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Kareekloof Energy PV and BESS

Electrical Grid Infrastructure

Terrestrial Biodiversity Report

25 July 2024

for

Cape EAPrac

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prepared by

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Disclaimer by specialists

We,



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declare, that the work presented in this report is our own and has not been influenced in any way by the developer or the Environmental Assessment Practitioner (EAP). At no point has the developer asked us as specialists to manipulate the results in order to make it more favourable for the proposed development. We consider ourselves bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP) and the EIA Regulations (2014, as amended). We have the necessary qualifications and expertise (*Pr. Sci. Nat. Zoological Science)* for developing this specialist report.

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Glossary

Critical Biodiversity Area (CBA): an area that must be maintained in a good ecological condition (natural or semi-natural state) in order to meet biodiversity targets. CBAs collectively meet biodiversity targets for all ecosystem types, as well as for species and ecological processes that depend on natural or semi-natural habitat that have not already been met in the protected area network. CBAs are identified through a systematic biodiversity planning process in a configuration that is complementary, efficient and avoids conflict with other land uses where possible.

Cumulative impact: in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

Ecosystem: a dynamic complex of animal, plant and micro-organism communities and their non-living environment interacting as a functional unit

Endemic: a species that is naturally restricted to a particular, well-defined region. This is not the same as the medical definition, which is 'occurring naturally in a region.

Extent of occurrence (EOO): the area contained within the shortest continuous imaginary boundary that can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy; and in short is the species' contemporary distribution range.

IUCN Red List Categories and Criteria: the threatened species categories used in Red Data Books and Red Lists have been in place for almost 30 years. The IUCN Red List Categories and Criteria provide an easily and widely understood system for classifying species at high risks of global extinction, so as to focus attention on conservation measures designed to protect them.

IUCN Red List status: the conservation status of species, based on the IUCN Red List categories and criteria.

Mitigation: means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.

Rehabilitation: in the context of EIA, this means the repairing of a habitat/ecosystem so that processes and productivity remain functional, but it does not specifically imply that the original condition of the habitat/ecosystem will be restored.

Species of conservation concern (SCC): includes all species that are assessed according to the IUCN Red List Criteria as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Data Deficient (DD) or Near Threatened (NT), as well as range-restricted species which are not declining and are nationally listed as Rare or Extremely Rare [also referred to in some Red Lists as Critically Rare].

Taxon: (plural taxa) a taxonomic group of any rank, such as a species, family, or class.

Threatened species: species that are facing a high risk of extinction. Any species classified in the IUCN categories Critically Endangered, Endangered or Vulnerable is a threatened species. In terms of section 56(1) of NEMBA, 'threatened species' means indigenous species listed under the Act as critically endangered, endangered or vulnerable species.

1 INTRODUCTION

1.1 PROJECT DESCRIPTION

Kareekloof Energy (Pty) Ltd is a Special Purpose Vehicle (SPV) incorporated for the sole purpose of developing, constructing, and operating an up to 900MW solar PV facility including a Battery Energy Storage System (BESS) facility situated near De Aar in the Northern Cape Province. The Kareekloof Energy PV and BESS Electrical Grid Infrastructure (EGI) Corridors containing on-site or IPP Substations and overhead, up to 132kV, transmission lines may (in addition to project farms) affect farms Swartkoppies 86 RE, Bas Berg 88 Portion 3 and Koppy Alleen 83 Portion 5 and Portion 1. These EGI corridors will connect 3 on-site substations to the proposed Krypton MTS.

The proposed EGI project of approximately 11.5 km in length is located ~14 km southeast of Potfontein and 50 km northeast of De Aar within the Pixley Ka Seme District Municipality in the Northern Cape Province (Figure 1-1). The site is situated within the Central corridor STR. Enviro-Insight was commissioned to perform the required terrestrial biodiversity studies. This document is the terrestrial biodiversity component required as part of the process to obtain environmental authorisation (EA) for the proposed development.

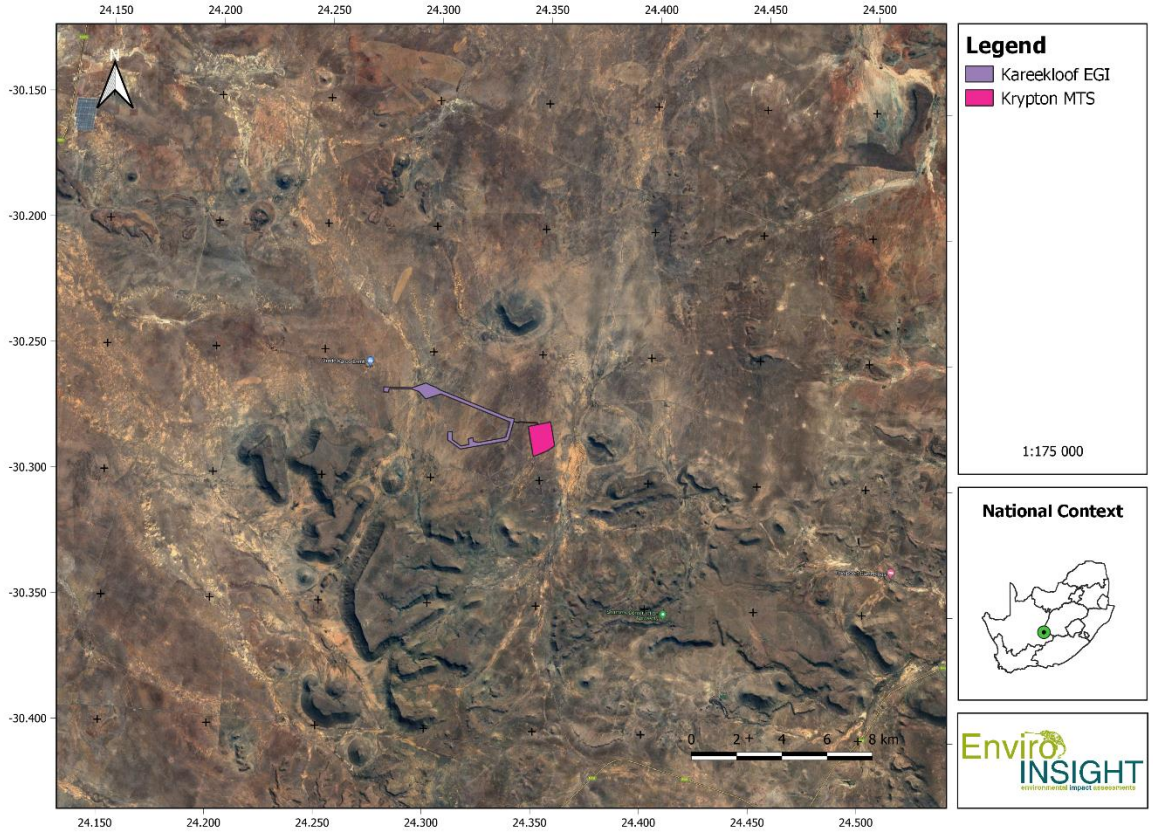


Figure 1-1. Location of the proposed Kareekloof Electrical Grid Infrastructure (EGI) Corridors to be developed.

The EGI on Kareekloof Project Farms:

- Portion 1 of the farm Bas Berg 88: 1878.04ha – EGI length 1700m from Sub3
- Portions 11 of the Farm Karee Kloof 85: 576.63ha – EGI lengths 2915m from Sub3 and 455m from Sub2 = 3370m
- Portion 6 of the farm Karee Kloof 85: 631.61ha – EGI lengths 1100m from Sub3, 618m from Sub2 and 1340m from Sub1/Sub2 = 3058m
- Portion 17 of the Farm Karee Kloof 85: 357.60ha – EGI length 210 m from Sub2
- Portion 2 of Farm Koppy Alleen 83: 45ha– EGI lengths 290m from Sub3 and 990m from Sub1/Sub2 = 1280m

The EGI on Non-Project Farms

- Remaining Extent of the Farm Swartkoppies 86: size 1675ha – EGI length 320m from Sub3 (referred to as Swartkoppies Gap EGI in Appendix A) OR Portion 3 of Bas Berg 88: size 1685ha – EGI length - EGI length 500m from Sub3 (referred to as Swartkoppies Gap EGI in Appendix A)
- Portion 1 of Farm Koppy Alleen 83 size 770ha – EGI length 250m from Sub3/Sub2/Sub1 exiting the project Farm Koppy Alleen 83 Portion 2 and continuing to Portion 5.
- Portion 5 of Farm Koppy Alleen 83 size 870ha– EGI length from Portion 1 of Koppy Alleen 83, 900m towards Krypton MTS.

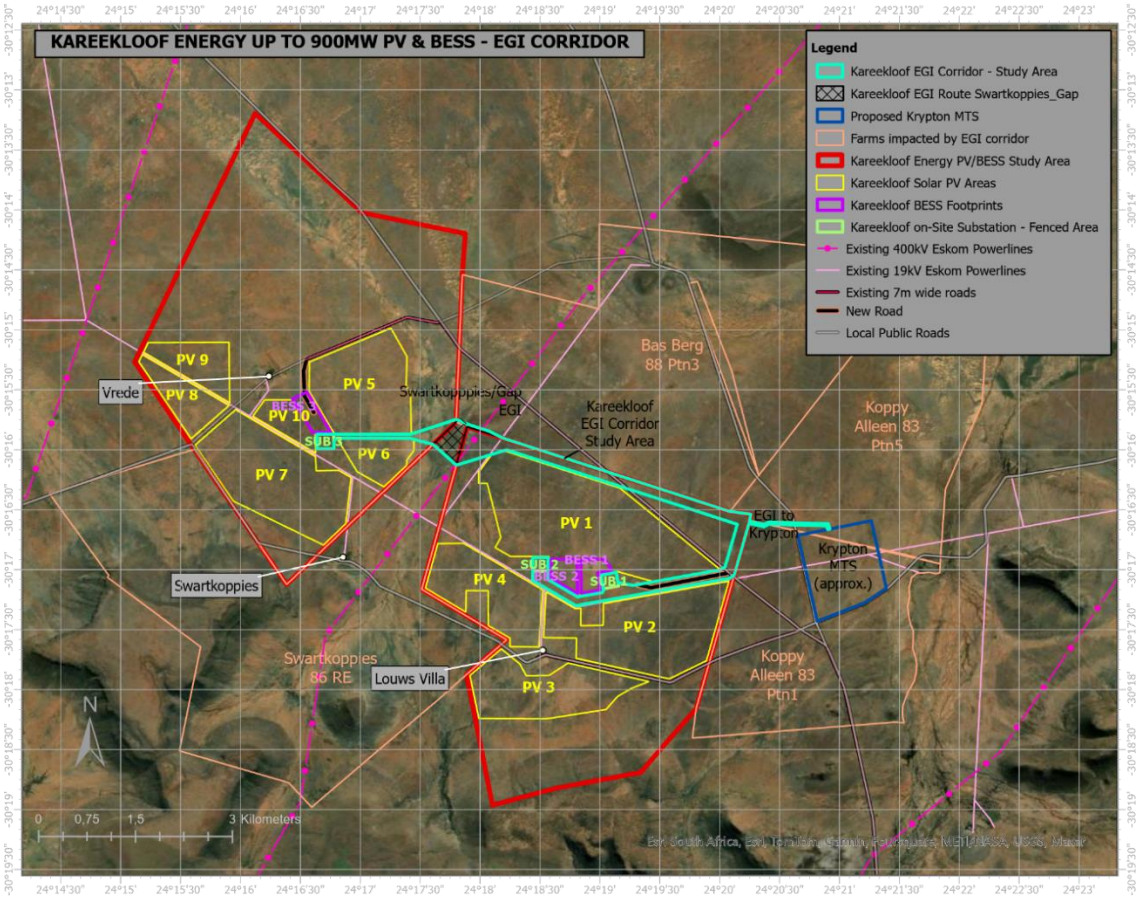


Figure 1-2: Kareeloof Energy PV and BESS Electrical Grid Infrastructure Map.

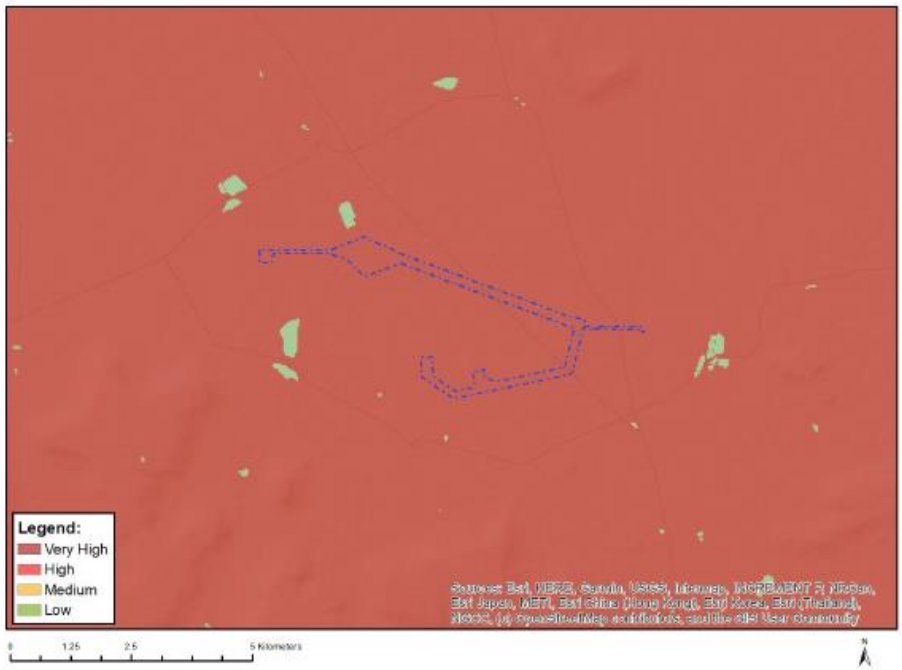
1.2 LEGAL CONTEXT & STUDY GUIDANCE

- This report addresses the Terrestrial Biodiversity Theme of the Basic Assessment Report (BAR) required for the environmental authorisation process for a proposed development.
- General guidance for the implementation of the above-mentioned protocol is drawn from the SANBI Species Environmental Assessment Guideline (2020).

1.3 SCREENING TOOL REPORT

The Screening Tool Report (STR) produced by the National Environmental Screening Tool[1] (generated on 25 July 2025) indicated a **Very High** Terrestrial Biodiversity Theme Sensitivity for the Kareekloof EGI project area, due to the presence of an Ecological Support Area (ESA) (Figure 1-3).

MAP OF RELATIVE TERRESTRIAL BIODIVERSITY THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Very High	ESA

Figure 1-3. Terrestrial Biodiversity Sensitivities of the Kareekloof EGI project area indicated by the National Screening Tool.

[1] https://screening.environment.gov.za/screeningtool/

1.4 DETAILS OF SPECIALIST

This specialist assessment has been undertaken by Corné Niemandt of Enviro-Insight CC. Corné has a MSc in Plant Science (University of Pretoria, 2015) and is professionally registered with the South African Council for Natural and Scientific Professions (SACNASP), with Registration Number 116598 in the field of Ecological Science. His curriculum vitae is included in Appendix A of this specialist input report.

2 METHODS

2.1 SITE SENSITIVITY VERIFICATION

Prior to commencing with a specialist assessment, the current use of the land and the potential environmental sensitivity of the site under consideration as identified by the screening tool must be confirmed by undertaking a site sensitivity verification. The purpose of this preliminary on-site inspection was to confirm the current use of the land and environmental sensitivities as identified by the screening tool.

Site verification was undertaken in August 2023. The peak rain period for this area is from December to April. However, much rain had fallen just prior to the site visit. Habitat inspections and georeferenced photography was coupled with existing knowledge bases to evaluate the sensitivity assigned to the Terrestrial Biodiversity Theme.

2.2 DESKTOP SURVEY

2.2.1 GIS

Existing data layers were incorporated into a GIS to establish how the proposed study areas and associated activities interact with important terrestrial entities. Emphasis was placed on the following spatial datasets:

- Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2018);
- Northern Cape Critical Biodiversity Areas (Northern Cape Department of Environment and Nature Conservation, 2016[a]);
- Northern Cape Critical Biodiversity Areas Reason (Northern Cape Department of Environment and Nature Conservation, 2016[b]);
- Protected and Conservation areas of South Africa (South Africa Protected Areas Database-SAPAD; South Africa Conservation Areas Database-SACAD)[2]; and
- Red List of Ecosystems (RLE) for terrestrial realm (SANBI, 2022).

All mapping was performed using open-source GIS software (QGIS[3]).

2.2.2 Habitat mapping

The existing national landcover classification was used to assist with the identification of habitat types during the initial surveys. Furthermore, a drainage and aquatic habitat map was obtained from the aquatic specialist. These were pre-emptively buffered by 100 m to include the more prominent marginal vegetation. Finally, a digital elevation model (DEM) was obtained for the area

[2] http://dea.maps.arcgis.com/apps/MapTools/index.html?appid=2367540dd75148e8b6eaeab178a19d3a
[3] http://qgis.osgeo.org/en/site/

and a slope analysis was performed to delineate sensitive rocky habitats. Slopes of > 7° were considered steep enough in this region to constitute potentially sensitive rocky habitats and these were buffered by 30 m.

2.3 FIELD SURVEYS

Site visits were undertaken in August 2023 and February 2024. The timing of the surveys represented late winter conditions following recent rains as well as wet summer season. During the field surveys performed, the habitats were evaluated while driving and on foot and a series of georeferenced photographs were taken of the habitat attributes. The field surveys focused on a classification of the observed flora, habitats as well as the actual and potential presence of species of conservation concern (either classified as Threatened by the IUCN (2024), protected by NEMBA (2007, as amended) or indeed other legislations applicable provincially or nationally). The coverage of the Kareekloof EGI project area was excellent and all habitats could be accessed (Figure 2-1).

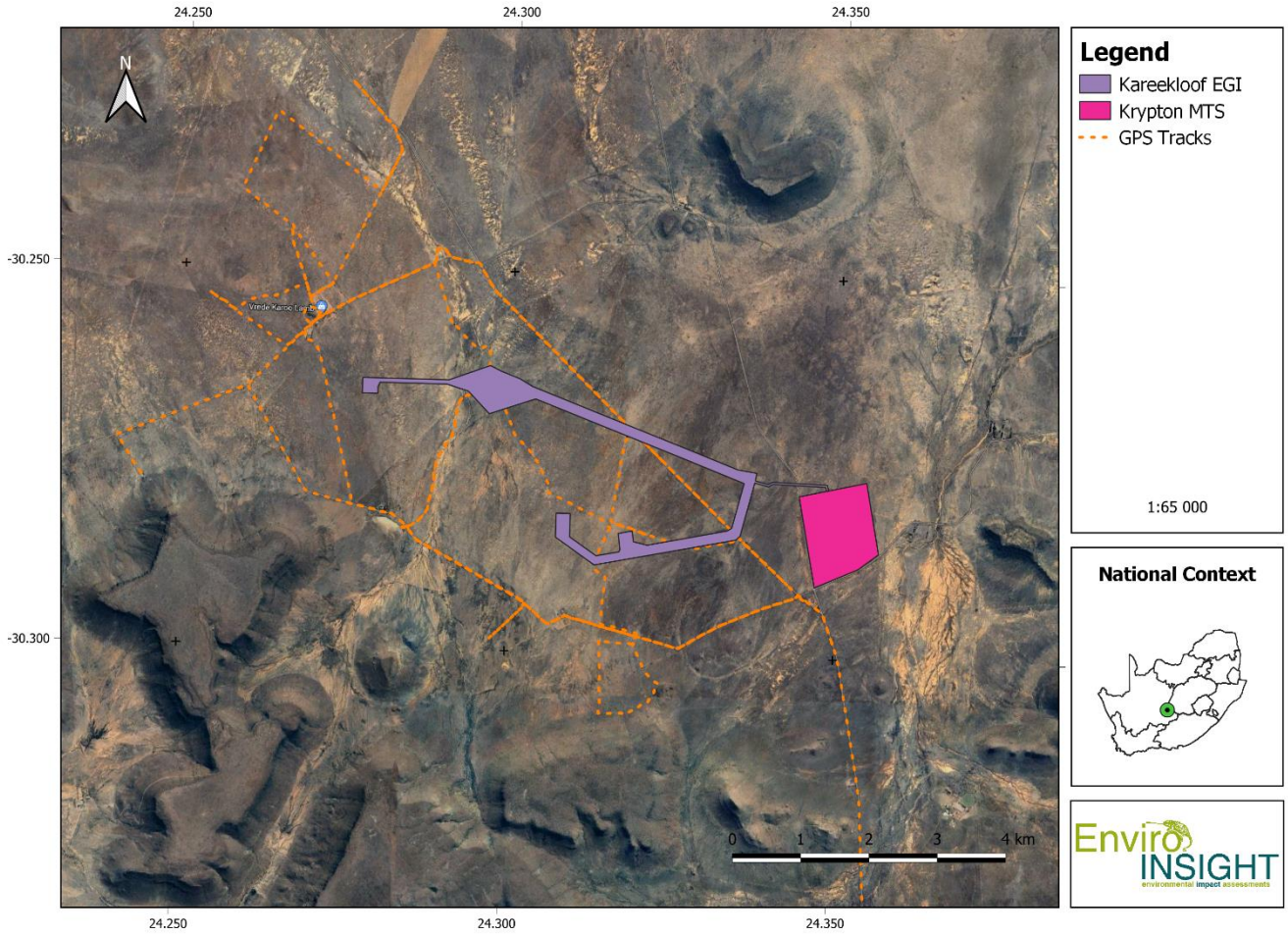


Figure 2-1: Specialist coverage of the Kareekloof EGI project area during August 2023.

2.4 SPECIES OF CONSERVATION CONCERN

The extinction risk status categories defined by the IUCN (Figure 2-2), which are considered here to represent species of conservation concern, are the "threatened" categories defined as follows:

- **Critically Endangered (CR)** – Critically Endangered refers to species facing immediate threat of extinction in the wild.
- **Endangered (EN)** – Endangered species are those facing a very high risk of extinction in the wild within the foreseeable future.
- **Vulnerable (VU)** – Vulnerable species are those facing a high risk of extinction in the wild in the medium-term.

Other measures of conservation status include species listed under the following:

- Trade in Protected Species (TOPS; National)
- Convention on International Trade in Endangered Species (CITES; International).

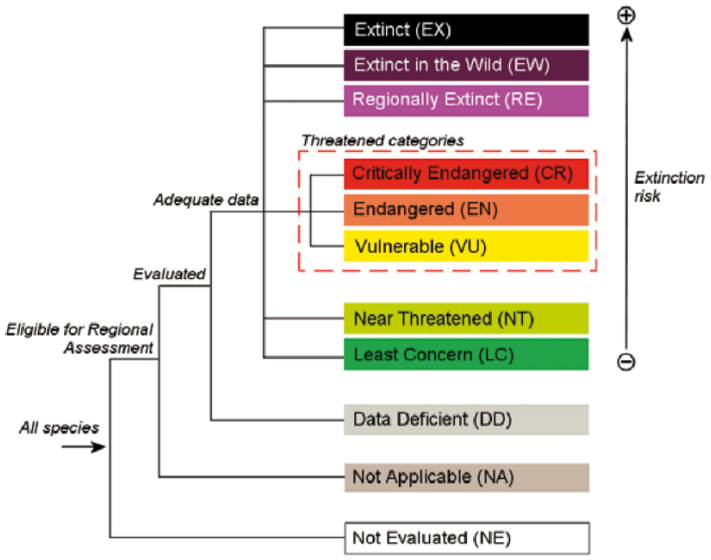


Figure 2-2: Schematic representation of the structure of the IUCN Red List Categories (IUCN 2012).

2.5 IMPACT ASSESSMENT

The following impact assessment methodology will be followed for the EIA phase of the project. SANBI (2020) cautions that assessing impacts by assigning numerical rankings that are then mathematically combined is not the preferred manner to evaluate impacts and may frequently lead to erroneous evaluations. Care must therefore be taken when interpreting such evaluations. The Mitigation Hierarchy Guideline for South Africa which offers appropriate guidance to determine impact significance is still in development and therefore cannot be implemented here. As such, the "traditional" method of evaluating impacts is followed in lieu of an accepted published alternative.

2.5.1 Definitions of terminology

The impact assessment includes:

- the nature, significance and consequences of the impact and risk;
- the extent and duration of the impact and risk;
- the probability of the impact and risk occurring;
- the degree to which impacts and risks can be mitigated;
- the degree to which the impacts and risks can be reversed; and
- the degree to which the impacts and risks can cause loss of irreplaceable resources.

As per the DFFET Guideline 5: Assessment of Alternatives and Impacts, the following methodology is applied to the prediction and assessment of impacts and risks. Potential impacts and risks have been rated in terms of the direct, indirect and cumulative:

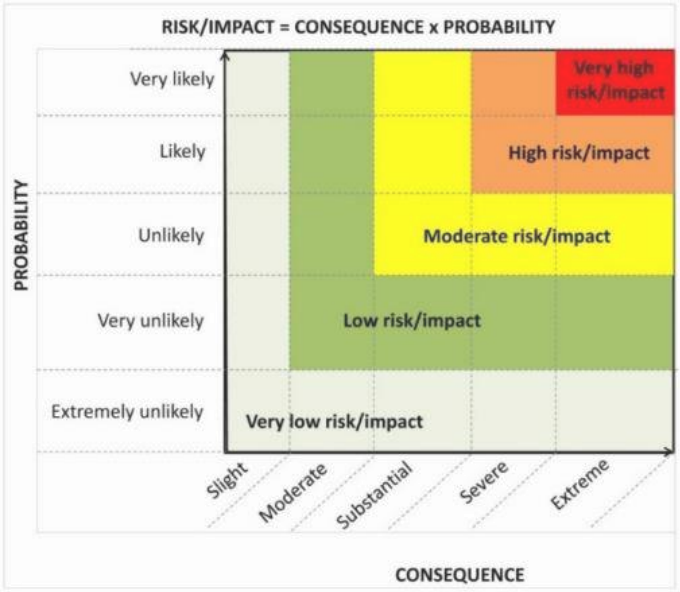
- Direct impacts are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.
- Indirect impacts of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all 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.
- Cumulative impacts are 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. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

The impact assessment methodology includes the following aspects:

- Nature of impact/risk - The type of effect that a proposed activity will have on the environment.
- Status - Whether the impact/risk on the overall environment will be:
  - Positive - environment overall will benefit from the impact/risk;
  - Negative - environment overall will be adversely affected by the impact/risk; or
  - Neutral - environment overall not be affected.
- Spatial extent – The size of the area that will be affected by the impact/risk:
  - Site specific;
  - Local (<10 km from site);
  - Regional (<100 km of site);
  - National; or
  - International (e.g. Greenhouse Gas emissions or migrant birds).
- Duration – The timeframe during which the impact/risk will be experienced:
  - Very short term (instantaneous);
  - Short term (less than 1 year);
  - Medium term (1 to 10 years);

  - Long term (the impact will cease after the operational life of the activity (i.e. the impact or risk will occur for the project duration)); or
  - Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient (i.e. the impact will occur beyond the project decommissioning).
- Reversibility of the Impacts - the extent to which the impacts/risks are reversible assuming that the project has reached the end of its life cycle (decommissioning phase):
  - High reversibility of impacts (impact is highly reversible at end of project life i.e. this is the most favourable assessment for the environment);
  - Moderate reversibility of impacts;
  - Low reversibility of impacts; or
  - Impacts are non-reversible (impact is permanent, i.e. this is the least favourable assessment for the environment).
- Irreplaceability of Receiving Environment/Resource Loss caused by impacts/risks – the degree to which the impact causes irreplaceable loss of resources assuming that the project has reached the end of its life cycle (decommissioning phase):
  - High irreplaceability of resources (project will destroy unique resources that cannot be replaced, i.e. this is the least favourable assessment for the environment);
  - Moderate irreplaceability of resources;
  - Low irreplaceability of resources; or
  - Resources are replaceable (the affected resource is easy to replace/rehabilitate, i.e. this is the most favourable assessment for the environment).
- Consequence – The anticipated consequence of the risk/impact:
  - Extreme (extreme alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they permanently cease);
  - Severe (severe alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they temporarily or permanently cease);
  - Substantial (substantial alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they temporarily or permanently cease);
  - Moderate (notable alteration of natural systems, patterns or processes, i.e. where the environment continues to function but in a modified manner); or
  - Slight (negligible alteration of natural systems, patterns or processes, i.e. where no natural systems/environmental functions, patterns, or processes are affected).
- Probability – The probability of the impact/risk occurring:
  - Extremely unlikely (little to no chance of occurring);
  - Very unlikely (<30% chance of occurring);
  - Unlikely (30-50% chance of occurring)
  - Likely (51 – 90% chance of occurring); or
  - Very Likely (>90% chance of occurring regardless of prevention measures).

To determine the significance of the identified impact/risk, the consequence is multiplied by probability as shown below



- *Significance – Will the impact cause a notable alteration of the environment?*
  - *Very low (the risk/impact may result in very minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making);*
  - *Low (the risk/impact may result in minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making);*
  - *Moderate (the risk/impact will result in moderate alteration of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated);*
  - *High (the risk/impact will result in major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making); and*
  - *Very high (the risk/impact will result in very major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making (i.e. the project cannot be authorised unless major changes to the engineering design are carried out to reduce the significance rating).*

- *Confidence – The degree of confidence in predictions based on available information and specialist knowledge:*
  - *Low;*
  - *Medium; or*
  - *High*

2.6 STUDY LIMITATIONS

- It is assumed that all third-party information acquired is correct (e.g. GIS data and scope of work).
- Avifauna assessments are not part of this assessment and is dealt with under the relevant theme.
- Due to the nature of most biophysical studies, it is not always possible to cover every square metre of a given study area.

3 TERRESTRIAL BIODIVERSITY RESULTS

The results are presented according to the requirements for undertaking SSV and for protocols for the assessment and minimum report content requirements of environmental impacts for environmental themes for activities requiring environmental authorisation dated 20 March 2020 (Government Gazette No. 43110, GN 320). To simplify this, each required aspect is indicated in Table 3-1 below, and where triggered it is discussed in more detail in the sections below.

Table 3-1: Terrestrial Biodiversity theme aspects required to be assessed.

Environmental Theme Aspect	Triggered for proposed activities	Section in report
Vegetation unit (SANBI 2018)	Yes – Eastern Upper Karoo	Section 3.2
Threatened Ecosystems (SANBI 2022)	No – no threatened ecosystem present	Section 3.2
Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA)	Yes. Project area intersects with an ESA as per the screening tool report.	Section 3.1 Section 3.3
Protected Areas	No – not located in any current or future planned protected areas.	Section 3.4
Ecology of the system	Main landscape features, habitats and dominant species recorded.	Section 3.5

3.1 SITE SENSITIVITY VERIFICATION

The findings of the site verification, which included a desktop assessment and site survey, could not confirm the **Very High** environmental sensitivity of the Terrestrial Biodiversity Theme, which is based solely on the presence of an Ecological Support Area (ESA) on which the Kareekloof EGI project area is located (Figure 1-3). This ESA is an extremely large area (860,279 ha; Figure 3-1) of low intensity land use activities. There are no specific terrestrial features that are linked to the ESA (e.g. specific habitat types or fauna populations), and the vast majority of the ESA encompassed ecosystems that are considered to be of Least Concern (see below). The ESA has most likely been classified as a supporting ecological role to provide connectivity between the surrounding Critical Biodiversity Areas and Protected Areas and to maintain healthy populations of many species that are not of conservation concern. While this is an important ecological role, designation of the entire area as Very High sensitivity for EGI developments seems unfounded. Detailed habitat descriptions and current impacts are discussed below to further substantiate this assertion.

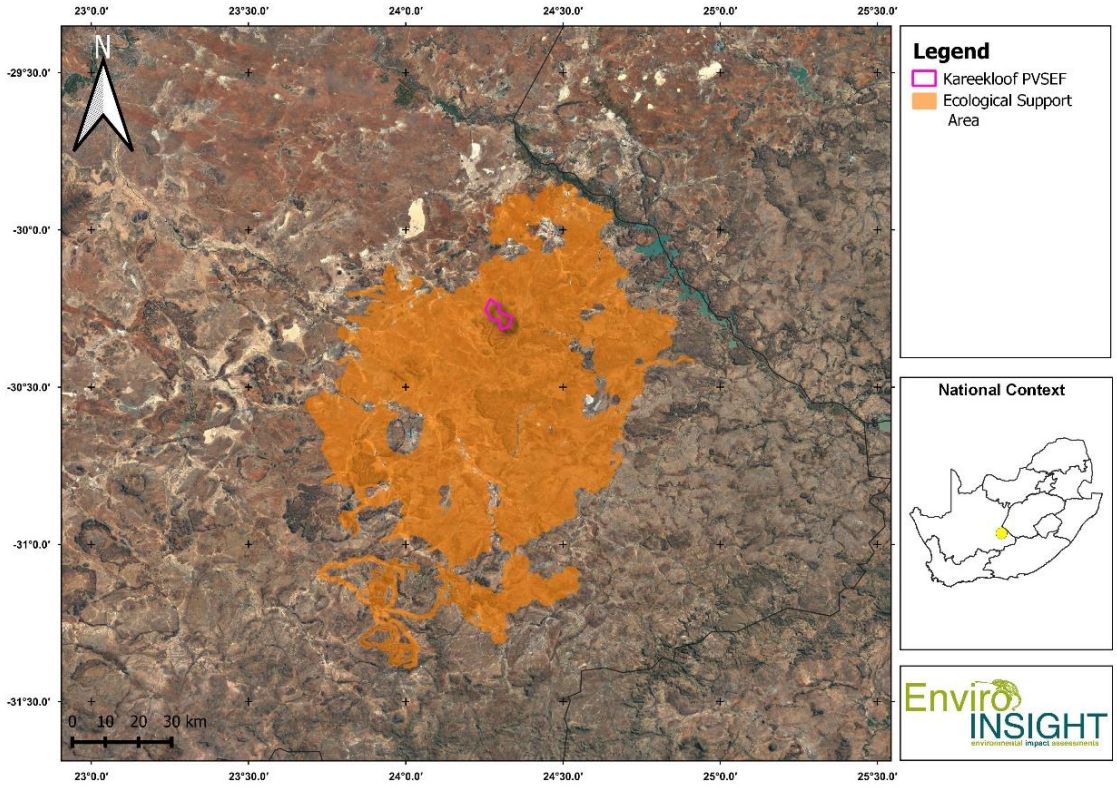


Figure 3-1: The extent of the Ecological Support Area on which the Kareekloof EGI project area is located.

3.2 REGIONAL VEGETATION

The study area is situated within the Nama-Karoo Biome. The Nama-Karoo is essentially a grassy, dwarf shrubland, dotted with characteristic koppies, most of which lies between 1,000 and 1,400 meters above sea level. Eastwards, the ratio of grasses to shrubs increases progressively, until the Nama Karoo eventually merges with the Grassland Biome. On the northern fringes the dwarf shrubland often has an overstory of shrubs and trees.

Natural disturbance factors that drive many vegetation dynamics include many that are linked to human actions and many disturbances interact to modify effects. Factors include grazing by livestock and wild herbivores, fire, rainfall and runoff and other episodic events such as hailstorms. Very little of the Nama-Karoo Biome in general has been transformed from natural vegetation to crops, dams, industry or other forms of land use that threaten natural diversity, mostly due to the arid conditions and/or rocky nature of the landscape. The dominant land use is the ranching of small stock, cattle and game farming with indigenous antelope.

The Eastern Upper Karoo vegetation types (Mucina & Rutherford, 2006, as amended) will be affected by the proposed development (Figure 3-2). Information as indicated in the NBA (2018) is summarised in Table 3-2.

Table 3-2: Vegetation types as per NBA (2018).

Vegetation type	Total area (ha) in South Africa	Conservation status from NSBA	Remaining (percent of area) from NSBA	Conservation target	Protection Status from NSBA
Eastern Upper Karoo	4983430.9	Least threatened	96.7%	21%	Poorly protected

The **Eastern Upper Karoo** vegetation type (Table 3-2) is one of the largest vegetation types in the country and consists of flat and gently sloping plains vegetation dominated by dwarf microphyllous shrubs with 'white' grasses, especially *Aristida, Eragrostis* and *Stipagrostis* (Mucina & Rutherford 2006). Eastern Upper Karoo is found in the Northern, Western and Eastern Cape, between Carnarvon and Loxton in the west, De Aar, Petrusville and Venterstad in the north and Burgersdorp and Cradock in the east, and the Great Escarpment in the south (Mucina & Rutherford 2006). The Eastern Upper Karoo is classified as Least Threatened with a national conservation target set at 21%, but less than 1% is formally protected. About 2% of the original extent has been transformed, largely due to building of dams (Mucina & Rutherford 2006); however, this could have increased in the last 16 years. Its geology consists of mudstones and sandstones of the Beaufort Group supporting duplex soils, which are vulnerable to erosion.

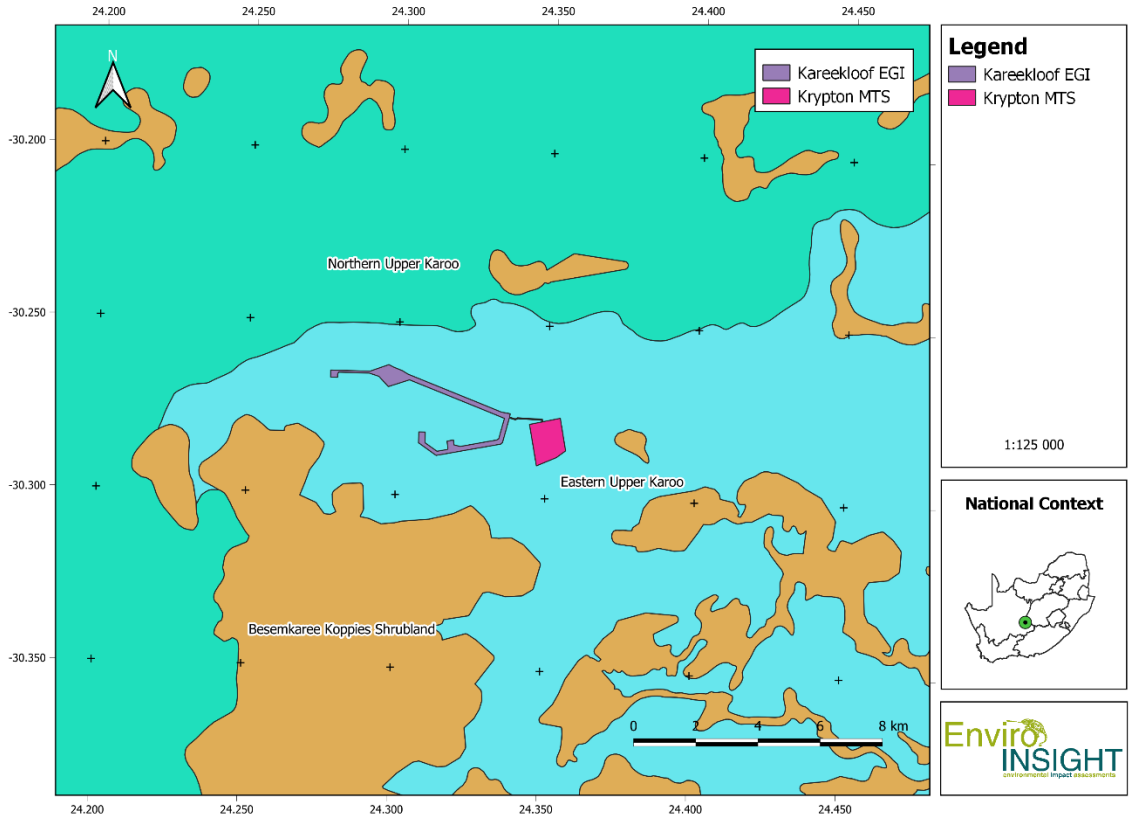


Figure 3-2: Regional vegetation type in relation to the Kareekloof EGI project area (SANBI, 2018).

Table 3-3: Attributes of the Eastern Upper Karoo vegetation type (Mucina and Rutherford, 2006, as amended).

Name of vegetation type	Eastern Upper Karoo
Code as used in the Book	NKu4
Conservation Target (percent of area) from NSBA	21%
Protected (percent of area) from NSBA	0.7%
Description of conservation status from NSBA	Least threatened
Description of the Protection Status from NSBA	Hardly protected
Area (km^2) of the full extent of the Vegetation Type	49821.32
Name of the Biome	Nama-Karoo Biome
Name of Group and Bioregion	Upper Karoo Bioregion

3.3 NORTHERN CAPE CRITICAL BIODIVERSITY AREAS

The Northern Cape CBA Map (2016) identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of landscape as a whole (Holness & Oosthuysen, 2016). Priorities from existing plans such as the Namakwa District Biodiversity Plan, the Succulent Karoo Ecosystem Plan, National Estuary Priorities, and the National Freshwater Ecosystem Priority Areas (NFEPA) were incorporated.

CBA's and ESA's are terrestrial and aquatic features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services. The primary purpose of CBA's is to inform land-use planning in order to promote sustainable development and protection of important natural habitat and landscapes. Biodiversity priority areas are described as follows:

- CBA's are areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. In other words, if these areas are not maintained in a natural or near-natural state then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses. For CBA's the impact on biodiversity of a change in land-use that results in a change from the desired ecological state is most significant locally at the point of impact through the direct loss of a biodiversity feature (e.g. loss of a populations or habitat).
- ESA's are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree of restriction on land use and resource use in these areas may be lower than that recommended for critical biodiversity areas. For ESA's a change from the desired ecological state is most significant elsewhere in the landscape through the indirect loss of biodiversity due to a breakdown, interruption or loss of an ecological process pathway (e.g. removing a migration corridor results in a population going extinct elsewhere). All natural non-FEPA wetlands and larger rivers have a minimum category of ESA.

The region surrounding the Kareekloof EGI project area has been classified as an Ecological Support Areas (ESA) due to it being located in the Platberg-Karoo Conservancy, the vegetation units and important wetland and river features (Northern Cape Department of Environment and Nature Conservation, 2016[b]). From a Terrestrial Biodiversity perspective, the Platberg-Karoo Conservancy and the vegetation units are important systems for grasslands and grassland-associated animals, as well as important areas for the conservation of avifauna. This section of the Karoo has the highest rainfall and provides an ecotone between the Nama Karoo and Grassland biomes. Accordingly, all developments within this ESA must undergo EA processes, where impacts are assessed and appropriate mitigation measures provided to lower the significance of negative impacts and enhance positive impacts, where appropriate.

According to the CBA Map, the Kareekloof EGI project area is entirely located on an ESA as confirmed by the screening tool (Figure 1-3) and discussed above (Figure 3-1). The assignment of this ESA as "Very High Sensitivity" in the Kareekloof EGI project area by the screening tool is considered unjustified given that:

- No threatened ecosystems or vegetation types are present in the ESA that cover the proposed Kareekloof EGI;

- No specific habitat the Kareekloof EGI project area has any obvious key ecological role such as a migration corridor;
- No threatened plant species are expected to occur in the Kareekloof EGI project area (screening tool);
- Only two threatened fauna species of Medium sensitivity (modelled to occur, not known to occur) were flagged by the screening tool for the Kareekloof EGI project area (see avifauna report); and
- This ESA is an extremely large area (860 279 ha; Figure 3-1).

3.4 PROTECTED AREAS AND EXPANSION AREAS

The Kareekloof EGI project area does not intersect with any current or future planned protected areas. The nearest protected area is the Rolfontein Provincial Nature Reserve situated ~ 40 km away towards the northeast. The Kareekloof EGI project area is however situated entirely within the "Platberg-Karoo Conservancy" Important Bird Area (IBA) (Figure 3-3). The nearest future planned protected area is the "Senqu Caledon" area located ~ 23 km towards the south of the Kareekloof EGI project area (Figure 3-4).

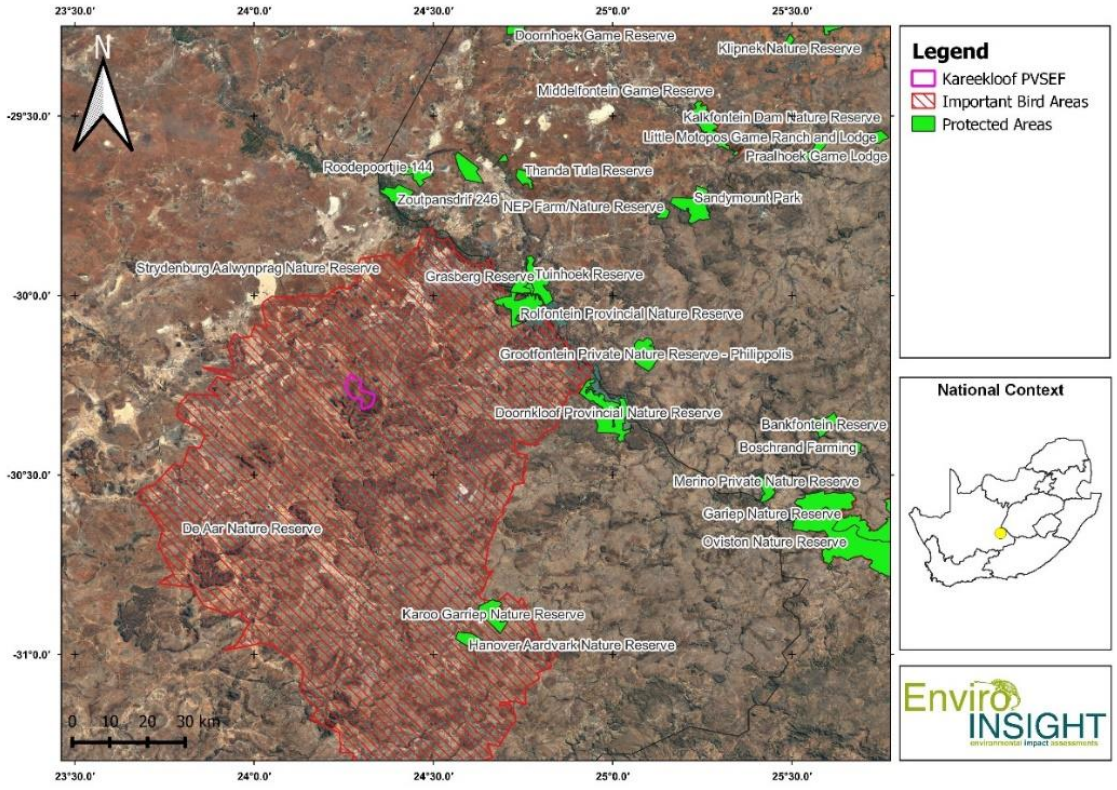


Figure 3-3.The Kareekloof EGI in relation to the nearest protected areas and IBAs.

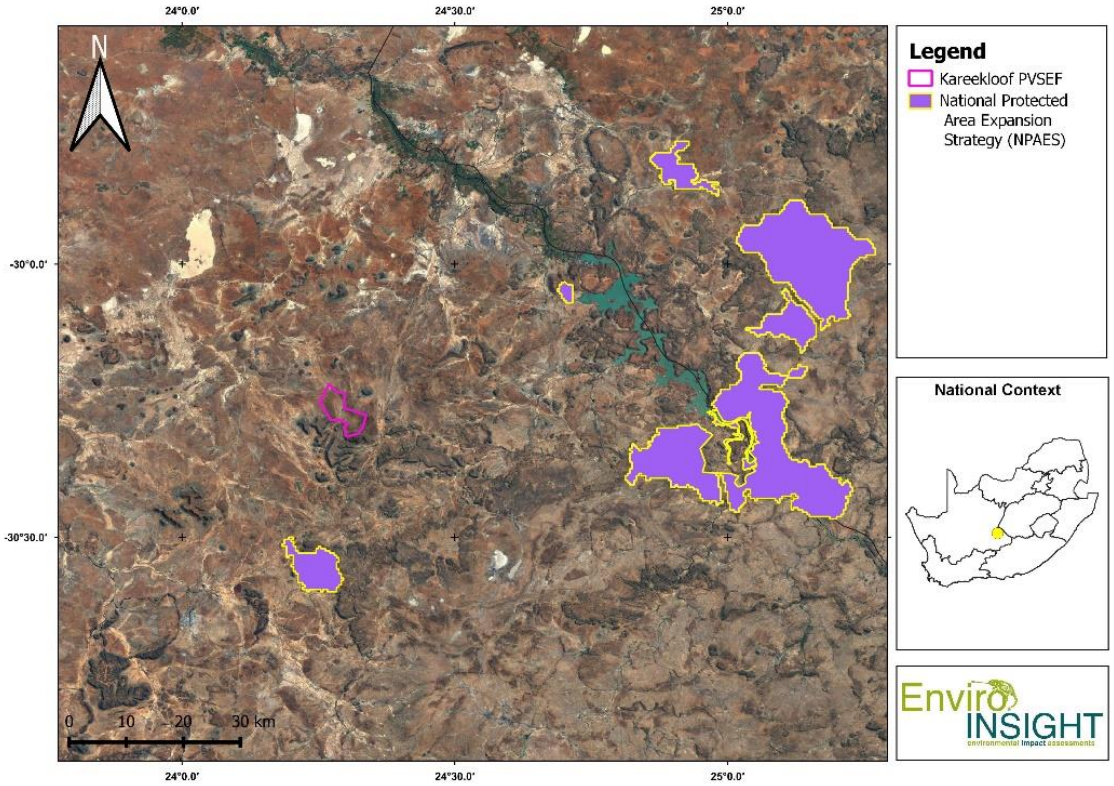


Figure 3-4.The Kareekloof EGI in relation to the National Protected Area Expansion Strategy (NPAES).

3.5 ECOLOGY OF THE SYSTEM

3.5.1 Ecological drivers and significant terrestrial landscape features

The Kareekloof EGI project area is predominantly located on relatively flat land, with elevated rocky ridges characterising the southern areas outside of the proposed EGI. There are few depression wetlands, scattered artificial dams and drainage areas present and no major rivers (Figure 3-5). The flat areas of Eastern Upper Karoo vegetation types are characterised by two major habitat types, namely Nama Karoo Low Shrubland and Natural Grassland according to the National Landcover Classification (NLC 2018[4]) (Figure 3-6).

Changes in vegetation structure and composition are mainly driven by overgrazing and the introduction of alien invasive species such as *Prosopis* sp. Transformation in the vegetation types are minimal and has increased mainly due to the construction of renewable energy facilities, both wind and solar since 2012 (see below).

[4] https://www.dffe.gov.za/projectsprogrammes/egis_landcover_datasets

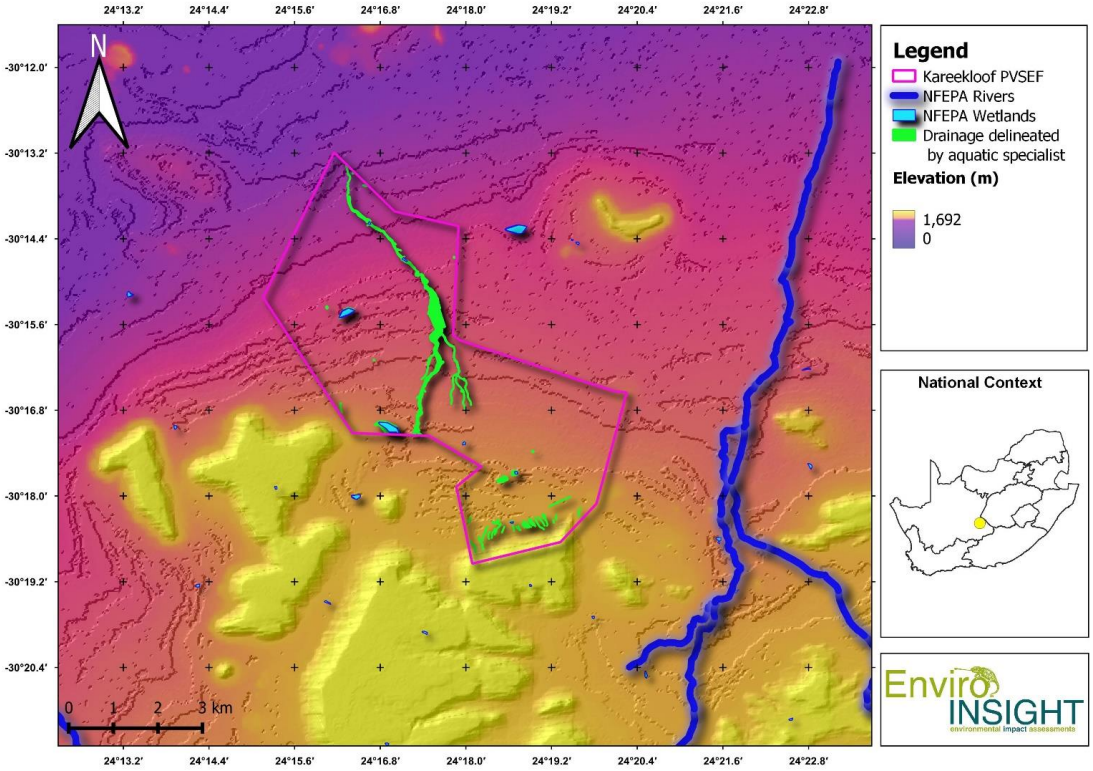


Figure 3-5. Major landscape features of the Kareekloof EGI project area.

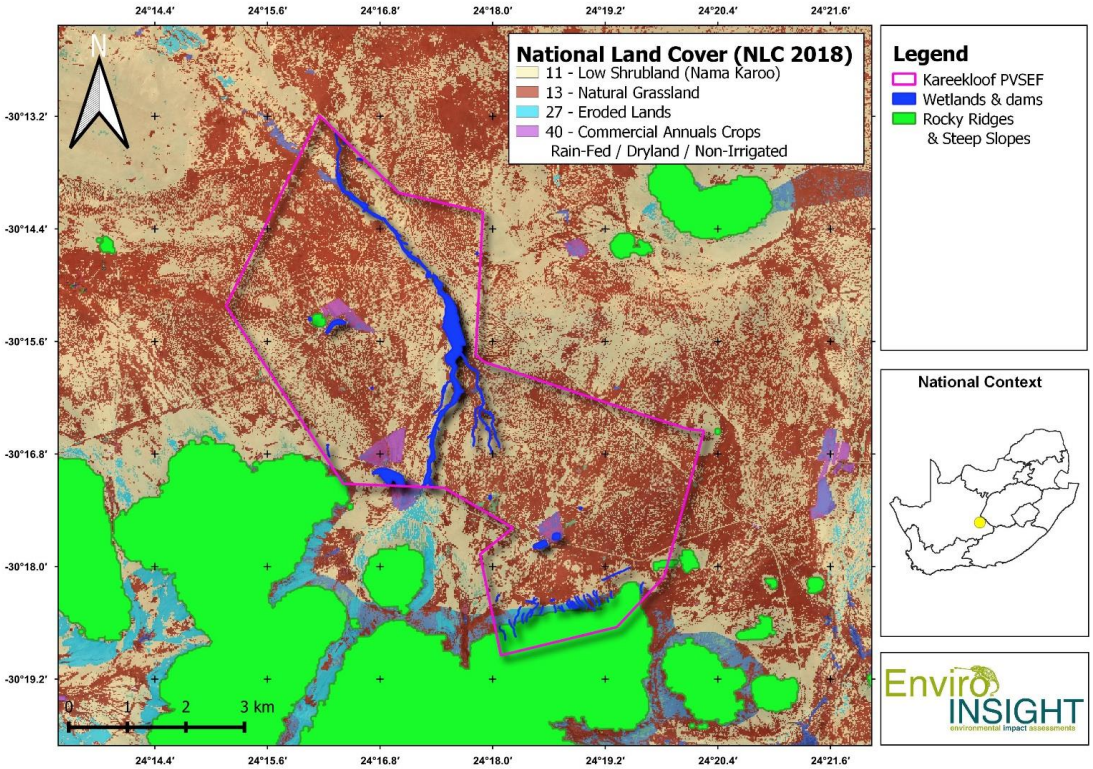


Figure 3-6.The major habitats and landscape features of the Kareekloof EGI project area.

3.5.1.1 National Freshwater Ecosystem Priority Areas (NFEPA), 2011

The National Freshwater Ecosystem Priority Areas (NFEPA) project provides strategic spatial priorities for conserving South Africa's freshwater ecosystems and supports sustainable use of water resources. These priority areas are called Freshwater Ecosystem Priority Areas (FEPAs).

FEPAs were identified based on:

- Representation of ecosystem types and flagship free-flowing rivers
- Maintenance of water supply areas in areas with high water yield
- Identification of connected ecosystems
- Representation of threatened and near-threatened fish species and associated migration corridors
- Preferential identification of FEPAs that overlapped with:
  - Any free-flowing river
  - Priority estuaries identified in the National Biodiversity Assessment 2018
  - Existing protected and focus areas for expansion identified in the NPAES.

The assessment revealed the presence of a few depression systems, all of which have been converted into artificial dams. No major rivers are present within the project area but a prominent drainage line, delineated by the aquatic specialist, bisects the project area (Figure 3-5 & Figure 3-6).

3.5.2 Ecological functioning and processes

The aquatic habitats (drainage and dams) and the rocky ridges and steep slopes habitats (Figure 3-6) represent the most limited and therefore, most important ecological features in the region, and if not protected could lead to reduced ecosystem services and could impact negatively on important terrestrial biodiversity features. It is recommended that these habitats should be avoided when designing the placement of infrastructure. Where linear infrastructure such as roads and powerlines need to cross these habitats, the appropriate mitigation measures need to be applied.

3.5.3 Ecological corridors and connectivity

An ecological corridor is a clearly defined geographical space that is governed and managed over the long-term to maintain or restore effective ecological connectivity. The main drainage line and its associated marginal vegetation as well as the rocky ridges and steep slopes habitats function as migration corridors across the landscape for fauna. Where linear infrastructure such as roads and powerlines need to cross these habitats, the necessary mitigation measures need to be implemented to reduce potential fauna fatality, and not to restrict any movement of fauna.

3.5.4 Species, distribution, and important habitats

This area generally receives very limited and sporadic rainfall. Accordingly, plant diversity is relatively low. Four main habitats were identified based on species composition and structure. The main driver of vegetation pattern in the area is the substrate. Georeferenced photographs were taken to assist in both the site characterisation as well as the sensitivity analysis and to provide lasting evidence for future queries. Each of these habitats is briefly discussed below.

3.5.4.1 Grassland

This is the dominant habitat and is mostly present on softer, sandier soils. It is characterised by a dense grass sward with only few shrubs present. It is dominated by white grasses of the genera *Aristida* and *Eragrostis* interspersed with microphyllous shrubs such as *Lycium* spp. (Figure 3-7). This habitat is considered moderately sensitive due to moderate species diversity and the potential presence of provincially protected species (of the genera *Aloe, Ruschia, Jamesbrittenia, Crassula, Haemanthus, Oxalis)*.

Figure 3-7. Major habitat of the Kareekloof EGI: Grassland on soft sandy soils.

3.5.4.2 Scrubland

This habitat is present as patches amongst the grassland, typically characterised by the near-absence of grasses (such as *Aristida* sp. and *Eragrostis* sp.) and the presence of large, woody shrubs (Figure 3-8). However, it often forms a habitat mosaic with the grassland, particularly on the ecotone of the two habitats. Similar to the grassland habitat, scrubland has a very expansive occurrence in the region and is therefore not considered to be highly sensitive. Provincially protected species of the genera *Aloe, Ruschia, Euphorbia, Haemanthus, Oxalis, Jamesbrittenia* and *Ammocharis* have been recorded in the area before.

Figure 3-8. Major habitat of the Kareekloof EGI: Scrubland.

3.5.4.3 Rocky Ridges & Steep Slopes

This structurally defined habitat (Figure 3-9) is limited in the region and has the potential to act a s a migration corridor for fauna. It is also not able to fully recover from any mechanical disturbances and has therefore been buffered from development by 30m. The presence of the protected tree (National Forests Act No. 84 of 1998) *Boscia albitrunca* has been recorded on similar Koppies or their foot slopes within a 5 km radius from the Kareekloof EGI.

Figure 3-9. Major habitat of the Kareekloof EGI: Rocky ridges & steep slopes.

3.5.4.4 Drainage, wetlands & dams

This is a collection of aquatic habitats predominantly characterised by the ephemeral drainage lines and their marginal vegetation, but also the man-made impoundments (dams) in these drainage lines which retain surface water for longer (Figure 3-10). These habitats are very limited in this arid region and due to the periodic presence of water provide excellent foraging habitats for fauna, particularly in the dry months. The dense marginal vegetation is also often suitable for fauna breeding purposes. This habitat is considered to be sensitive as it functions as both foraging habitat and migration corridors for fauna and is limited in the landscape. It has therefore been buffered from development by 100 m.

Figure 3-10. Major habitat of the Kareekloof EGI: Drainage, wetlands & dams.

4 OPPORTUNITIES & CONSTRAINTS

Following the sensitivity ratings for the habitats defined above, a No-Go delineation was developed to indicate the areas where development of infrastructure should be avoided. Since no High sensitivity areas or buffers were identified for the Terrestrial Biodiversity theme, by implication, the Kareekloof EGI project area is considered developable. The sensitivity map for the proposed Kareekloof EGI project area is provide in Figure 4-1.

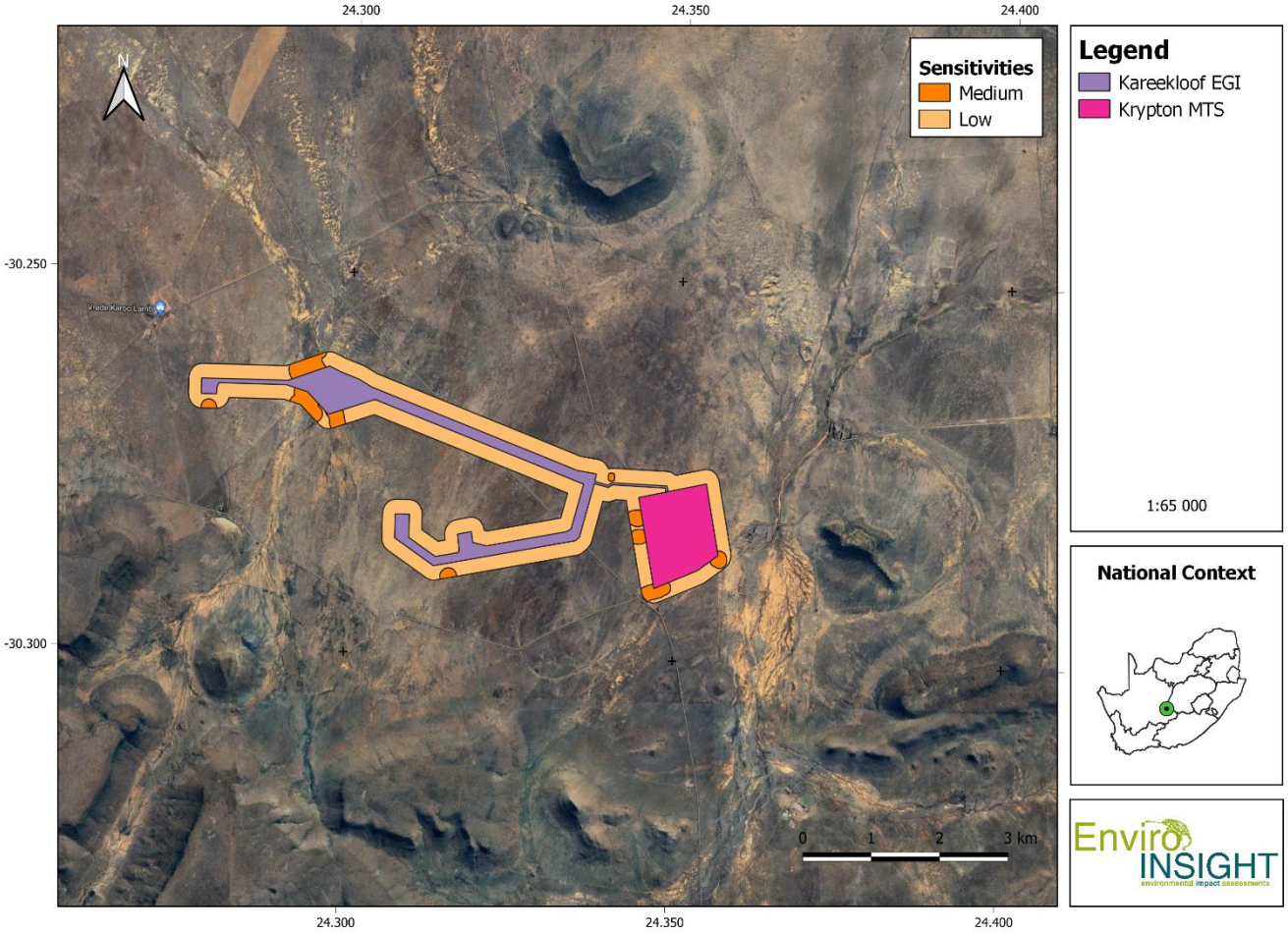


Figure 4-1. Terrestrial Biodiversity opportunities and constraints (No-Go areas) map for the proposed Kareekloof EGI.

5 IMPACT ASSESSMENT

The development of the Kareekloof EGI is likely to result in a variety of impacts to terrestrial biodiversity, associated largely with the disturbance and transformation of intact vegetation and faunal habitat to hard infrastructure including service areas, access roads, and laydown areas.

5.1 POTENTIAL IMPACTS

Potential impacts associated with the proposed development include:

- During the preconstruction phase, vegetation will be removed for the laydown area, access roads and other infrastructure as part of ground preparation. This will result in habitat loss and fragmentation.
- The proposed EGI consist of numerous pylons to support powerline of approximately 4km. The entire site will not be cleared of vegetation. Not all vegetation will be cleared underneath the EGI, but species structure and composition could be impacted on.
- Disturbance underneath the powerlines could lead to increased alien invasive species and increased erosion and soil compaction.

Currently, no anticipated fatal flaws exist as avoidance is possible and where not, appropriate mitigation measures can reduce impacts to low levels. Theses impacts are discussed below in more detail.

The locality of renewable energy projects is based on agreements with landowners, basically where land is available for development in combination with suitable solar resource and proximity to Eskom Power Stations. Accordingly, the locality alternative needs to be assessed with these limitations in mind, and the developer generally seeks out suitable land. Potential flaws were highlighted to the developer from the onset regarding this chosen site, and the high sensitivity areas and protected species were avoided by the development footprint.

5.1.1 Potential Impacts during the Construction Phase

Impact	*Impact Criteria*		*Significance (Pre-Mitigation)*	*Potential mitigation measures*	*Significance (Post-Mitigation)*	*Confidence Level*
CONSTRUCTION PHASE						
Habitat loss and fragmentation	*Status*	*Negative*	*Moderate*	• *No High sensitivity areas have been identified for the EGI project. As far as possible, the Watercourse habitat should be avoided for the placement of pylons and roads.* • *With appropriate mitigation and rehabilitation impacts can be reduced for other habitats.* • *No construction related activities, such as the site camp, storage of materials, temporary roads or ablution facilities may be located in Watercourses.* • *The topsoil and vegetation disturbed for the for the preparation of foundations and temporary infrastructure must be replaced and rehabilitated where necessary.* • *Only the planned placement of powerlines must be disturbed. Vegetation and topsoil removal outside of these areas must be avoided.*	*Low*	*Medium*
	Spatial Extent	*Site specific*				
	Duration	*Medium term*				
	Consequence	*Severe*				
	Probability	*Very Likely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Moderate*				
Loss of species of conservation concern	*Status*	*Negative*	*Low*	• *Avoidance is the best measure.* • *No plant SCC were recorded or likely to be present on the site.*	*Low*	*High*
	Spatial Extent	*Site specific*				
	Duration	*Long term*				
	Consequence	*Moderate*				
	Probability	*Unlikely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Moderate*				
Loss of protected species	*Status*	*Negative*	*Moderate*	*Where the approved layout designs impact on provincially protected species permit applications are required for either the relocation or destruction of provincially protected species (Free State Nature Conservation Ordinance 8 of 1969).* *This is also relevant to protected trees such as Boscia albitrunca which could be impacted on by the proposed development.*	*Low*	*High*
	Spatial Extent	*Site specific*				
	Duration	*Long term*				
	Consequence	*Moderate*				
	Probability	*Likely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Moderate*				
Increased alien invasive species	*Status*	*Negative*	*Moderate*	*Compile an alien and invasive species control and monitoring plan in terms of NEMBA.*	*Moderate to Low*	*Medium*
	Spatial Extent	*Local*				

Impact	Impact Criteria		Significance (Pre-Mitigation)	Potential mitigation measures	Significance (Post-Mitigation)	Confidence Level
	Duration	Medium term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate reversibility				
	Irreplaceability	Low irreplaceability				
Increased erosion and soil compaction	Status	Negative	Moderate	• Utilise existing access routes as far as possible. • Confine the movement of vehicles to the access routes to and from the site and to the construction and operation areas. • Do not drive in the natural veld. • Rehabilitate new vehicle tracks and areas where the soil has been compacted as soon as possible. • Monitor the entire site for signs of erosion throughout the construction, operational and decommissioning phases of the project. • Refer to Aquatic Report mitigation measures relevant to watercourse crossings and development close to watercourses.	Low	Medium
	Spatial Extent	Site specific				
	Duration	Medium term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate reversibility				
	Irreplaceability	Low irreplaceability				
Littering and general pollution	Status	Negative	Moderate	• The site camp must not be located in high sensitivity areas and their buffer zones. • Dangerous goods may not be stored within 100 m of a watercourse – refer to the BESS assessment for more details. • Hydrocarbon fuels must be stored in a secure, bunded area. • Sufficient waste disposal bins must be available on site and clearly marked. Skip bins may be required during the construction phase which must be emptied on a regular basis. • Ablution facilities must be located outside sensitive areas and their buffer zones. • Portable ablution facilities must be regularly cleaned and maintained in good working condition. • Any spillage from ablution facilities must be cleaned up immediately and disposed of in an • appropriate manner. • Vehicles must be in good working condition, with no oil, water or fuel leaks. Vehicles must be regularly inspected and any problems corrected.	Low	Medium
	Spatial Extent	Local				
	Duration	Short to Medium term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate reversibility				
	Irreplaceability	Low irreplaceability				

Impact	Impact Criteria		Significance (Pre-Mitigation)	Potential mitigation measures	Significance (Post-Mitigation)	Confidence Level
				• *Refuelling may only take place in an appropriate, bunded area. Refuelling may not take place in sensitive areas.* • *Hydrocarbon spills must be contained and cleaned up immediately. Spill kits must be available on site in case of accidental spillage.*		

5.1.2 Potential Impacts during the Operational Phase

Impact	Impact Criteria		Significance (Pre-Mitigation)	Potential mitigation measures	Significance (post-mitigation)	Confidence Level
OPERATIONAL PHASE						
Loss of species composition and diversity	*Status*	*Negative*	*Moderate*	• *The loss of species composition and diversity cannot be fully mitigated due to a permanent structure which will change microclimatic conditions for the life of the facility operation.* • *A rehabilitation plan is required to restore each habitat to a natural state that is representative of the respective vegetation type after decommissioning.*	*Low*	*Medium*
	Spatial Extent	*Site specific*				
	Duration	*Long term*				
	Consequence	*Moderate*				
	Probability	*Likely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Low*				
Increased alien invasive species	*Status*	*Negative*	*Moderate*	*Compile an alien and invasive species control and monitoring plan in terms of NEMBA.*	*Low*	*High*
	Spatial Extent	*Local*				
	Duration	*Long term*				
	Consequence	*Moderate*				
	Probability	*Likely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Low*				
Littering and general pollution	*Status*	*Negative*	*Moderate*	• *Vehicles must be in good working condition, with no oil, water or fuel leaks.* • *Vehicles must be regularly inspected, and any problems corrected.*	*Low*	*High*
	Spatial Extent	*Local*				
	Duration	*Medium term*				

Impact	Impact Criteria		Significance (Pre-Mitigation)	Potential mitigation measures	Significance (post-mitigation)	Confidence Level
	Consequence	Moderate		• Refuelling may only take place in an appropriate, designated bunded area. • Any spillages must be reported immediately and dealt with appropriately. • Spill kits must be available on site in case of accidental spillage. • Sufficient waste disposal bins must be available on site and clearly marked.		
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Replaceable				

5.1.3 Potential Impacts during the Decommissioning Phase

Impact	Impact Criteria		Significance (Pre-Mitigation)	Potential mitigation measures	Significance (Post-Mitigation)	Confidence Level
DECOMMISSIONING PHASE						
Loss of habitat	Status	Negative	Low	The loss of vegetation is unavoidable within the approved layout development footprint, but sensitive areas must be avoided. A rehabilitation plan is required to restore each habitat to a natural state after decommissioning.	Very Low	Medium
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	Moderate				
Increased alien invasive species	Status	Negative	Moderate	Compile an alien and invasive species control and monitoring plan in terms of NEMBA.	Low	Medium
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				

5.2 ANTICIPATED CUMULATIVE IMPACTS

Cumulative impacts are notoriously difficult to assess accurately. However, the evaluation of cumulative impacts from EGIs can largely be considered as a spatial analysis, because the most obvious impact to terrestrial biodiversity from these developments in arid areas is the loss of habitat.

The Kareekloof EGI development is located in the Central Strategic Transmission Corridor (STC) as is the case for many other renewable energy projects in the area. There are about 47 renewable energy projects within a 30 km radius of which 11 are wind energy facilities and 34 are solar energy facilities (REEA Q1 2024[5]) (Figure 5-1). Only two separate transmission line applications have been submitted. The proposed Kareekloof EGI itself only represents <1% of the 30 km radius area, indicating an insignificant proportion of transformation in the regional context that can be expected from this development alone. It is important to note that not all of these areas will be transformed by the proposed developments and mitigation recommendations made above and implemented by the existing developments will ensure that the most sensitive habitats remain undisturbed in the region. The cumulative impact of habitat loss is therefore considered negligible.

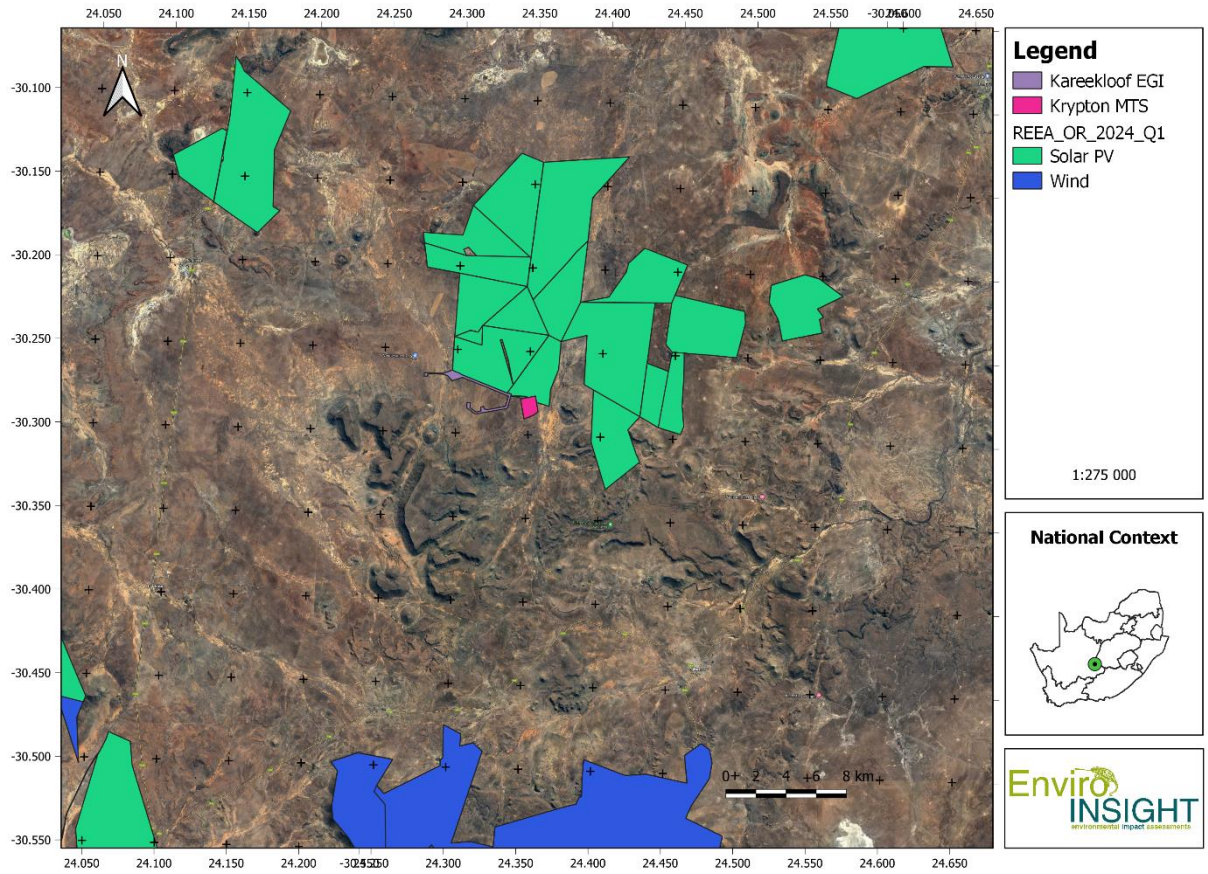


Figure 5-1. Location of known regional renewable energy projects (Quarter 1, 2024[6]) in relation to the Kareekloof EGI.

[5] Renewable Energy EIA Application Database Quarter 1 2024 - https://egis.environment.gov.za/data_egis/data_download/current
[6] https://egis.environment.gov.za/data_egis/data_download/current

6 CONCLUSION AND PROFESSIONAL OPINION

The proposed Kareekloof EGI is located within the Eastern Upper Karoo vegetation type listed as Least Threatened but poorly protected. None of the facilities are in a threatened ecosystem or national protected expansion area. The Terrestrial Biodiversity theme of the screening tool report is rated as Very High sensitivity. However, based on the SSV, this could not be confirmed and is considered to be of low sensitivity in relation to the proposed development. The project is in an ESA and no plant SCC are expected to occur on site. The ESAs are mainly due to watercourses on site which should be avoided for the placement of pylons as far as possible and the appropriate mitigation measures should be in place to reduce impacts to acceptable levels.

Most of the project is in grasslands on flat plains and gently sloping hills that are considered to be moderately sensitive. The drainage areas, wetlands and rocky ridges with associated steep slopes are sensitive and should be avoided during the construction period as far as possible, specifically for permanent infrastructure including laydown areas. As far as possible, roads and pylons should not cross watercourses, but where this is not possible the impacts can be mitigated by reducing it to acceptable levels.

Considering the above-mentioned information, no fatal flaws are evident for the proposed project should the layout incorporate the final habitat sensitivities. It is the opinion of the specialists that the project, may be considered for authorisation, on condition that all prescribed mitigation measures and supporting recommendations are implemented. Should the layout be amended, and significant changes occur which impacts on sensitive features, all necessary protocols need to be followed to ensure all highly sensitive areas are avoided.

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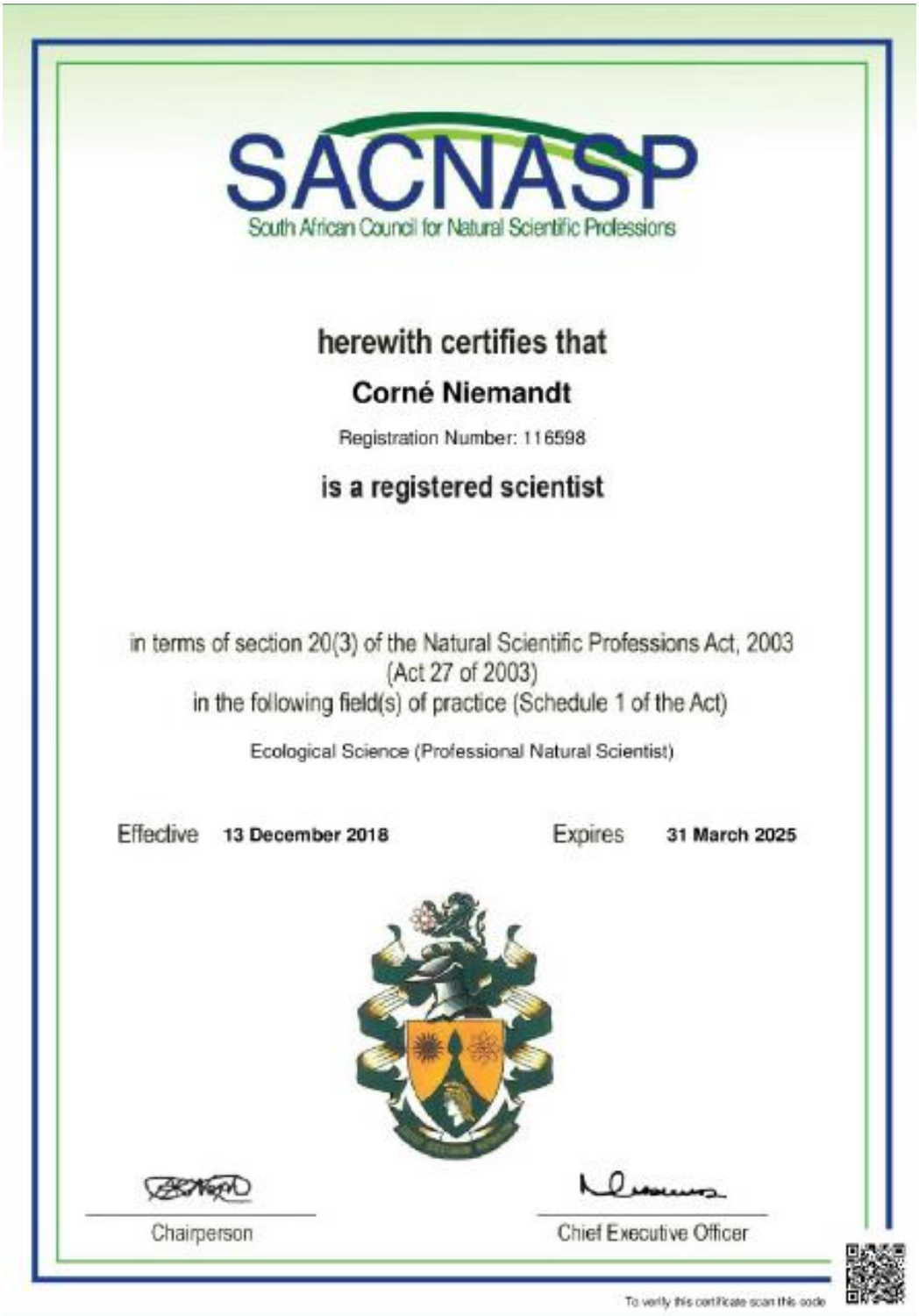
APPENDIX A: SACNASP PROFESSIONAL CERTIFICATES



SACNASP
South African Council for Natural Scientific Professions

herewith certifies that

Corné Niemandt

Registration Number: 116598

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule 1 of the Act)

Ecological Science (Professional Natural Scientist)

Effective **13 December 2018** Expires **31 March 2025**

Chairperson

Chief Executive Officer

To verify this certificate scan this code