogenous and consists of extensive sandy and gravel plains with low shrub. The vegetation on the site itself consists mostly of shrubs scattered between bare patches of sand and gravel. The dominant vegetation is a mixture of Bushmanland Arid Grassland and Bushmanland Basin Shrubland. These vegetation types consist of dwarf shrubland dominated by a mixture of low, sturdy and spiny (and sometimes also succulent) shrubs (*Rhigozum sp., Salsola sp., Pentzia sp., and Eriocephalus sp.*), 'white' grasses (*Stipagrostis sp.*) and in years of high rainfall also abundant annual flowering plants such as species of Gazania sp. and *Leysera sp.* (Mucina & Rutherford 2006). The closest **Important Bird Area (IBA)**, the Bitterputs Conservation Area IBA SA036, is located approximately 75km to the north (Birdlife 2014) and **falls outside the zone of influence of this development**.

The South African Bird Atlas 1 (SABAP1) recognises six primary vegetation divisions within South Africa, namely (1) Fynbos (2) Succulent Karoo (3) Nama Karoo (4) Grassland (5) Savanna and (6) Forest (Harrison et al. 1997). The criteria used by the authors to amalgamate botanically defined vegetation units, or to keep them separate were (1) the existence of clear differences in vegetation structure, likely to be relevant to birds, and (2) the results of published community studies on bird/vegetation associations. It is important to note that no new vegetation unit boundaries were created, with use being made only of previously published data. Using this classification system, the natural vegetation in the study area is classified as Nama Karoo.

Nama Karoo as dominated by low shrubs and grasses; peak rainfall occurs in summer from December to May. Trees, e.g., *Vachellia karroo* are mainly restricted to ephemeral watercourses, but in the proposed development area, due to the extreme aridity the ephemeral watercourses are devoid of trees. The warmest month (with the highest average high temperature) is January (29.7°C). The months with the lowest average high temperature are June and July (15.1°C). The month with the highest average low temperature is February (17.7°C). The coldest month (with the lowest average low temperature) is July (5.7°C) (www.weatheratlas.com).

The project site lies in an ecotonal area between the Nama Karoo and the Succulent Karoo. In comparison with the Succulent Karoo, the Nama Karoo has higher proportions of grass and tree cover. The two Karoo vegetation types support a particularly high diversity of bird species endemic to Southern Africa, particularly in the family Alaudidae (Larks). Its avifauna typically comprises ground-dwelling species of open habitats. Because rainfall in the Nama Karoo falls mainly in summer, while peak rainfall in the Succulent Karoo occurs mainly in winter, it provides opportunities for birds to migrate between the Succulent and Nama Karoo, to exploit the enhanced conditions associated with rainfall. Many typical karroid species are nomads, able to use resources that are patchy in time and space (Barnes 1998).

The project development area is classified as **High sensitivity** for avifauna, according to the DFFE online screening tool. The classification of High sensitivity is linked to the potential occurrence of Ludwig's Bustard *Neotis ludwigii* (Regionally and Globally Endangered), Red Lark *Calendulauda burra* (Regionally and Globally Vulnerable) and Secretarybird *Saggitarius serpentarius* (Regionally Vulnerable Globally

Endangered) (Figure 36). The proposed classification of **High Sensitivity** in the screening tool was confirmed during the site sensitivity verification survey which was conducted on 11 November 2022.

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY


Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at eiadatarequests@sanbi.org.za listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

| Very High sensitivity | High sensitivity | Medium sensitivity | Low sensitivity |
|---|---|---|---|
| | X | | |

Sensitivity Features:

| Sensitivity | Feature(s) |
|---|---|
| High | Aves-Neotis ludwigii |
| High | Aves-Calendulauda burra |
| Medium | Aves-Sagittarius serpentarius |

Figure 36. The classification of the Project Site according to the animal species theme in the DFFE National Screening Tool. The High sensitivity is linked to the possible occurrence of Ludwig's Bustard *Neotis ludwigii* (Regionally and Globally Endangered), Red Lark *Calendulauda burra* (Regionally and Globally Vulnerable) and Secretarybird *Saggitarius serpentarius* (Regionally Vulnerable Globally Endangered).

The occurrence of Species of Conservation Concern (SCC) was confirmed during the original surveys in the adjacent Loeriesfontein Wind Farm, which took place in the period of September 2011 through to September 2013. Karoo Korhaan (Regionally Near threatened), Ludwig's Bustard (Regionally and Globally Endangered), Red Lark, Martial Eagle (Regionally and Globally Endangered) Sclater's Lark (Globally and Regionally Near threatened) were recorded at the site. The subsequent site visit in November 2022 **confirmed that the habitat has not changed and that habitat for the above listed SCC, as well as the other SCC listed in Table 3.3 exists at the development area**. This classification is assessed to be accurate as far as the potential presence of SCC is concerned, based on actual conditions recorded on the ground during the site visits in September 2011 through to September 2013, and the subsequent site visit conducted in November 2022.

Bird distribution data of the South African Bird Atlas 2 (SABAP 2) was obtained from the University of Cape Town (2022), as a means to ascertain which species occur within the broader area i.e., within a block consisting of 4 pentads where the proposed project development area will be located (Figure 36 below). A pentad grid cell covers 5 minutes of latitude by 5 minutes of longitude (5'× 5'). Each pentad is approximately 8 × 7.6 km. From 2007 to date, a total of 41 full protocol lists (i.e., surveys lasting a minimum of two hours each) have been completed for this area. In addition, 56 ad hoc protocol lists (i.e., surveys lasting less than two hours but still yielding valuable data) have been completed. The broader area was selected on the basis of the number of checklists that had been completed, in order to get a more representative view of the avifauna that could occur at the project site.

According to the SABAP2 project surveys, a total of 95 species occurs in the broader area (Table 3.3). The species that were recorded on and around the project development area during the pre-construction monitoring at the adjacent Loeriesfontein Wind Farm (September 2011 – September 2013) and the subsequent site visit in November 2022 are listed in Table 3.3.


Figure 37. The broader area (4 x pentad grid cells) where the project development area is located.

**Table 3.3. Avifauna recorded by SABAP 2 and during surveys in the broader area in September 2011 – September 2013 and at the Loeriesfontein 3 PV site in November 2022. Species of conservation concern (SCC) are shaded in green.**

| Species name | *Scientific name* | SABAP2 Full protocol reporting rate | SABAP2 Ad hoc protocol reporting rate | Global status | Regional status | Recorded during monitoring 2011-2013 | Recorded during monitoring 2022 |
|---|---|---|---|---|---|---|---|
| Acacia Pied Barbet | *Tricholaema leucomelas* | 12.20 | 0.00 | - | - | | |
| African Black Duck | *Anas sparsa* | 2.44 | 0.00 | - | - | | |
| African Pipit | *Anthus cinnamomeus* | 9.76 | 3.57 | - | - | | x |
| African Red-eyed Bulbul | *Pycnonotus nigricans* | 2.44 | 0.00 | - | - | | |
| Ant-eating Chat | *Myrmecocichla formicivora* | 29.27 | 3.57 | - | - | | |
| Barn Swallow | *Hirundo rustica* | 21.95 | 5.36 | - | - | x | |
| Black-chested Prinia | *Prinia flavicans* | 2.44 | 0.00 | - | - | | |
| Black-chested Snake Eagle | *Circaetus pectoralis* | 2.44 | 3.57 | - | - | x | |
| Black-eared Sparrow-Lark | *Eremopterix australis* | 58.54 | 8.93 | - | - | x | |
| Black-headed Canary | *Serinus alario* | 9.76 | 3.57 | - | - | | |
| Blacksmith Lapwing | *Vanellus armatus* | 2.44 | 0.00 | - | - | | |
| Black-winged Stilt | *Himantopus himantopus* | 2.44 | 0.00 | - | - | | |
| Bokmakierie | *Telophorus zeylonus* | 70.73 | 3.57 | - | - | x | x |
| Booted Eagle | *Hieraaetus pennatus* | 4.88 | 0.00 | - | - | | |
| Burchell's Courser | *Cursorius rufus* | 7.32 | 0.00 | - | VU | | |
| Cape Bunting | *Emberiza capensis* | 43.90 | 14.29 | - | - | x | x |
| Cape Crow | *Corvus capensis* | 24.39 | 7.14 | - | - | | |
| Cape Penduline Tit | *Anthoscopus minutus* | 43.90 | 5.36 | - | - | x | x |
| Cape Sparrow | *Passer melanurus* | 97.56 | 46.43 | - | - | x | x |
| Cape Turtle Dove | *Streptopelia capicola* | 51.22 | 0.00 | - | - | | |
| Cape Wagtail | *Motacilla capensis* | 29.27 | 0.00 | - | - | | |
| Capped Wheatear | *Oenanthe pileata* | 48.78 | 7.14 | - | - | x | |
| Chat Flycatcher | *Melaenornis infuscatus* | 73.17 | 17.86 | - | - | x | |
| Common Quail | *Coturnix coturnix* | 2.44 | 0.00 | - | - | | |
| Common Swift | *Apus apus* | 14.63 | 0.00 | - | - | | |
| Crowned Lapwing | *Vanellus coronatus* | 4.88 | 1.79 | - | - | | |
| Double-banded Courser | *Rhinoptilus africanus* | 24.39 | 5.36 | - | - | | |
| Dusky Sunbird | *Cinnyris fuscus* | 12.20 | 0.00 | - | - | x | |
| European Bee-eater | *Merops apiaster* | 12.20 | 3.57 | - | - | | x |
| Familiar Chat | *Oenanthe familiaris* | 41.46 | 8.93 | - | - | | x |
| Greater Kestrel | *Falco rupicoloides* | 68.29 | 12.50 | - | - | x | x |
| Greater Striped Swallow | *Cecropis cucullata* | 4.88 | 0.00 | - | - | | |
| Grey Tit | *Melaniparus afer* | 29.27 | 5.36 | - | - | | |
| Grey-backed Cisticola | *Cisticola subruficapilla* | 24.39 | 5.36 | - | - | x | x |
| Grey-backed Sparrow-Lark | *Eremopterix verticalis* | 46.34 | 17.86 | - | - | | |
| House Sparrow | *Passer domesticus* | 34.15 | 3.57 | - | - | | x |
| Jackal Buzzard | *Buteo rufofuscus* | 7.32 | 3.57 | - | - | x | x |
| Karoo Chat | *Emarginata schlegelii* | 90.24 | 55.36 | - | - | x | x |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Karoo Eremomela | *Eremomela gregalis* | 63.41 | 21.43 | - | - | x | x |
| Karoo Korhaan | *Eupodotis vigorsii* | 90.24 | 37.50 | - | NT | x | x |
| Karoo Long-billed Lark | *Certhilauda subcoronata* | 92.68 | 23.21 | - | - | x | |
| Karoo Prinia | *Prinia maculosa* | 24.39 | 7.14 | - | - | x | x |
| Karoo Scrub Robin | *Cercotrichas coryphoeus* | 78.05 | 5.36 | - | - | x | x |
| Lanner Falcon | *Falco biarmicus* | 7.32 | 0.00 | - | VU | x | |
| Lappet-faced Vulture | *Torgos tracheliotos* | 2.44 | 0.00 | EN | EN | | |
| Large-billed Lark | *Galerida magnirostris* | 87.80 | 35.71 | - | - | x | |
| Lark-like Bunting | *Emberiza impetuani* | 78.05 | 21.43 | - | - | x | |
| Laughing Dove | *Spilopelia senegalensis* | 39.02 | 1.79 | - | - | | x |
| Layard's Warbler | *Curruca layardi* | 4.88 | 0.00 | - | - | x | |
| Lesser Flamingo | *Phoeniconaias minor* | 2.44 | 0.00 | NT | NT | | |
| Little Swift | *Apus affinis* | 9.76 | 0.00 | - | - | x | |
| Ludwig's Bustard | *Neotis ludwigii* | 58.54 | 8.93 | EN | EN | x | |
| Malachite Sunbird | *Nectarinia famosa* | 0.00 | 1.79 | - | - | | |
| Martial Eagle | *Polemaetus bellicosus* | 14.63 | 3.57 | EN | EN | x | x |
| Namaqua Dove | *Oena capensis* | 36.59 | 3.57 | - | - | | x |
| Namaqua Sandgrouse | *Pterocles namaqua* | 87.80 | 26.79 | - | - | x | |
| Nicholson's Pipit | *Anthus nicholsoni* | 4.88 | 0.00 | - | - | | |
| Northern Black Korhaan | *Afrotis afraoides* | 2.44 | 0.00 | - | - | x | |
| Pale Chanting Goshawk | *Melierax canorus* | 78.05 | 17.86 | - | - | x | x |
| Pied Crow | *Corvus albus* | 90.24 | 32.14 | - | - | x | x |
| Pied Starling | *Lamprotornis bicolor* | 0.00 | 1.79 | - | - | | x |
| Red Lark | *Calendulauda burra* | 92.68 | 25.00 | VU | VU | x | x |
| Red-capped Lark | *Calandrella cinerea* | 82.93 | 17.86 | - | - | x | |
| Red-headed Finch | *Amadina erythrocephala* | 2.44 | 0.00 | - | - | | |
| Rock Kestrel | *Falco rupicolus* | 17.07 | 17.86 | - | - | x | x |
| Rock Martin | *Ptyonoprogne fuligula* | 53.66 | 7.14 | - | - | | |
| Rufous-cheeked Nightjar | *Caprimulgus rufigena* | 4.88 | 0.00 | - | - | | |
| Rufous-eared Warbler | *Malcorus pectoralis* | 90.24 | 33.93 | - | - | x | |
| Sclater's Lark | *Spizocorys sclateri* | 41.46 | 0.00 | NT | NT | x | |
| Sickle-winged Chat | *Emarginata sinuata* | 4.88 | 17.86 | - | - | x | |
| South African Shelduck | *Tadorna cana* | 7.32 | 0.00 | - | - | | |
| Southern Double-collared Sunbird | *Cinnyris chalybeus* | 2.44 | 0.00 | - | - | | |
| Southern Fiscal | *Lanius collaris* | 68.29 | 3.57 | - | - | | x |
| Southern Masked Weaver | *Ploceus velatus* | 46.34 | 0.00 | - | - | | |
| Speckled Pigeon | *Columba guinea* | 70.73 | 8.93 | - | - | | |
| Spike-heeled Lark | *Chersomanes albofasciata* | 92.68 | 35.71 | - | - | x | |
| Spotted Eagle-Owl | *Bubo africanus* | 26.83 | 0.00 | - | - | x | |
| Spotted Flycatcher | *Muscicapa striata* | 2.44 | 0.00 | - | - | | |
| Spotted Thick-knee | *Burhinus capensis* | 19.51 | 3.57 | - | - | | |
| Spur-winged Goose | *Plectropterus gambensis* | 2.44 | 0.00 | - | - | | |
| Stark's Lark | *Spizocorys starki* | 7.32 | 5.36 | - | - | | |
| Three-banded Plover | *Charadrius tricollaris* | 9.76 | 0.00 | - | - | | |
| Tractrac Chat | *Emarginata tractrac* | 97.56 | 44.64 | - | - | x | |
| Western Barn Owl | *Tyto alba* | 0.00 | 1.79 | - | - | | x |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| White-backed Mousebird | *Colius colius* | 2.44 | 0.00 | - | - | | |
| White-rumped Swift | *Apus caffer* | 4.88 | 0.00 | - | - | | |
| White-throated Canary | *Crithagra albogularis* | 58.54 | 10.71 | - | - | | x |
| Yellow Canary | *Crithagra flaviventris* | 100.00 | 50.00 | - | - | x | x |
| Yellow-bellied Eremomela | *Eremomela icteropygialis* | 41.46 | 1.79 | - | - | x | |
| Yellow-billed Kite | *Milvus aegyptius* | 2.44 | 0.00 | - | - | | |
| Kori Bustard | *Ardeotis kori* | 0.00 | 0.00 | | | x | |
| Fairy Flycatcher | *Stenostira scita* | 0.00 | 0.00 | | | x | |
| African Hoopoe | *Upupa africana* | 0.00 | 0.00 | | | | x |
| Yellow-fronted Canary | *Crithagra mozambica* | 0.00 | 0.00 | | | | x |

**No nests of Red Data priority species were recorded at the project site during the site inspection in November 2022**. The site inspection in November 2022 confirmed that **the receiving environment had not changed in any material way**. It is **recommended by the specialist that the validity of the EA be extended by an additional 5 years, provided the recommendations in the avifauna report are strictly implemented**.

### 3.3. Bats

Animalia Consultants (Pty) Ltd undertook the bat impact assessment as part of the original Environmental impact Assessment (EIA) process in 2012 (SiVEST, 2012), and the 12-month pre-construction monitoring for the 100 MW Loeriesfontein 3 Photovoltaic (PV) Solar Energy Facility (SEF), 33/132kV Independent power Producer (IPP) Portion of the Shared On-site Substation (including the Transformer) and associated infrastructure, near Loeriesfontein in the Hantam Local Municipality, Northern Cape Province (DFFE Reference Number: 12/12/20/2321/2/1) in 2012 during the original assessment by SiVEST.

Although the original assessment considered the proposed wind energy facility, PV SEF and associated grid connection infrastructure, the specialist was asked to provide an opinion (Appendix I) on this amendment application i.e. the validity extension of the 100MW PV SEF and IPP portion of the shared on-site substation.

The specialist confirmed that due to the relatively **low impacts** of PV facilities on bats, and the low levels of change in the receiving PV environment, the specialist had **no objection** to the proposed amendment of extending the EA validity for a further 5 years.

### 3.4. Aquatic/Surface Water

The Aquatic/Surface Water comparative assessment was undertaken by Brian Colloty of EnviroSci (Pty) Ltd in January 2023 (Appendix E) and the findings of the assessment are discussed below.

The previous assessments undertaken (SiVEST, 2012 & NatureStamp 2020) highlighted several watercourses that occurred within the PV site, which were then provided with a suitable buffer and avoided by the proposed PV panel areas and associated buildings. This also included that later for inclusion of the BESS within the authorised PV SEF site (SiVEST, 2020). It must be noted that the inclusion of the BESS, DFFE Ref: (21/12/20/2321/2) was undertaken as a separate Basic Assessment (BA) process by SiVEST in 2020. As the BESS is located within the PV SEF site, the findings during the BA process can also be used for the purposes of this amendment.

Those reports indicated that the observed systems were dry ephemeral water courses with little to no vegetation, and no obligate aquatic vegetation. This was confirmed during this assessment conducted in January 2023 (Plate 6). **Due to the form and function of the observed aquatic systems, no change to these systems (baseline) has occurred in the past 12 years.**

The later NatureStamp (2020) survey did indicate the potential of two small depressions, as indicated in the NFEPA Wetland Map, updated as part of the NSBA 2018 spatial data when the BESS locality was assessed. These were also confirmed in the site visit conducted this year (Plate 2 and Figure 38). These same wetlands were also included in the Northern Cape Biodiversity Spatial Plan (2017) as Ecological Support Areas (ESAs) (Figure 39), as these have limited aquatic function, i.e., limited obligate aquatic function and only contain water for short periods after heavy rainfall events.

Based then on the assessment of the proposed footprints, the **project would still have little bearing on the aquatic environment,** assuming the final footprint is located either well outside of any watercourses and wetlands, while main access is positioned within existing roads.

Consequently, the proponent took cognisance of the sensitivity layers (river & wetlands) supplied during the original specialist assessments, by locating the proposed structures within previously disturbed areas, **thus avoiding any potential Very High Sensitivity areas**. This is assuming that the wetland areas are avoided (inclusive of a 50m buffer).

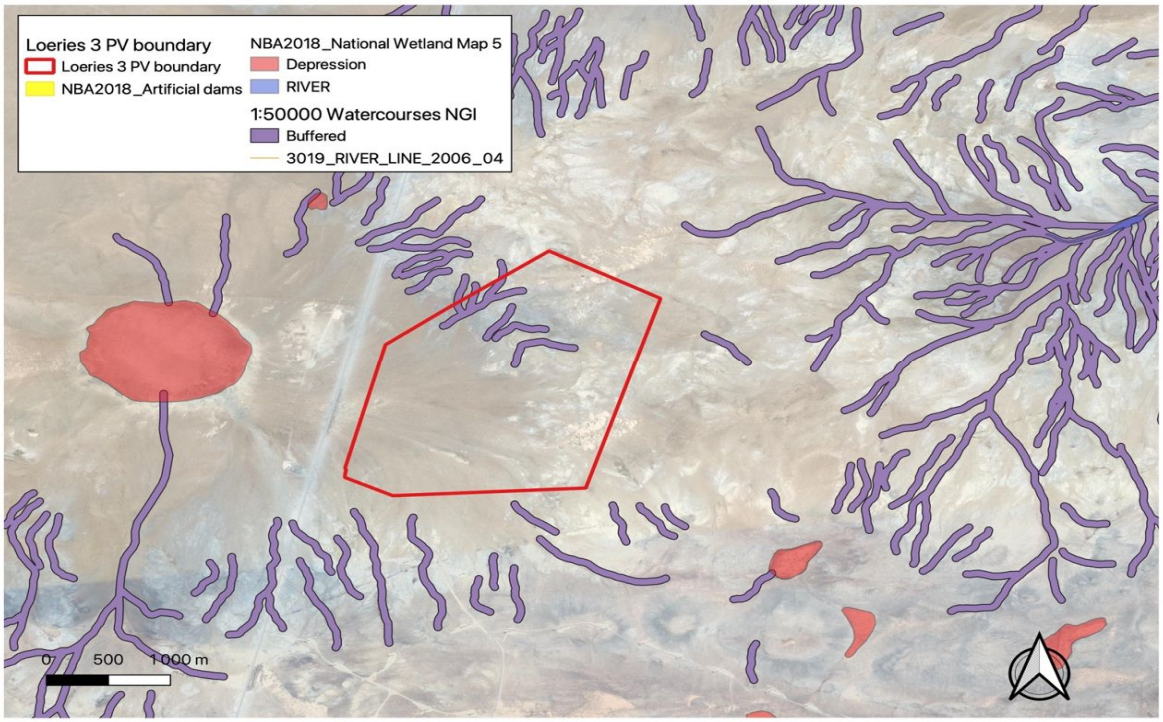



Figure 38: Results of the original survey findings, confirmed in this assessment.

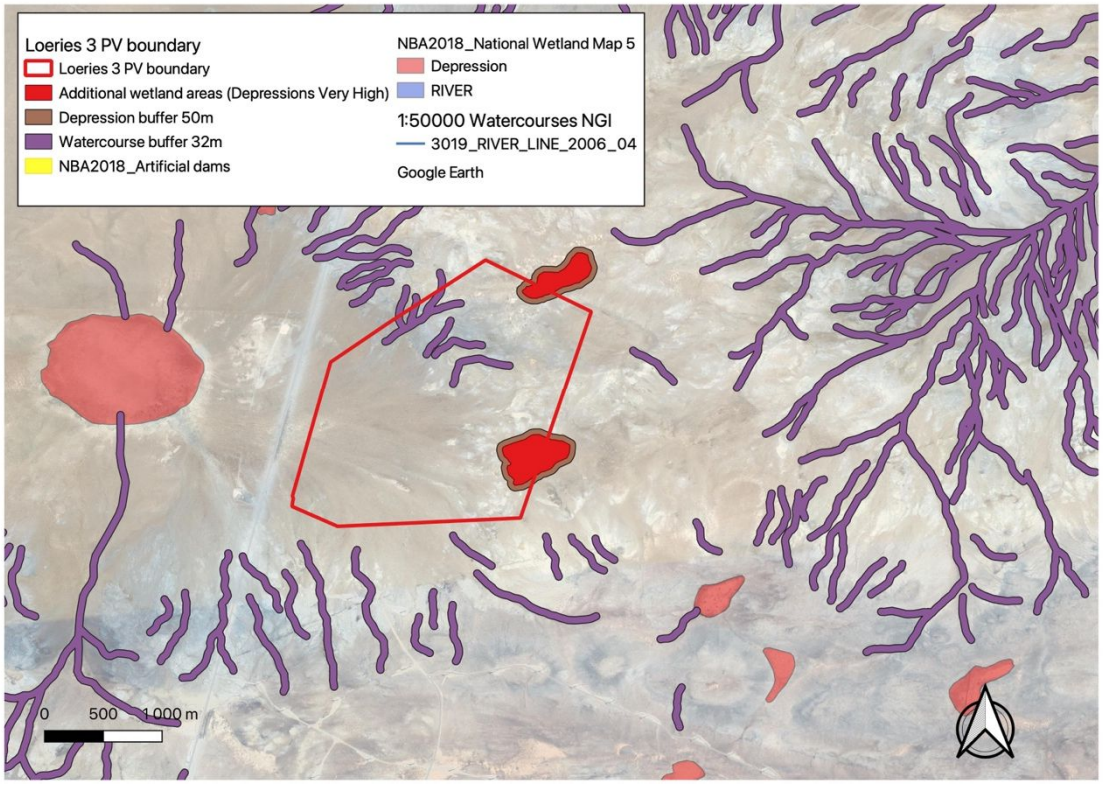



Figure 39: Results of the original survey findings, confirmed in this assessment.

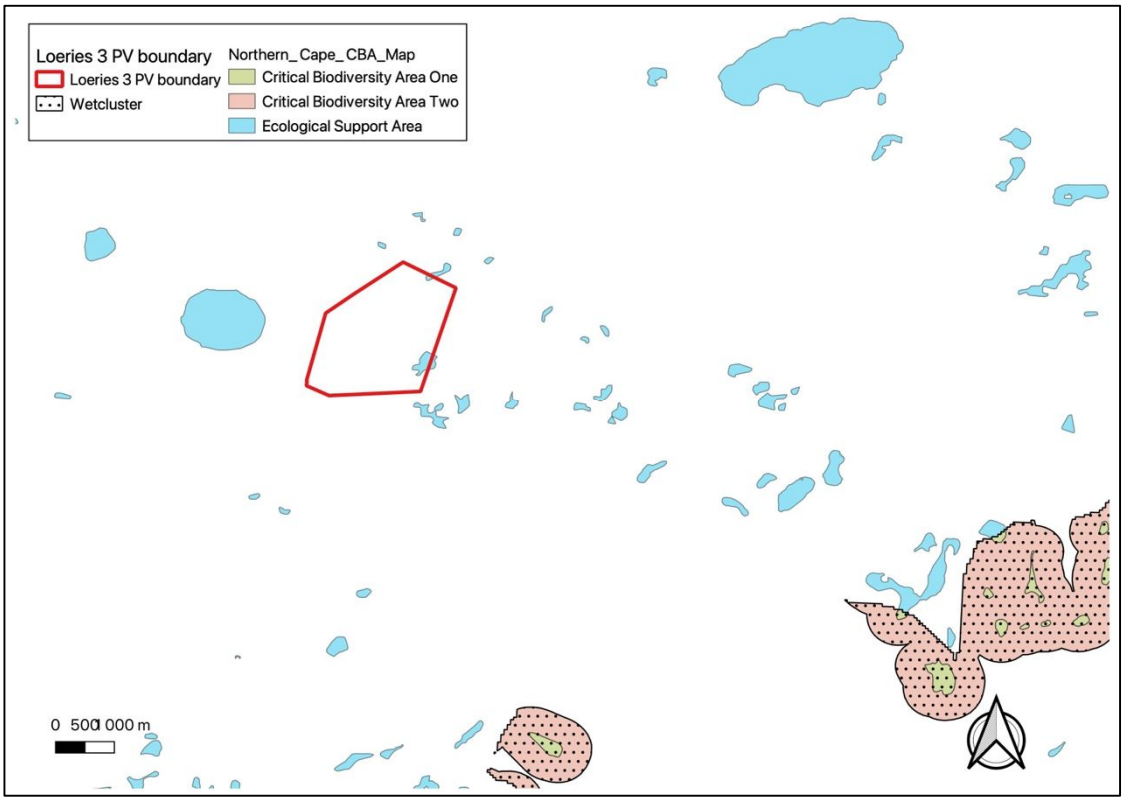



Figure 40: Ecological Support Areas (ESAs) as shown in the Northern Cape Biodiversity Conservation Plan (2017).

Plate 6: A view of one of the small drainage areas

Plate 7: A view of the southernmost depression

The relevant legislation and/or guidelines which are relevant to the PV development were considered as part of the previous assessments. In terms of new assessments, legislation and/or guidelines which are now relevant to the authorised development which were not undertaken as part of the previous assessments, the PROTOCOL FOR SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR THE ENVIRONMENTAL IMPACTS ON BIODIVERSITY, and in particular Aquatic Biodiversity, related to Government Gazette 43110, (20 March 2020) and Appendix 6 of the NEMA EIA Regulations, have also been considered in this compliance statement. As such, all relevant legislation, assessments and/or guidelines have been taken into consideration and addressed.

The DFFE screening tool indicated that that the sites are all located in Very High sensitivity areas (Aquatic Theme), as indicated in the Screening Tool Results. This was **confirmed during the site visit conducted on 18 January 2023**, due to the presence of the small depressions. However, **if these areas are avoided then the previously assessed impacts would thus remain unchanged against the previous assessments**.

### 3.5. Soil and Agricultural potential

The Soil and Agricultural comparative assessment was undertaken by TerraAfrica in January 2023 (Appendix G), and the findings of the assessment are discussed below.

The **low agricultural potential** of the soils within the project area is confirmed by the absence of crop field boundaries following the delineation of DALRRD (2019). The nearest crop fields are located between 22 to 25 km north and northeast of the PV development area. There are no irrigated crop fields within a 30 km radius from the development area.

The long-term grazing capacity of the area, according to DALRRD (2018), is 45 ha per Large Stock Unit (LSU). This can be converted to 11 ha per SSU. This is slightly lower than the 10 ha per SSU that was indicated by the farmers during the compilation of the initial Soil and Agricultural Potential Report by Barichievy (2012). The data **confirms that description of the area's livestock grazing potential as low-moderate**.


Figure 41. Location of field crop boundaries around the Loeriesfontein 3 PV SEF (data source: DALRRD, 2019)

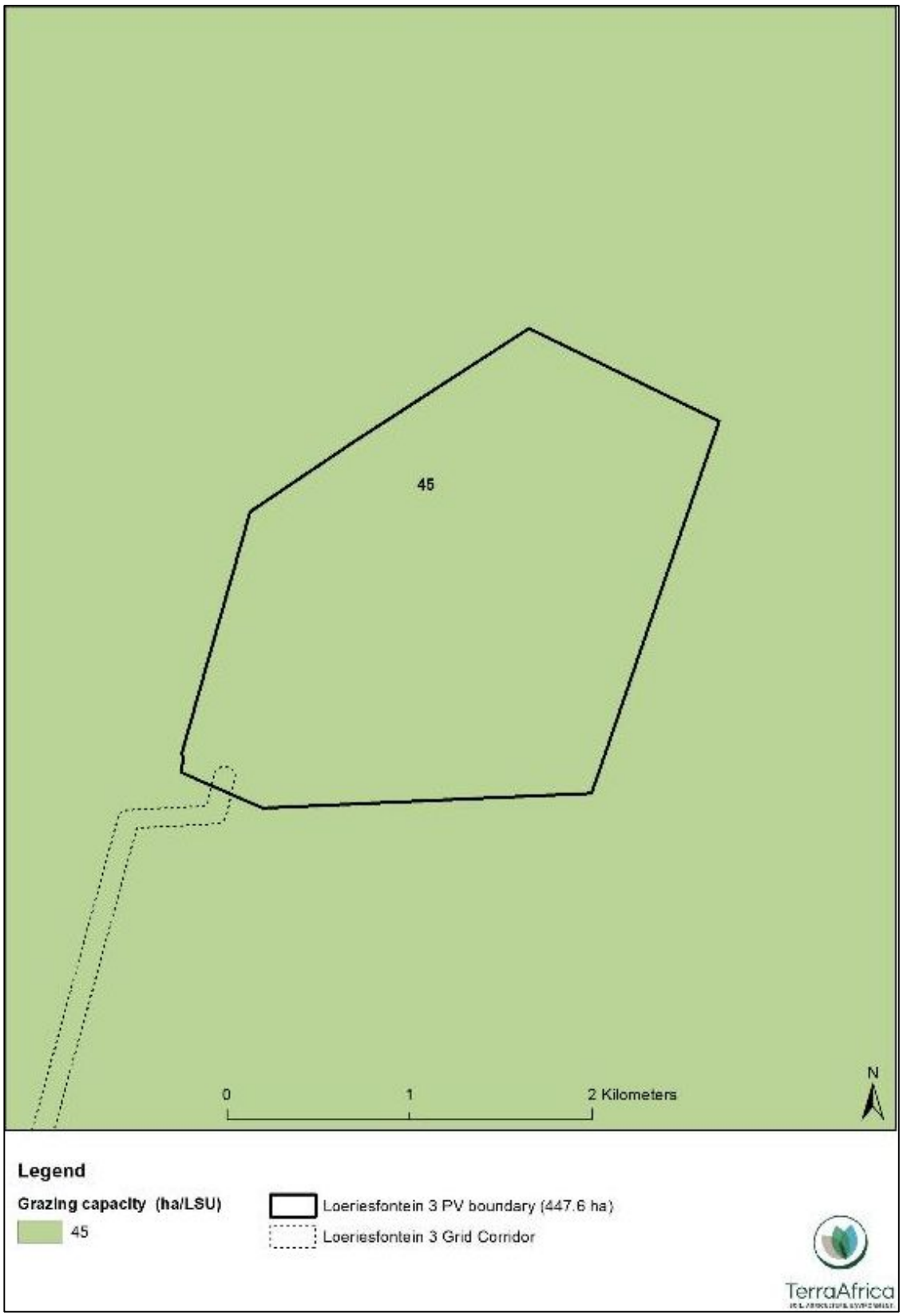



Figure 42. Grazing capacity of the Loeriesfontein 3 PV SEF development area

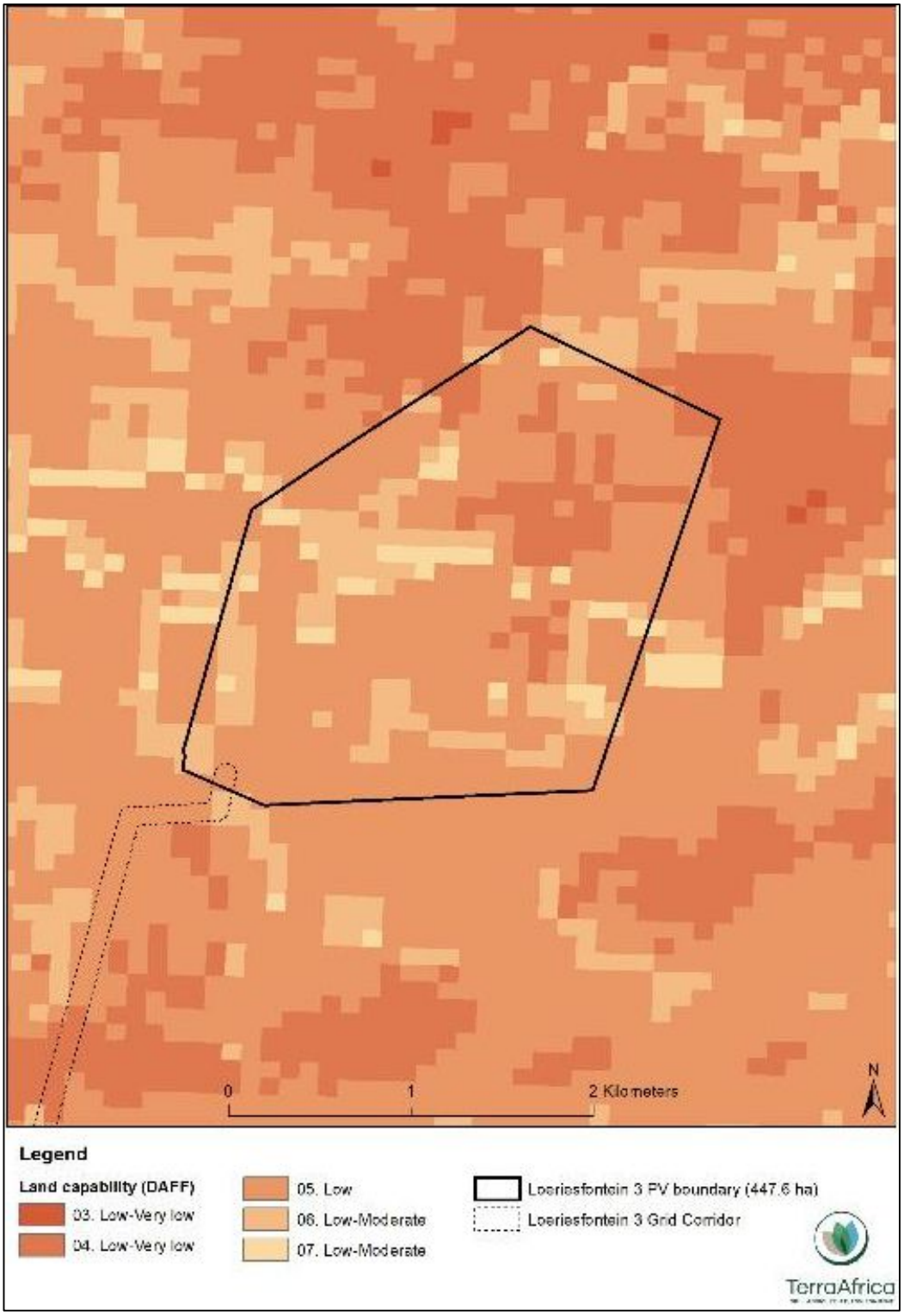



Figure 43. Land capability classification of the Loeriesfontein 3 PV SEF development area (data source: DALRRD, 2016)

The dominant land capability class of the development area is **Low** (Class 05). Smaller areas with **Low-Moderate** (Classes 06 and 07) and **Very low** (Class 04) are interspersed between the Low land capability. The development area is surrounded by land of the same combination of land capability classes.

The agricultural theme map of the sensitivity screening tool indicates that the development area assessed consists of **Low and Medium agricultural sensitivity**. The initial assessment of the agricultural potential of the area had a similar conclusion based on the presence of very shallow to shallow soils and an arid climate with low rainfall. The report concluded that there is no suitability for rainfed agriculture and limited suitability for livestock farming (Barichievy, 2012).

The desktop analysis conducted in 2022/2023 for the comparative assessment **agrees with the sensitivity rating of the screening tool report**, as all the data sets released by DALRRD since 2012 indicates that the agricultural potential and productivity of the area has not improved. It is concluded that the agricultural sensitivity of the area ranges between **Low and Medium** and there are **no areas of High sensitivity**.

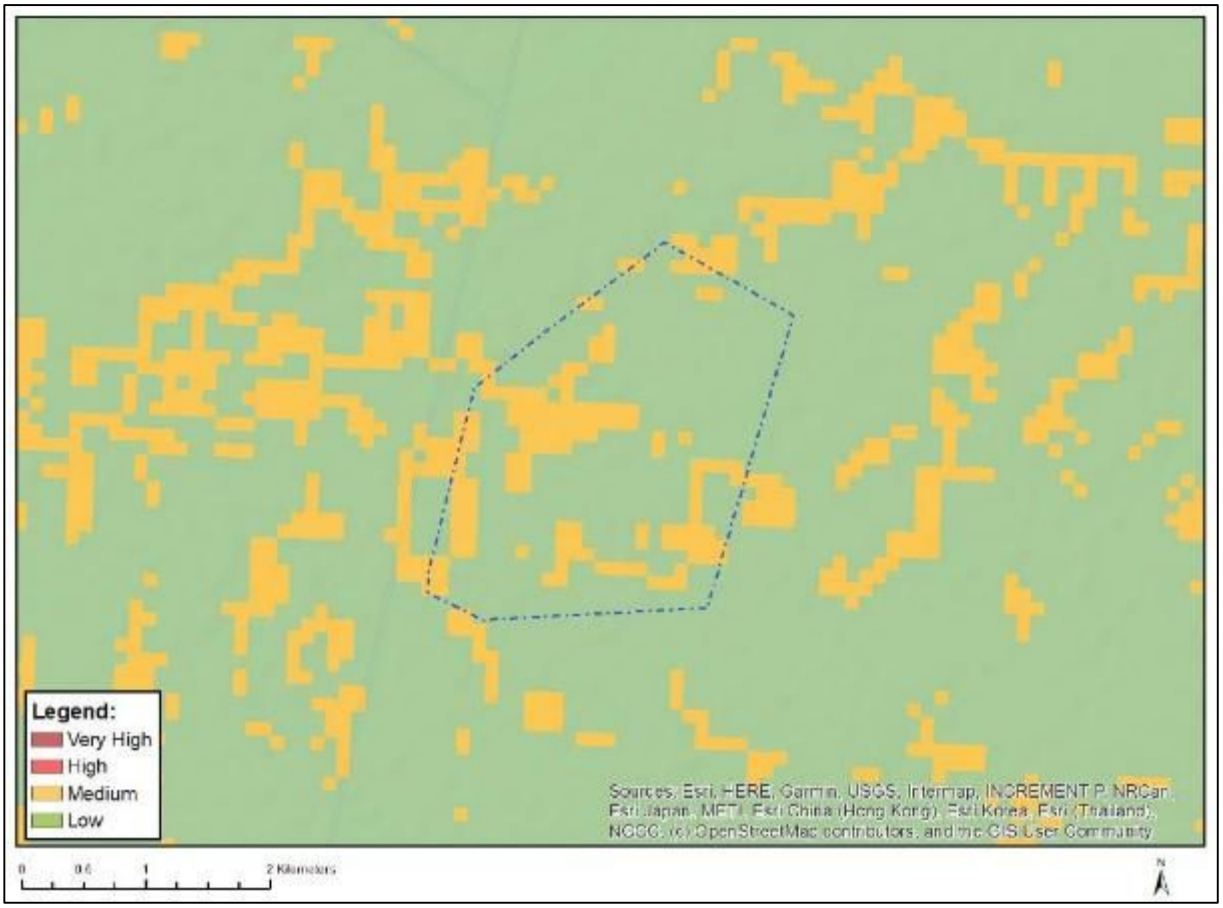



Figure 44. Agricultural theme from the screening tool report for the Loeriesfontein 3 PV SEF

The project area was also superimposed on the High Potential Agricultural Areas of the Northern Cape Province (DALRDD, 2020), to determine whether the area falls within any of these areas. The result of the analysis is shown in Figure 44 below. The **project area does not overlap with any High Potential Agricultural Areas** and **the nearest areas are located 100 to 130 km southwest and southeast of the project area.**

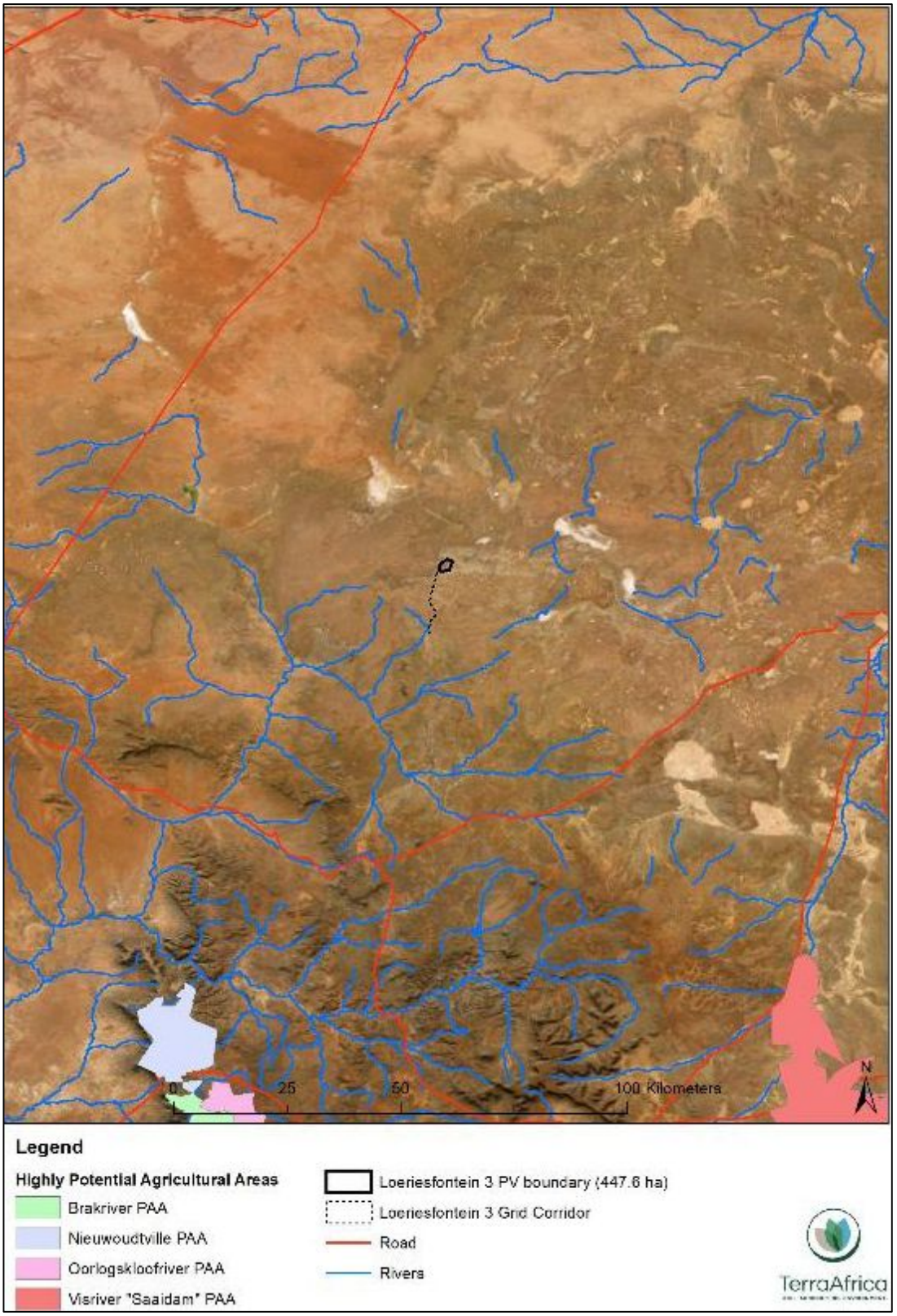



Figure 45. The project area in relation to High Potential Agricultural Areas of the Northern Cape Province (data source: DALRRD, 2020)

Following the data analysis and results of the impact assessment, the previously authorised Loeriesfontein 3 PV SEF is **still considered an acceptable development** in the project area, even with the requested amendments now made by the applicant.

The soil forms present within the development area consist mostly of shallow soils underlain by rock and hardpan carbonate that has severe limitations to rainfed crop production. These soils are of the Mispah and Coega forms and the effective depths of these soils are shallower than 300 mm. Other soil forms include that of the Prieska, Augrabies and Brandvlei forms. These profiles have effective depth between 300 mm and 600 mm, and although deeper, is still not suitable for rainfed agriculture in the arid climate of the development area.

The entire project has never been used for rainfed or irrigated crop production before. There is also no irrigation infrastructure, such as centre pivots or drip irrigation, present within the project area and the area is considered suitable for livestock farming with limited grazing capacity (11 ha/SSU). The development area is located at least 100 km from any High Potential Agricultural Area.

It was the specialist's professional opinion that the **request for the extension of the validity period of the EA for an additional five-year period be considered favorably, permitting that the mitigation measures of the initial assessment still be implemented. No additional mitigation measures are recommended, over and above those already provided as part of the original assessment (Barichievy, 2012)**.

### 3.6 Visual assessment

A desktop assessment of the current affected environment was undertaken in January 2023 by NuLeaf to determine the status of the physical landscape characteristics now. As per the previous VIA undertaken in 2012 (SiVEST, 2012), this consisted of describing the current physical landscape characteristics in terms of the prevailing topography, vegetation cover and land use within the study area. These findings are described below.

The topography of the study area is relatively flat and homogenous, described predominantly as slightly irregular plains and pans to the north and east, and plains to the south-west. The elevation ranges from 850m above sea level (a.s.l.) in the south-west (along the Klein_Rooiberg River floodplain) to 1010m a.s.l. at the top of the hills located south of the Khobab Wind Energy Facility (WEF).

The Loeriesfontein 3 PV site itself is located at an average elevation of 935m a.s.l. and has an even slope to the south towards the Klein-Rooiberg River. This non-perennial river flows into the Kroms River located further afield to the southwest of the site. These rivers are only occasionally flooded during infrequent rainfall periods and are therefore dry riverbeds for most of the year. Other hydrological features in the study area are non-perennial pans to the north. Some of the larger pans include:

- Boegoefontein Pan
- Bitterputs Pan
- Kareedoring Pan
- Brakpan
- Dwaggas Salt Pan (located just beyond the extent of the study area to the northeast of Boegoefontein Pan)

Figure 46. Long distance view of the Dwaggas Salt Pan from the north (Photo credit: Google Earth – Rehan Opperman).

Regionally, the site is located some 60km north of the little town of Loeriesfontein (at the closest) within the Northern Cape Province, within a region commonly referred to as the Bushmanland. The Bushmanland falls within the arid Nama-Karoo Biome; a biome characterised by its dry semi-dessert climate and associated dessert-like vegetation. The vegetation cover of most of the study area, to the north and east, is identified as Bushmanland Basin Shrubland, interspersed with non-perennial pans (Bushmanland Vloere).

The dominant land use (at present) within the region is sheep farming. There is very limited agricultural activity (dryland cultivation) due to the limited rainfall (less than 300mm per annum) and arid climate. The predominant land cover types include seasonal grassland, bare sand surfaces and Low Shrubland, mainly to the south.

Some of the non-perennial pans previously mentioned are home to limited industrial activities within the region, namely salt mining, e.g., at Boegoefontein Pan and further afield at Dwaggas Pan. Other than these relatively small salt mining operations, other industrial infrastructure within the study area includes the Sishen to Saldanha iron ore railway line (southeast of the site), the Helios Substation located to the south, and the Aries to Helios 400kV power line.

Despite the limited industrial activity, it should be noted that the region has, over the years, attracted a large number of renewable energy applications (both wind and solar), most of which have been authorised. The site itself is located immediately north and northeast of the operational Loeriesfontein and Khobab Wind Energy Facilities (WEFs) respectively. These WEFs respectively have 61 and 58 operational wind turbines, each connected (from their collector substations) to the Eskom Helios Main Transmission Substation, located to the south of the site.

Other authorised but not yet constructed Renewable Energy Facilities within the study area include the Dwarsrug WEF, as well as the Kokerboom 1 and 3 WEF's.

Overall, the region has a predominantly undeveloped, rural and natural character, with scattered isolated homesteads or farm settlements occurring within the study area. These are generally located at great distances from each other. The region has a population density of less the 1 person per $km^2$.

Since the initial VIA undertaken by SiVEST in 2012, the **landscape characteristics comprising the topography and vegetation of the study area have remained unchanged**. However, in terms of the land use, while the majority of the land uses noted in 2012 have remained the same (i.e., sheep farming, etc.), some changes have subsequently taken place as detailed below:

- In 2012, gypsum mining was noted to have taken place along the railway line within the study area. While these areas of disturbance are still noted on the current land cover / broad land use map and updated Google Earth aerial imagery, a comparison of current aerial imagery to historical aerial imagery take in 2012 indicates that these areas have largely remained unchanged in size and are therefore assumed to be inactive mines.
- The most significant changes in land use noted between 2012 and present day (2023) is the presence of the two operational WEFs (i.e. Loeriesfontein and Khobab WEFs) located to the south and south west of the site. However, it must be noted that while these activities are new land uses within the study area currently, this change in land use was anticipated already in the initial 2012 study undertaken. Therefore, as predicted in the initial assessment, this change in land use is in line with the noted trends in the region at that time.
- Salt mining activities are noted to now be taking place at Boegoefontein Pan and further afield at Dwaggas Pan. These activities were not noted to be taking place in 2012, however, subsequently as of 2017, EIA applications were submitted for these activities.

Overall, despite the above-mentioned changes in land use, the study area has retained its predominately undeveloped, rural and natural character, as well as low population density. Therefore, in the opinion of the author, the **status of the environment has largely remained the same.**

It should be noted that no viewsheds were generated during the initial visual study undertaken by SiVEST in 2012. The reason given is that since detailed digital data was not available and the topography within the study area was relatively flat, generating viewsheds from coarse- grained DTMs would only take the large-scale topographical variations into account and not minor topographical features, vegetative screening, or man-made structures which are important factors influencing the severity of visual impacts in this context.

Instead, 'distance bands' were assigned for the PV Facility. These bands were assigned to each facility largely based on the height of the structures and the fact that very few receptors were spread over a large distance in the study area. The methodology followed applied the concept that the proposed development will be more visible to receptors located within a short distance and these receptors will experience a higher adverse visual impact than those located at a moderate or long distance from the proposed development. The distance of the potentially sensitive receptors from the development area of the PV Facility was then considered when rating the visual impact of the development on these receptors.

The distance radii chosen was as follows:

- 0 – 1km (Short distance)
- >1km – 2km (Moderate distance)
- >2km – 5km (Long distance)

Based on the application of these 'distance bands', the following visual receptors potentially sensitive to the proposed PV Facility were identified:

**Table 3.4: Potential sensitive visual receptors as identified by SiVEST in 2012**

| Name | Current Use | Coordinates | Distance from the proposed site |
|---|---|---|---|
| Main dwelling on Kareedoorn Pan Farm | Residential dwelling | 30°25'40.47"S 19°36'19.62"E | Within proposed site |
| Old farmhouse on Kareedoorn Pan Farm | Storeroom (will house farm worker in the near future) | 30°25'28.59"S 19°34'38.99"E | Within proposed site |
| Dwelling on Sous Farm | Farm workers dwelling | 30°28'32.58"S 19°33'52.36"E | Moderate distance |

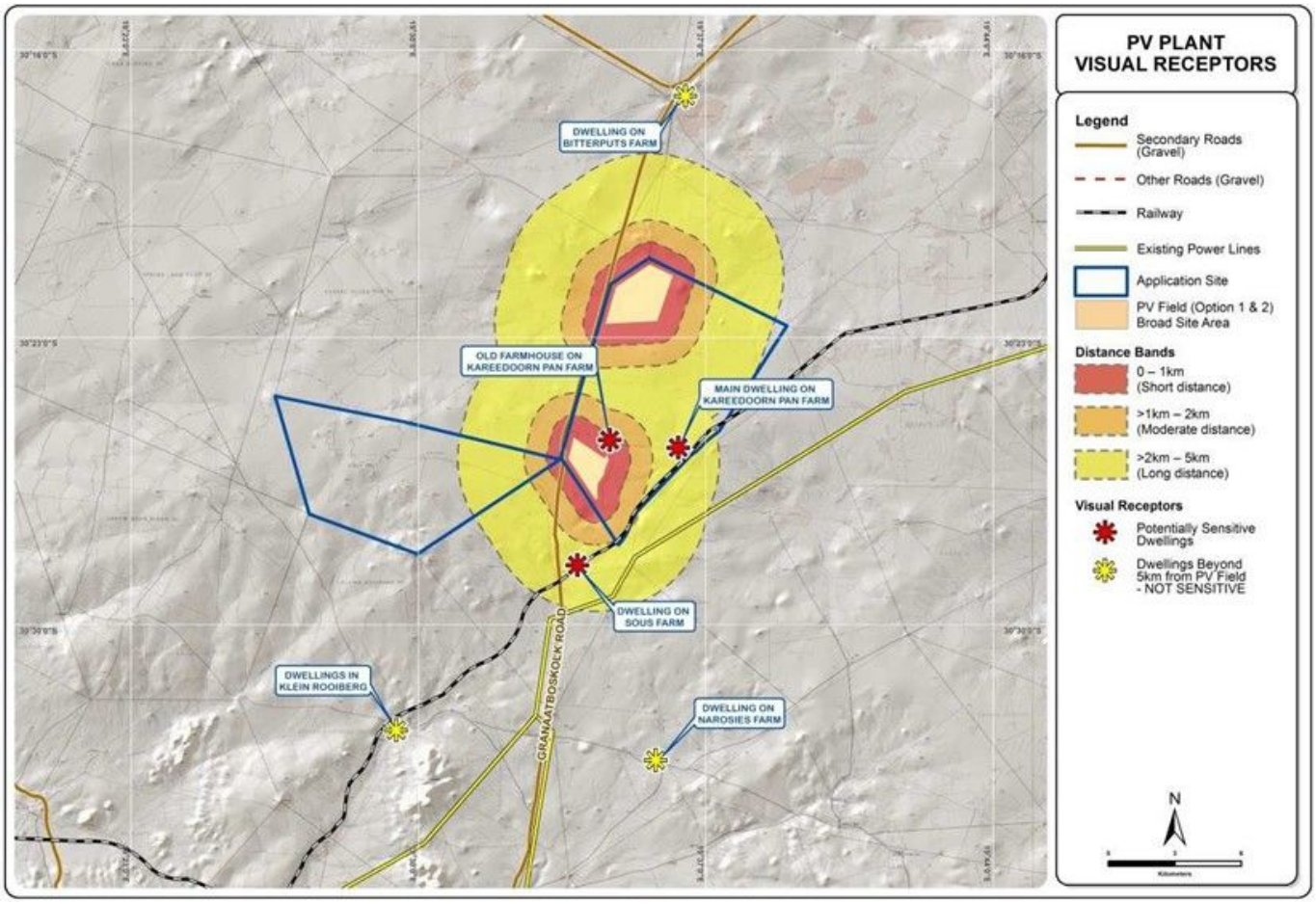



Figure 47. Visual receptors potentially sensitive to the PV plant (SiVEST, 2012)

It must be noted that during the initial VIA undertaken by SiVEST in 2012, two site alternatives for the proposed PV Facility were assessed concurrently. As such, the above map and identified receptors, as well as the receptors' distance from the proposed site, are based on their proximity to both alternatives. EA was only granted for Alternative 1 (Option 1, as labelled in Figure 47), which is the layout and PV site under investigation currently.

Subsequently, access to detailed digital data has made visual exposure modelling possible and as such, a viewshed analysis for the proposed Loeriesfontein 3 PV Facility was undertaken in order to determine the validity of the results of the previous VIA undertaken in 2012. The result of the viewshed analyses for the proposed Loeriesfontein 3 PV Facility is shown on Figure 48 that follows. An analysis has

been undertaken within the proposed development area in order to determine the general visual exposure (visibility) of the area under investigation. A generic height of 5m was used in order to illustrate the anticipated visual exposure of the solar energy facility. Typically, structures of this height (i.e., 5m) may be visible from up to 6km away. In this respect, the anticipated Zone of Visual Influence for this facility as calculated from the development footprint has been indicated at 6km. The extent of visual exposure within this zone is low.

The viewshed analysis does not include the effect of vegetation cover or existing structures on the exposure of the proposed facility, therefore signifying a worst-case scenario.

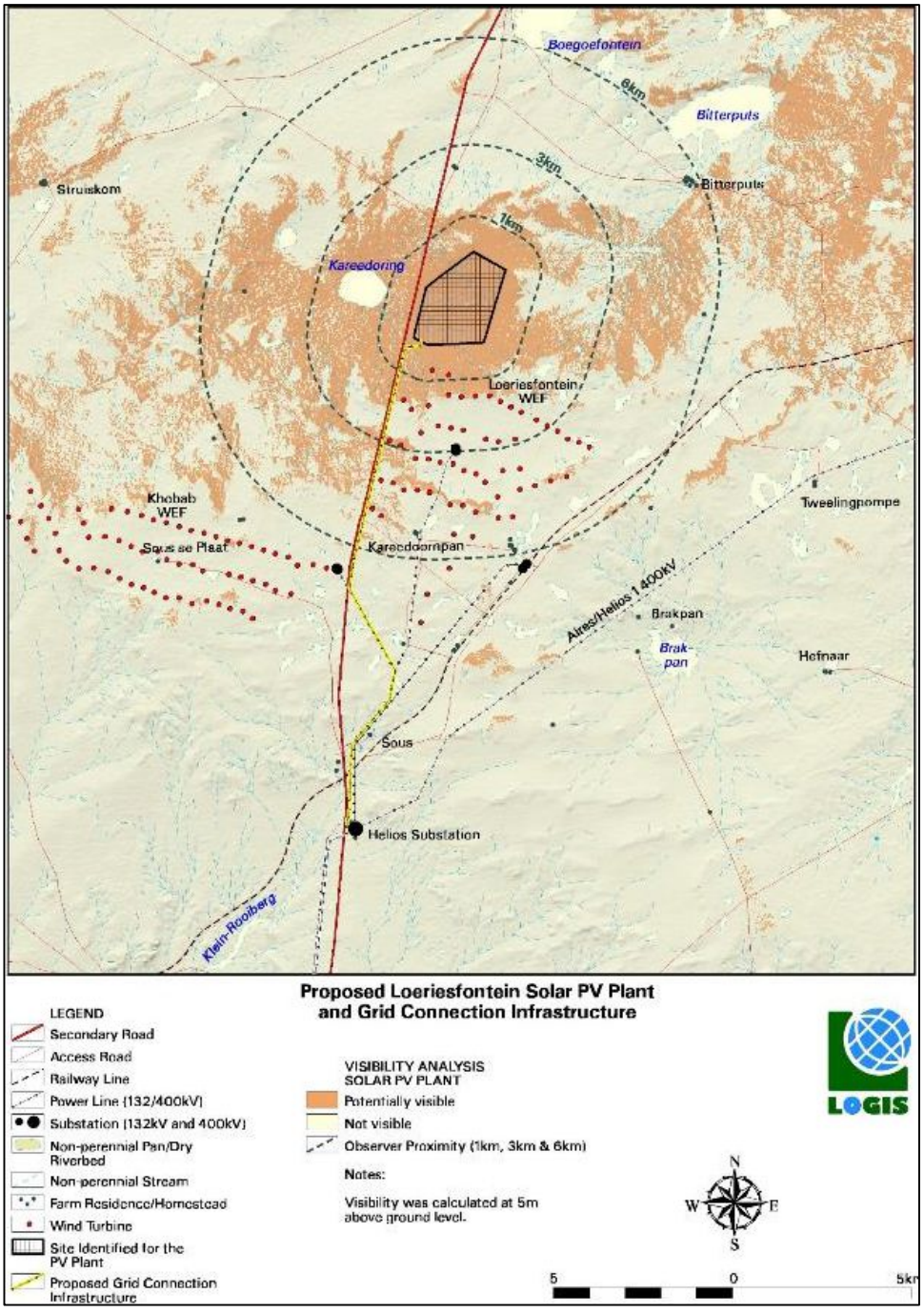



Figure 48. Viewshed analysis of the proposed Loeriesfontein 3 PV Facility

Figure 48 above indicates areas from which any number of the proposed infrastructure could potentially be visible, as well as proximity offsets from the proposed facility. These proximity offsets are based on the anticipated visual experience of the observer over varying distances. The distances are adjusted upwards for larger facilities and downwards for smaller facilities (i.e., depending on the size and nature of the proposed infrastructure.

Therefore, for the purpose of this study, proximity offsets have been calculated from the expected boundary of the site, as indicated on Figure 47 above and as follows:

- 0 – 1km. Short distance view where the facility would dominate the frame of vision and constitute a very high visual prominence.
- 1 - 3km. Short to medium distance view where the structures would be easily and comfortably visible and constitute a high to moderate visual prominence.
- 3 - 6km. Medium to long distance view where the facility would become part of the visual environment but would still be visible and recognisable. This zone constitutes a moderate visual prominence.
- > 6km. Long distance view of the facility where the structures are not expected to be immediately visible and not easily recognisable. This zone constitutes a lower visual prominence for the facility.

The following is an overview of the findings of the viewshed based on the layout illustrated on the Map provided:

- The potential visual exposure of the facility is contained to a core area on the site itself and within a 1 km radius thereof. Sensitive visual receptors are observers travelling along the secondary road.

- Potential visual exposure in the short to medium distance (i.e., between 1 and 3km), is scattered throughout with scattered visually screened areas to the north, east and south. Sensitive visual receptors are observers travelling along the secondary road, as well as the operators of the Loeriesfontein WEF.

- In the medium to long distance (i.e., between 3 and 6km offset), the extent of potential visual exposure is fragmented throughout the area with large visually screened areas lying to the southeast and north of the site. Sensitive visual receptors include residents of Bitterputs, as well as observers travelling along the secondary road.

  Of note is that while the homestead Kareedoornpan (including the old farmhouse and the main residential dwelling) falls within this zone, no visual exposure is expected based on the viewshed analysis modelling.

- Beyond the 6km offset from the proposed facility, potential visual exposure becomes extremely scattered and very low. Sensitive visual receptors are not likely to be visually exposed to the proposed facility, despite lying within the viewshed.

In general, as a result of the scattered and lower population density of the study area, the **Loeriesfontein PV 3 Facility may constitute a visual prominence, potentially resulting in a moderate - low visual impact.**

Additionally, the DFFE screening tool generated for Loeriesfontein 3 PV Facility indicates that the site has a **very high** sensitivity for landscape, owing to the fact that the site is located on top of mountains/high ridges. Refer to Figure 49 below.

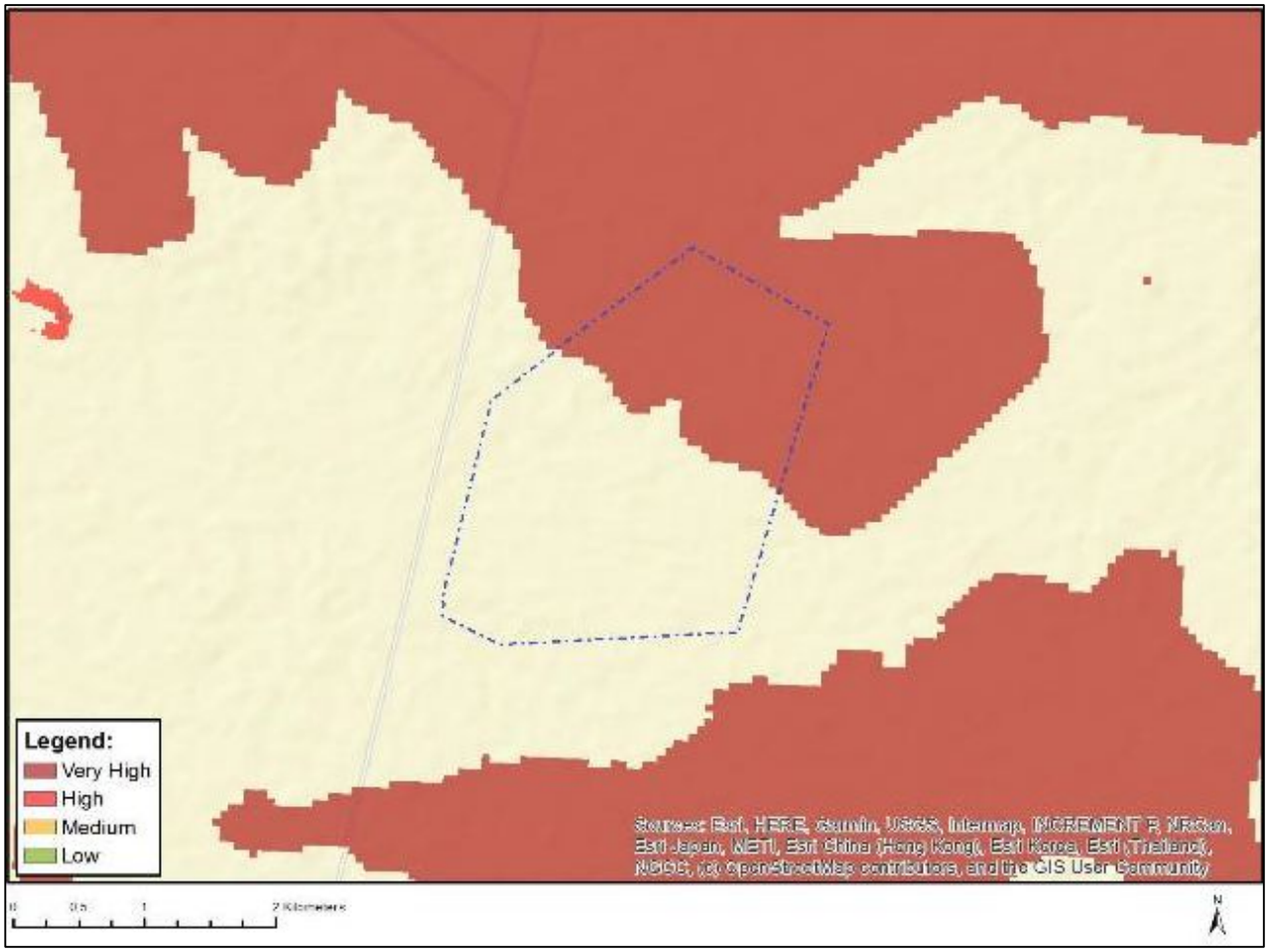



Figure 49: *Relative landscape (solar) theme sensitivity as per the DFFE Screening Tool for the proposed Loeriesfontein 3 PV Facility*

In order to verify the overall visual sensitivity of the proposed site (as proposed by the DFFE's screening tool) in the absence of any mitigation, the following matrix was utilized:

**Table 3.5: Matrix to determine overall visual sensitivity for the proposed Loeriesfontein 3 PV Facility**

| Sensitive Receptor | Very High Sensitivity 4 | High Sensitivity 3 | Moderate Sensitivity 2 | Low Sensitivity 1 |
|---|---|---|---|---|
| **Topographic features, including mountain ridges** | On topographical feature | Within 250m from base | Within 250 - 500m from base | > 500m from base |
| **Home/farmsteads** | Within 500m | Within 500m - 1km | Within 1-2 km | >2 km |
| **Provincial/arterial/ secondary roads** | Within 1km | Within 1-3km | Within 3-6 Km | >6 Km |
| **VAC** | Low VAC | Moderate VAC | High VAC | Very High VAC |
| **Visual Quality** | Natural environment intact with no built infrastructure | Natural environment intact with limited built infrastructure | Natural environment somewhat intact with fair amount of built infrastructure | Built infrastructure is dominant with little to no natural environment remaining |
| **Presence of existing infrastructure** | Absent | Very low densities | Present in moderate quantities | High densities |

| | |
|---|---|
| **Total** | **High (16)** |

Overall visual sensitivity rating:

- Low (0-6)
- Moderate (7-12)
- High (13-18)
- Very High (19-24)

Therefore, it can be concluded that the landscape visual sensitivity of the site is actually **high,** due to the fact that no PV structures are located on mountain tops or ridges and and the general low occurrence of potential sensitive visual receptors.

Based on the above assessment, there has been **no changes in the land cover and minimal changes in land uses**. Additionally, the **impacts as assessed today will be moderate**. Therefore, it is recommended that the proposed Part 1 Amendment extending the validity of the EA for the Loeriesfontein 3 PV SEF be **supported**, subject to the conditions and recommendations as stipulated in the current EA, and according to the Environmental Management Programme (EMPr), as well as the suggested mitigation measures, as provided in this and the original Visual Impact Assessment report compiled in 2012.

## 3.7 Heritage and Palaeontology

A Heritage and Palaeontological Screening Assessment was undertaken by CTS Heritage and the findings of the assessment are discussed below.

**Cultural Landscape and Built Environment**

According to an impact assessment completed for the original EA application for the Loeriesfontein PV SEF (Webley and Halkett, 2012), an adjacent farm is named "Klein Rooiberg" because the area south of the study area is dominated by outcropping regions ("koppies") which are reddish in colour. The assessment goes on to note that "*The site is covered by low lying vegetation of the Succulent Karoo Biome. A number of drainage lines were identified crossing the study area… The drainage systems are associated with the Volstruisnesholte River catchment.*" (Webley and Halkett, 2012). The study area is considered to be fairly natural succulent Karoo shrubland with low intensity sheep grazing on the site. There are two existing transmission lines near the site, including a 66kV transmission line that runs along the district road towards the substation and a 400kV transmission line that runs to the west of the site in the direction of Klein Rooiberg. There is a district road which runs adjacent to the project site. The predominant context of this area is wilderness landscape dominated by topographic features such as koppies and rivers, as well as existing renewable energy facilities. In his assessment of the Kokerboom WEF located south of this development area, Orton (2021) notes that "*The landscape is also considered to be a heritage resource, but its cultural component is very limited and a new layer of electrical infrastructure is starting to dominate the landscape…*"

As can be seen in Figure 52, the area proposed for development is scattered with farm werfs and connecting roads. According to Webley and Halkett (2012), "*from approximately 1850 onwards, Dutch Trekboers started making seasonal use of the summer grazing around the large pans in the area. Many contemporary farmers in Namaqualand still own two farms, one in the Bushmanland and the other in Namaqualand. The livestock is transported between their farms by truck.*" Orton (2021) notes that "*It is unlikely that many earlier farmsteads (than the earlier 20th Century) would be present because this harsh landscape was only permanently settled in relatively recent times.*" According to Van Schalkwyk's assessment of the area proposed for the Loeriesfontein 3 PV SEF, "*An investigation of the Title Deeds of most of the farms under consideration indicated that they were surveyed during the latter part of the nineteenth century,*

*implying that they would have been occupied since then. Both the farms Sous and Aan de Karree Dorn Pan were first surveyed in 1898*." (Van Schalkwyk, 2012). Based on this desktop assessment, the nearest farm werfs are all located more than 5km away from the PV area and the heritage significance of these has yet to be ascertained. **No direct or indirect impact is anticipated to the heritage value of these werfs as a result of the PV facility**.

It is also clear from Figure 52, how the evolution of the occupation of this area has been guided by the presence of pans. It is clear that the location of farm werfs and roads are linked to the presence of pans nearby or as the destination at the ends of the roads. Prior to colonial settlement, this region was occupied by San hunter-gatherers and remained here living around the salt pans until they were "*forced off the land as the farms were surveyed and made available to European farmers. Some of these "Basters", of mixed descent, travelled north and settled in the southern Richtersveld. Many of the farms were only allocated after the introduction of the wind pump to South Africa in the 1870s made the more arid lands accessible and suitable for grazing*." The salt pans of this area therefore have associated cultural landscape value; however, no salt pans are evident within the area proposed for development.

**Archaeology**

As a result of the renewable energy facilities proposed in this area, a number of Heritage Impact Assessments have been completed that are relevant here, and a number of significant archaeological resources identified as per Figure 50, Figure 51 and Figure 52 below.

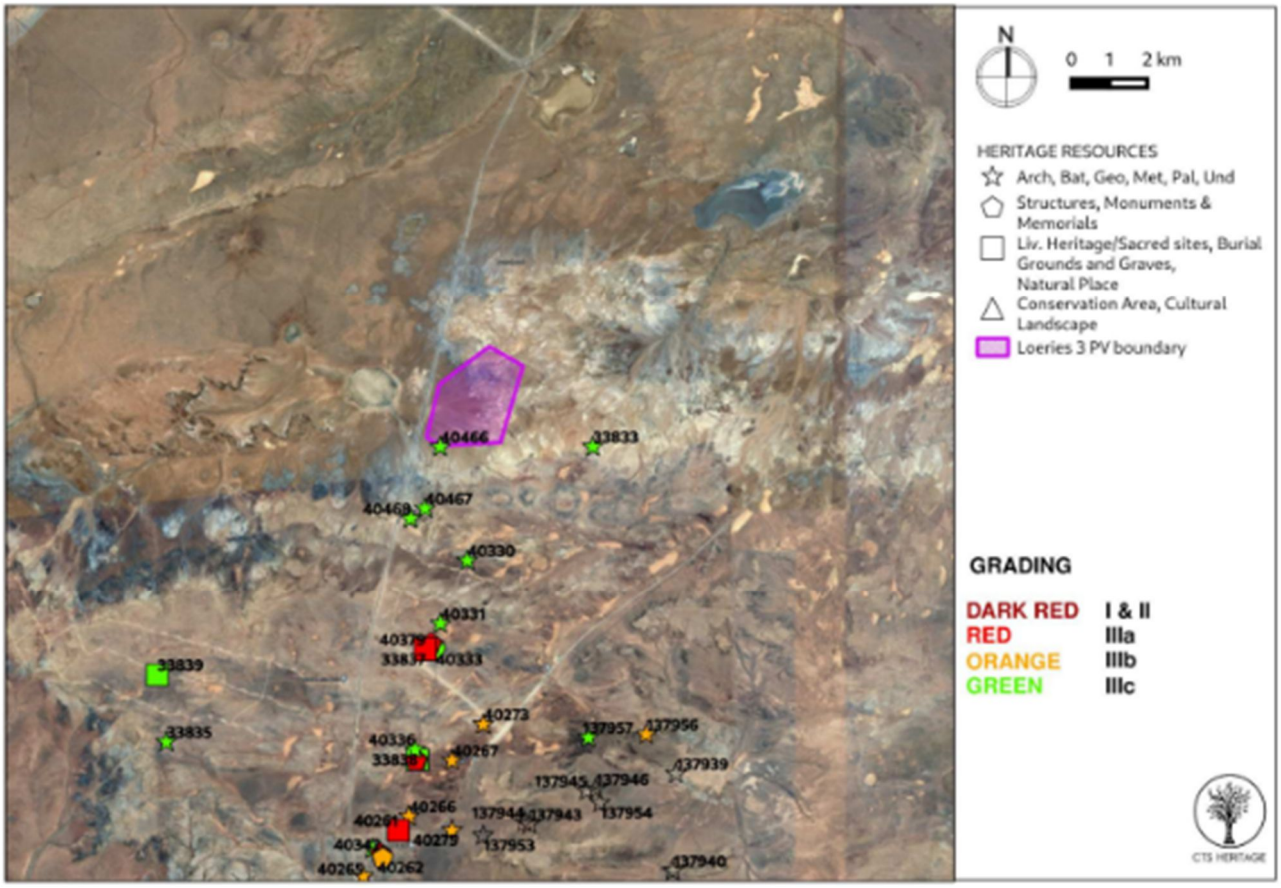



Figure 50. Heritage Resources Map. Heritage Resources previously identified within the study area, with SAHRIS Site IDs indicated in the insets below. Please See Appendix 4 of the Heritage & Palaeontological Report (Appendix F) for a full description of heritage resource types.


Figure 51. Heritage Resources Map showing heritage resources near the proposed development.

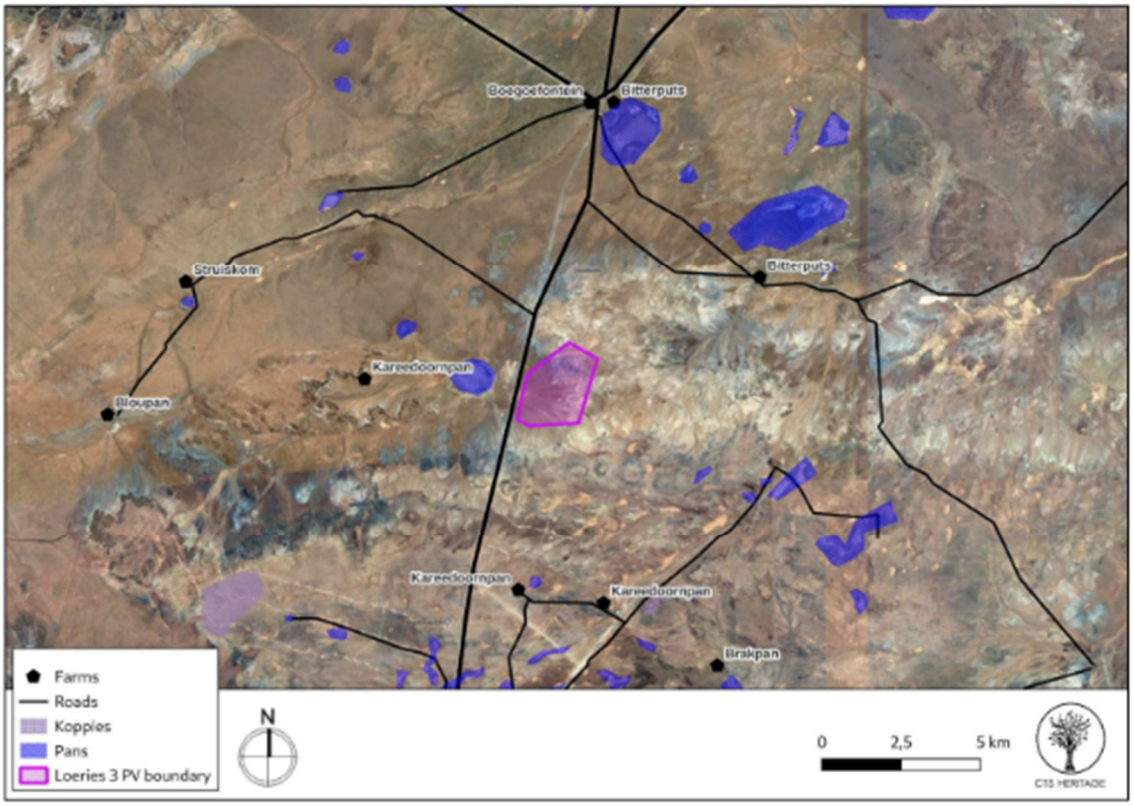



Figure 52. Heritage Resources Map showing potential heritage resources and areas of high sensitivity near the development

Orton (2021) and Webley and Halkett (2012) both found extensive evidence of Middle and Later Stone Age archaeology in the broader area, noting that MSA artefacts tend to more prevalent on the lowlands and generally attributable to background scatter, whereas LSA scatters

tend to be associated with topographical features such as koppies, dolerite outcrops, rivers and salt pans. It is likely that this pattern remains applicable within the development area. These features are therefore considered to be highly sensitive in terms of potential impacts to significant archaeology. An archaeological assessment was completed for the proposed PV facility by Van Schalkwyk in 2012. His assessment identified MSA artefact scatters across the broader area (**none within the proposed PV area**). These sites consist of low-density surface scatters of MSA material, mostly of hardened shale and chalcedony. Van Schalkwyk (2012) notes that "*There must be hundreds of similar occurrences in the larger region. As they are all surface finds, their significance is judged to be low.*" **Additional sites identified by Van Schalkwyk (2012) all fall outside of the development area** and include sites associated with the colonial occupation of the area including farm werfs, farm infrastructure and burial grounds.

In 2013, Morris conducted a heritage assessment for the Khobab WEF and grid, which overlaps somewhat with the grid alignment proposed for the Loeriesfontein 3 PV SEF. Morris (2013) notes that "I*n the wider region, van der Walt (2012) examined the proposed site for the Hantam PV Solar Energy Facility on the farm Naronsies 228, immediately south east of Sous, finding no sites of heritage significance. A similar paucity of sites is reported by Morris (2007) examining borrow pit sites in the region along the Sishen-Saldanha railway. In marked contrast to these observations on the relatively featureless, eroded plains north of Loeriesfontein, a wealth of Later Stone Age sites has been recorded on dunes on the fringes of large pans in the wider vicinity, e.g. at Klawer Vlei (farms Commissioners Vley, T'Boop and Tafel Kop – Beaumont & Morris 1985), and at Waterkuil (Morris 1996) where lithics, ceramics and ostrich eggshell container fragments are densely scattered at numerous sites. E.J. Dunn (1873) described artefacts from Klawervlei in the 1870s, also having met /Xam people still making stone tools in the area. He remarked upon "the enormous quantities of broken eggshells (ostrich) [which] create astonishment and convey some rough idea of the numbers of Bushmen and the length of time they must have lived in this neighbourhood". It is clear from previous surveys in the area that the distribution of sites may be highly structured relative to resources, principally water (Beaumont et al. 1995)*." Morris (2013) identified a small number of isolated artefacts with very low scientific significance. These observations are mapped relative to the development in Figure 50 and 51 and are reflected as **sites 40466, 40467, 40468 and 40469. No impact to these sites is anticipated.**

Based on the results of various assessments in the area, it seems that the significant archaeological resources known from the area are associated with river systems, pans and koppies**. None of these features are located within the Loeriesfontein PV 3 development area. As such, it is unlikely that the proposed development will negatively impact on significant archaeological heritage.**

**Palaeontology**

According to the SAHRIS Palaeosensitivity Map (Figure 4a of Appendix F), the area proposed for development is underlain by geology of variable palaeontological sensitivity, ranging from very high to moderate and zero. According to the Council of GeoScience Map for Loeriesfontein, the area proposed for development is underlain by the Whitehill Formation (very high sensitivity) of the Ecca Group of the Karoo Supergroup, Jurassic dolerite (zero palaeontological sensitivity) and quaternary sands (moderate sensitivity).

In the PIA completed for the Loeriesfontein 3 PV project, Almond (2011) concludes that "*Important fossil material of aquatic vertebrates (mesosaurid reptiles, fish), invertebrates (e.g. crustaceans) and petrified wood is known from the Whitehill Formation and to a lesser extent from the Prince Albert and Tierberg Formations. However fossils other than trace assemblages are generally sparse and most of the Ecca sediments are of low overall palaeontological sensitivity. Their palaeontological potential may well have been locally compromised by chemical weathering and dolerite intrusion. Furthermore, a substantial portion of the Ecca Group outcrop area is mantled by superficial*

*sediments (downwasted gravels, alluvium etc) of* ***low palaeontological sensitivity***." This conclusion is reiterated by Butler (2020) in her palaeontological assessment for the Loeriesfontein BESS located within the development area. Butler (2020) recommends that a Chance Fossil Finds Procedure be implemented for the duration of excavation activities in this area.

Archaeological and palaeontological heritage resources reflect the environments of the deeper past and are unlikely to change significantly in as short a geological time span as 10 years. Some changes to heritage resources may result from processes of erosion and deflation but, in this particular ecological setting, this is unlikely to have an impact on the conclusions of the results of the previous heritage assessments completed. In this context, **the findings of the assessments completed by Van Schalkwyk (2012), Fourie (2020), Almond (2011) and Butler (2020) remain appropriate and applicable for this development.**

Furthermore, since the initial HIA completed by Van Schalkwyk (2012), additional work has been completed in the area as noted above and furthermore, a Heritage Management Plan was drafted for the Loeriesfontein WEF which has been approved by SAHRA. Throughout these processes, **no heritage resources of significance have been identified as being impacted by the Loeriesfontein 3 PV SEF. The heritage impact assessments completed in this area previously provide sufficient, appropriate and relevant information for the purposes of this application and no additional heritage, archaeological and palaeontological field assessments are recommended.**

In light of the above, there is **no heritage objection to granting the extension to the validity** to develop the Loeriesfontein 3 PV SEF based on the current site conditions on condition that the relevant recommendations included in the previous heritage assessments conducted are implemented, including that the attached Chance Fossil Finds Procedure is added to the EMPr.

### 3.8 Social assessment

The socio-economic comparative assessment was undertaken by Dr Tony Barbour in January 2023 (Appendix K), and the finding of the assessment are discussed below.

The specialist indicated that the study area settlement pattern remains sparse, with permanent inhabitation limited. No new dwellings have been constructed on the site or adjacent properties since 2012. The nearest dwellings are still located >5 km from the site. The relevant properties continue to be used for extensive grazing, mainly seasonal (summer) grazing. Very few dedicated permanent employment opportunities are associated with the study properties. Still no tourism receptors are located within any significant proximity to the site.

The only significant changes since 2012 are associated with renewable energy projects. These relate to actual and potential changes in land use (additional), visual changes (turbines and other infrastructure) and increased use of the Granaatboskolk public gravel road (which links the study area properties to Loeriesfontein), especially by heavy vehicle traffic during construction. With the exception of Bitterputs 187/RE located directly to the north of the site, all study properties are associated with operational, proposed, or potential REF projects.

**Table 3.6. Overview of site- and adjacent properties**

| OWNER | FARM | USE | COMMENT |
|---|---|---|---|
| Lindveld brothers | Aan die Karee Doorn Pan 213/2 | 2 x inhabited dwellings; Grazing; | Loeriesfontein 3 PV site |

| | | | |
|---|---|---|---|
| | Aan die Karee Doorn Pan 213/2 | Loeriesfontein WEF | Loeriesfontein WEF substation – feeds into Helios MTS |
| Lombard, Mr Gys | Aan die Karee Doorn Pan 213/RE<br>Karee Doorn Pan 214/1 | Grazing;<br>No permanent inhabitation | Kokerboom 3 and 4 WEFs proposed on Lombard properties (2016 ff);<br>Proposed to feed into Helios MTS |
| Strauss, Mr Wynand | Bitterputs 187/RE | Permanent inhabitation;<br>Grazing | No proposed or existing REF or Eskom infrastructure |
| Rona Rupert Trust | Sous 226/RE | Grazing;<br>No permanent inhabitation;<br>Khobab WEF | Feeds into Helios MTS;<br>Helios MTS is located on 226/1 within 226/RE |
| Versfeld brothers | Buchu Fontein 184 | Permanent inhabitation;<br>Grazing | Property currently investigated for potential WEF (Charles Versfeld, pers. comm) |

A key issue that was raised by local landowners was the impact of construction traffic on the Granaatboskolk Road during the construction of Mainstream's Loeriesfontein and Khobab WEFs, and the current construction of Solar Capital Orange PV. The road will also be impacted by the construction of the Dwarsrug WEF in 2023. The Kokerboom 1-4 WEFs and other proposed REFs would also use the road. The cumulative impacts on the road are therefore an issue that should be addressed. Local farmers in the area indicated that the option of surfacing the road should be considered by the renewable energy companies operating in the area.

Based on the review of the 2012 Socio-Economic Assessment (MasterQ Research, 2012) and associated documentation, the proposed amendments, including the proposed extension of the validity period, for the Loeriesfontein 3 PV SEF are **acceptable from a social and socio-economic perspective**.

## SECTION 4 – SITE VERIFICATION AND NEW GUIDELINES/PROTOCOLS

The proposed development does not fall within the Renewable Energy Development Zone (REDZ) (Government Notice No. 786 Government Gazette No. 17 July of 2020), however, falls within the Electrical Grid Infrastructure corridors (namely the Western Corridor as per in Government Gazette 41445, Government Notice 113). Where required, specialists have taken into consideration the Protocol for the specialist assessment and minimum report content requirements for environmental impacts (Government Gazette No 43855, 30 October 2020).

### 4.1 Biodiversity (Fauna & Flora)

Following current legislation, an assessment of the site would have required compliance with the gazetted Species Protocols. ( https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Terrestrial_Biodiversity_Assessment_Protocols.pdf ) as per Government Gazette No 43110, 20 March 2020 . A Screening Tool report for the site shows that Terrestrial Biodiversity and Aquatic Biodiversity Themes have Very high sensitivity. This would need to be confirmed by an on-site field verification, followed by a Site Sensitivity Verification. The terrestrial biodiversity screening theme sensitivity for the area is 'Very High', due to the presence of an Ecological Support Area (ESA) and the Freshwater Ecological Priority Area (FEPA) Sub catchment. The assessment (January 2023) determined the sensitivity of the degraded shrubland habitat to be 'Medium', whereas the Limestone habitat was rated with a High SEI. Thus, the following is concluded: **The completion of the terrestrial biodiversity assessment disputes the very high sensitivity of degraded shrubland habitats that overlap with the screening report, however, corroborates with the screening report in regard to the Limestone habitat.**

### 4.2 Avifauna

The project development area is classified as High sensitivity for avifauna, according to the DFFE online screening tool. The development sites contain confirmed habitat for Red Data species. The classification of High sensitivity is linked to the potential occurrence of Ludwig's Bustard *Neotis ludwigii* (Regionally and Globally Endangered), Red Lark *Calendulauda burra* (Regionally and Globally Vulnerable) and Secretarybird *Saggitarius serpentarius* (Regionally Vulnerable Globally Endangered).

The occurrence of Species of Conservation Concern (SCC) was confirmed during the original surveys in the adjacent Loeriesfontein Wind Farm, which took place in the period of September 2011 through to September 2013. Karoo Korhaan (Regionally Near threatened), Ludwig's Bustard (Regionally and Globally Endangered), Red Lark, Martial Eagle (Regionally and Globally Endangered) Sclater's Lark (Globally and Regionally Near threatened) were recorded at the site. The subsequent site visit in November 2022 confirmed that the **habitat has not changed and that habitat for the listed SCC exists at the development area.** This classification **is assessed to be accurate as far as the potential presence of SCC is concerned**, based on actual conditions recorded on the ground during the site visits in September 2011 through to September 2013, and the subsequent site visit conducted in November 2022.

### 4.3. Landscape (Solar) Theme

The DFFE screening tool generated for the Loeriesfontein 3 PV Facility indicates that the site has a very high sensitivity for landscape, owing to the fact that the site is located on top of mountains/high ridges. In order to verify the overall visual sensitivity of the proposed site (as proposed by the DFFE's screening tool) in the absence of any mitigation, the following matrix was utilized:

**Table 4.1: Matrix to determine overall visual sensitivity for the proposed Loeriesfontein 3 PV Facility**

| Sensitive Receptor | Very High Sensitivity 4 | High Sensitivity 3 | Moderate Sensitivity 2 | Low Sensitivity 1 |
|---|---|---|---|---|
| **Topographic features, including mountain ridges** | On topographical feature | Within 250m from base | Within 250 - 500m from base | > 500m from base |
| **Home/farmsteads** | Within 500m | Within 500m - 1km | Within 1-2 km | >2 km |
| **Provincial/arterial/ secondary roads** | Within 1km | Within 1-3km | Within 3-6 Km | >6 Km |
| **VAC** | Low VAC | Moderate VAC | High VAC | Very High VAC |
| **Visual Quality** | Natural environment intact with no built infrastructure | Natural environment intact with limited built infrastructure | Natural environment somewhat intact with fair amount of built infrastructure | Built infrastructure is dominant with little to no natural environment remaining |
| **Presence of existing infrastructure** | Absent | Very low densities | Present in moderate quantities | High densities |
| **Total** | **High (16)** | | | |

Overall visual sensitivity rating:

- Low (0-6)
- Moderate (7-12)
- High (13-18)
- Very High (19-24)

Therefore, it can be concluded that the **landscape visual sensitivity of the site is actually high, due to the fact that no PV structures are located on mountain tops or ridges and and the general low occurrence of potential sensitive visual receptors.**

### 4.4. Palaeontology

The DFFE screening tool generated for the Loeriesfontein 3 PV Facility indicates that the site has a very high sensitivity. According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by geology of variable palaeontological sensitivity, ranging from very high to moderate and zero. According to the Council of GeoScience Map for Loeriesfontein, the area proposed for development is underlain by the Whitehill Formation (very high sensitivity) of the Ecca Group of the Karoo Supergroup, Jurassic dolerite (zero palaeontological sensitivity) and quaternary sands (moderate sensitivity).

In the PIA completed for the Loeriesfontein 3 PV project, Almond (2011) concludes that "*Important fossil material of aquatic vertebrates (mesosaurid reptiles, fish), invertebrates (e.g. crustaceans) and petrified wood is known from the Whitehill Formation and to a lesser extent from the Prince Albert and Tierberg Formations. However, fossils other than trace assemblages are generally sparse and most of*

*the Ecca sediments are of low overall palaeontological sensitivity. Their palaeontological potential may well have been locally compromised by chemical weathering and dolerite intrusion. Furthermore, a substantial portion of the Ecca Group outcrop area is mantled by superficial sediments (downwasted gravels, alluvium etc) of low palaeontological sensitivity*."

Archaeological and palaeontological heritage resources reflect the environments of the deeper past and are unlikely to change significantly in as short a geological time span as 10 years. Some changes to heritage resources may result from processes of erosion and deflation but, in this particular ecological setting, this is unlikely to have an impact on the conclusions of the results of the previous heritage assessments completed. In this context, **the findings of the assessments completed by Van Schalkwyk (2012), Fourie (2020), Almond (2011) and Butler (2020) remain appropriate and applicable for this development**.

### 4.5. Aquatic Biodiversity

Prior to finalising the Aquatic Biodiversity Specialist Assessment in accordance with the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (Government Notice 320, dated 20 March 2020), a site sensitivity verification was undertaken in January 2023 to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool).

Government Notice No. 320, dated 20 March 2020, includes the requirement that an Initial Site Sensitivity Verification Report must be produced for a development footprint. As per Part 1, Section 2.3, the outcome of the Initial Site Verification must be recorded in the form of a report that -

(a) Confirms or disputes the current use of the land and environmental sensitivity as identified by the national web based environmental screening tool.
(b) Contains a motivation and evidence of either the verified or different use of the land and environmental sensitivity.
(c) Is submitted together with the relevant reports prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

The report has been produced specifically to consider the aquatic biodiversity theme and addresses the content requirements of (a) and (b) above. The report has been appended to the respective specialist study included in the NEMA related reports produced for the project. Site sensitivity based on the aquatic biodiversity theme included in the Screening Tool and specialist assessment. Based on the DFFE Screening Tool, the sites were rated Very High sensitivity due to the presence of a National Freshwater Ecosystem Priority Areas – NFEPA.


Figure 53. DFFE Screening Tool outcome for the aquatic biodiversity theme

Based on the outcomes, the specialist **confirmed** the environmental sensitivities identified on site, informed by site visits undertaken by Dr Brian Colloty would be rated as **Very High**. However, this was not due to the presence of the NFEPA, as there is no direct connection with any surface water flows between the site and or any mainstem systems of importance, but two small depressions that would be considered sensitive were observed (Figure 54). This information was substantiated by current wetland inventories, 1: 50 000 topocadastral surveys mapping and the Northern Cape Biodiversity Spatial Plan (2017). It was however **confirmed that no sensitive aquatic systems are located within the sites as proposed for the PV SEF works**.

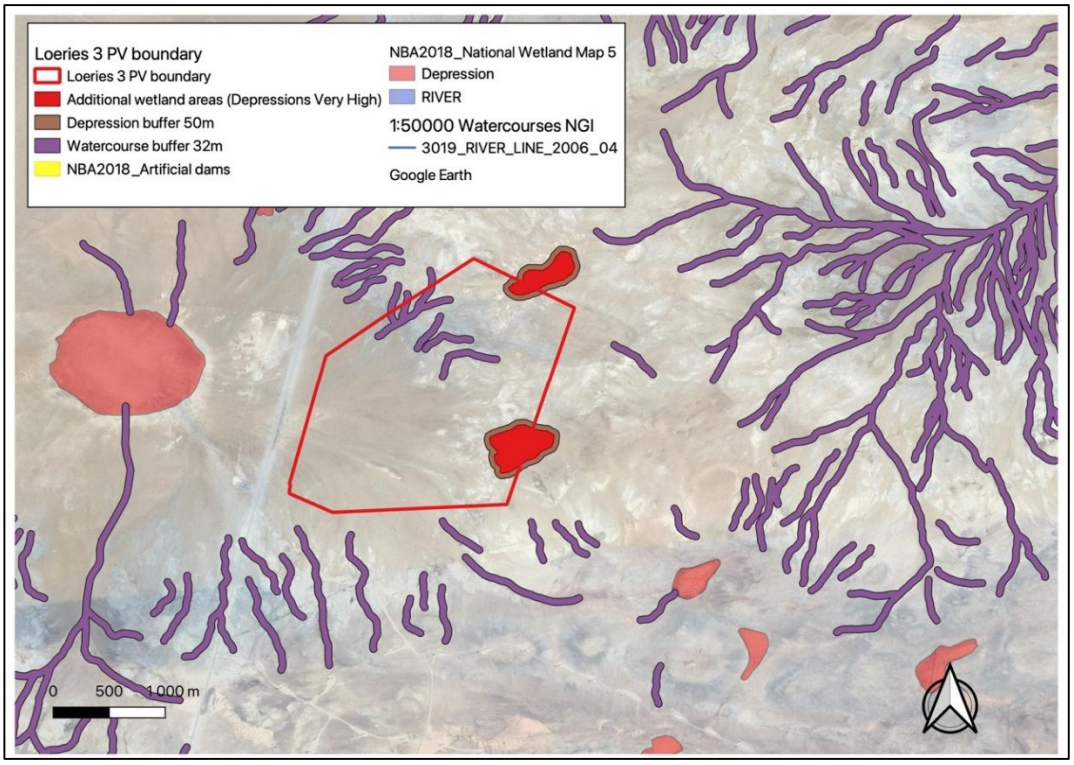



Figure 54. Results of the original survey findings, confirmed in this assessment

In conclusion, the DFFE Screening Tool identified one sensitivity rating within the development footprint, namely, **Very High**, which was confirmed on site but at a finer scale related to two small ephemeral wetland areas (depressions).

### 4.6. Socio- Economic

The Socio-Economic Assessment (SiVEST, 2012) did not undertake a review of policies and legislation that was relevant to renewable energy at the times. The Socio-Economic Assessment also did not undertake a review of relevant local planning documents, such as the Hantam and Namakwa Municipality Integrated Development Plans. Given that the Socio-Economic Assessment was undertaken in 2012, there have been changes to some key national policy documents, specifically the Integrated Resource Plan (2010), and local planning documents, including relevant Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDF).

As part of the socio-economic input for the amendment process, the latest local policy documents have been reviewed, including:

- National Energy Act (2008).
- White Paper on the Energy Policy of the Republic of South Africa (December 1998).
- White Paper on Renewable Energy (November 2003).
- Integrated Resource Plan (IRP) for South Africa (2019).
- National Infrastructure Plan (NIP) (2012 and 2021).
- National Development Plan (2011).
- Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa (CSIR, 2015).
- Northern Cape Provincial Growth and Development Plan (NCPGDP) (2014)
- Northern Cape Provincial Spatial Development Framework (NCSDF) (2012)

- Namakwa District Municipality Integrated Development Framework (2019/2020 Revision).
- Namakwa District Climate Change Response Plan (2017-2022).
- Hantam Local Municipality Integrated Development Plan (2022-2023).

A detailed annual review of the Independent Power Producers Procurement Programme (IPPPP) is also undertaken each year by the Department of Energy, National Treasury and DBSA. The most recent was in December 2021. Annexure C of the Socio- Economic Comparative Assessment contains a summary of the review of these documents.

### 4.7. Soil and Agricultural Potential

The agricultural theme map of the sensitivity screening tool indicates that the development area assessed consists of Low and Medium agricultural sensitivity. The initial assessment of the agricultural potential of the area had a similar conclusion, based on the presence of very shallow to shallow soils and an arid climate with low rainfall. The report concluded that there is no suitability for rainfed agriculture and limited suitability for livestock farming (Barichievy, 2012). The desktop analysis conducted in 2022/2023 for the comparative assessment **agrees with the sensitivity rating of the screening tool report**, as all the data sets released by DALRRD since 2012 indicates that the agricultural potential and productivity of the area has not improved. In addition to the data obtained from DALRRD, the map of the Agricultural theme of from the screening tool report was evaluated to determine the agricultural sensitivity of the PV site, according to the DFFE Screening Tool. **It is concluded that the agricultural sensitivity of the area ranges between Low and Medium and there are no areas of High sensitivity.**

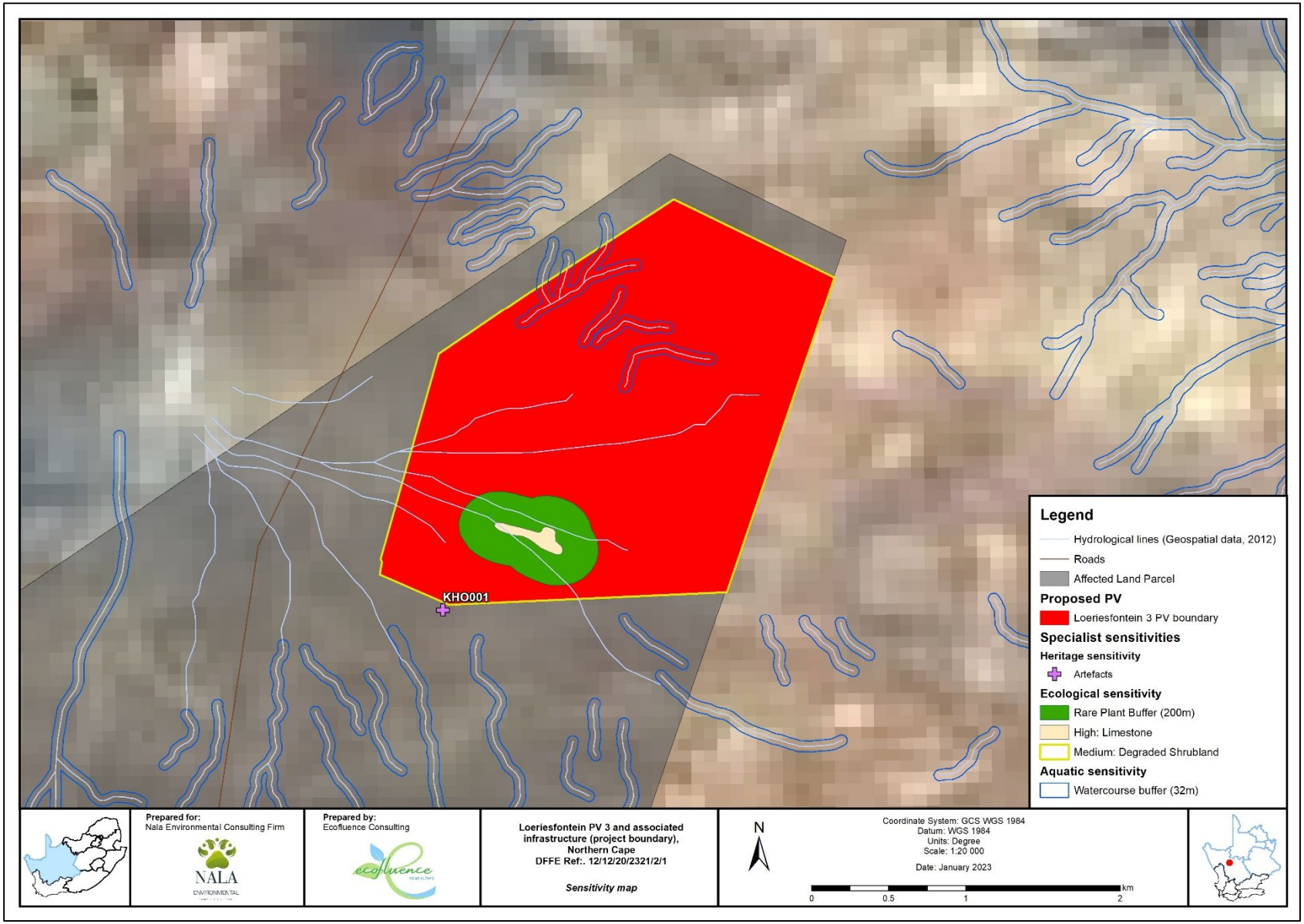



Figure 55. Sensitivity Map of the proposed PV SEF site (2023)

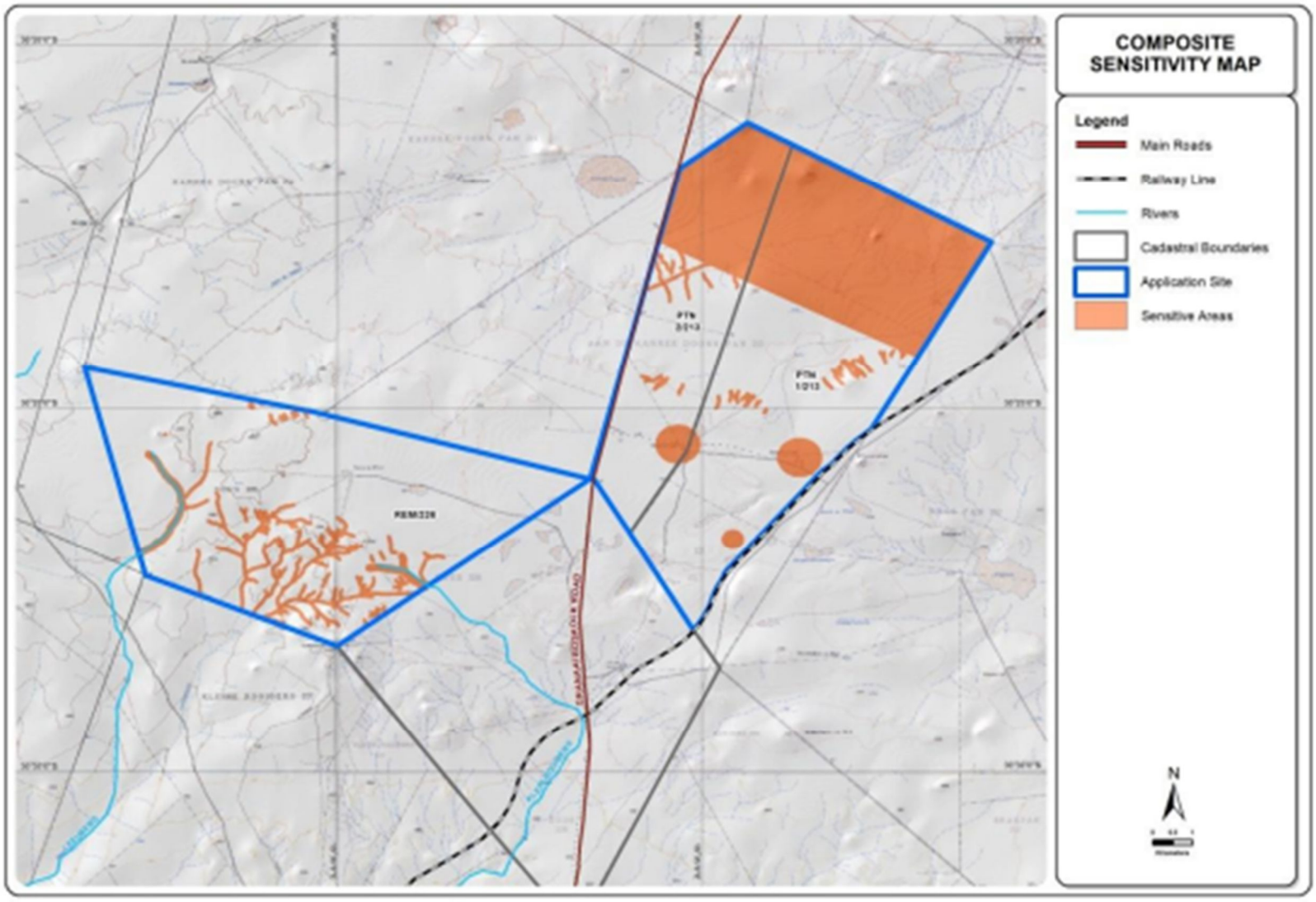



Figure 56. Environmental Sensitivity Map of the proposed PV SEF site (SiVEST, 2012)

## SECTION 5 – TERMS OF REFERENCE FOR SPECIALIST INPUTS FOR AMENDMENT PROCESS

All the specialists were provided with the same terms of references for input into the EA amendment process. These were in line with the information as requested by the DFFE letter of additional information requirements dated 07 November 2022. The terms of reference for the comparative assessments are shown below.

The Terms of Reference (ToR) for the specialist inputs into the provision of a specialist statement for the Application for Amendment of the EA to extend the validity period of the EA required the following:

- Description of the status (baseline) of the environment that was assessed during the initial assessment.
- Confirmation of the current status of the assessed environment.
- Description and assessment of any changes to the environment that has occurred since the initial EA was issued, if any.
- Indication if the impact rating as provided in the initial assessment remains valid; if the mitigation measures provided in the initial assessment are still applicable; or if there are any new mitigation measures which need to be included into the EA/EMPr, should the request to extend the commencement period, and other proposed amendments, be granted by the Department.
- Indication if there are any new assessments and/or guidelines which are now relevant to the authorised development which were not undertaken as part of the initial assessment, must be taken into consideration, and addressed in the specialist statement/report.
- Description and an assessment of the surrounding environment, in relation to new developments or changes in land use which might impact on the authorised project, the assessment must consider the following:
    - Similar developments within a 30km radius.
    - Identified cumulative impacts must be clearly defined, and where possible the size of the identified impact must be quantified and indicated, i.e., hectares of cumulatively transformed land.
    - Detailed process flow and proof must be provided, to indicate how the specialist's recommendations, mitigation measures and conclusions from the various similar developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project.
    - The cumulative impacts significance rating must also inform the need and desirability of the proposed development.
    - A cumulative impact environmental statement on whether the proposed development must proceed.

The study must conclude the following:

- Has the baseline status of the receiving environment changed significantly since the original Assessment in 2012?
- Is the initial impact rating undertaken during the initial assessment still valid?
- Are the mitigation measures provided in the initial assessment (or subsequent updated assessments) still applicable?
- Are there any new mitigation measures that should be added to the EA/EMPr should the DFFE approve the amendments?
- Describe any update/new mitigations (or refer to them in the EMPr update report), where relevant.
- Are the proposed amendments, including proposed extension of the validity period, acceptable (relative to your area of expertise)?

## ASSESSMENT CRITERIA

The EIA Methodology assists in evaluating the overall effect of a proposed activity on the environment. The determination of the effect of an environmental impact on an environmental parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the environmental impact assessment. The impact evaluation of predicted impacts was undertaken through an assessment of the significance of the impacts.

### Determination of Significance of Impacts

Direct, indirect and cumulative impacts of the issues identified through the EIA process were assessed in terms of the following criteria:

- The nature, which includes a description of what causes the effect, what will be affected and how it will be affected.

- The extent, wherein it is indicated whether the impact will be
  - 1 = site only
  - 2 = local
  - 3 = regional
  - 4 = national
  - 5 = international

- The duration, wherein is indicated whether:
  - 1 = the lifetime of the impact will be of a very short duration (0–1 years)
  - 2 = the lifetime of the impact will be of a short duration (2-5 years)
  - 3 = medium-term (5–15 years)
  - 4 = long term (> 15 years)
  - 5 = permanent

- The consequences (magnitude), quantified on a scale from 0-10, where:
  - 0 = small and will have no effect on the environment
  - 2 = minor and will not result in an impact on processes
  - 4 = low and will cause a slight impact on processes
  - 6 = moderate and will result in processes continuing but in a modified way
  - 8 = high (processes are altered to the extent that they temporarily cease)
  - 10 = very high and results in complete destruction of patterns and permanent cessation of processes.

- The probability of occurrence, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale of 1–5, where:
  - 1 = very improbable (probably will not happen)
  - 2 = improbable (some possibility, but low likelihood)

- 3 = probable (distinct possibility)
- 4 = highly probable (most likely)
- 5 is definite (impact will occur regardless of any prevention measures)

- The significance, which is determined through a synthesis of the characteristics described above and is assessed as low, medium or high.
- The status, which is described as either positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The degree to which the impact can be mitigated.

The significance is calculated by combining the criteria in the following formula:

**S = (E+D+M) P**

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

## SECTION 6 – CONFIRMATION OF IMPACT RATING AND MITIGATION MEASURES AS PER ORIGINAL ASSESSMENT (SIVEST, 2012)

The following specialist studies were conducted as part of the EIR Phase for the original EIA process (SiVEST, 2012), as stipulated in the Plan of Study for EIA:

- Biodiversity (flora and fauna) Assessment
- Avifauna Assessment
- Bat Assessment
- Surface Water Impact Assessment
- Agricultural Potential
- Visual Impact Assessment
- Geotechnical Assessment
- Heritage Assessment
- Socio-economic Impact Assessment

A summary of the findings is provided in the table below:

**Table 6.1: Summary of findings and recommendations as per original EIA process (SiVEST, 2012)**

| Environmental Parameter | Summary of major findings | Recommendations |
|---|---|---|
| Biodiversity | The study area is very uniform in nature with characteristic Nama Karoo shrubland exhibiting sparse vegetation. No larger trees are present on the site.<br><br>Farm Aan De Karree Doorn Pan is considered to be in a fairly natural state due to the floral diversity noted. However, it currently operates as a functioning sheep farm.<br><br>The site is very uniform in nature with very few distinct sensitive areas. Drainage lines on the site are not well defined due to the infrequent rains that occur. Those that have been clearly identified are considered to be sensitive as they provide rare habitat on the site when water is available.<br><br>Areas of topographical change are also considered to be sensitive as they provide different microclimates on a site that is very uniform in nature.<br><br>Various mammal, amphibian and reptile species are likely to occur within the study area. No Red Data species were noted during the field investigations.<br><br>The potential impacts of the proposed development mainly related to loss of habitat for red data and general species; potential loss of species richness, edge effect and erosion. The impact of the proposed development will be limited to the PV Panel construction areas and the | Strict implementation of the suggested mitigation measures must be undertaken to ensure that the proposed development is not to the detriment of the biodiversity of the region.<br><br>Although No Red Data species were noted during the field investigations, this does not however rule out their potential occurrence. Therefore, it is imperative that the mitigation measures are strictly implemented to ensure strict management should these species be encountered. |

| | | |
|---|---|---|
| | associated infrastructure such as roads. Surrounding vegetation will remain intact and will not be impacted upon. As such the impact is localised and if the mitigation measures are implemented, the overall impact can be reduced.<br><br>No significant impacts on vegetation and habitat are expected during the operation phase of the proposed development, as long as rehabilitation of the impacted surrounding areas has taken place. | |
| Avifauna Assessment | The proposed site is characterised by intrinsic avian biodiversity value. It does not contain any unique habitats or landscape features, but it may affect locally important waterbird flyways, which may exists in the northern part of the proposed site.<br><br>There are regionally and/or nationally important impact susceptible species present (or potentially present), and the proposed facility may have a significant detrimental effect on these birds, both during the construction and operational phases of the development. | If possible, northern part of the proposed site should be kept free of PV panels until more information is available on actual bird traffic over the site.<br><br>Although regionally and/or nationally important impact susceptible bird species likely to be affected by the proposed facility (both during the construction and operation) are potentially present, implementation of the required mitigation measures should reduce these impacts to Low |
| Bat Assessment **(Applicable to WEF only)** | The Loeriesfontein site does not have any of the three factors of possible roosting space, surface water and probability of insects strongly, with roosting space very limited and some foraging space in the stream beds.<br><br>Overall the site is very dry and insect numbers as well as surface water would be limited during most of the year. A total of 9 bat species may occur on the site and 3 (e.g. *Nycteris thebaica* and *Cistugo seabrae*) have a high probability of occurring on the site. Two bat species, namely Egyptian free-tailed bat (*Tadarida aegyptiaca*) and Cape serotine | The site needs to be visited by a bat specialist quarterly (4 times during the period) to assess and compare the bat activity on a seasonal basis. |

| | | |
|---|---|---|
| | (*Neoromicia capensis*), were confirmed on site, however, none of them are of conservation concern<br><br>Generally there were very low bat activity levels due to the lack of roosting and foraging opportunities. | |
| Surface Water Impact Assessment | No wetlands were identified on the study site. However, two Priority Rivers and 233 drainage lines occur in the study area, namely the Leeuberg River and the Klein-rooiberg River. | Construction activities will need to take place in a few of the watercourses and associated buffer zone areas identified. It has been identified that environmental authorisation will most likely therefore be required with regards to activities 11 and 18 of Listing Notice 1 of the EIA Regulations (2010). Furthermore, since construction will most likely take place in and nearby several watercourses, a water use licence will be required for activities that involve the alteration of the bed, banks, course or characteristics of a watercourse.<br><br>Anticipated potential impacts in the pre-construction, construction, operation and decommissioning phases have been scoped and appropriate mitigation measures have been stipulated for the proposed development.<br><br>A final walk-down by a suitably qualified wetland specialist will not be required for the proposed development. Sufficient information is available to address identified potential impacts that may result |

| | | |
|---|---|---|
| | | from the proposed development of the PV Power Plant. |
| Agricultural Potential | The study area has an arid Mediterranean type climate with winter rainfall regime i.e. most of the rainfall is confined to early autumn and winter. Mean Annual Precipitation (MAP) is approximately 179 mm per year. The combination of low rainfall and severe moisture deficient means that sustainable arable agriculture cannot take place on the farm without some form of irrigation.<br><br>The soils identified on the Proposed Development Area (PDA) are predominantly calcic and shallow with a low agricultural potential. Rocky and shallow calcic soils (Mispah and Coega Form) cover 97% of the surveyed area. Virtually all the soils encountered had a layer that was limiting to plant growth and the effective soil depth rarely extended below 50 cm.<br><br>The site is not classified as high potential nor is it a unique dry land agricultural resource. The study area has been classified as having an extremely low potential for crop production due to an arid climate and highly restrictive soil characteristics but are considered to have a moderately low value as grazing land, its current use. | Normal grazing (the dominant agricultural activity) will be within the PV field. The farm which constitutes the study area is dominated by grazing land and this activity is considered non-sensitive when assessed within the context of the proposed development. Consequently, the impact of the proposed development on the study area's agricultural potential will be extremely low, with the loss of agricultural land being attributed to the creation of the service roads and around the array foundations.<br><br>There are no centre pivots, irrigation schemes or active agricultural fields which will be influenced by the proposed development. Therefore, from an agricultural perspective, there are no problematic or fatal flaw areas for the site. |
| Visual Impact Assessment | Due to the limited human habitation in the surrounding area, very few potentially sensitive receptors are present in the study area and the proposed development will have a low or medium impact on most of these receptors. The proposed solar energy facility will have a negative low visual impact during construction and a negative medium visual impact during operation, with very few mitigation measures available. | Proposed mitigation measures should be implemented. |

<table>
<tr>
<td>Heritage Assessment</td>
<td>Several heritage resources have been identified on site which can be classed as having high significance.</td>
<td>Sensitive heritage resource areas are to be excluded as no-go areas. Suggested buffer zones must be implemented.<br><br>All suggested mitigation measures must be implemented and included in the EMPr for the proposed development.</td>
</tr>
<tr>
<td>Socio-economic Impact Assessment</td>
<td>A summary of the construction impacts shown in the table below:
<table>
<tr><th>Change Process</th><th>Issue</th><th>Pre-Mitigation</th><th>Post-Mitigation</th></tr>
<tr><td>Economic</td><td>Employment and output creation</td><td>+18</td><td>+30</td></tr>
<tr><td rowspan="2">Socio-cultural</td><td>Social mobilisation</td><td>-20</td><td>-7</td></tr>
<tr><td>Health and safety</td><td>-60</td><td>-28</td></tr>
<tr><td>Average</td><td>Overall construction impacts</td><td>-20</td><td>-1.6</td></tr>
</table>
Apart from the possibility of temporary employment, overall the construction phase is characterised by negative low social impacts.<br><br>In certain instances the implementation of mitigation measures can bring about positive changes. One such case would be the implementation of an effective HIV/AIDS prevention programme that extends to the local communities where construction workers will</td>
<td>Even though all of the identified social impacts can be mitigated or enhanced successfully, this can only be done if Mainstream, or its appointed contractor(s), commit to the responsibility of ensuring that the level of disturbance brought about to the social environment by the more negative aspects of the project, is minimised as far as possible.<br><br>It is therefore recommended that:<br><br>• Social issues identified during the EIA phase are addressed. This could be done by engaging social specialists where necessary or by ensuring that Environmental Control Officers (ECOs) used during construction have the necessary knowledge and skills to identify social problems and address these when necessary. Guidelines on managing possible social changes and impacts could be developed for this purpose.</td>
</tr>
</table>

spend their free time, as this can also serve to inform and empower local people to make better and more informed decisions regarding their future (sexual) behaviour. Where Mainstream has the opportunity to bring about positive change to local communities, they should pursue such opportunities where possible.

The housing problem would be amplified in the case of the PV plant when 872 people would require housing. Cognisance should therefore be taken in both instances that the hospitality industry in Loeriesfontein might not be able to cater for the needs of the construction team and that alternative arrangements might have to be made in terms of accommodation.

The majority of impacts that would occur during the construction phase would affect people's sense of wellbeing and security within their social environment. A number of changes to the socio-economic environment would lead to economic impacts, but for the most part these impacts would be restricted to individuals or individual households and would not extend to the community at large.

A summary of the operations and maintenance impacts is provided below:

| Change Process | Issue | Pre-Mitigation | Post-Mitigation |
|---|---|---|---|
| Economic | Employment and output creation | +20 | +36 |
| | Tax income | +14 | +14 |

- Alternative accommodation options are considered for the construction phase, as it would appear that the hospitality industry in Loeriesfontein would not be able to cater for the quantity of people.
- Neighbouring landowners are informed beforehand of any construction activity that is going to take place in close proximity to their property. Prepare them on the number of people that will be on site and on the activities they will engage in.
- Employees are aware of their responsibility in terms of Mainstream's relationship with landowners and communities surrounding the site. Implement an awareness drive to relevant parts of the construction team to focus on respect, adequate communication and the 'good neighbour principle.'
- All mitigation measures in the Social Impact Assessment (SIA) are incorporated in the Environmental Management Programme (EMPr) to ensure that Mainstream and the contractor adhere to these.

| | | | |
|---|---|---|---|
| | Corporate Social Investment | +27 | +48 |
| | Agricultural output | -11 | -11 |
| | Tourism | -10 | -10 |
| | Property prices | -10 | -10 |
| Socio-cultural | Sense of place - | -24 | -20 |
| *Average* | *Overall operations and maintenance impacts* | +0.9 | +6.7 |

The presence of the PV facility during the operation and maintenance phase overall will have a low positive impact, although certain elements will yield medium positive impacts whereas other elements are expected to have a more negative connotation. Most positive impacts are of an economic nature, most significantly Mainstream's corporate social investment in the area, which in turn could lead to an array of other positive social upliftment projects (outside the scope of this study). Negative impacts are expected to be on the low side and would in all probability be over-shadowed by the more positive contributions that Mainstream will make to the area through their Corporate Social Investment (CSI).

The results of the impact rating undertaken by the relevant specialist as part of the EIR Phase for the original EIA process (SiVEST, 2012) are detailed below.

**Key**

| | |
|---|---|
| **LOW NEGATIVE** | **LOW POSITIVE** |
| **MEDIUM NEGATIVE** | **MEDIUM POSITIVE** |
| **HIGH NEGATIVE** | **HIGH POSITIVE** |

**Table 6.2: Impact rating summary for the proposed PV plant during the construction phase, as per specialist studies conducted as part of the original EIA process (SiVEST, 2012)**

| Environmental Parameter | Environmental Impacts | ImpactRating without Mitigation | Impact Rating with Mitigation |
|---|---|---|---|
| Biodiversity | Loss of habitat for red data / general species | -24 (low negative) | -6 (low negative) |
| | Edge effect | -28 (low negative) | -7 (low negative) |
| Avifauna | Displacement of priority species due to disturbance | -30 (Medium negative) | -22 (low negative) |
| | Displacement of priority species due to habitat destruction | -16 (low negative) | -16 (low negative) |
| | Bird collisions | -28 (medium negative) | -7 (low negative) |
| | Bird Electrocutions | -28 (medium negative) | -7 (low negative) |
| Bats | Destruction of foraging habitat | 11 (negative Low) | 8 (negative low) |
| Surface Water | Construction activities taking place in, near or through watercourses and associated buffer zone areas | -30 to -32 (negative medium) | -14 (negative low) |
| | stormwater run-off impacts | - 20 (low negative) | - 6 (low negative) |
| | Contamination of local soil and land use resources | -12 (low negative) | -12 (low negative) |
| Agricultural Potential | Loss of agricultural land and / or production | -12 (low negative) | -12 (low negative) |
| Visual Impact | Day-time visual impact during construction: Large construction vehicles and equipment during the construction phase will alter the natural character of the study area and expose visual receptors to visual impacts associated with the construction phase. | -20 (negative low) | -10 (negative low) |

| | | | |
|---|---|---|---|
| | Night-time visual impact during construction: The night scene is characterised by a dark night environment with very few light sources visible. Most construction activities are likely to take place during day-time business hours and therefore the construction phase of the development is unlikely to have a significant impact on the visual quality of the area at night. | -7 (negative low) | -6 (negative low) |
| Heritage | Stone Age sites: Physical disturbance of the material and its context | -75 (Negative, very high impact) | -12 (Negative, low impact) |
| | Damaging of farmsteads | -75 (Negative, very high impact) | -12 (Negative, low impact) |
| | Damaging of cemeteries | -75 (Negative, very high impact) | -12 (Negative, low impact) |
| | Damaging of farming related features | -75 (Negative, very high impact) | -12 (Negative, low impact) |
| Socio-economic | Creation of local jobs and income | + 18 (Positive low) | +30 (Positive medium) |
| | Social mobilization: Conflict situations that can delay the project and prolong the duration of impacts, which in turn would affect local residents' quality of life and result in economic impacts | -20 (Negative low) | -7 (Negative low) |
| | Health and Safety impacts: Workers at risk f spreading HIV/AIDS | +60 (Negative high) | -28 (Negative low) |

No significant negative impacts (i.e., high impacts) were identified during the construction phase, following the implementation of the recommended mitigation measures. In addition, one impact of positive medium significance was identified by the socio-economic specialist.

**Table 6.3: Impact rating summary for the proposed PV plant during the operation phase, as per specialist studies conducted as part of the original EIA process (SiVEST, 2012)**

| Environmental Parameter | Environmental Impacts | Impact Rating without Mitigation | Impact Rating with Mitigation |
|---|---|---|---|
| Biodiversity | Loss of habitat for red data / general species | -10 (low negative) | -6 (low negative) |
| | Edge effect | -26 (low negative) | -7 (low negative) |
| Avifauna | Displacement of priority species | -24 to -26 (low negative) | -22 (low negative) |
| | Mortality of priority species with the power line | -30 -32 (medium negative) | -26 to -28 (low negative) |
| | Bird collisions | -28 (Medium negative) | -7 (low negative) |
| | Bird Electrocutions | -28 (Medium negative) | -7 (low negative) |
| Bats | Bat mortalities due to blade collisions and barotrauma during foraging | -28 (Negative low) | -10 (Negative low) |
| | Bat mortalities due to blade collisions and barotrauma during migration | -34 (Negative medium) | -13 (Negative low) |
| Surface water | Vehicle damage to watercourses and buffer zones during maintenance | - 28 (low negative) | - 6 (low negative) |
| | Stormwater and consequent erosion impacts to watercourses and associated buffer zones | - 28 (low negative) | - 8 (low negative) |
| Visual Impact | Day-time visual impact during operation: The PV plant and associated infrastructure will alter the natural character of the study area and expose receptors to visual impacts associated with the proposed development during operation. | -34 (negative medium) | -28 (negative low) |
| | Night-time visual impact during operation: The night scene is characterised by a dark night environment with very few light sources visible. The proposed development will therefore alter the visual quality of the area at night by introducing an additional light source in the form of security lighting. | -28 (negative low) | -26 (negative low) |
| Heritage | Stone Age sites: Physical disturbance of the material and its context | -75 (very high impact) | -12 (low Impacts) |
| | Damaging of farmsteads | -75 (very high impact) | -12 (low Impacts) |
| | Damaging of cemeteries | -75 (very high impact) | -12 (low Impacts) |
| | Damaging of farming related features | -75 (very high impact) | -12 (low Impacts) |
| Socio-economic | The creation of local jobs and income | +20 (Positive low) | +36 (Positive medium) |
| | Increase in central and local tax income | +14 (Positive low) | +14 (Positive low) |

| | | | |
|---|---|---|---|
| | Corporate social investment | +27 (Positive low) | +48 (Positive medium) |
| | Displacing existing agricultural production | -11 (Negative low) | -11 (Negative low) |
| | Diverting/Attracting tourism from or to area | -10 (Negative low) | -10 (Negative low) |
| | Change in property prices adjacent to the new development | -10 (Negative low) | -10 (Negative low) |
| | The presence of the PV plant and associated infrastructure such as the substation and the power lines would change the landscape of the area from open spaces to 'spoilt' which could affect the way in which people related to the land and the sense of connectedness they have with the area, in short, their sense of place | -24 (Negative low) | -24 (Negative low) |

No significant negative impacts (i.e., high impacts) were identified during the construction phase, following the implementation of the recommended mitigation measures. In addition, two impacts of positive medium significance and one of positive low significance was identified by the socio-economic specialist.

## SECTION 7 – POTENTIAL FOR CHANGE IN THE SIGNIFICANCE OF IMPACTS AS ASSESSED IN THE EIA (SiVEST, 2012) AS A RESULT OF THE REQUESTED AMENDMENT

### 7.1 Impacts on Ecology

The original assessment undertaken as part of the EIA process in 2012 (SiVEST, 2012) identified the following impacts for the proposed project:

- Irreplaceable loss of resources (Low impact and negative low persists after mitigation)
- Edge effect on the biodiversity (negative Low impact i.e. the anticipated impact will have negligible negative effects however mitigation measures must be implemented. The negative low impact persists after mitigation

Findings of the Biodiversity Comparative Assessment (2023)

Comparison with the previous reports (SiVEST, 2012) and recent studies (2023) results in **no significant changes to the impact rating, except for the recording of the Rare plant species (*Oregeochloa calviniensis*) during the 2023 assessment**. This exception may however be mitigated by adding the mentioned avoidance mitigation ( the implementation of a 200m buffer), to be included in the EA, should the request to extend the commencement period be granted by the Department. Avoidance mitigation will result in avoiding approximately 35 ha of the proposed 448 Ha in order to prevent any significant impact on the Rare plant species population recorded.

**New proposed mitigation measures**

In order to manage the impacts effectively, the following additional (possible repeats) mitigation management should be incorporated into the existing EMPr, as well as the previous studies' mitigations, for the impacts associated with habitat, flora and fauna:

**Table 7.1: New Proposed mitigation measures (2023)**

| Impact Management Actions | Implementation | |
|---|---|---|
| | Phase | Responsible Party |
| • Clearing of vegetation should be minimized and avoided where possible. All activities must be restricted to flat areas and Medium SEI areas as far as possible. It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon. All disturbed footprints to be rehabilitated and landscaped after installation is complete. Rehabilitation of the disturbed areas existing in the project area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to the project area vegetation type. | Life of operation | Project manager, Environmental Officer |

| | | |
|---|---|---|
| • Indigenous vegetation to be maintained under the solar panels to ensure biodiversity is maintained and to prevent soil erosion (Beatty et al, 2017; Sinha et al, 2018).<br>• Vegetation clearing to commence only after the necessary permits have been obtained.<br>• The High SEI area, including the 200 m buffer must be avoided. | | |
| Existing servitudes, access routes, and especially roads must be made use of. | Construction/Operational Phase | Environmental Officer & Design Engineer |
| • All laydown, chemical toilets etc. should be restricted to outside of the project area.<br>• No materials may not be stored within the project area, and all materials must be removed from the project area once the construction phase has been concluded.<br>• No permanent construction structures/formwork should be permitted.<br>• No storage of vehicles or equipment will be allowed outside of the designated project areas. | Construction/Operational Phase | Environmental Officer & Design Engineer |
| Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species. All livestock should always be kept out of the project area, especially areas that have been recently re-planted. | Operational phase | Environmental Officer & Contractor |
| • A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site.<br>• Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment to take place within the project area unless necessary.<br>• All contaminated soil/yard stone shall be treated in situ or removed and placed in containers.<br>• Appropriately contain any diesel or oil storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them from leaking and entering the environment. | Life of operation | Environmental Officer & Contractor |

| | | |
|---|---|---|
| • Construction activities and vehicles could cause the spillage of lubricants, fuels and waste material potentially negatively affecting the functioning of the ecosystem. All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the project area. | | |
| It should be made an offence for any staff to take/bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants. | Life of operation | Project manager, Environmental Officer |
| A fire management plan needs to be complied and implemented to restrict the impact that fire might have on the surrounding areas. | Life of operation | Environmental Officer & Contractor |
| Any protected plant that may be present needs a relocation or destruction permit for any individual that may be removed or destroyed due to the development. If left undisturbed the sensitivity and importance of these species needs to be part of the environmental awareness program. All protected and red-list plants should be relocated, along with as many other geophytic species. | Life of operation | Project manager, Environmental Officer |
| Develop and implement a monitoring program for the Rare plant SCC. | Life of operation | Project manager, Environmental Officer |
| • A qualified environmental control officer must be on site when construction begins.<br>• A site walk through is recommended by a suitably qualified ecologist prior to any construction activities, preferably during the wet season, and any SSC should be noted.<br>• Should animals not move out of the area on their own relevant specialists must be contacted to advise on how the species can be relocated.<br>• Should any large nests be observed within the project area construction should stop immediately and a qualified specialist must be contacted. | Construction Phase | Environmental Officer, Contractor |
| The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments. Signs must be put up to enforce this. | Construction/Operational Phase | Project manager, Environmental Officer |
| The duration of the construction should be minimized to as short term as possible, to reduce the period of disturbance on fauna. | Construction | Project manager, Environmental |

| | | |
|---|---|---|
| | | Officer & Design Engineer |
| Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian species and nocturnal mammals. | Construction/Operational Phase | Environmental Officer |
| No trapping, killing, or poisoning of any wildlife is to be allowed: Signs must be put up to enforce this. | Life of operation | Environmental Officer |
| • All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife.<br>• Speed limits must still be enforced to ensure that road killings, dust and erosion is limited. The speed limits should be restricted to a maximum of 30 km/h within the project area. | Life of operation | Health and Safety Officer |
| • Outside lighting should be designed and limited to minimize impacts on fauna. Lighting fixtures should be fitted with baffles, hoods or louvres and directed downward.<br>• Outside lighting should be directed away from highly sensitive areas such as the wetland.<br>• Fluorescent and mercury vapor lighting should be avoided and sodium vapor (yellow) lights should be used wherever possible | Construction/Operational Phase | Project manager, Environmental Officer & Design Engineer |
| Schedule activities and operations during least sensitive periods, to avoid migration, nesting and breeding seasons: Driving on access roads at night should be restricted in order to reduce or prevent wildlife road mortalities which occur more frequently during this period. | Life of operation | Project manager, Environmental Officer & Design Engineer |
| Any holes/deep excavations must done in a progressive manner on a needs basis only. No holes/excavations may be left open overnight. In the event holes/excavations are required to remain open overnight, these areas must be covered to prevent fauna falling into these areas and subsequently inspected prior to backfilling | Planning and Construction | Environmental Officer & Contractor, Engineer |
| Ensure that cables and connections are insulated successfully and adequately to reduce electrocution risk. | Life of project | Environmental Officer & Contractor, Engineer |

| | | |
|---|---|---|
| • Compilation and Implementation of an Invasive Alien Plant (AIP) management plan.<br>• Regular monitoring for IAP encroachment during the operation phase to ensure that no alien invasion problems have developed as a result of the disturbance. This should be every 3 months during the first two years of the operation phase and every six months for the life of the project.<br>• All IAP species must be removed/controlled using the appropriate techniques as indicated in the IAP management plan | Life of operation | Project manager, Environmental Officer & Contractor |
| A pest control plan must be put in place and implemented; it is imperative that poisons not be used due to the presence of faunal SCC in the area. | Life of operation | Environmental Officer & Health and Safety Officer |
| Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces: No non-environmentally friendly suppressants may be used as this could result in the pollution of valuable water sources. | Life of operation | Contractor |
| Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests from entering the site | Life of operation | Environmental Officer & Contractor |
| Litter, spills, fuels, chemical and human waste in and around the project area must be cleared and safely/appropriately stored immediately. | Construction/Operation/Closure Phase | Environmental Officer & Health and Safety Officer |
| A minimum of one toilet must be provided per 10 persons. Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area. | Life of operation | Environmental Officer & Health and Safety Officer |
| The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility. | Life of operation | Environmental Officer & Health and Safety Officer |
| Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regard to waste management. Under no circumstances may domestic waste be burned on site or stored in pits. | Life of operation | Environmental Officer, Contractor & Health and Safety Officer |
| Refuse bins will be emptied and secured. Temporary storage of domestic waste shall be in covered waste skips. Maximum domestic waste storage period will be 10 days. | Life of operation | Environmental Officer, Contractor & Health and Safety Officer |

| | | |
|---|---|---|
| • All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area (Rare plant) and to inform contractors and site staff of the presence of red-listed species, their identification, conservation status and importance, biology, habitat requirements and management requirements in line with the Environmental Authorisation and within the EMPr.<br>• The avoidance and protection of the high sensitivity area and associated buffer must be included in a site induction. Contractors and employees must all undergo the induction and be made aware of the "no-go" areas to be avoided. | Life of operation | Health and Safety Officer |
| • Speed limits of 30 km/h must be put in place to reduce erosion.<br>• Dust generated, especially by earth moving machinery, must be minimised through wetting of the soil surface and putting up signs to enforce speed limits.<br>• Speed bumps must be built to force slow speeds. Signs must be put up to enforce this. | Life of operation | Project manager, Environmental Officer |
| Where possible, existing access routes and walking paths must be made use of. | Life of operation | Project manager, Environmental Officer |
| Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events and strong winds. This is to be done according to the Re-vegetation and Habitat Rehabilitation Plan. | Life of operation | Project manager, Environmental Officer |
| A stormwater management plan must be compiled and implemented. | Life of operation | Project manager, Environmental Officer |

**Conclusion**

Assuming the High SEI area, as well as the fact that the associated 200m buffer will be avoided; all prescribed mitigation measures and supporting recommendations presented here will help to achieve an acceptable residual impact, as per the previous findings. These **measures and recommendations will remain applicable** for the requested extension of the EA. To this end, these measures have to be included in the updated EMPr for this development as per the requirements of the EA. As such, considering the review of the 2012 Biodiversity Assessment and associated documentation, and the implementation of the mitigation measures described above and as included in the updated EMPr for this development be implemented, it is the reasoned opinion of the specialist that the EA for the Loeriesfontein 3 PV SEF may be extended for an additional 5 years (i.e., EA to lapse on 29 October 2027).

### 7.2 Impacts on Avifauna

Due to the long period that had transpired since the original impact assessment was completed (9 years), and due to experience gained in assessing the potential impacts of solar PV facilities on avifauna since the original impact study, it was decided that the impacts and proposed mitigation measures need to be re-assessed before a recommendation can be made with regard to the proposed extension of the EA. The following potential impacts were identified:

- Displacement due to disturbance associated with the construction of the solar PV plant and associated infrastructure;
- Displacement due to habitat transformation associated with the construction of the solar PV plant and associated infrastructure;
- Collisions with the solar panels;
- Entrapment in perimeter fences;
- Electrocution of priority species on the internal medium voltage reticulation network; and
- Mortality of avifauna due to collision with the internal medium voltage lines.

These impacts were addressed as follows for in the avifauna comparative assessment (2023).

**Displacement due to disturbance associated with the construction of the solar PV plant and associated infrastructure**;
As far as disturbance is concerned, it is likely that all the avifauna will be temporarily displaced in the footprint area, either completely or more likely partially (reduced densities) during the construction phase, due to the disturbance associated with the construction activities e.g., increased vehicle traffic, and short-term construction-related noise (from equipment) and visual disturbance. At the PV facility, the species which would be most severely affected by disturbance would be ground dwelling species, those that utilise low shrubs for nesting, and raptors which predate these bird species, and on other ground/shrub-dwelling fauna.

**Table 7.2 Displacement of avifauna due to disturbance associated with construction and decommissioning of the Loeriesfontein 3 PV facility and associated infrastructure.**

| Nature: Displacement of avifauna due to disturbance associated with construction and decommissioning of the Loeriesfontein 3 PV facility and associated infrastructure. | | |
|---|---|---|
| | Without mitigation | With mitigation |
| Extent | 2 local | 2 local |
| Duration | 1 very short | 1 very short |
| Magnitude | 8 high | 6 moderate |
| Probability | 5 definite | 5 definite |
| **Significance** | **55 MEDIUM** | **45 MEDIUM** |
| Status (positive or negative) | Negative | Negative |
| Reversibility | High | High |
| Irreplaceable loss of resources? | No | No |
| Can impacts be mitigated? | Yes, but to a limited extent | |
| Mitigation:<br>• Construction activity should be restricted to the immediate footprint of the infrastructure as far as possible<br>• Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of solar priority species. | | |

| |
|---|
| • Measures to control noise and dust should be applied according to current best practice in the industry.<br>• Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum as far as practical.<br>• The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the construction footprint is concerned. |
| Residual Risks:<br><br>The residual risk of displacement will be reduced but remain at a medium level after mitigation, if the proposed mitigation is implemented. |

**Displacement due to habitat transformation associated with the construction of the solar PV plant and associated infrastructure**; As far as displacement, either completely or partially (reduced densities) due to habitat loss is concerned, it is highly likely that a pattern of reduced avifaunal densities will manifest itself at the proposed PV facility. Ground nesting species, shrubland specialists and some raptors are likely to be impacted most by the habitat transformation, raptors particularly as a result of reduced prey availability and accessibility. Regularly occurring species which fall in this category are Red Lark, Ludwig's Bustard, Northern Black Korhaan, Karoo Korhaan and Spotted Eagle-Owl, and some which may occur but less regularly such as Sclater's Lark and Kori Bustard. Some species might be able to recolonise the area after the completion of the construction phase, but for some species this might only be partially the case, resulting in lower densities than before once the SEF is operational, due to the disturbance factor of the operational facility. Micro-habitat modelling has shown that the adjacent Kokerboom Wind Farm site with similar habitat contains areas of good to very good habitat for the endemic and range restricted Red Lark, with an expected density of 0.015 birds per/hectare averaged over all habitat types (Spatiallytics 2020). These areas are mostly sandy areas with grasses and shrubs which is similar to where the proposed Loeriesfontein 3 PV solar arrays footprint (182 ha) are planned. This translates into a population of approximately 2.7 birds for the 182 hectares which comprise the total surface area covered by the PV footprint. The current global population of Red Larks is estimated to exceed 10 000 mature individuals (Taylor et al. 2015), therefore the displacement of 2 - 3 birds **should not be biologically significant** as far as the national population is concerned i.e. having a statistically significant effect that has a noteworthy impact on survival.

**Table 7.3 During construction: Displacement of avifauna due to habitat transformation associated with construction of the Loeriesfontein PV facility and associated infrastructure.**

| Nature: During construction: Displacement of avifauna due to habitat transformation associated with construction of the Loeriesfontein PV facility and associated infrastructure. | | |
|---|---|---|
| | Without mitigation | With mitigation |
| Extent | 1 site only | 1 site only |
| Duration | 4 long term | 4 long term |
| Magnitude | 8 high | 6 moderate |
| Probability | 5 definite | 4 improbable |
| **Significance** | **65 HIGH** | **44 MEDIUM** |
| Status (positive or negative) | Negative | Negative |
| Reversibility | High | High |
| Irreplaceable loss of resources? | Yes | Yes |
| Can impacts be mitigated? | To a limited extent | |
| Mitigation:<br>• Maximum used should be made of existing access roads and the construction of new roads should be kept to a minimum. | | |

| |
|---|
| • The mitigation measures proposed by the biodiversity and vegetation specialists must be strictly implemented. |
| Residual Risks:<br><br>The residual risk of displacement will be reduced after mitigation but will remain for some species due to the change in habitat. |

**Collisions with the solar panels;**

The results of the available literature lack compelling evidence of collisions as a cause of large-scale mortality among birds at PV facilities. Kosciuch et al. (2020) synthesized results from fatality monitoring studies at 10 photovoltaic solar facilities across 13 site years in California and Nevada in the USA. Annual fatality rates never exceeded 2.99 fatalities/MW/year (1.03 fatalities/hectare/year), and 3 of the four top species detected were ground-dwelling species. Based on the lack of evidence to the contrary, it is **not foreseen that collisions with the solar panels at the PV facility will be a significant impact**. The solar priority species which would most likely be potentially affected by this impact include small terrestrial birds which forage between the solar panels, and raptors which predate these small birds or forage for insects and other animals between the PV panels, e.g., Greater Kestrels (i.e., if they are not completely displaced due to the habitat transformation).

**Table 7.4: Nature: Mortality of avifauna due to collisions with solar panels at the Loeriesfontein 3 PV facility**

| Nature: Mortality of avifauna due to collisions with solar panels at the Loeriesfontein 3 PV facility. | | |
|---|---|---|
| | Without mitigation | With mitigation |
| Extent | 2 local | 2 local |
| Duration | 4 long term | 4 long term |
| Magnitude | 4 low | 4 low |
| Probability | 2 probable | 2 probable |
| **Significance** | **20 LOW** | **20 LOW** |
| Status (positive or negative) | Negative | Negative |
| Reversibility | High | High |
| Irreplaceable loss of resources? | No | No |
| Can impacts be mitigated? | No mitigation required | |
| Mitigation:<br>• Due to the expected low significance of this impact, no mitigation measures are recommended. | | |
| Residual Risks:<br><br>Not applicable | | |

**Entrapment in perimeter fences;**

It is **not foreseen that entrapment of solar priority species in perimeter fences will be a significant impact** at the PV facility. The solar priority species which could potentially be affected by this impact are most likely medium to large terrestrial species, and large owls. Impacts associated with this include the following:

- Electrocution of priority species on the internal medium voltage reticulation network; and
- Mortality of avifauna due to collision with the internal medium voltage lines.

**Table 7.5 Nature: Entrapment of large-bodied birds in the double perimeter fence lines of the Loeriesfontein 3 PV facility.**

| Nature: Entrapment of large-bodied birds in the double perimeter fence lines of the Loeriesfontein 3 PV facility. |
|---|

| | Without mitigation | With mitigation |
|---|---|---|
| Extent | 2 local | 2 local |
| Duration | 4 long term | 4 long term |
| Magnitude | 6 moderate | 4 low |
| Probability | 3 possible | 2 improbable |
| **Significance** | **36 MEDIUM** | **20 LOW** |
| Status (positive or negative) | Negative | Negative |
| Reversibility | High | High |
| Irreplaceable loss of resources? | Yes | No |
| Can impacts be mitigated? | Yes | |
| Mitigation:<br>• It is recommended that a single perimeter fence is used<br>• Increasing the spacing between at least the top two wires (to a minimum of 30cm) and ensuring they are correctly tensioned will reduce the snaring risk for owls | | |
| Residual Risks:<br><br>The residual risk of electrocution will be low once mitigation is implemented. | | |

**Electrocution of avifauna on the internal medium voltage reticulation network:**

Medium voltage electricity poles (33kV) could potentially pose an electrocution risk to raptors. Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components (van Rooyen 2000). The electrocution risk is largely determined by the design of the electrical hardware. While the intention is to place the majority of the medium voltage reticulation network underground at the PV facility, there is the possibility that some of the lines could run above ground. Electrocutions at the on-site substations are also a probability.

**Table 7.6 Mortality due to electrocution on medium voltage internal reticulation poles**

| Nature: Mortality due to electrocution on medium voltage internal reticulation poles | | |
|---|---|---|
| | Without mitigation | With mitigation |
| Extent | 2 local | 2 local |
| Duration | 4 long term | 4 long term |
| Magnitude | 8 high | 4 low |
| Probability | 3 possible | 1 very improbable |
| **Significance** | **42 MEDIUM** | **10 LOW** |
| Status (positive or negative) | Negative | Negative |
| Reversibility | High | High |
| Irreplaceable loss of resources? | Yes | No |
| Can impacts be mitigated? | Yes | |
| Mitigation:<br>• Use underground cables as much as possible.<br>• A raptor-friendly pole design must be used, and the pole design must be approved by the avifaunal specialist. | | |
| Residual Risks:<br><br>The residual risk of electrocution will be low once mitigation is implemented. | | |

**Mortality of avifauna due to collisions with the internal medium voltage reticulation network:**

While the intention is to place the majority of the medium voltage reticulation network underground at the PV facility, there are areas where the lines might run above ground. These spans will pose a collision risk to avifauna

**Table 7.7 Mortality of priority species due to collisions with the medium voltage internal reticulation networks**

| Nature: Mortality of priority species due to collisions with the medium voltage internal reticulation networks | | |
|---|---|---|
| | Without mitigation | With mitigation |
| Extent | 2 local | 2 local |
| Duration | 4 long term | 4 long term |
| Magnitude | 6 medium | 4 low |
| Probability | 3 possible | 2 improbable |
| **Significance** | **36 MEDIUM** | **20 LOW** |
| Status (positive or negative) | Negative | Negative |
| Reversibility | High | High |
| Irreplaceable loss of resources? | No | No |
| Can impacts be mitigated? | Yes | |
| Mitigation:<br>• Use underground cables as much as possible.<br>• All internal medium voltage lines must be marked with Eskom approved Bird Flight Diverters according to the latest official Eskom Engineering Instruction. | | |
| Residual Risks:<br><br>The residual risk of collision will still be present for Ludwig's Bustard, but significantly reduced for other species. | | |

**New proposed mitigation measures:**

**Table 7.8 Avifauna: Management Plan for the Planning and Design Phase**

| Impact | Mitigation/Management Objectives and Outcomes | Mitigation/Management Actions | | Monitoring | |
|---|---|---|---|---|---|
| | | | *Methodology* | *Frequency* | *Responsibility* |
| **Avifauna: Entrapment** | | | | | |
| Entrapment of medium and large terrestrial birds between the perimeter fences, leading to mortality. | Prevent mortality of avifauna | 1. A single perimeter fence should be used[4]. | Design the facility with a single perimeter fence. | Once-off during the planning phase. | Project Developer |
| **Avifauna: Mortality due to electrocutions on the internal 33kV network** | | | | | |
| Electrocution of priority species on the 33kV network | Prevention of electrocution mortality | 1. Design the facility with underground cables as much as possible.<br>2. A raptor -friendly pole design must be used, and the pole design must be approved by the avifaunal specialist. | Design the facility with underground cabling and where impractical, use a bird friendly pole design approved by the avifaunal specialist. | Once-off during the planning phase. | Project Developer |

**Table 7.9 Avifauna: Management Plan for the Construction Phase**

| Impact | Mitigation/Management Objectives and Outcomes | Mitigation/Management Actions | Monitoring | | |
|---|---|---|---|---|---|
| | | | *Methodology* | *Frequency* | *Responsibility* |
| **Avifauna: Disturbance** | | | | | |

[4] If a fence is used consisting of an outer diamond mesh fence and inner electric fence with a separation distance of approximately 100 mm or less, it should not pose any risk of entrapment for large terrestrial species and can be considered a single fence.

| Impact | Mitigation/Management Objectives and Outcomes | Mitigation/Management Actions | Monitoring | | |
|---|---|---|---|---|---|
| | | | *Methodology* | *Frequency* | *Responsibility* |
| The noise and movement associated with the construction activities at the development footprint will be a source of disturbance which would lead to the displacement of avifauna from the area | Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the Construction Environmental Management Programme (CEMPr.) | A site-specific CEMPr must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the CEMPr and should apply good environmental practice during construction. The CEMPr must specifically include the following:<br>1. No off-road driving;<br>2. Maximum use of existing roads, where possible;<br>3. Measures to control noise and dust according to latest best practice;<br>4. Restricted access to the rest of the property;<br>5. Strict application of all recommendations in the botanical specialist report pertaining to the limitation of the footprint. | 1. Implementation of th CEMPr. Oversee activitie to ensure that the CEMPr i implemented and enforce via site audits an inspections. Report an record any non compliance.<br>2. Ensure that construction personnel are made aware of the impacts relating to off-road driving.<br>3. Construction access roads must be demarcated clearly. Undertake site inspections to verify.<br>4. Monitor the implementation of noise control mechanisms via site inspections and record and report non-compliance.<br>5. Ensure that the construction area is demarcated clearly and that construction | 1. On a daily basis<br>2. Monthly<br>3. Monthly<br>4. Monthly<br>5. Monthly | 1. Contractor and ECO<br>2. Contractor and ECO<br>3. Contractor and ECO<br>4. Contractor and ECO<br>5. Contractor and ECO |

| Impact | Mitigation/Management Objectives and Outcomes | Mitigation/Management Actions | Monitoring | | |
|---|---|---|---|---|---|
| | | | ***Methodology*** | ***Frequency*** | ***Responsibility*** |
| | | | personnel are made aware of these demarcations. Monitor via site inspections and report non-compliance. | | |
| Mortality of priority species due to collisions with the medium voltage internal reticulation network | Prevention of powerline collision mortality | Eskom approved bird flight diverters should be installed on the full span length of all 33kV overhead lines according to the applicable Eskom Engineering Instruction. These devices must be installed as soon as the conductors are strung. | Bird Flight Diverters must b installed as soon as th conductors are strung. | 1. Once-off | 1. Contractor and ECO |

**Table 7.10 Avifauna: Management Plan for the Operational Phase**

| Impact | Mitigation/Management Objectives and Outcomes | Mitigation/Management Actions | Monitoring | | |
|---|---|---|---|---|---|
| | | | ***Methodology*** | ***Frequency*** | ***Responsibility*** |
| **Avifauna: Displacement due to habitat transformation** | | | | | |
| Total or partial displacement of avifauna due to habitat transformation associated with the vegetation clearance and the presence of the solar PV plants and associated infrastructure. | Prevent unnecessary displacement of avifauna by ensuring that the rehabilitation of transformed areas is implemented by an appropriately qualified rehabilitation specialist, according to the recommendations of the botanical specialist study. | 1. Develop a Habitat Restoration Plan (HRP).<br>2. Monitor rehabilitation via site audits and site inspections to ensure compliance.<br>3. Record and report any non-compliance. | 1. Appointment of rehabilitation specialist to develop HRP.<br>2. Site inspections to monitor progress of HRP.<br>3. Adaptive management to ensure HRP goals are met. | 1. Once-off<br>2. Once a year<br>3. As and when required | 1. Project Developer<br>2. Facility Environmental Manager<br>3. Project Developer and Facility Operational Manager |

**Conclusion**

A number of additional impacts on avifauna were recorded during the site inspection in November 2022 that had not been identified previously in the Final Impact Assessment Report (SiVEST 2012). **No nests of Red Data priority species were recorded** at the project site during the site inspection in November 2022. The site inspection in November 2022 **confirmed that the receiving environment had not changed in any material way.** A number of **additional mitigation measures** were identified as a result of the site inspection in November 2022. Although several additional impacts were identified during the follow up inspection in November 2022, the post-mitigation aggregate ratings of all the impacts did not differ from the original ratings i.e. **low post mitigation**. It is recommended that the validity of the EA be extended by an additional 5 years, provided the recommendations in this report are strictly implemented.

### 7.3 Impacts on Heritage

The original assessment undertaken as part of the original EIA process (Van Schalkwyk, 2012) identified these impacts for the proposed project, as follows:

- Impacts on Stone Age sites
- Impacts on Farmsteads
- Impacts on cemeteries
- Impacts on farming related features

Since 2012, the broader understanding of heritage significance and impacts to these resources has developed and evolved. As such, while the **findings and recommendations from the initial assessments remain valid and applicable**, the methodology used for the assessment of impact with regard to the tables has changed. Furthermore, the heritage impact assessments (including impact ratings, where required) completed in this area previously provide sufficient, appropriate and relevant information for the purposes of this application and no additional heritage, archaeological and palaeontological field assessments are recommended. The findings of the initial assessments have therefore been re-evaluated below to align with our current understanding of heritage significance and impacts. In light of the above, the relevant **recommendations included in the previous heritage assessments conducted remain valid**.

The impacts were addressed as follows for in the Heritage and Palaeontological comparative assessments.

**Cultural Landscape Heritage Resources impacted by the Loeriesfontein 3 PV Facility**

Before mitigation, the cultural value of the pristine Karoo Landscape is very high, however, the location of the proposed development away from significant roads and farm werfs is unlikely to impact this significance while after mitigation remains the same.

**Table 7.11: Cultural Landscape Heritage Resources impacted by the Loeriesfontein 3 PV Facility**

| Nature: The broader context of the area proposed for development has cultural significance that may be impacted by the proposed development | | |
|---|---|---|
| | Without mitigation | With mitigation |
| Extent | 5 regional | 5 regional |
| Duration | 4 long term | 4 long term |

| | | |
|---|---|---|
| Magnitude | 8 high | 8 high |
| Probability | 2 low | 2 low |
| **Significance** | **34 MEDIUM** | **24 MEDIUM** |
| Status (positive or negative) | Neutral | Neutral |
| Reversibility | low | low |
| Irreplaceable loss of resources? | Unlikely | Unlikely |
| Can impacts be mitigated? | N/A | N/A |
| Mitigation:<br>N/A | | |
| Residual Risks:<br><br>N/A | | |

**Impacts on Archaeological Heritage Resources impacted by the Loeriesfontein 3 PV Facility**

Some significant archaeological resources were identified within the broader area but **none within the specific development area**.

**Table 7.12: Impacts on Archaeological Heritage Resources impacted by the Loeriesfontein 3 PV Facility**

| Nature: The area proposed for development is known to conserve heritage resources of archaeological significance that may be impacted by the proposed development | | |
|---|---|---|
| | Without mitigation | With mitigation |
| Extent | 1 local | 1 local |
| Duration | 5 long term | 5 long term |
| Magnitude | 7 high | 7 high |
| Probability | 1 low | 1 low |
| **Significance** | **13 LOW** | **24 LOW** |
| Status (positive or negative) | Neutral | Neutral |
| Reversibility | low | low |
| Irreplaceable loss of resources? | Unlikely | Unlikely |
| Can impacts be mitigated? | Yes | |
| Mitigation:<br>N/A | | |
| Residual Risks:<br>Should any significant archaeological resources be impacted (however unlikely) residual impacts may occur, including a negative impact due to the loss of potentially scientific cultural resources | | |

**Impacts on Palaeontological Heritage Resources impacted by the Loeriesfontein 3 PV Facility**

**No highly significant palaeontological resources were identified within the development area**, however. the geology underlying the development area is very sensitive for impacts to significant fossils.

**Table 7.13: Impacts on Palaeontological Heritage Resources impacted by the Loeriesfontein 3 PV Facility**

| Nature: The area proposed for development is known to conserve heritage resources of palaeontological significance that may be impacted by the proposed development | | |
|---|---|---|
| | Without mitigation | With mitigation |
| Extent | 1 local | 1 local |
| Duration | 5 long term | 5 long term |

| | | |
|---|---|---|
| Magnitude | 8 high | 8 high |
| Probability | 5 high | 1 low |
| **Significance** | **70 HIGH** | **14 LOW** |
| Status (positive or negative) | Neutral | Neutral |
| Reversibility | low | low |
| Irreplaceable loss of resources? | Likely | Unlikely |
| Can impacts be mitigated? | Yes | |
| Mitigation:<br>The Chance Fossil Finds Procedure must be implemented for the duration of construction activities | | |
| Residual Risks:<br>Should any significant archaeological resources be impacted (however unlikely) residual impacts may occur, including a negative impact due to the loss of potentially scientific cultural resources | | |

## NEW PROPOSED MITIGATION MEASURES

It should be noted that although new impact ratings have been provided in this assessment, the **recommendations of the initial assessment remain valid, while the mitigation measures provided in the initial assessment are also still applicable**. There are thus **no new mitigation measures** which need to be included into the EA, should the validity period be extended. It is however reiterated that the Chance Fossil Finds Procedure must be included in the EMPr.

### Conclusion

Archaeological and palaeontological heritage resources reflect the environments of the deeper past and are unlikely to change significantly in as short a geological time span as 10 years. Some changes to heritage resources may result from processes of erosion and deflation but, in this particular ecological setting, this is unlikely to have an impact on the conclusions of the results of the previous heritage assessments completed. In this context, the findings of the assessments completed by Van Schalkwyk (2012), Fourie (2020), Almond (2011) and Butler (2020) **remain appropriate and applicable** for this development.

Furthermore, since the initial HIA completed by Van Schalkwyk (2012), additional work has been completed in the area as noted above and furthermore, a Heritage Management Plan was drafted for the Loeriesfontein WEF which has been approved by SAHRA. Throughout these processes, **no heritage resources of significance have been identified** as being impacted by the Loeriesfontein 3 PV SEF. The heritage impact assessments completed in this area previously provide sufficient, appropriate and relevant information for the purposes of this application and no additional heritage, archaeological and palaeontological field assessments are recommended. In light of the above, there is **no heritage objection** to granting the extension to the validity to develop the Loeriesfontein 3 PV SEF based on the current site conditions, on condition that the relevant recommendations included in the previous heritage assessments conducted are implemented, including that the attached Chance Fossil Finds Procedure is added to the EMPr.

### 7.4 Visual Impacts

The VIA undertaken by SiVEST in 2012 utilised a matrix that took into account a number of factors which was then applied to each receptor location. The matrix adopted was based on the factors as listed below:

- Distance of receptor away from the proposed development area (distance banding)
- Primary focus / orientation of the receptor
- Presence of screening factors (topography, vegetation etc.)

Based on the application of this matrix, it was determined that the impact of the Loeriesfontein 3 PV Facility (namely Alternative 1) would be as follows on the identified visual receptors:

**Table 7.14: Impact table summarising the significance ratings on identified sensitive visual receptors in close proximity to the proposed infrastructure in 2012 (SiVEST, 2012)**

| Receptor Location | Distance | Primary Focus | Screening | Total Score | Visual Impact Score Average | Visual Impact Rating |
|---|---|---|---|---|---|---|
| Main dwelling on Kareedoorn Pan Farm | 1 | 1 | 2 | 4 | **1.3** | **Low** |
| Old farmhouse on Kareedoorn Pan Farm | 1 | 4 | 4 | 9 | **3** | **Medium** |
| Dwelling on Sous Farm | **Beyond 5km from the development area therefore not considered to be a visual receptor if the PV plant were developed at field alternative 1.** | | | | | |

As indicated in the table above, it was determined that the proposed Loeriesfontein 3 PV Facility would only impact on two visual receptors, which are both located on the farm Kareedoorn Pan, for which the visual impact is likely to be offset by the fact that the farm owner had signed a lease agreement with the Applicant, indicating his willingness to lease his property to them should the project receive an EA and License. The farm owner would therefore benefit from the development, as he would receive revenue from this lease agreement. This is likely to offset the visual impact experienced by the landowner by reducing any negative sentiments that he may have towards the development. This low to medium visual impact rating is therefore not regarded as a realistic representation of the actual impacts likely to be experienced at the receptor location.

Impact ratings for the following were also undertaken as part of the 2012 assessment (SiVEST, 2012), and the significance rating determined as below:

**Table 7.15: Impact table summarising the significance ratings as determined in 2012 (SiVEST, 2012)**

| Significance Ratings Summary (2012) | | |
|---|---|---|
| | **Pre-mitigation impact rating** | **Post mitigation impact rating** |

| | | |
|---|---|---|
| **Day-time visual impacts of the PV plant during construction** | -20 (negative low) | -10 (negative low) |
| **Day-time visual impacts of the PV plant during operation** | -34 (negative medium impact) | -28 (negative low impact) |
| **Night-time visual impacts of the PV plant during construction** | -7 (negative low) | -6 (negative low) |
| **Night-time visual impacts of the PV plant during operation** | -28 (negative low) | -26 (negative low) |

The impact ratings as determined in 2012 were expected to be **contained from low to medium** for the proposed Loeriesfontein 3 PV Facility.

The impacts as assessed as part of the 2023 Visual Comparative Assessment (Nuleaf Planning and Environmental, 2023) were as follows. These were assessed with the new mitigation measures illustrated in the tables below.

### *POTENTIAL VISUAL IMPACT ON SENSITIVE VISUAL RECEPTORS IN CLOSE PROXIMITY TO THE FACILITY DURING THE OPERATIONAL PHASE*

The visual impact on sensitive visual receptors (i.e. users of secondary roads) in close proximity to the proposed infrastructure (i.e. within 1 km) is expected to be of **moderate** significance. Observers traveling along the secondary road will only be exposed to the visual intrusion for a short period of time. This reduces the probability of this impact occurring.

**No mitigation is possible within this environment and for a facility of this scale**. Of note is that the visual impact on the secondary road users was not initially assessed as part of the VIA undertaken by SiVEST in 2012. The table below illustrates this impact assessment.

**Table 7.16 Impact table summarising the significance of sensitive visual receptors in close proximity to the proposed infrastructure**

| Nature of Impact:<br>Visual impact on the users of secondary roads and residents of homesteads in close proximity to the proposed infrastructure. | | |
|---|---|---|
| | No mitigation | Mitigation considered |
| Extent | High (4) | N/A |
| Duration | Long term (4) | N/A |
| Magnitude | Very High (10) | N/A |
| Probability | Probable (3) | N/A |
| **Significance** | **Moderate (54)** | **N/A** |
| Status (positive or negative) | Negative | N/A |
| Reversibility | Recoverable (3) | N/A |
| Irreplaceable loss of resources? | No | N/A |
| Can impacts be mitigated? | No | |

### *POTENTIAL VISUAL IMPACT ON SENSITIVE VISUAL RECEPTORS WITHIN THE AREA DURING THE OPERATIONAL PHASE*

The visual impact on sensitive visual receptors (i.e. residents of homesteads and users of secondary roads) within the region (i.e. between 1 - 6km offset) is expected to be of **low** significance.

The original VIA (SiVEST, 2012) identified the homesteads located on Kareedoornpan (including the old farmhouse and the main residential dwelling) as the predominate sensitive receptors within this zone, however, based on the viewshed analysis undertaken it was determined that **no visual exposure is expected on the residents of these homesteads, thereby negating the potential of this visual impact occurring**. However, the residents of Bitterputs (located almost 6km away) are likely to be visually exposed to some extent to the proposed facility (as determined by the viewshed analysis) and therefore the visual impact significance for these sensitive receptors is determined below.

**No mitigation is possible within this environment and for a facility of this scale, but the very low occurrence of visual receptors within the area reduces the probability of this impact occurring**. The table below illustrates this impact assessment.

**Table 7.17: Impact table summarising the significance of visual impacts on sensitive visual receptors within the region**

| Nature of Impact:<br>Visual impact on the users of secondary roads and residents of homesteads on the periphery of the 1km offset and within the region beyond | | |
|---|---|---|
| | No mitigation | Mitigation considered |
| Extent | Low (2) | N/A |
| Duration | Long (4) | N/A |
| Magnitude | Moderate (6) | N/A |
| Probability | Improbable (2) | N/A |
| **Significance** | **Low (24)** | **N/A** |
| Status (positive or negative) | Negative | N/A |
| Reversibility | Recoverable (3) | N/A |
| Irreplaceable loss of resources? | No | N/A |
| Can impacts be mitigated? | Yes | |

### *POTENTIAL VISUAL IMPACT OF CONSTRUCTION ON SENSITIVE VISUAL RECEPTORS IN CLOSE PROXIMITY TO THE PROPOSED FACILITY*

During the construction period, there will be an increase in heavy vehicles utilising the roads to the construction sites that may cause, at the very least, a visual nuisance to other road users and landowners in the area in close proximity.

Within the region, dust as a result of construction activities may be visible, especially in this receiving environment, and as such will result in visual impact during construction. This impact is likely to be of **moderate** significance pre mitigation and **low** significance post mitigation.

Mitigation entails proper planning, management and rehabilitation of all construction sites to forego visual impacts.

**The low occurrence of visual receptors reduces the probability of this impact occurring**. The table below illustrates the assessment of this anticipated impact.

**Table 7.18: Impact table summarising the significance of the visual impacts of associated infrastructure on sensitive visual receptors in close proximity**

| Nature of Impact: Visual impact of construction on sensitive visual receptors in close proximity to the proposed facility | | |
|---|---|---|
| | No mitigation | Mitigation considered |
| Extent | High (4) | High (4) |
| Duration | Short term (1) | Short term (1) |
| Magnitude | Very High (10) | Low (4) |
| Probability | Probable (3) | Improbable (2) |
| **Significance** | **Moderate (45)** | **Low (18)** |
| Status (positive or negative) | Negative | Negative |
| Reversibility | Recoverable (3) | Recoverable (3) |
| Irreplaceable loss of resources? | No | No |
| Can impacts be mitigated? | Yes | |

***POTENTIAL VISUAL IMPACT OF OPERATIONAL LIGHTING AT NIGHT ON SENSITIVE VISUAL RECEPTORS DURING CONSTRUCTION AND THE OPERATIONAL PHASE***

The receiving environment has a relatively small number of populated places, and it can be expected that any light trespass and glare from the security and after-hours operational lighting for the facility will have some significance. In addition, the remote sense of place and rural ambiance of the local area increases its sensitivity to such lighting intrusions.

The potential lighting impact is known as sky glow. Sky glow is the condition where the night sky is illuminated when light reflects off particles in the atmosphere such as moisture, dust or smog. The sky glow intensifies with the increase in the number of light sources. Each new light source, especially upwardly directed lighting, contributes to the increase in sky glow. The general lighting of the facility may contribute to the effect of sky glow in an otherwise dark environment.

The visual impacts as a result of lighting at night on sensitive visual receptors in the region is likely to be of **moderate** significance and may be mitigated to **low,** for both the construction and the operational phase. Best practice guidelines for general site lighting that may occur on the site has been taken into consideration. The tables below illustrate this impact assessment (during both construction and operation).

**Table 7.19: Impact table summarising the significance of visual impact of operational lightening at night on visual receptors within the region during construction.**

| Nature of Impact: Visual impact of lighting at night on sensitive visual receptors in close proximity to the proposed facility | | |
|---|---|---|
| | No mitigation | Mitigation considered |
| Extent | High (4) | High (4) |
| Duration | Short term (1) | Short term (1) |
| Magnitude | High (8) | Low (4) |

| | | |
|---|---|---|
| Probability | Probable (3) | Improbable (2) |
| **Significance** | **Moderate (39)** | **Low (18)** |
| Status (positive or negative) | Negative | Negative |
| Reversibility | Recoverable (3) | Recoverable (3) |
| Irreplaceable loss of resources? | No | No |
| Can impacts be mitigated? | Yes | |

**Table 7.20: Impact table summarising the significance of visual impact of operational lightening at night on visual receptors within the region during the operational phase**

| *Nature of Impact:* Visual impact of lighting at night on sensitive visual receptors in close proximity to the proposed facility | | |
|---|---|---|
| | *No mitigation* | *Mitigation considered* |
| Extent | High (4) | High (4) |
| Duration | Long term (4) | Long term (4) |
| Magnitude | High (8) | Low (4) |
| Probability | Probable (3) | Improbable (2) |
| **Significance** | **Moderate (48)** | **Low (24)** |
| Status (positive or negative) | Negative | Negative |
| Reversibility | Recoverable (3) | Recoverable (3) |
| Irreplaceable loss of resources? | No | No |
| Can impacts be mitigated? | Yes | |

**NEW PROPOSED MITIGATION MEASURES**

It is recommended that the following best practice mitigation measure also be included (over and above those already provided as part of the 2012 VIA conducted by SiVEST):

- Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint.
- Wherever possible, use materials, coatings, or paints that have little or no reflectivity.
- Commercial messages, symbols and/logos are not permitted on structures.
- Use slight variations in topography to screen PV panels, where possible. Design linear features to follow natural land contours rather than straight lines.
- Plan ancillary infrastructure in such a way and in such a location that clearing of vegetation is minimised. Consolidate existing infrastructure as much as possible and make use of already disturbed areas rather than pristine sites wherever possible.
- Use existing roads wherever possible. Where new roads are required, these should be planned carefully, taking due cognisance of the local topography. All efforts should be employed to try and align roads along the landscape contours wherever possible. Construction of roads should be undertaken properly, with adequate drainage structures in place to forego potential erosion problems.
- Some mitigation of primary and secondary impacts may be achieved by ensuring that the preservation and/or re-introduction of carefully placed vegetation be allowed for in the planning and implementation of the development. This measure will help to

soften the appearance of the facility within its context and assist in breaking up the visual intrusion. Such mitigation includes the following:

- If possible, keep the construction period to a minimum.
- Plan the placement of lay-down areas and any potential temporary construction camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.
- Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
- Ensure that rubble, litter, and disused construction materials are appropriately stored and then disposed regularly at licensed waste facilities.
- Rehabilitate all disturbed areas, construction areas, roads, slopes etc. immediately after the completion of construction works. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.
- Access roads, which are not required post-construction, should be ripped and rehabilitated.
- Monitor all rehabilitated areas for at least a year for rehabilitation failure and implement remedial action as required. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.

- Mitigation of other lighting impacts includes the pro-active design, planning and specification lighting for the facility. The correct specification and placement of lighting and light fixtures will go far to contain rather than spread the light. Additional measures include the following:
  - Shielding the sources of light by physical barriers (walls, vegetation, or the structure itself);
  - Limiting mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights;
  - Making use of minimum lumen or wattage in fixtures;
  - Making use of down-lighters, or shielded fixtures;
  - Making use of Low-Pressure Sodium lighting or other types of low impact lighting.
  - Making use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.
- During Operations, monitor the general appearance of the facility, as well as, all rehabilitated areas.
  - The maintenance of the buildings and ancillary structures and infrastructure will ensure that the facility does not degrade, thus aggravating visual impact. Implement remedial action where required.
  - Roads must be maintained to forego erosion and to suppress dust, and rehabilitated areas must be monitored for rehabilitation failure. Remedial actions must be implemented as a when required.
- After decommissioning, all infrastructure should be removed and all disturbed areas appropriately rehabilitated. Monitor rehabilitated areas post-decommissioning and implement remedial actions and consult an ecologist regarding rehabilitation specifications if necessary.

The possible mitigation of both primary and secondary visual impacts as listed above should be implemented and maintained on an on-going basis.

**Conclusion**

The impact ratings as determined in 2012 were expected to be **contained from low to medium** for the proposed Loeriesfontein 3 PV Facility. In comparison, it is expected that the **impact ratings will also be medium to low** considering the present-day land uses and expected visual exposure. Therefore, **no increase in the visual impact is anticipated**. Based on the above assessment, there has been **no changes in the land cover and minimal changes in land uses**. Additionally, the **impacts as assessed today will be moderate**. Therefore, it is recommended that the proposed Part 1 Amendment extending the validity of the EA for the Loeriesfontein 3 PV SEF be supported, subject to the conditions and recommendations as stipulated in the current EA, and according to the EMPr as well as the suggested mitigation measures, as provided in this and the original Visual Impact Assessment (VIA) report compiled by SiVEST in 2012.

### 7.5 Impacts on Soil and Agricultural potential

The original assessment undertaken as part of the EIA process in 2012 (SiVEST, 2012) identified impacts for the proposed project, and stated as follows:

The impact assessment found in the Barichievy report (2012) only included impacts associated with **contamination of local soils and land use resources** and **briefly mentioned the risk of soil erosion** due to the arid climate of the development area.

Mitigation measures included in the Barichievy report (2012) included;

- Clearing activities should be kept to a minimum (Road and PV site footprint).
- In the unlikely event that heavy rains are expected activities should be put on hold to reduce the risk of erosion.
- If additional earthworks are required, any steep or large embankments that are expected to be exposed during the 'rainy' months should either be armoured with fascine like structures.

The current report (2023) included the following environmental impacts as discussed later in this report:

- Land use change from livestock grazing to PV facility.
- Soil erosion.
- Soil pollution.
- Soil compaction.

The environmental impact assessment for the soil pollution and contamination of local soils and land use resources did not differ.

**Conclusion**

Following the data analysis and results of the impact assessment above (including cumulative impact assessment), the previously authorised Loeriesfontein 3 PV SEF is still considered an acceptable development in the project area, even with the requested amendments. The original 2012 environmental impact and mitigation measures are still considered applicable, but attention should be given to the current reports (2023) environmental impact and mitigation measures as additional environmental impact and mitigation measures are described as cumulative impacts discussed later in this report. It is the specialists professional opinion that the request for the extension of the validity period of the EA be **considered favorably**, permitting that the mitigation measures of the initial assessment still be

implemented. **No additional mitigation measures are recommended**, over and above those already provided as part of the original assessment (Barichievy, 2012).

### 7.5 Impacts on Social- Economic Aspects

The **construction phase** impacts identified in the 2012 Report (MasterQ Research, 2012) are listed below. The significance ratings are summarized in table below:

- The creation of local jobs and income during construction.
- Conflict between workers and landowners and local residents.
- Health risks associated with workers spreading Sexually Transmitted infections including HIV.

**Table 7.21: Summary of construction phase impacts**

| Impact | Significance without Enhancement/Mitigation | Significance with Enhancement/Mitigation |
|---|---|---|
| ➢ Employment and output creation | ➢ Low (+) | ➢ Medium (+) |
| ➢ Social Mobilisation | ➢ Low (-) | ➢ Low (-) |
| ➢ Health and Safety | ➢ High (-) | ➢ Low (-) |

The **operational phase** impacts identified in the 2012 Report are listed below. The significance ratings are summarized in table 7.22 below:

- Employment and output creation. The creation of local jobs and income during the operation of the PV plant
- Tax income. Increase in central and local tax income during operations.
- Corporate Social Investment. 1.5% of expected revenue of RR1bn will be retained for development in the form of an enterprise development fund (0.4%) and socio-economic development fund (1.1%). An additional 5% of profits (est. at R46m per annum) is expected to be paid out as a community dividend as part of a community development fund.
- Agricultural output. Displacing existing agricultural production
- Tourism. Diverting/Attracting tourism from or to area
- Property prices. Change in property prices adjacent to the new development (positive or negative)
- Sense of place. The presence of wind farm and associated infrastructure such as the substation and the transmission power lines would change the landscape of the area from open spaces to 'spoilt' which could affect the way in which people related to the land and the sense of connectedness they have with the area, in short, their sense of place.

**Table 7.22: Summary of operational phase impacts**

| Impact | Significance without Enhancement/Mitigation | Significance with Enhancement/Mitigation |
|---|---|---|
| ➢ Employment and output creation | ➢ Medium (+) | ➢ Medium (+) |
| ➢ Tax income | ➢ Low (+) | ➢ Low (+) |
| ➢ Corporate Social Investment | ➢ Low (+) | ➢ Medium (+) |
| ➢ Agricultural output | ➢ Low (-) | ➢ Low (-) |

| | | |
|---|---|---|
| ➢ Tourism | ➢ Low (-) | ➢ Low (-) |
| ➢ Property prices | ➢ Low (-) | ➢ Low (-) |
| ➢ Sense of place | ➢ Low (-) | ➢ Low (-) |

**Findings of the Socio- Economic Assessment (2023)**

Based on the authors experience, the significance ratings contained in the Socio-Economic Assessment (MasterQ Research, 2012) **remain valid**. The **mitigation measures listed are also regarded as appropriate**. However, several potential social issues associated with the construction phase were not assessed. These are outlined below:

- Safety and security risks to local farmers and farming operations.
- Influx of job seekers.
- Nuisance impacts such as noise, dust and safety impacts associated with construction related activities and vehicles.
- Potential risk of grass fires.

The author has undertaken in the region of 140 SIAs for renewable energy projects, including renewable energy projects located in the study area. Based on the findings of these SIAs, the significance of all the potential negative impacts with mitigation is likely to be **Low Negative**. The negative impacts can therefore be effectively mitigated. Table 7.23 below provides a summary of the potential significance ratings for the additional social impacts associated with the construction phase of the Loeriesfontein 3 PV SEF .

**Table 7.23: Additional social impacts during construction phase**

| Impact | Significance without Mitigation/Enhancement | Significance with Mitigation/Enhancement |
|---|---|---|
| Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers | Medium (Negative) | Low (Negative) |
| Influx of job seekers | Low (Negative) | Low (Negative) |
| Nuisance impacts such as noise, dust and safety impacts associated with construction related activities and vehicles | Medium (Negative) | Low (Negative) |
| Increased risk of grass fires | Medium (Negative) | Low (Negative) |

**NEW PROPOSED MITIGATION MEASURES**

The following **mitigation measures** for the construction phase should be included in the EMPr (over and above those already recommended as part of the original assessment undertaken in 2012).

- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- The SEP and CHSSP should include a Grievance Mechanism that enables stakeholders to report resolve incidents.

- The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc., during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.
- Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas.
- Smoking on site should be confined to designated areas.
- Contractor to ensure that construction related activities that pose a potential fire risk, such as welding, are effectively managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high-risk dry, windy winter months.
- Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle.
- Contractor to provide fire-fighting training to selected construction staff.
- In the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities.

The socio-economic issues associated with the **operational phase** identified in the original Socio-Economic Assessment (MasterQ Research, 2012) as listed in table 7.22 above were:

- Employment and output creation.
- Tax income.
- Corporate Social Investment.
- Agricultural output.
- Tourism.
- Property prices.
- Sense of place.

Based on the authors experience, these accurately reflect the issues associated with PV SEFs. The **significance ratings as listed remain valid** for the Loeriesfontein 3 PV SEF. The **mitigation measures listed are also regarded as appropriate**. The significance of all the potential negative impacts with mitigation is likely to be **Low Negative**. The negative impacts can therefore be effectively mitigated.

**Conclusion**

The socio-economic baseline conditions in Loeriesfontein and the Hantam Local Municipality (HLM) have changed since 2012, when the Socio-Economic Assessment and EIA were undertaken. These changes include increase in population, changes in economic activities, specifically the impact on COVID-19 on the local economy (2019-2020/22). These changes do not however have a material bearing on the findings of the Socio-Economic Assessment undertaken in 2012.

### 7.6. Aquatic Impacts

**Table 7.24: Impact summary table comparing authorised infrastructure against the previous assessments and the overall findings of the site visit conducted in 2023, measured against the authorised project layouts**

| Issue & Impact | Authorised layout impact rating with mitigation | Additional works impact rating with mitigation | Comment |
|---|---|---|---|
| Site clearing, with removal of vegetation and soil disturbance | LOW | LOW | No additional impacts are anticipated but as recommended in the authorised project, a preconstruction walkdown must be conducted. |
| Upgrading existing roads | LOW | LOW | All the important aquatic zones can be avoided. |
| Loss of riparian systems and water courses | LOW | LOW | All the important aquatic zones can be avoided or contain high levels of alien tree cover. |
| Impact on aquatic systems through the possible increase in surface water runoff on downstream sedimentation and erosion | LOW | LOW | No additional impacts are anticipated, although the development of stormwater management features is reiterated. Similarly, this would then not impact on the overall water resource within the site, as none of the new structures must impede or divert water from the catchments |
| Potential impact on localised surface water quality | LOW | LOW | No impacts and or additional mitigation, when compared to the EIA, are required. |
| Cumulative impacts such as loss of ecosystem services | LOW | LOW | Through avoidance of any high value aquatic systems and the general improvement of existing crossings, a positive cumulative impact could occur if river/wetland rehabilitation occurs, which for the most parts include alien vegetation management and was included |

| | | | |
|---|---|---|---|
| | | | in the original proposed mitigation for the project. |
| No-Go option | LOW | LOW | Loss of natural systems within the region is on-going as reported in the original assessment. |

**Conclusion**

In conclusion, the final impact of the proposed additional works on the aquatic environment with avoidance of aquatic features, suitable stormwater management and or crossing designs, **will remain unchanged from the original impact assessments if all the proposed mitigations are upheld.** Thus, based on the findings of aquatic comparative assessment, there is **no objection from an aquatic impact perspective** to the extension of the validity period, if all mitigations proposed in the reports submitted are carried out.

### 7.7. Bat Impacts

Animalia Consultants (Pty) Ltd undertook the bat impact assessment as part of the original Environmental impact Assessment (EIA) process in 2012 (SiVEST, 2012), and the 12-month pre-construction monitoring for the 100 MW Loeriesfontein 3 Photovoltaic (PV) Solar Energy Facility (SEF), 33/132kV Independent power Producer (IPP) Portion of the Shared On-site Substation (including the Transformer) and associated infrastructure, near Loeriesfontein in the Hantam Local Municipality, Northern Cape Province (DFFE Reference Number: 12/12/20/2321/2/1), and was subsequently completed in 2012.

Although the original assessment (2012) considered the wind energy facility, PV SEF and associated grid connection infrastructure and that this theme was not identified by the DFFE Screening Tool, the specialist was asked to provide an opinion on the proposed amendment for the extension of validity to the EA for the PV and IPP portion of the shared on-site substation. The specialist concluded that due to the relatively **low impacts** of PV facilities on bats, and the **low levels of change in the receiving PV environment**, the specialist had **no objection** to the proposed amendment of extending the EA validity for a further 5 years.

## SECTION 8 – CUMULATIVE IMPACTS AND MITIGATION MEASURES IDENTIFIED WITHIN THE ORIGINAL EIA REPORT (SiVEST, 2012)

### 8.1 Cumulative Impacts

**Table 8.1: Cumulative Impacts**

| Environmental Parameter | Cumulative Impact |
|---|---|
| Biodiversity Impact Assessment | • Construction<br>Due to the negligible amount of infrastructure present within the study area, cumulative impacts are anticipated to be low during construction.<br>• Operation<br>The infrastructure to be added is very small in comparison to that already present. Some solar infrastructure is planned for the adjacent farm however this will not isolate the site and movement of fauna and flora will still be possible.<br>• Decommissioning<br>Decommissioning of the plant will result in the elimination of the cumulative impacts mentioned above. |
| Surface Water Impact Assessment | Cumulative impacts may occur. These are assessed from a site specific point of view and a larger regional perspective.<br><br>At a site specific scale, where several impacts occur concurrently and where no mitigation measures are applied as stipulated in this report. In particular, during the construction and decommissioning phases, construction related activities in conjunction with storm water impacts can significantly negatively affect watercourses by degrading the condition of the watercourses. Additionally, the cumulative effect of these impacts can physically compromise the integrity of the hydrological system both in situ and downstream off-site. It is therefore critical that the stipulated mitigation measures are applied at the appropriate phases of the proposed development.<br><br>From a regional perspective, the impact of a number of PV plants in the local area on a number of properties can negatively impact on surface water resources where construction activities are allowed in surface water resources. Ideally, this should be discouraged and prevented where possible to limit impact from a regional perspective in terms of the type of development (renewable energy development impacts). |
| Visual Assessment | Several renewable energy facilities are proposed within relatively close proximity to the proposed PV plant. EIAs need to be undertaken for these proposed projects and a number of them are already at advanced stages, or have received an environmental authorisation.<br><br>The renewable energy developments that are being proposed in the surrounding area, are indicated in the table below.<br><br>Large-Scale renewable energy developments proposed in close proximity to the PV plant |

| Proposed Development | Current Status of EIA | Proponent | Proposed Capacity | Approximate Location |
|---|---|---|---|---|
| CPV/PV Plant on the Farm Kaalspruit | Environmental Authorisation Issued by DEA | Mainstream Renewable Power | 50MW | Approximately 12km north of Loeriesfontein |
| Hantam PV Solar Energy Facility | Draft Environmental Impact Report (comment period ended 17 Feb 2012) | Solar Capital (Pty) Ltd | Up to 525MW | Approximately 47km north of Loeriesfontein (just east of Helios Substation). |
| PV Plant on Klein Rooiberg Farm | Draft Scoping Report – comment period | Orlight SA (Pty) Ltd | Up to 150MW | Approximately 41km north of Loeriesfontein (10km south of Helios Substation). |

These pending renewable energy developments and their potential for large scale visual impacts could significantly alter the sense of place and visual character in the study area, if constructed. The cumulative visual impact experienced by each visual receptor will depend on the number of proposed developments within a 10km radius from the receptor location, as beyond 10km the visual impact of the development would diminish to an insignificant level. The number of proposed developments that each receptor would be visually exposed to (i.e. the cumulative impact experienced at each site) is indicated in table below. It should be noted that the impact on each receptor location is indicative of the 'worst case' scenario which assumes that all of the proposed facilities would be developed.

Cumulative visual impact on potentially sensitive receptors will include the following:

| Visual Receptors | Proposed Wind Farm | CPV/PV Plant on the Farm Kaalspruit | Hantam PV Solar Energy Facility | PV Plant on Klein Rooiberg Farm |
|---|---|---|---|---|
| Dwelling on Bitterputs Farm | ▪ | | | |
| Main dwelling on Kareedoorn Pan Farm | ▪ | | ▪ | |
| Old farmhouse on | ▪ | | ▪ | |

<table>
<tr><td></td><td>
<table>
<tr><td>Kareedoorn Pan Farm</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Dwelling on Sous Farm</td><td>▪</td><td></td><td>▪</td><td></td></tr>
<tr><td>Dwelling on Narosies Farm</td><td>▪</td><td></td><td>▪</td><td>▪</td></tr>
<tr><td>Dwellings in Klein Rooiberg</td><td>▪</td><td></td><td>▪</td><td>▪</td></tr>
</table>
<br>As indicated in the table above, the greatest cumulative impact will be experienced by the dwelling on Narosies Farm and the dwellings in Klein Rooiberg, as they would be visually exposed to the Hantam PV Solar Energy Facility and the PV Plant on Klein Rooiberg Farm. None of the receptors will be visually exposed to the CPV/PV Plant on the Farm Kaalspruit as this proposed development is too far away.</td></tr>
<tr><td>Social Assessment</td><td>
<ul>
<li>Construction Phase
<ul>
<li>The perception or expectation (even it if is unrealistic on the part of locals) that the project will offer employment often results in locals informing family and friends from elsewhere that there are jobs available in the area, which in turn then leads to the in-migration of jobseekers. This can make it difficult to distinguish between a permanent resident and an opportunistic jobseeker, which in turn can complicate a fair job allocation system should unskilled labour be required – even more so where there is very little demand, but an oversupply of labour.</li>
<li>If a simultaneous in-migration of unemployed jobseekers occurs, this can intensify the temporary increase in need for housing. Some of the jobseekers might find shelter with friends or family while others are left destitute. This can then lead to the creation and/or expansion of informal settlements, which in turn can place additional strain on already limited resources (municipal services, available land, job opportunities, etc.). The expansion of informal settlement puts the local municipality under pressure as it increases the housing backlog with more and more people requiring formal housing and municipal services on par with RDP standards.</li>
<li>If a HIV/AIDS prevention plan is implemented effectively within the local communities on a level that they understand, and if the necessary resources are easily available and accessible to the community (e.g. condoms, information posters, VCT centres, support groups) for the duration of the construction phase, this would leave an informed and empowered community behind who would be able to continue to prevent HIV infections by informing and empowering others.</li>
</ul>
</li>
<li>Operations and Maintenance Phase
<ul>
<li>The presence of the PV plant, and associated infrastructure (substation and transmission line) can set an unintended precedent for further land use change. For example: If additional power lines are required in future, it is oftentimes preferred to place such lines next to existing lines as the area is already regarded as disturbed.</li>
</ul>
</li>
</ul>
</td></tr>
</table>

| | |
|---|---|
| | ○ The cumulative impact of corporate social investments through Mainstream's proposed trust can be high. Economic empowerment (through funds and land), improved healthcare, business growth, skills development, and higher education are massive for the local people. These would increase earning potentials, improve livelihoods, increase lifespans, benefit quality of life variables, hasten local people out of poverty (where applicable), and assist future generations and relatives of those who benefit directly. |

## SECTION 9 – POTENTIAL FOR CHANGE IN THE SIGNIFICANCE OF THE CUMULATIVE IMPACTS AS ASSESSED IN THE ORIGINAL EIA PROCESS (SiVEST, 2012) AS A RESULT OF THE REQUESTED AMENDMENT (2023)

The impacts of projects are often assessed by comparing the post-project situation to a pre-existing baseline. Where projects can be considered in isolation, this provides a good method of assessing a project's impact. However, in areas where baselines have already been affected, or where future development will continue to add to the impacts in an area or region, it is appropriate to consider the cumulative effects of development. This is similar to the concept of shifting baselines, which describes how the environmental baseline at a point in time may represent a significant change from the original state of the system.

Specialist were provided with a Terms of Reference and Impact Assessment methodology as per Section 5 of this report and consideration was given to the assessing the cumulative of the development in isolation versus the cumulative impact of the development with regards to existing infrastructure , approved development (future development) and proposed development applications currently underway within a 30km radius of the proposed development site. Each specialist has included process flow within the various specialist reports to Indicate how the recommendations and mitigation measures have been formulated.

### 9.1 Cumulative impacts on Ecology

Presently, the surrounding immediate and broader landscape consists of natural vegetation used for supporting livestock. The remnants layer was released as part of the NBA (Skowno et al, 2019) and provides the present spatial extent of vegetation. The South African Renewable Energy EIA Application Database (Q3, 2022) contains spatial data for renewable energy applications for EA. It includes spatial and attribute information for both active (in process and with valid authorisations) and non-active (lapsed or replaced by amendments) applications. Data is captured and managed on a parcels level as well as aggregated to the project level at the boundary level.

Assuming the entire Project area (448), except for the High SEI area and its associated buffer (34.67 Ha), will be developed, the following is calculated:

The total area within the 30 km buffer around the PV development area amounts to 303674.50 Ha, but when considering the transformation (1255.10 ha) that has taken place within this radius, 302.419.40 ha of intact habitat remains according to the 2018 National Biodiversity Assessment. Therefore, the area within 30 km of the project has experienced approximately 0.41% loss in natural habitat. Considering this context, the PV development footprint for is 413.33 Ha similar project exists in the 30 km region measuring a maximum of 84438.71 Ha, which the Project area is already part of (as per the latest South African Q3 2022 Renewable Energy EIA Application Database), which means that the total amount of remaining habitat lost as a result of the solar project amounts to 27.92% (PV developments as a percentage of the total remaining habitat).

**Table 9.1: Habitat affected percentage**

| | Total Habitat (Ha) | Total Loss (Ha) | Tot. Remaining Habitat (Ha) (Remnants) | Total Historical Loss | PV Development Similar Projects | Tot. Remaining Habitat (Ha) | Cumulative Habitat Lost |
|---|---|---|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Approximate Solar development cumulative effects (Spatial)** | 303674.50 | 1255.10 | 302419.40 | 0.41% | 84438.71 | 217980.69 | 27.92% |

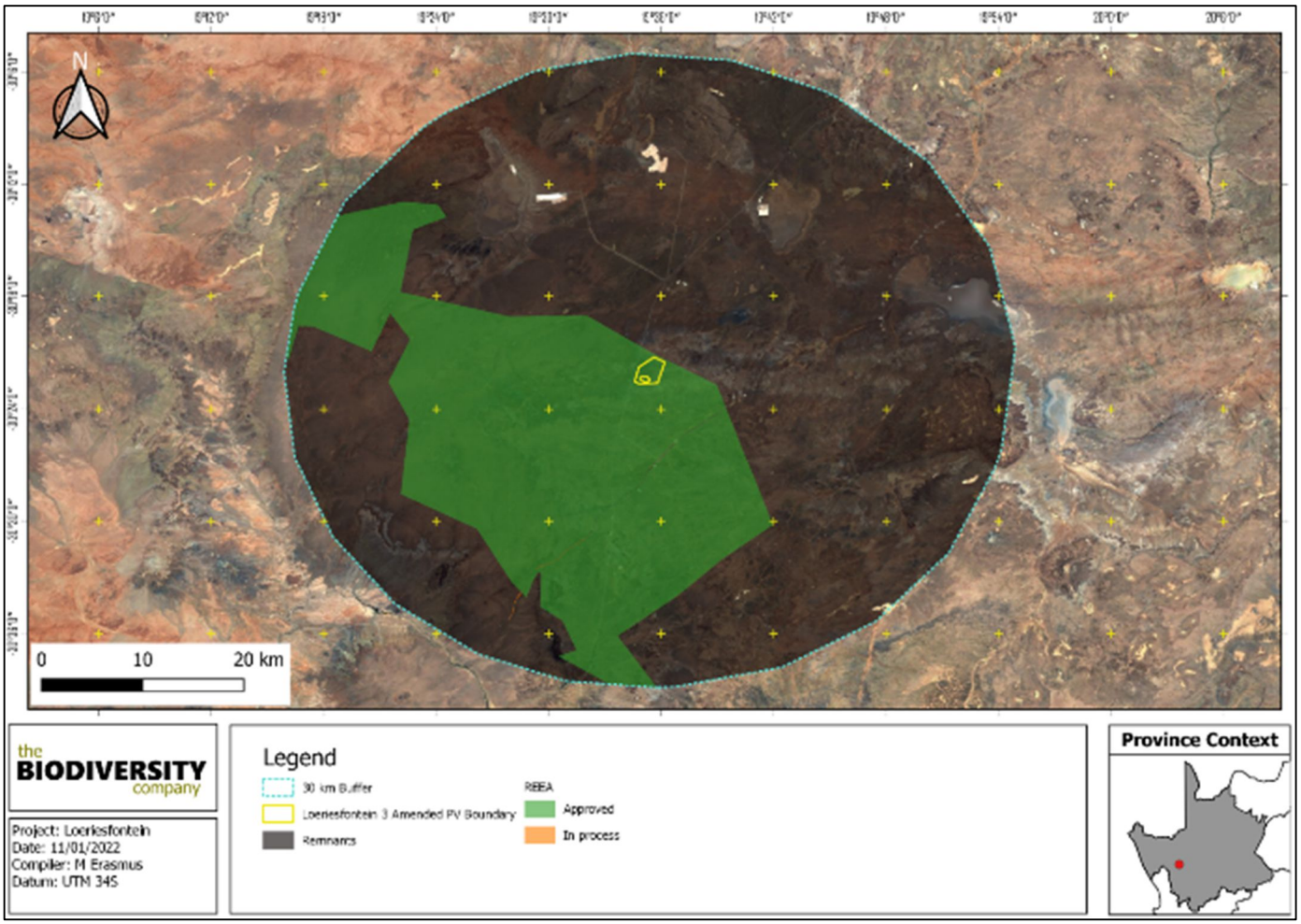



Figure 57: Map illustrating additional renewable energy developments 30km area.

**Table 9.2 Cumulative habitat loss within the region**

| *Nature: Cumulative habitat loss within the region* | | |
|---|---|---|
| The development of the proposed infrastructure will contribute to cumulative habitat loss within ESAs and thereby impact the ecological processes in the region. | | |
| | Overall impact of the proposed project considered in isolation | Cumulative impact of the project and other projects in the area |
| Extent | Low (2) | High (4) |
| Duration | Long term (4) | Long term (4) |
| Magnitude | Low (4) | Moderate (6) |
| Probability | Improbable (2) | Highly probable (4) |
| **Significance** | **Low** | **Medium** |
| Status (positive or negative) | Negative | Negative |
| Reversibility | Moderate | Moderate |

| | | |
|---|---|---|
| Irreplaceable loss of resources? | No | No |
| Can impacts be mitigated? | Yes | |
| Mitigation:<br>• Minimise vegetation clearing to the minimum required.<br>• Ensure that a rehabilitation plan and IAP management plan be compiled for each development and are effectively implemented. | | |
| Residual Impacts:<br>The loss of currently intact vegetation is an unavoidable consequence of the project and cannot be entirely mitigated. The residual impact would however be low. | | |

**CONCLUSION**

Considering the severe extent of approved and in-process developments within the area (Figure 56), the expected cumulative impact of PV development as a whole is expected to be of a 'Moderate-High' significance, however, the contribution of the Project area itself (413.33 Ha) is calculated at 0.49% of the total (84438.71 ha) 27.92%. The cumulative impacts contribution of the proposed project results in a '**Low Significance**'. It can be concluded that the proposed development **will not result in any unacceptable loss** considering all the projects proposed in the area, especially when considering the proposed project occurs within an area already "approved".

## 9.2 Cumulative impacts on Avifauna

There are currently twelve (12) renewable energy projects authorised, operational or in process within a 30 km radius around the proposed Loeriesfontein 3 PV SEF (Figure 57). The projects were identified using the latest (Q3 2022) Renewable Energy EIA Application Database for SA from the DFFE and publicly available documents on the internet.

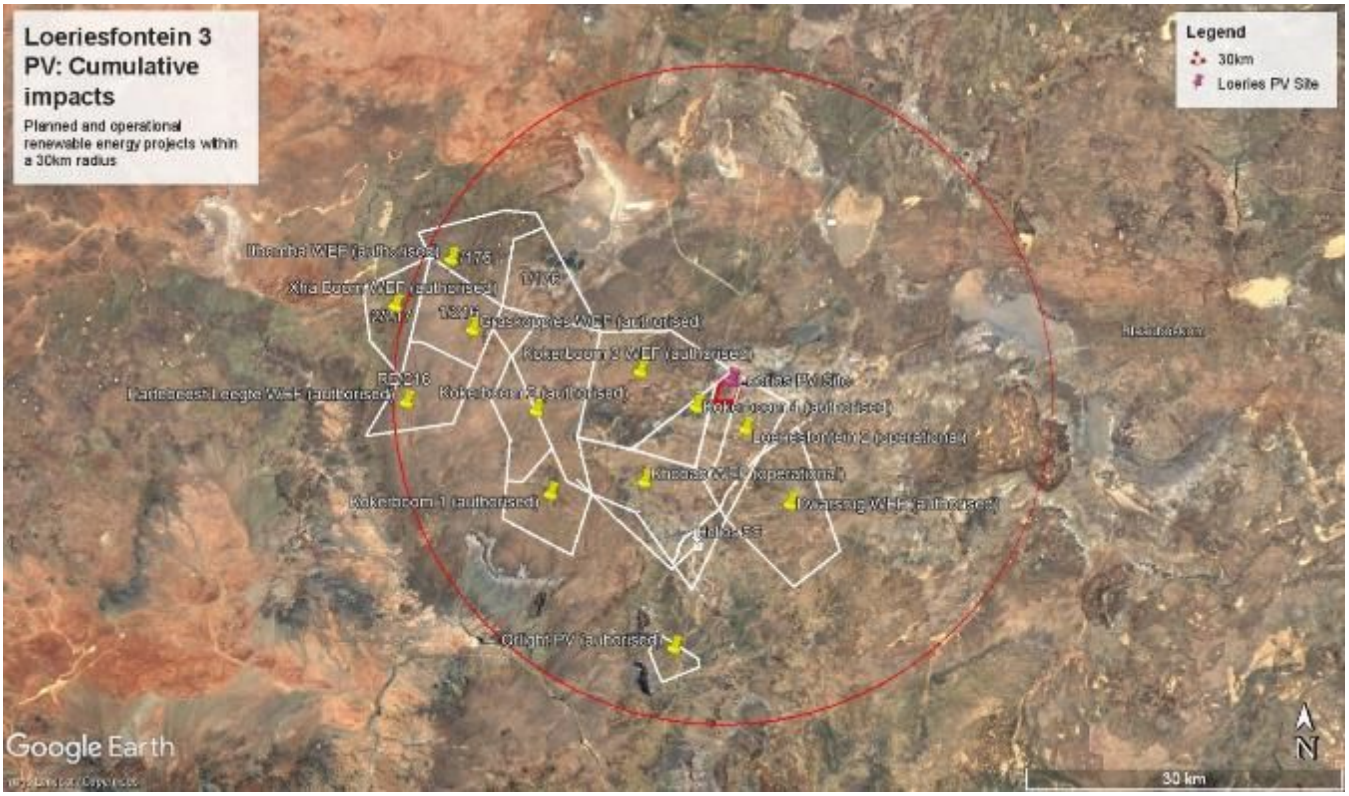



Figure 58: The planned renewable energy project land parcels within a 30km radius around the proposed Loeriesfontein 3 PV project.

The total affected land parcel area taken up by authorised and operational renewable energy projects within the 30 km radius, including the Loeriesfontein 3 PV SEF Project, is approximately 788 km². The total affected land parcel area affected by the Loeriesfontein 3 PV SEF Project equates to approximately 4.8km², and the solar array footprint only 1.76m². The proposed Loeriesfontein 3 PV SEF Project land parcel area thus constitute approximately 0.6% of the total areas taken up by the authorised and planned renewable energy projects, and the actual footprint approximately 0.2%. The cumulative impact of the proposed Loeriesfontein 3 PV SEF Project is thus anticipated to be **low.**

**Table 9.3 below summarises the post-mitigation cumulative impacts associated with the proposed development**

| | | |
|---|---|---|
| ***Nature:*** *Cumulative impacts associated with renewable energy facilities*<br>• *Displacement due to disturbance associated with the construction of the renewable energy facility and associated infrastructure*<br>• *Displacement due to habitat transformation associated with the construction and operation of the renewable energy facility and associated infrastructure*<br>• *Collisions with the solar panels*<br>• *Collison with wind turbines*<br>• *Entrapment in perimeter fences*<br>• *Displacement due to disturbance associated with the decommissioning of the renewable energy facilities and associated infrastructure*<br>• *Mortality of priority species due to electrocution on the medium voltage internal reticulation networks*<br>• *Mortality of priority species due to collisions with the medium voltage internal reticulation networks* | | |
| | **Cumulative impact of the proposed Pixley Park Renewable Energy Project within a 30km radius (post mitigation).** | **Cumulative impact of other renewable energy projects within a 30km radius (post mitigation)** |
| ***Extent*** | 3 regional | 3 regional |

| | | |
|---|---|---|
| ***Duration*** | 4 long term | 4 long term |
| ***Magnitude*** | 2 minor | 6 moderate |
| ***Probability*** | 3 probable | 3 probable |
| ***Significance*** | **27 LOW** | **39 MEDIUM** |
| ***Status (positive/negative)*** | Negative | Negative |
| ***Reversibility*** | High | High |
| ***Loss of resources?*** | No | Yes |
| ***Can impacts be mitigated?*** | Yes | |
| ***Confidence in findings:*** Medium. | | |
| ***Mitigation:***<br>All mitigation measures listed in this report for the Loeriesfontein 3 PV Renewable Energy Project and all mitigation measures relevant to avifauna listed in the various specialist reports for the other planned projects within a 30km radius of the Pixley Park Renewable Energy Project should be followed. | | |

**CONCLUSION**

The total area within the 30km radius around the proposed Loeriesfontein 3 PV SEF Project equates to about 2 827km² of similar habitat. The total combined size of the land parcels potentially affected by renewable energy projects will equate to approximately 34% of the available habitat in the 30km radius. Assuming that all the projects are actually constructed, the cumulative impact of all the proposed renewable energy projects is estimated to be high. However, the actual physical footprint of the renewable energy facilities will be much smaller than the land parcel areas themselves. Furthermore, several of these projects must still be subject to a competitive bidding process, where only the most competitive projects will win a power purchase agreement required for the project to proceed to construction. If all mitigation measures listed in the specialist reports are strictly implemented, the **cumulative impact could be reduced to medium**.

### 9.3 Cumulative impacts on Bats

There were no further cumulative impacts noted from the specialists in 2023.

Due to the relatively **low impacts** of gridlines on bats, and the low levels of change in the receiving PV environment, Animalia has **no objection to the proposed amendment of extending the EA validity for a further 5 years**.

### 9.4 Cumulative impacts on Heritage & Palaeontology

The study area is considered to be fairly natural succulent Karoo shrubland, with low intensity sheep grazing on the site. There are two. existing transmission lines near the site, including a 66kV transmission line that runs along the district road towards the substation and a 400kV transmission line that runs to the west of the site in the direction of Klein Rooiberg. There is a district road which runs adjacent to the project site. The predominant context of this area is wilderness landscape dominated by topographic features such as koppies and rivers, as well as existing renewable energy facilities. In his assessment of the Kokerboom WEF located south of this development area, Orton (2021) notes that "The landscape is also considered to be a heritage resource but its cultural component is very limited and a new layer of electrical infrastructure is starting to dominate the landscape…"

As can be seen in Figure 58 below, the area proposed for development is scattered with farm werfs and connecting roads. According to Webley and Halkett (2012), "*from approximately 1850 onwards, Dutch Trekboers started making seasonal use of the summer grazing around the large pans in the area. Many contemporary farmers in Namaqualand still own two farms, one in the Bushmanland and the other in Namaqualand. The livestock is transported between their farms by truck.*" Orton (2021) notes that "*It is unlikely that many earlier farmsteads (than the earlier 20th Century) would be present because this harsh landscape was only permanently settled in relatively recent times.*" According to Van Schalkwyk's assessment of the area proposed for the Loeriesfontein 3 PV SEF, "*An investigation of the Title Deeds of most of the farms under consideration indicated that they were surveyed during the latter part of the nineteenth century, implying that they would have been occupied since then. Both the farms Sous and Aan de Karree Dorn Pan were first surveyed in 1898.*" (Van Schalkwyk, 2012). Based on this desktop assessment, the nearest farm werfs are all located more than 5km away from the PV area, and the heritage significance of these has yet to be ascertained. **No direct or indirect impact is anticipated to the heritage value of these WEFs** as a result of the PV facility.

It is also clear that the evolution of the occupation of this area has been guided by the presence of pans. It is clear that the location of farm werfs and roads are linked to the presence of pans nearby or as the destination at the ends of the roads. Prior to colonial settlement, this region was occupied by San hunter-gatherers and remained here living around the salt pans until they were "*forced off the land as the farms were surveyed and made available to European farmers. Some of these "Basters", of mixed descent, travelled north and settled in the southern Richtersveld. Many of the farms were only allocated after the introduction of the wind pump to South Africa in the 1870s made the more arid lands accessible and suitable for grazing.*" The salt pans of this area therefore have associated cultural landscape value; however, **no salt pans are evident within the area proposed for development**.

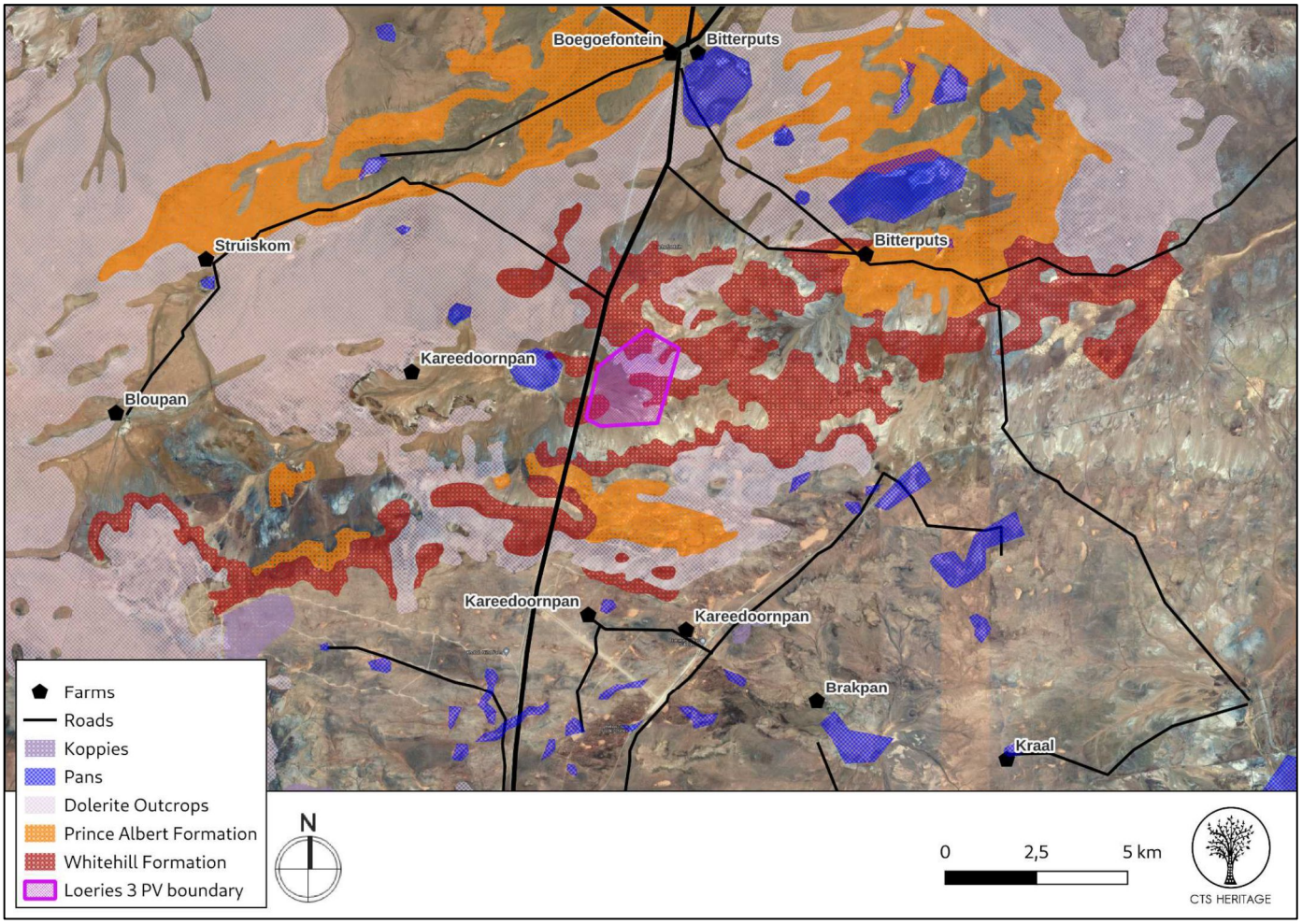



Figure 59. Cumulative Heritage Sensitivity Map

**Table 9.4: Project impact on surrounding areas**

| ***Nature:*** The broader context of the area proposed for development has cultural significance that may be impacted by the proposed development | | |
|---|---|---|
| | Overall impact of the proposed project considered in isolation | Cumulative impact of the project and other projects in the area |
| Extent | Regional | Regional |
| Duration | Where manifest, the impact will be long term - for the duration of the grid infrastructure lifetime | Where manifest, the impact will be long term - for the duration of the grid infrastructure lifetime |
| Magnitude | The cultural value of the pristine Karoo Landscape is very high and the location of the proposed development will impact this significance | The cultural value of the pristine Karoo Landscape is very high and the location of the proposed development will impact this significance |
| Probability | It is extremely likely that a significant cultural landscape resources will be impacted | It is extremely likely that a significant cultural landscape resources will be impacted |
| **Significance** | **HIGH** | **HIGH** |
| Status (positive or negative) | Negative | Negative |
| Reversibility | High | Low |

| | | |
|---|---|---|
| Irreplaceable loss of resources? | Yes | Yes |
| Can impacts be mitigated? | Yes | Yes |
| Confidence in findings: High. | | |
| Mitigation:<br>NA | | |

**CONCLUSION**

With regard to cumulative impacts to heritage resources, this is discussed in detail in the section of text regarding impacts to the Cultural Landscape. In general, the sense of place of this area has been significantly altered due to the extensive renewable energy development taking place here. At this stage, there is the potential for the cumulative impact of the proposed PV facility and associated infrastructure to negatively impact the cultural landscape due to a change in the landscape character from rural to semi-industrial. Based on the available information, a few renewable energy facilities and their associated grid infrastructure (power lines and substations) have been approved in the immediate vicinity of the proposed development. It is noted that it is preferable to have renewable energy facility development and associated infrastructure focused in an area such as a REDZ or Strategic Transmission Corridor, so that this infrastructure is clustered on the landscape and not spread out.

### 9.5 Cumulative impacts on Visual

Cumulative visual impacts can be defined as the additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments. In this case, the 'development' would be a new Solar PV Facility as seen in conjunction with the existing (or proposed/authorised) renewable energy facilities and infrastructure in close proximity.

Cumulative visual impacts may be:

- Combined, where facilities are within the observer's arc of vision at the same time;
- Successive, where the observer has to turn his or her head to see the various structures of a renewable energy facility; and
- Sequential, when the observer has to move to another viewpoint to see different renewable energy facilities, or different views of the same facility (such as when travelling along a route).

The cumulative impact of the proposed Loeriesfontein 3 PV Facility on the landscape and visual amenity is a product of:

- The distance between the renewable energy facilities;
- The distance over which the structures are visible;
- The overall character of the landscape and its sensitivity to the structures;
- The siting and design of the facility; and
- The way in which the landscape is experienced.

The cumulative impacts as assessed by SiVEST in the original VIA undertaken in 2012 stated that several renewable energy facilities were proposed within relatively close proximity to the proposed development. These facilities were either in the advanced stages of the EIA process or had already received environmental authorisation. The renewable energy developments that were being proposed at that stage (2012) in the surrounding area are indicated in the table below.

**Table 9.5: Large-scale renewable energy developments proposed in close proximity to the PV plant as assessed in 2012**

| Proposed Development | Status of EIA (2012) | Proponent | Proposed Capacity | Approximate Location | Current Status of EIA (2023) |
|---|---|---|---|---|---|
| CPV/PV Plant on the Farm Kaalspruit | Environmental Authorisation Issued by DEA | Mainstream Renewable Power | 50MW | Approximately 12km north of Loeriesfontein | Approved (Not constructed) |
| Hantam PV Solar Energy Facility | Draft Environmental Impact Report (Comment period ended 17 Feb 2012) Impact Report (comment period ended 17 Feb 2012 | Solar Capital (Pty) Ltd | Up to 525MW | Approximately 47km north of Loeriesfontein (just east of Helios Substation) | In Process |
| PV Plant on Klein Rooiberg Farm | Draft Scoping Report – comment period | Orlight SA (Pty) Ltd | Up to 150MW | Approximately 41km North of Loeriesfontein (10km south of Helios Substation) | Approved (Not constructed) |

The potential for large scale visual impacts as a result of the above proposed developments in 2012 was deemed to significantly alter the sense of place and visual character of the study area, if constructed. The cumulative visual impacts of each visual receptor were then assessed, and it was found that the greatest cumulative impact would be experienced by the dwelling on Narosies Farm and the dwellings in Klein Rooiberg, as they would be visually exposed to the Hantam PV Solar Energy Facility and the PV Plant on Klein Rooiberg Farm. None of the receptors were found to be visually exposed to the CPV/PV Plant on the Farm Kaalspruit as this proposed development was too far away. No quantification of the impacts in terms of an impact rating were made.

Over the years, many EIA applications for renewable energy facilities have been undertaken within the study area and greater region. The proposed PV Facility infrastructure is currently located adjacent to existing power lines and wind energy facilities (i.e. Loeriesfontein and Khobab WEF). The proposed Loeriesfontein 3 PV Facility, although in line with current development and land use trends in the region, will certainly contribute to the increased cumulative visual impact of Solar PV Facilities in the region.

Additionally, **Error! Reference source not found.**59 below illustrates that it will contribute to the increased cumulative visual impact of renewable energy facilities in the region in general, assuming that all approved renewable energy applications (i.e. Dwarsrug, Kekerboom 1 and 3 WEFs) are constructed.

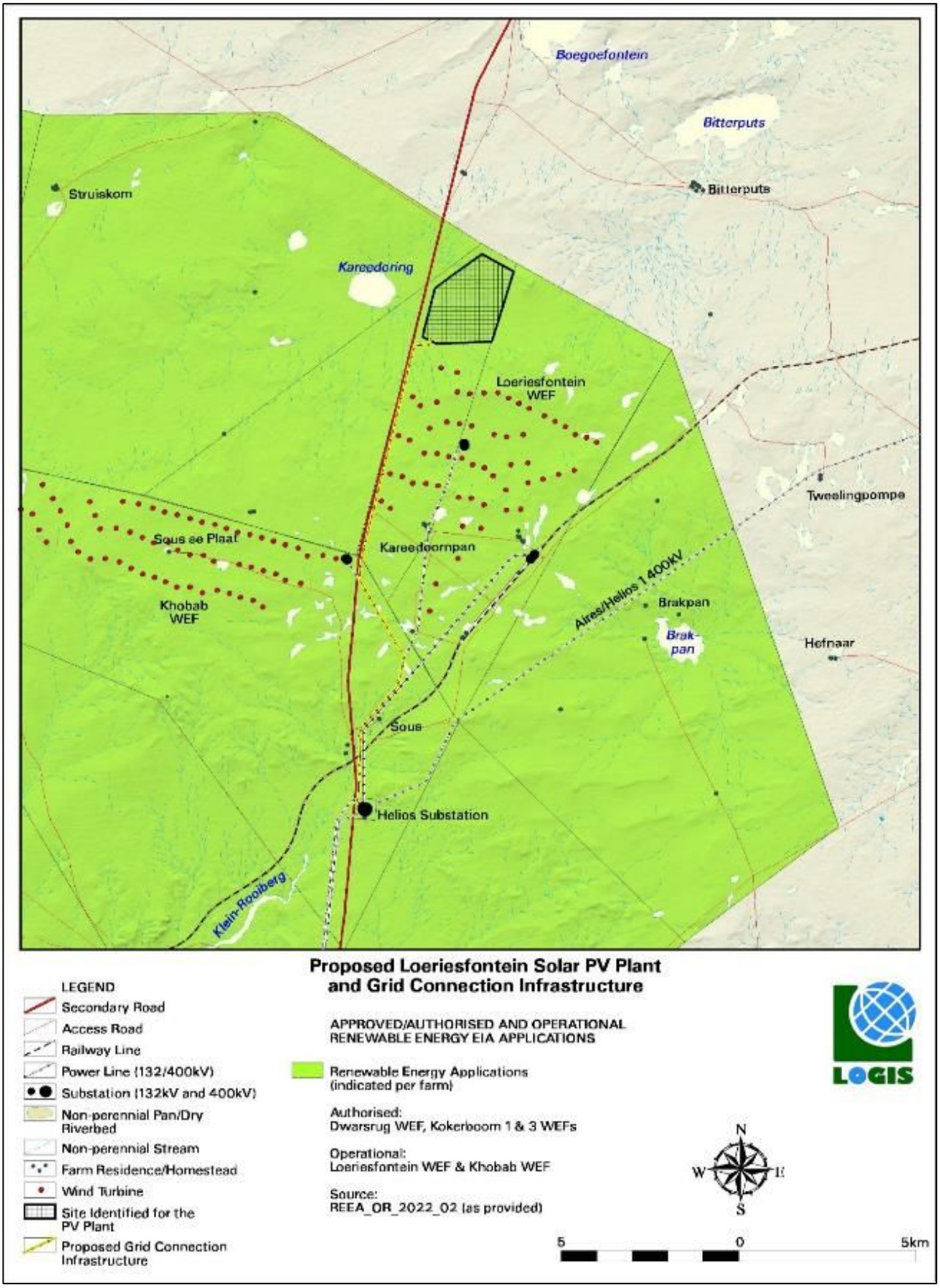



Figure 60: Increased cumulative visual impact of renewable energy facilities in the region

Table 9.6 below illustrates the assessment of the anticipated cumulative visual impact of infrastructure on sensitive visual receptors within the region.

**Table 9.6: Assessment of the anticipated cumulative visual impact of infrastructure on sensitive visual receptors within the region**

| ***Nature of Impact:*** The potential cumulative visual impact of the proposed Loeriesfontein 3 PV Facility when considered with other development in the area on sensitive visual receptors within the region | | |
|---|---|---|
| | Overall impact of the proposed project considered in isolation | Cumulative impact of the project and other projects in the area |
| Extent | Very low (1) | Very low (1) |
| Duration | Long (4) | Long (4) |
| Magnitude | Moderate (6) | High (8) |
| Probability | Probable (3) | Highly Probable (4) |
| **Significance** | **Moderate (33)** | **Moderate (52)** |
| Status (positive or negative) | Negative | Negative |
| Reversibility | Reversible (1) | Reversible (1) |
| Irreplaceable loss of resources? | No | No |
| Can impacts be mitigated? | No | |
| Mitigation potential | Very Difficult | |

The cumulative visual impacts of the proposed Loeriesfontein 3 PV Facility is ultimately expected to be of **moderate** significance, when considered with other development in the area on sensitive visual receptors within the region. Particularly when considering its remote location and the general low occurrence of potential sensitive visual receptors.

## CONCLUSION

Comparatively, since 2012, many more EIA applications for renewable energy facilities have taken place within the study area, as well as the general region and none of the proposed facilities as outlined in 2012 (refer to Table 8.1 – Visual Assessment) have been constructed to date. Subsequently, two WEFs not accounted for in the 2012 assessment, have been constructed within the study area namely, the Loeriesfontein and Khobab WEF. Additionally, no specific cumulative impact ratings were undertaken in the original 2012 VIA undertaken by SiVEST. These variations in data therefore make it difficult to comparatively compare the cumulative impacts expected in 2012 and what can be expected to date (2023). It can, however, be stated that cumulatively the construction of these facilities has altered the sense of place and visual character of the study area as predicted in the original 2012 assessment.

However, while the construction of these facilities has already altered the sense of place and visual character of the study area (as predicted in 2012 by SiVEST), from a visual perspective it is preferrable that the visual impact of renewable energy facilities be consolidated in one area in order to contain the visual impact to select areas as opposed to being scattered throughout the country.

Taking into account all the above findings, the potential cumulative visual impact is therefore expected to be **within acceptable limits**, considering the approved and existing Wind Energy Facilities in the area and the existing power lines within the region.

## 9.6 Cumulative impacts on Aquatic resources

The specialist that undertook the 2023 assessment has been involved In the assessment of several projects within a 30km radius of the proposed development site, in which the Loeriesfontein 3 PV SEF project was considered in the cumulative assessment for those projects.

**Table 9.7: Assessment of Cumulative impacts on Aquatic resources**

| Issue & Impact | Authorised layout impact rating with mitigation | Additional works impact rating with mitigation | Comment |
|---|---|---|---|
| Cumulative impacts such as loss of ecosystem services | LOW | LOW | Through avoidance of any high value aquatic systems and the general improvement of existing crossings, a positive cumulative impact could occur if river/wetland rehabilitation occurs, which for the most parts include alien vegetation management and was included in the original proposed mitigation for the project. |

## CONCLUSION

In the assessment of potential cumulative impacts, **no additional impacts or changes to the previously assessed impacts would be required** due to the proposed amendment. This was compared to any current developments and future proposed developments within a 30km radius, and as EnviroSci has been involved in most of these projects, the same principle of avoidance rather mitigation has been applied by those projects. This then contributed to a **Low impact** on the observed systems as well as a **Low cumulative impact**, which has been confirmed as some of the projects have been established and have had no longer term impact on the aquatic resources. Furthermore, the sites will also be included in Water Use Application under a General Authorisation, being submitted to DWS.

## 9.7 Cumulative impacts on Agriculture & Soil Potential

The Loeriesfontein 3 PV SEF will be located within a 30km radius of 12 renewable energy projects / facilities that are already either operational, in process or authorised (i.e., obtained EA). The cumulative impacts of the proposed project in addition to the authorised solar developments are rated and discussed below.

**Table 9.8. Assessment of cumulative impact of decrease in areas available for livestock farming**

| Nature: Decrease in areas with suitable land capability for livestock (sheep) farming. | | |
|---|---|---|
| | Overall impact of the proposed project considered in isolation | Cumulative impact of the project and other projects in the area |

| | | |
|---|---|---|
| Extent | Local (1) | Regional (2) |
| Duration | Very short duration - 0-1 years (1) | Short duration – 2 – 5 years (2) |
| Magnitude | Minor (2) | Low (4) |
| Probability | Probable (3) | Probable (3) |
| **Significance** | **Low (12)** | **Low (24)** |
| Status (positive/negative) | Negative | Negative |
| Reversibility | High | Low |
| Loss of resources? | No | Yes |
| Can impacts be mitigated? | N/A | No |
| Confidence in findings:<br>**High.** | | |
| Mitigation:<br>Vegetation clearance must be restricted to areas where infrastructure is constructed.<br>No materials removed from development area must be allowed to be dumped in nearby livestock farming areas.<br>Prior arrangements must be made with the landowners to ensure that livestock are moved to areas where they cannot be injured by vehicles traversing the area.<br>No boundary fence must be opened without the landowners' permission.<br>All left-over construction material must be removed from site once construction on a land portion is completed.<br>No open fires made by the construction teams are allowable during the construction phase. | | |

**Table 9.9: Assessment of cumulative impact of areas susceptible to soil erosion**

| **Nature: Increase in areas susceptible to soil erosion** | | |
|---|---|---|
| | Overall impact of the proposed project considered in isolation | Cumulative impact of the project and other projects in the area |
| Extent | Local (1) | Regional (2) |
| Duration | Medium-term (3) | Medium-term (3) |
| Magnitude | Moderate (6) | Moderate (6) |
| Probability | Probable (3) | Probable (3) |
| **Significance** | **Medium (30)** | **Medium (33)** |
| Status (positive/negative) | Negative | Negative |
| Reversibility | Low | Low |
| Loss of resources? | Yes | Yes |
| Can impacts be mitigated? | Yes | No |
| Confidence in findings:<br>**High.** | | |
| Mitigation:<br>Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint;<br>Unnecessary land clearance must be avoided; | | |

| |
|---|
| Level any remaining soil removed from excavation pits (where the PV modules will be mounted) that remained on the surface, instead of allowing small stockpiles of soil to remain on the surface;<br>Where possible, conduct the construction activities outside of the rainy season; and<br>Stormwater channels must be designed to minimise soil erosion risk resulting from surface water runoff. |

**Table 9.10: Assessment of cumulative impact of areas susceptible to soil compaction**

| **Nature: Increase in areas susceptible to soil erosion** | | |
|---|---|---|
| | Overall impact of the proposed project considered in isolation | Cumulative impact of the project and other projects in the area |
| Extent | Local (1) | Regional (2) |
| Duration | Medium-term (3) | Medium-term (3) |
| Magnitude | Low (4) | Low (4) |
| Probability | Improbable (2) | Probable (3) |
| **Significance** | **Low (16)** | **Low (27)** |
| Status (positive/negative) | Negative | Negative |
| Reversibility | Low | Low |
| Loss of resources? | No | No |
| Can impacts be mitigated? | Yes | Yes |
| Confidence in findings:<br>**High.** | | |
| Mitigation:<br>Vehicles and equipment must travel within demarcated areas and not outside of the construction footprint;<br>Unnecessary land clearance must be avoided;<br>Materials must be off-loaded and stored in designated laydown areas;<br>Where possible, conduct the construction activities outside of the rainy season; and<br>Vehicles and equipment must park in designated parking areas. | | |

**Table 9.11. Assessment of cumulative impact of increased risk of soil pollution**

| **Nature: Increase in areas susceptible to soil pollution** | | |
|---|---|---|
| | Overall impact of the proposed project considered in isolation | Cumulative impact of the project and other projects in the area |
| Extent | Local (1) | Regional (2) |
| Duration | Short-term (2) | Short-term (2) |
| Magnitude | Moderate (6) | Moderate (6) |
| Probability | Probable (3) | Probable (3) |
| **Significance** | **Low (27)** | **Medium (30)** |
| Status (positive/negative) | Negative | Negative |
| Reversibility | Low | Low |
| Loss of resources? | Yes | Yes |

| Can impacts be mitigated? | Yes | No |
|---|---|---|
| Confidence in findings:<br>High. | | |
| Mitigation:<br>▪ Maintenance must be undertaken regularly on all vehicles and construction/maintenance machinery to prevent hydrocarbon spills;<br>▪ Any waste generated during construction must be stored into designated containers and removed from the site by the construction teams;<br>▪ Any left-over construction materials must be removed from site;<br>▪ The construction site must be monitored by the Environmental Control Officer (ECO) to detect any early signs of fuel and oil spills and waste dumping;<br>▪ Ensure battery transport and installation by accredited staff / contractors; and<br>▪ Compile (and adhere to) a procedure for the safe handling of battery cells during transport and installation. | | |

**CONCLUSION**

Following the data analysis and results of the impact assessment above (including cumulative impact assessment), the previously authorised Loeriesfontein 3 PV SEF, is **still considered an acceptable development** in the project area, even with the requested amendments.

### 9.8 Cumulative impacts on Socio-Economic Impacts

The potential cumulative impacts associated with the proposed Loeriesfontein 3 PV SEF include the cumulative impact on the areas sense of place, cumulative impact on services, specifically during the construction phase, and cumulative impact on the local economy.

#### 9.8.1 Cumulative Impact on sense of place

The Scottish Natural Heritage (2005) describes a range of potential cumulative landscape impacts associated with wind farms on landscapes. These issues raised in these guidelines as to what defines a cumulative impact are also regarded as pertinent to transmission lines. The relevant issues identified by Scottish Natural Heritage study include:

- Combined visibility (whether two or more transmission lines) will be visible from one location).
- Sequential visibility (e.g. the effect of seeing two or more two or more transmission lines) along a single journey, e.g. road or walking trail).
- The visual compatibility of different two or more transmission lines in the same vicinity.
- Perceived or actual change in land use across a character type or region.
- Loss of a characteristic element (e.g. viewing type or feature) across a character type caused by developments across that character type.

There are several renewable energy facilities located in the vicinity of the site (Figure 60) specifically to the south of the site. The potential for cumulative impacts associated with combined visibility (whether two or more renewable energy facilities will be visible from one location) and sequential visibility (e.g., the effect of seeing two or more renewable energy facilities along a single journey) therefore exists. However, the site is relatively remote and the renewable energy facilities are largely concentrated in the area to the south of the site. While this does not necessarily reduce the cumulative visual impact on the areas sense of place, it does assist to confine the impact to a relatively concentrated area.

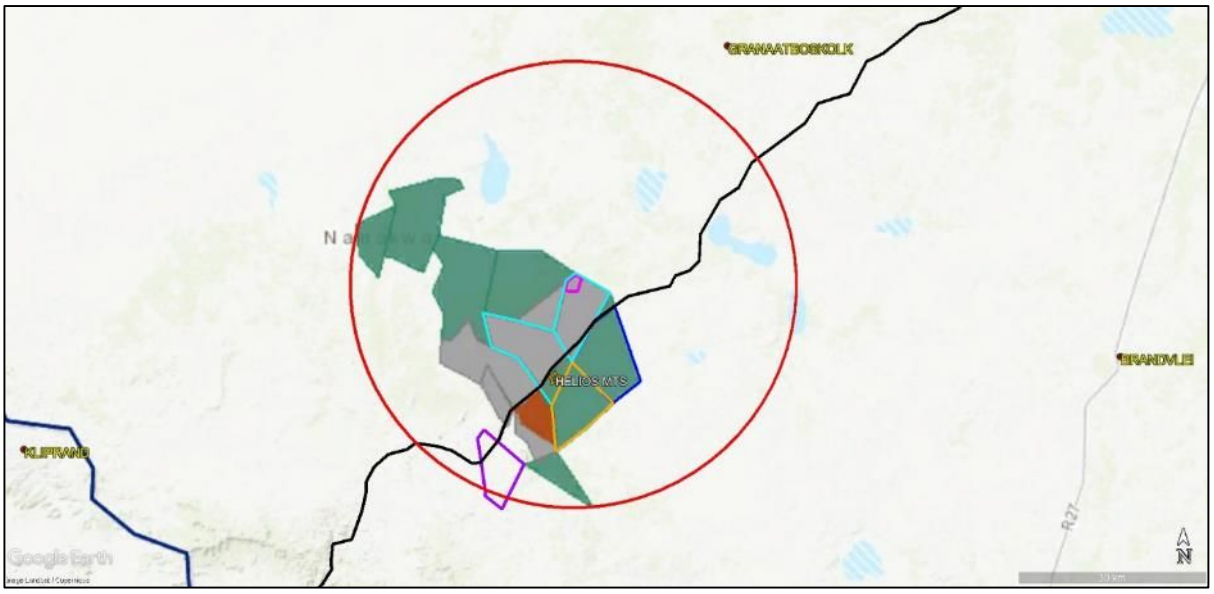



Figure 61: Location of other renewable energy facilities within a 30 km radius of the site

There are several existing power lines in the study area associated with the Helios Substation and other renewable energy projects. The potential for cumulative impacts associated with combined visibility (whether two or more power lines will be visible from one location) and sequential visibility (e.g., the effect of seeing two or more power lines along a single journey, e.g., road or walking trail) does therefore exist. However, the cumulative impact on the areas sense of place is therefore likely to be **Moderate to Low Negative**. None of the affected property owners interviewed identified visual impacts as a concern. The area also falls within the Western Transmission Corridor. The area has therefore been identified as suitable for the establishment of the grid infrastructure.

Based on SIAs undertaken by the author for other renewable energy projects located in the study area, the significance of the cumulative impact on sense of place is rated as **Medium Negative with mitigation** (9.12 below).

**Table 9.12: Cumulative impacts on sense of place and the landscape**

| **Nature**: Visual impacts associated with the establishment of more than one renewable energy facility and the potential impact on the area's rural sense of place and character of the landscape. | | |
|---|---|---|
| | **Overall impact of the proposed project considered in isolation** | **Cumulative impact of the project and other projects in the area** |
| **Extent** | Local (1) | Local and regional (2) |
| **Duration** | Long term (4) | Long term (4) |
| **Magnitude** | Moderate (6) | Moderate (6) |
| **Probability** | Highly Probable (4) | Highly Probable (4) |
| **Significance** | **Medium (44)** | **Medium (48)** |
| **Status (positive/negative)** | Negative | Negative |
| **Reversibility** | Yes. SEF components and other infrastructure can be removed. | |
| **Loss of resources?** | No | No |
| **Can impacts be mitigated?** | Yes | |
| **Confidence in findings:** High. | | |

### 9.8.2 Cumulative impacts on local services and accommodation

The establishment of the proposed Loeriesfontein 3 PV SEF and the other renewable energy facilities and associated grid infrastructure, including the 132kV overhead powerline, in the Hantam Local Municipality (HLM) has the potential to place pressure on local services in nearby towns, specifically in the town of Loeriesfontein. Services affected include medical, education and accommodation. This pressure will be associated with the influx of workers to the area associated with the construction phases, and to a lesser extent, the operational phases. Due to the lack of accommodation in Loeriesfontein, the construction of existing wind farms in the area have involved the establishment of on-site construction camps. The potential impact on local services can be mitigated by employing local community members.

However, this impact should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of a renewable projects in the area. These benefits will create opportunities for investment in the HLM, including the opportunity to up-grade and expand existing services.

Based on SIAs undertaken by the author for other renewable energy projects located in the vicinity of Loeriesfontein, the significance of the cumulative impact on local services and accommodation is rated as **Low Negative** with mitigation (Table 9.13).

**Table 9.13: Cumulative impacts on local services**

| **Nature:** The establishment of a number of renewable energy facilities in the HLM has the potential to place pressure on local services, specifically medical, education and accommodation |
|---|

| | **Overall impact of the proposed project considered in isolation** | **Cumulative impact of the project and other projects in the area** |
|---|---|---|
| **Extent** | Local (1) | Local and regional (2) |
| **Duration** | Long term (4) | Long term (4) |
| **Magnitude** | Low (4) | Low (4) |
| **Probability** | Probable (3) | Probable (3) |
| **Significance** | **Low (27)** | **Medium (30)** |
| **Status (positive/negative)** | Negative | Negative |
| **Reversibility** | Yes. SEF components and other infrastructure can be removed. | |
| **Loss of resources?** | No | No |
| **Can impacts be mitigated?** | Yes | |
| **Confidence in findings:** High. | | |

The option of surfacing the road or implementing an effective maintenance and repair program should be investigated.[5]

### 9.8.3 Cumulative impacts on local economy

The establishment of a number of renewable energy facilities in the area, including the Loeriesfontein 3 PV SEF, will create socio-economic opportunities for the HLM, which, in turn, will result in positive social benefits. The positive cumulative impacts include the creation of employment, skills development and training opportunities and downstream business opportunities. The potential cumulative benefits for the local and regional economy are associated with both the construction and operational phase of renewable energy projects and extend over a period of 20-25 years.

Based on SIAs undertaken by the author for other renewable energy projects located in the study area and other parts of South Africa, the significance of the cumulative impact on the local economy is rated as **High Positive** with enhancement (Table 9.14 below).

**Table 9.14: Cumulative impact on local economy**

| **Nature:** The establishment of a number of renewable energy facilities in the ELM will create employment, skills development and training opportunities, creation of downstream business opportunities. | | |
|---|---|---|
| | **Overall impact of the proposed project considered in isolation** | **Cumulative impact of the project and other projects in the area** |
| **Extent** | Local (1) | Local and regional (2) |
| **Duration** | Long term (4) | Long term (4) |
| **Magnitude** | Moderate (6) | Moderate (6) |
| **Probability** | Probable (3) | Definite (5) |

[5] As per the EIA report, Mainstream indicated that after construction Mainstream's use of the road will be minimal, ~ about 5-10 vehicles per day.

| | | |
|---|---|---|
| **Significance** | **Medium (33)** | **High (60)** |
| **Status (positive/negative)** | Positive | Positive |
| **Reversibility** | Yes. WEF components and other infrastructure can be removed. | |
| **Loss of resources?** | No | No |
| **Can impacts be mitigated?** | Yes | |
| **Confidence in findings:** High. | | |

**PROPOSED NEW MITIGATION MEASURES**

The following additional/new mitigation measures are proposed:

- The recommendations of the VIA (SiVEST, 2012) should be implemented.
- The Northern Cape Provincial Government, in consultation with the HLM and the proponents involved in the development of renewable energy projects in the HLM, should consider establishing a Development Forum to co-ordinate and manage the development and operation of renewable energy projects in the area with the specific aim of mitigating potential negative impacts and enhancing opportunities. This would include identifying key needs, including capacity of existing services, accommodation and housing and the implementation of an accredited training and skills development programmes aimed at maximising the opportunities for local workers to be employed during the construction and operational phases of the various proposed projects. These issues should be addressed in the Integrated Development Planning process undertaken by the HLM.
- The option of surfacing the Granaatboskolk Road or implementing an effective maintenance and repair program should be investigated. This should be a collaborative effort between the relevant road authority and the renewable energy facilities operating in the study area.
- The proponent should liaise with the HLM and local business sector to identify strategies aimed at maximising the potential benefits associated with the project.
- Local skills development and training program should be developed and implemented in consultation with the HLM.

**CONCLUSION**

The potential cumulative impacts associated with the proposed Loeriesfontein 3 PV SEF include cumulative impact on the areas sense of place, cumulative impact on services, specifically during the construction phase, and cumulative impact on the local economy. Based on the findings of SIAs undertaken by the author for other renewable energy projects located in the study area, the significance of the cumulative impact on sense of place, local services and the local economy are rated as **Medium Negative, Low Negative and High Positive** respectively.

## SECTION 10 – NEED AND DESIRABILITY

### 10.1 Climate friendly development

The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through the reduction of GHG emissions. South Africa is estimated to currently be responsible for approximately 1% of global GHG emissions (and circa half of those for which Africa is responsible) and is currently ranked 12th/13th worldwide in terms of per capita carbon dioxide emissions (www.polity.org.za). The proposed development and the associated electricity generated as a result of the facility will result in considerable savings on tons of $CO_2$ emissions.

### 10.2 Reduce dependency on fossil fuels

At present, between 84-86% of South Africa's energy is generated by coal-fired power stations (www.energy.gov.za). This translates into the country ranking first in using coal for energy generation on the African continent and Internationally. Apart from coal being a finite resource that will eventually run out, fossil fuels are harmful not only to the environment but to humans as the by-products emitted from the burning of coal contribute to the worsening of the climate crisis and the increase in human health issues.

Subsequently, solar is a free and infinite resource that occurs naturally in the environment whilst the conversion of wind energy into electricity releases no harmful by-products into the environment and will reduce the dependency on fossil fuels.

### 10.3 Employment Creation

The development, procurement, installation, operations, maintenance and management of renewable energy facilities have significant potential for job creation and much needed skills development in South Africa. The development, construction and installation phases of the project will create direct and indirect full-time equivalent (FTE) employment opportunities, whilst the operations and maintenance phases will create limited full-time employment opportunities. It is estimated that 250 000 new FTE jobs can be created from renewable energy projects in the country.

### 10.4 Energy Crisis

The electricity crisis currently plaguing South Africa has been taking place for 15 years, with no long-term solution in sight. The number of days of national loadshedding has increased drastically over the last 5-6 years, with 2022 having had close to 3000 hours of national loadshedding (Business Tech). This has been caused by constant breakdowns of infrastructure at power plants, subsequently decreasing Eskom's Energy Availability Factor (EAF) with approximately only 53% of installed energy capacity being available at the end of 2022.

Stage 3 and Stage 4 of loadshedding have become a daily norm, but in September 2022 blackouts reached record levels pushing up to Stage 6. 2023 blackout predictions are projected to be even worse after having experienced Stage 6 in the first few weeks of 2023. As a result of continuous infrastructural collapse at Eskom power plants across the country, warnings of Stage 7 and Stage 8 are clear prospects for the nearing future, meaning up to 10-12 hours a day without electricity. This comes as the EAF decreases and with the

subsequent planned maintenance of the Koeberg Power Station that will begin in upcoming months (2023), decreasing the generation capacity even further. Not only has loadshedding affected our daily lives but it has had detrimental effects for the economy, with it being estimated to have reduced the economy between 8-10% and further contributing to the rise in unemployment in the country.

Whilst the EA for the Loeriesfontein 3 PV SEF project has lapsed, it should be in the Department's and the country's best interest to extend the validity period of the EA to facilitate the construction of the above-mentioned project. The construction of the SEF will assist in increasing the EAF for the country, whilst simultaneously assisting in reducing South Africa's climate ranking, reducing the country's GHG emissions but also offering a short and long-term solution for skills development and employment opportunities in the country.

### 10.5 Cumulative Impact Considerations

The impacts of the PV SEF in isolation has been indicated as Low- High sensitivity as per the specialist findings and determined to be of Medium- High significance taking into consideration existing, approved and proposed renewable energy project within a 30km radius of the proposed PV SEF site. It must be noted that since 2012 (when the original EIA was undertaken) many of the existing and proposed facilities did not exist and therefore were not assessed, however, as the EA for the PV SEF had been granted, all recently constructed facilities and proposed facilities have taken into consideration the cumulative impacts associated their individual projects and surrounding projects inclusive of the Loeriesfontein 3 PV SEF and IPP portion of the shared on-site substation. In the current assessment (Nala Environmental, 2023), the specialists have endeavoured to provide suitable additional mitigation measures that would mitigate the direct, indirect and cumulative impacts of the facility under the current local and regional conditions. These mitigations are required to be included within the EMPr for the facility. Taking into consideration the implementation of these mitigation measures, positive socio-economic impacts and the current state of South Africa's energy crisis (i.e. permanent Stage 2 and Stage 3 load shedding from 2022 to 2024 as delivered to Eskom's address to the Nation on the 22 January 2023), it is recommended that the validity extension of the EA for the 100MW Loeriesfontein 3 PV SEF and 33k/132kV IPP portion of the shared on-site substation be granted to give an opportunity to provide relief to the energy constraints currently being experienced.

## SECTION 11 – CUMULATIVE IMPACT ASSESSEMENT

The cumulative impacts associated with the proposed amendment are described in Section 9 of this report and are summarized below:

**Biodiversity (Fauna and Flora):** The cumulative impacts contribution of the proposed project taking into consideration the proposed, approved and existing renewable energy facilities and associated infrastructure within a 30km radius of the PV SEF site was deemed of 'Low Significance'. It can be concluded that the proposed development will not result in any unacceptable loss considering all the projects proposed in the area, especially when considering the proposed project occurs within an area already "approved".

**Avifauna:** Additional impacts were identified taking into consideration the approved, proposed and existing renewable energy facilities and associated infrastructure within a 30km radius of the PV SEF i.e. Displacement due to disturbance associated with the construction of the renewable energy facility and associated infrastructure, displacement due to habitat transformation associated with the construction and operation of the renewable energy facility and associated infrastructure, collisions with the solar panels, collision with wind turbines, entrapment in perimeter fences, displacement due to disturbance associated with the decommissioning of the renewable energy facilities and associated infrastructure, mortality of priority species due to electrocution on the medium voltage internal reticulation networks and mortality of priority species due to collisions with the medium voltage internal reticulation networks. The total affected land parcel area taken up by authorised and operational renewable energy projects within the 30 km radius, including the Loeriesfontein 3 PV SEF Project, is approximately 788 km². The total affected land parcel area affected by the Loeriesfontein 3 PV SEF Project equates to approximately 4.8km², and the solar array footprint only 1.76m². The proposed Loeriesfontein 3 PV SEF Project land parcel area thus constitute approximately 0.6% of the total areas taken up by the authorised and planned renewable energy projects, and the actual footprint approximately 0.2%. The cumulative impact of the proposed Loeriesfontein 3 PV SEF Project is thus anticipated to be Low Significance.

**Visual:** Comparatively, since 2012, many more EIA applications for renewable energy facilities have taken place within the study area, as well as the general region, and none of the proposed facilities as outlined in 2012 have been constructed, to date. Subsequently, two WEFs not accounted for in the 2012 assessment have been constructed within the study area, namely the Loeriesfontein and Khobab WEFs. Additionally, no specific cumulative impact ratings were undertaken in the original 2012 VIA undertaken by SiVEST. These variations in data therefore make it difficult to comparatively compare the cumulative impacts expected in 2012 and what can be expected to date (2023). It can, however, be stated that cumulatively the construction of these facilities has altered the sense of place and visual character of the study area as predicted in the original 2012 assessment. However, while the construction of these facilities has already altered the sense of place and visual character of the study area (as predicted in 2012 by SiVEST), from a visual perspective it is preferrable that the visual impact of renewable energy facilities be consolidated in one area in order to contain the visual impact to select areas as opposed to being scattered throughout the country. Taking into account all the above findings, the potential cumulative visual impact is therefore expected to be within acceptable limits, considering the approved and existing Wind Energy Facilities in the area and the existing power lines within the region.

**Heritage & Palaeontology:** With regard to cumulative impacts to heritage resources, the sense of place of this area has been significantly altered due to the extensive renewable energy development taking place here (high significance). At this stage, there is the potential for the cumulative impact of the proposed PV facility and associated infrastructure to negatively impact the cultural landscape due to a change in the landscape character from rural to semi-industrial. Based on the available information, a few renewable energy facilities and

their associated grid infrastructure (power lines and substations) have been approved in the immediate vicinity of the proposed development. It is noted that it is preferable to have renewable energy facility development and associated infrastructure focused in an area such as a REDZ or Strategic Transmission Corridor so that this infrastructure is clustered on the landscape and not spread out.

**Soil & Agricultural Potential:** Several additional cumulative impacts were identified, taking into consideration the approved and existing renewable energy facilities and associated infrastructure since the 2012 assessment had been undertaken i.e. decrease in areas with suitable land capability, increase in soil erosion and increase in soil pollution (Low-Medium significance). The specialist determined that with the implementation of the additional mitigation measures the Loeriesfontein PV SEF is still considered an acceptable development.

**Socio- Economic Aspects:** Several additional cumulative impacts were identified, taking into consideration the existing, approved and proposed renewable energy facilities and associated infrastructures within a 30km radius of the proposed PV SEF site i.e. impacts on sense of place and landscape, impact on local services and accommodation and impacts on local economy. These impacts were determined to be of Medium to High (+) with the implementation of additional mitigation measures.

**Aquatic**: In the assessment of potential cumulative impacts, no additional impacts or changes to the previously assessed impacts would be required due to the proposed amendment. This was compared to any current developments and future proposed developments within a 30km radius, and as EnviroSci has been involved in most of these projects, the same principle of avoidance rather mitigation has been applied by those projects. This then contributed to a Low impact on the observed systems as well as a Low cumulative impact, which has been confirmed as some of the projects have been established and have had no longer term impact on the aquatic resources.

**Bats:** The cumulative impacts that were previously assessed were applicable to the wind energy facility, solar energy facility and associated grid connection infrastructure that had been included within the 2012 EIA report compiled by SiVEST. As the scope of this assessment is for the PV SEF and IPP portion of the shared on-site substation, cumulative bat related impacts are low to negligible.

**Table 11.1: Summary of Cumulative Assessment:**

| Specialist Assessment | Overall impact of the project considered in isolation | Cumulative impact of the project and other projects in the area |
|---|---|---|
| Biodiversity (Fauna & Flora) | Low | Medium |
| Avifauna | Low | Medium |
| Visual | Medium | Medium |
| Heritage & Palaeontology | High | High |
| Soil & Agricultural Potential | Low- Medium | Medium |
| Socio- Economic | Medium | Medium- High |
| Aquatic | Low | Low |
| Bats | N/A | N/A |

**Cumulative Impact Statement:**

Based on the findings of the specialist assessments undertaken for the proposed amendment, the significance of impacts, taking into consideration the proposed Loeriesfontein 3 PV SEF project and other projects within a 30km radius of the project site, ranged from **Medium-High significance**, however, as per the specialist conclusions the cumulative impacts can be reduced to acceptable levels with the implementation of the additional mitigation measures that are to be included within the EMPr. Based on the findings of the assessment and implementation of the mitigation measures, **it is the opinion of the EAP that the extension to the validity period of the EA for an additional 5 years be granted**.

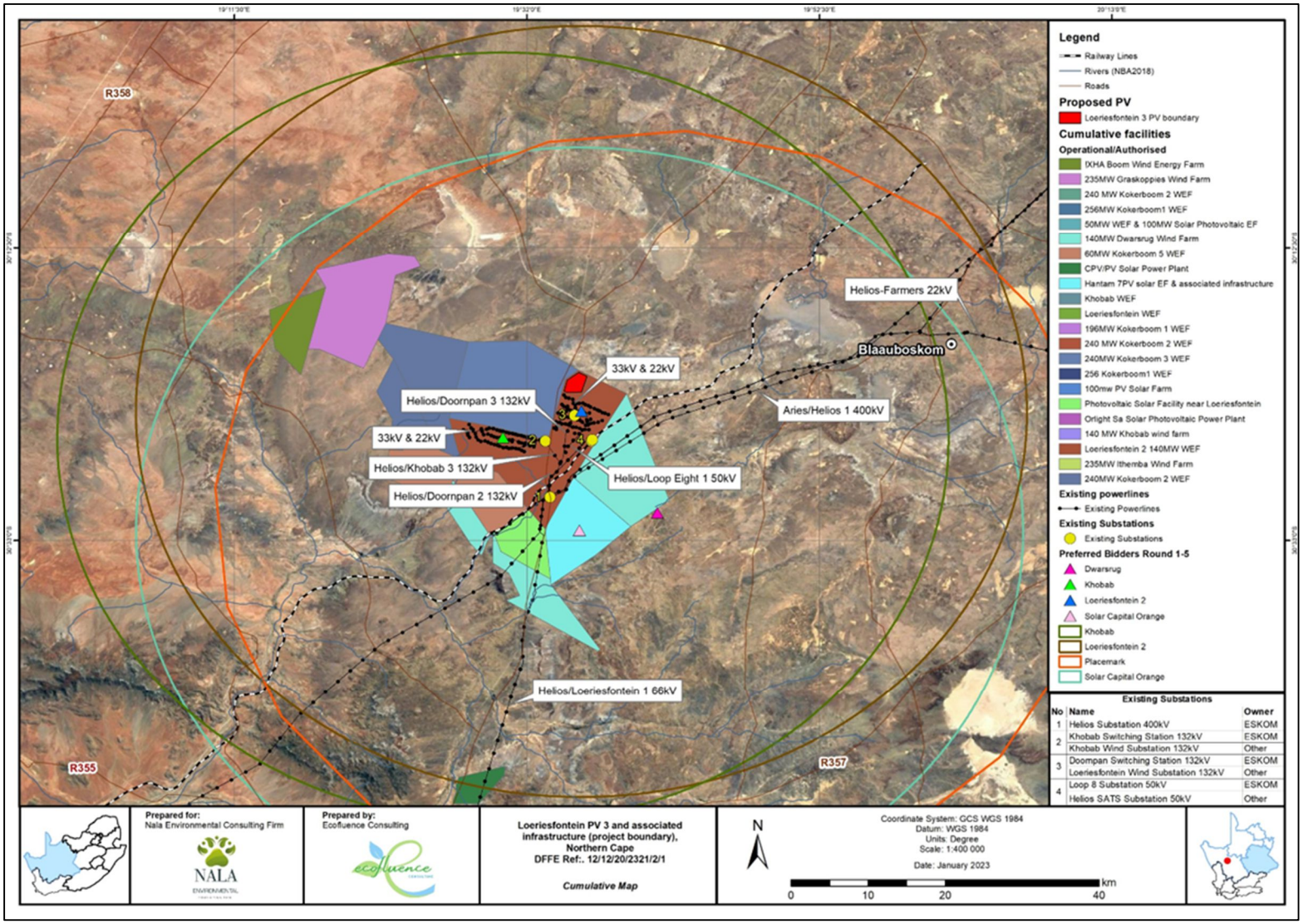



Figure 62. Cumulative Map showing other projects within a 30km radius of the proposed Loeriesfontein 3 PV SEF site (2023)

## SECTION 12 – CONCLUSION AND MOTIVATION FOR APPROVAL OF THE REQUESTED AMENDMENTS

The specialist verification undertaken as part of the amendment application process have concluded that there are **no fatal flaws associated with the proposed amendment** being requested by the developer. Based on the specialist findings, it is concluded that the proposed amendments to extend the validity of the EA are not expected to result in significant increase to the significance ratings for the identified potential impacts. As the original assessment was undertaken in 2012 and there has been no change to the scope of the proposed development, several additional mitigation measures have been recommended by the various specialists in order to minimize the impact associated the proposed PV SEF and IPP portion of the shared on-site substation.

The requested amendment is for the extension of the validity period of the SEF EA (DFFE Ref: 12/12/20/2321/2/1) by an additional 5 years. No other amendments are being applied for and the layout of the authorised infrastructure remains unchanged.

**Avifauna** – A number of additional impacts on avifauna were recorded during the site inspection in November 2022 that had not been identified previously in the Final Impact Assessment Report (SiVEST 2012). No nests of Red Data priority species were recorded at the project site during the site inspection in November 2022. The site inspection in November 2022 confirmed that the receiving environment had not changed in any material way. A number of additional mitigation measures were identified as a result of the site inspection in November 2022. Although several additional impacts were identified during the follow up inspection in November 2022, the post-mitigation aggregate ratings of all the impacts did not differ from the original ratings i.e., low post mitigation. It is recommended by the specialist that the validity of the EA be extended by an additional 5 years, provided the recommendations are strictly implemented.

**Heritage & Palaeontology** – Archaeological and palaeontological heritage resources reflect the environments of the deeper past and are unlikely to change significantly in as short a geological time span as 10 years. Some changes to heritage resources may result from processes of erosion and deflation but, in this particular ecological setting, this is unlikely to have an impact on the conclusions of the results of the previous heritage assessments completed. In this context, the findings of the assessments completed by Van Schalkwyk (2012), Fourie (2020), Almond (2011) and Butler (2020) remain appropriate and applicable for this development. Furthermore, since the initial HIA completed by Van Schalkwyk (2012), additional work has been completed in the area as noted above and furthermore, a Heritage Management Plan was drafted for the Loeriesfontein WEF which has been approved by SAHRA. Throughout these processes, no heritage resources of significance have been identified as being impacted by the Loeriesfontein 3 PV SEF. The heritage impact assessments completed in this area previously provide sufficient, appropriate and relevant information for the purposes of this application and no additional heritage, archaeological and palaeontological field assessments are recommended. In light of the above, there is no heritage objection to granting the extension to the validity to develop the Loeriesfontein 3 PV SEF based on the current site conditions on condition that the relevant recommendations included in the previous heritage assessments conducted are implemented, including that the attached Chance Fossil Finds Procedure is added to the EMPr.

**Visual** – There has been no changes in the land cover and minimal changes in land uses. Additionally, the impacts as assessed today will be moderate. Therefore, it is recommended that the proposed Part 1 Amendment extending the validity period of the EA for the Loeriesfontein 3 PV SEF be supported, subject to the conditions and recommendations as stipulated in the current EA, and according to

the EMPr, as well as the suggested mitigation measures, as provided in this and the original Visual Impact Assessment report compiled in 2012.

**Biodiversity** – Comparison with the previous reports and recent studies results in no significant changes to the impact rating, except for the recording of the rare plant species during the 2023 assessment. This exception may however be mitigated by adding the mentioned avoidance mitigation, to be included in the EA, should the request to extend the commencement period be granted by the Department. Avoidance mitigation will result in avoiding approximately 35 ha of the proposed 448 ha, in order to prevent any significant impact on the rare plant species population recorded. As such, considering the review of the 2012 Biodiversity Assessment and associated documentation, and the implementation of the mitigation measures described above and as included in the updated EMPr for this development be implemented**,** it is the reasoned opinion of the specialist that the EA for the Loeriesfontein 3 PV SEF may be extended for an additional 5 years (i.e., EA to lapse on 29 October 2027).

**Soil & Agricultural Potential** – Following the data analysis and results of the impact assessment above (including cumulative impact assessment), the previously authorised Loeriesfontein 3 PV SEF is still considered an acceptable development in the project area, even with the requested amendments. The entire project has never been used for rainfed or irrigated crop production before. There is also no irrigation infrastructure, such as centre pivots or drip irrigation, present within the project area and the area is considered suitable for livestock farming with limited grazing capacity (11 ha/SSU). The development area is located at least 100 km from any High Potential Agricultural Area. It is the professional opinion of the specialist that the request for the extension of the validity period of the EA for an additional five-year period be considered favourably, permitting that the mitigation measures of the initial assessment still be implemented. No additional mitigation measures are recommended, over and above those already provided as part of the original assessment (Barichievy, 2012).

**Socio- Economic Aspects** - The mitigation measures to address the socio-economic and social impacts identified in the 2012 Socio-Economic Assessment (MasterQ Research, 2012) remain valid. The mitigation and enhancement measures to address the additional socio-economic and social issues identified are listed within this report. Based on the review of the 2012 Socio-Economic Assessment (MasterQ Research, 2012) and associated documentation, the proposed amendments, including the proposed extension of the validity period, for the Loeriesfontein 3 PV SEF are acceptable from a social and socio-economic perspective.

**Aquatic** – Based on the findings of this study, there is no objection from an aquatic impact perspective to the extension of the validity period, if all mitigations proposed in the original reports submitted are carried out. Similarly, in the assessment of potential cumulative impacts, no additional impacts or changes to the previously assessed impacts would be required due to the proposed amendment. This was compared to any current developments and future proposed developments within a 30km radius, and as EnviroSci has been involved in most of these projects, the same principle of avoidance rather mitigation has been applied by those projects. This then contributed to a Low impact on the observed systems as well as a Low cumulative impact, which has been confirmed as some of the projects have been established and have had no longer term impact on the aquatic resources. Furthermore, the sites will also be included in Water Use Application under a General Authorisation, being submitted to DWS. No changes to the original mitigations or EMPr considerations are required.

It is to be noted that **the proposed amendment does not constitute a listed activity and the mitigation measures recommended in the EIA remain valid, however, it is imperative that the additional mitigation measure as recommended by the various specialists in this report be included within the EMPr**.

Therefore, taking into consideration the conclusions from the specialist site verification and comparative assessment reports and the findings of this report, it is concluded that **the proposed amendments are acceptable from an environmental perspective**, subject to the implementation of the additional recommended mitigation measures and those already included in the EIA as well as the EMPr.

**Table 12.1: The advantages and disadvantages of extending the validity of the PV SEF and IPP portion of the shared on-site substation:**

| Advantages | Disadvantages |
|---|---|
| The impact should be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of a renewable projects in the area. These benefits will create opportunities for investment in the HLM, including the opportunity to up-grade and expand existing services | The establishment of the proposed Loeriesfontein 3 PV SEF and the other renewable energy facilities in the HLM has the potential to place pressure on local services in nearby towns, specifically in the town of Loeriesfontein. |
| The establishment of a number of renewable energy facilities in the area, including the Loeriesfontein 3 PV SEF, will create socio-economic opportunities for the HLM, which, in turn, will result in positive social benefits. The positive cumulative impacts include the creation of employment, skills development and training opportunities, and downstream business opportunities | None |
| Due to the lack of accommodation in Loeriesfontein, the construction of existing wind farms in the area have involved the establishment of on-site construction camps. The potential impact on local services can be mitigated by employing local community members. | None |
| The implementation of the mitigation measures as per the Biodiversity comparative assessment will allow for the avoidance of approximately 35 Ha of the proposed 448 Ha in order to prevent any significant impact on the Rare plant species population recorded. | Habitat loss |
| Overall it is anticipated that the proposed amendment will not have an adverse impact to heritage resources in general. | None |
| The proposed amendment does not introduce any new palaeontological impacts or increase the significance of impact already identified. | None |

| | |
|---|---|
| The site has no suitability for rainfed agricultural and limited suitability for livestock farming and no additional direct or impact impacts were identified. | Additional cumulative impacts were identified associated with the approved, existing and proposed renewable energy facilities within a 30km radius of the site. However, with the implementation of additional mitigation measures these can be mitigated to acceptable levels. |
| No nests of Red Data priority species were recorded at the project site during the site inspection. | A number of additional impacts on avifauna were recorded during the site inspection in November 2022 that had not been identified previously in the Final Impact Assessment Report (SiVEST 2012). Although several additional impacts were identified during the follow up inspection in November 2022, the post-mitigation aggregate ratings of all the impacts did not differ from the original ratings i.e. low post mitigation. |
| The site inspection in November 2022 confirmed that the receiving environment had not changed in any material way. | None |
| Should the validity extension to the EA be granted, the project will have the opportunity to bid into future REIPPPP bid windows or private procurement programmes and if successful, will be able to add much needed generation capacity to South Africa's constrained grid. | Should the validity extension to the EA not be granted, the EA will subsequently lapse thereby resulting in a new EIA process being undertaken, thereby facing undue delays. The project will therefore not be given an opportunity to provide much needed relief to the energy crisis currently facing South Africans. |

## SECTION 13 – PUBLIC PARTICIPATION TO BE FOLLOWED

Public participation is the cornerstone of any Environmental Assessment process. The principles of NEMA together with EIA Regulations of 2017 (as amended in 2017), govern both the EIA process and public participation. The Public Participation Process (PPP) for the proposed EA amendment process has been conducted according to the requirements of Chapter 6 of the EIA Regulations of December 2014 (as amended in 2017). These include provision of sufficient and transparent information on an ongoing basis to stakeholders to allow them to comment.

The public participation process is primarily based on two factors; firstly, ongoing interaction with the environmental specialists and the technical teams in order to achieve integration of technical assessment and public participation throughout. Secondly, to obtain the bulk of the issues to be addressed early in the process, with the latter half of the process designed to provide environmental and technical evaluation of these issues.

The key public participation tasks undertaken as part of the EA amendment process are as follows:

- The database/register of I&APs has been updated and maintained.
- Placement of site notices on the boundaries of the affected properties (see Appendix C2 for proofs) and the erection of posters as public venues in the town of Loeriesfontein [namely the Loeriesfontein Library - 3 Main/Hoofstraat; Hantam Municipality Offices - 13 Long Street and Mainstream Offices - 5 Main Street (white Building after Loeriesfontein library)] on 23 January 2023.
- Written notifications to registered I&APs as well as Organs of State / stakeholders regarding the availability of the Motivation Report for review and comment were distributed on **24 January 2023**.
- Placement of an advertisement in Gemsbok Newspaper on 18 January 2023 announcing the proposed amendment to the EA and providing potential I&APs and Organs of State / stakeholders with the relevant information to register on the project database and details as to where and how project documentation can be obtained.
- The Motivation Report has been made available for the 30-day review and comment period, **from 24 January 2023 to 23 February 2023**, on the Nala Environmental website: https://nalaenvironmental.co.za/projects/part-1-amendment-application-for-the-extension-of-the-validity-period-of-the-ea-for-the-100mw-loeriesfontein-3-pv-solar-energy-facility-northern-cape-province/ and has been made available in electronic tablet format at the Loeriesfontein Public Library (13 Hoofstraat, Loeriesfontein). Hard copies, including CD and USB copies, of the documentation can be made available upon request.

I&APs and Organs of State / key stakeholders will be given an opportunity to review and comment on the full draft report and will be notified about the venues accordingly. All I&APs and Organs of State / key stakeholders registered on the project database will be notified of the submission of the draft report and the above-mentioned 30-day review and comment period accordingly. A notification (via e-mail) will be sent to all I&APs and Organs of State / key stakeholders to inform them of the availability of the draft report for review and comment. The notification will contain a link to the Nala Environmental website, which can be used to access and download the draft report

and associated appendices. Should I&APs and/or Organs of State / key stakeholders contact Nala Environmental to indicate that they are not able to access any of the online project documentation due to lack of internet connectivity, suitable alternative means of providing the I&AP and/or Organ of State / key stakeholder with the requested project information will be explored. Proof of this will be included as part of final report.

Comments received during the 30-day review and comment period will be addressed within in a comments and response report and will be included as an Appendix C7 in the final submission of the Motivation Report to the DFFE for consideration in the decision-making process. Proof of attempts made to obtain comments from relevant Organs of State and key stakeholders will also be included in the Final Motivation Report.