PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY AND ASSOCIATED GRID INFRASTRUCTURE, NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE, SOUTH AFRICA.

FAUNA & FLORA SPECIALIST STUDY

3Foxes Biodiversity Solutions

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SiVEST SA (PTY) LTD

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EXECUTIVE SUMMARY

Genesis Enertrag Koup 1 Wind (Pty) Ltd is proposing the development of a commercial wind farm and associated infrastructure on a site located near to Beaufort West in the Western Cape. It is anticipated that the proposed Koup 1 WEF will comprise twenty-eight (28) wind turbines with a maximum total energy generation capacity of up to approximately 140MW. A preferred project site with an extent of ~4280ha has been identified by Genesis as a technically suitable area for the development of the Koup 1 Wind Energy Facility 1. As part of the required EIA process, this ecological specialist study details the ecological characteristics of the site and provides an assessment of the likely ecological impacts associated with the development of the Koup 1 WEF and Grid Infrastructure. Impacts are assessed for the construction, operation, and decommissioning phases of the development and a variety of mitigation and avoidance measures are recommended to reduce the impact of the development on the receiving environment.

Several site visits and desktop review of the available ecological information for the area was conducted in order to identify and characterise the ecological features of the site and inform an ecological sensitivity map for the site, which has been used to guide development at the site. The Koup 1 site falls entirely within the Gamka Karoo vegetation type and consists of open gravel plains and low hills dissected by numerous drainage lines. Vegetation cover is generally very low and dominated by low shrubs and scattered low trees. In general, the vegetation of the Koup 1 site is considered low sensitivity and there are few species of concern present. In terms of fauna, the diversity of mammals, reptiles and amphibians is considered relatively low, even by Karoo standards. Although the site falls within the broad distribution of the Riverine Rabbit, the drainage lines of the site do not have extensive floodplains with dense riparian vegetation that represent the typical habitat of this species in the area. The Koup 1 site is therefore considered unsuitable for this species and the development is considered highly unlikely to have any impact on the Riverine Rabbit. The site also falls within the range of the Karoo Padloper and if present it would be associated with the hills of the site with sufficient loose rock and coarse rubble to provide shelter. The low vegetation cover and paucity of such habitat suggests that the site is not an important area for this species and no evidence of this species was observed on the site.

While the smaller drainage features of the site are classified as Ecological Support Areas, there is only one small area of CBA in the east of the site that would not be directly impacted by the development. As such impacts on CBAs and ESAs are considered acceptable. In terms of cumulative impacts, the wider area currently has a low development impact from renewable energy and the contribution of the Koup 1 WEF to cumulative impact at less than 50ha is considered relatively low and would not generate significant broad-scale impact and as such is considered acceptable.

In terms of the sensitivity mapping and the set limits of acceptable change, the development is within the limits of acceptable change and as such meets the proposed limits of acceptability in terms of the distribution of impacts across the different sensitivity categories of the site.

Impact Statement - Koup1 WEF

There are no impacts associated with the Koup 1 Wind Energy Facility that cannot be mitigated to an acceptable level. With the application of relatively simple mitigation and avoidance measures, the impact of the Koup 1 Wind Farm on the local environment can be reduced to a low and acceptable magnitude. The contribution of the Koup 1 Wind Farm development to cumulative impact in the area would be low and is considered acceptable. Overall, there are no specific long-term impacts likely to be associated with the development of the Koup 1 wind farm that cannot be reduced to a low significance. As such, there are no fatal flaws associated with the development and no terrestrial ecological considerations that should prevent it from proceeding.

Impact Statement - Koup1 Grid Connection

There are no impacts associated with the Koup 1 Grid Connection Option 2 and associated infrastructure that cannot be mitigated to an acceptable level. With the application of relatively simple mitigation and avoidance measures, the impact of the Koup 1 Grid Connection on the local environment can be reduced to a low and acceptable magnitude. The contribution of the Koup 1 Grid Connection development to cumulative impact in the area would be low and is considered acceptable. Overall, there are no specific long-term impacts likely to be associated with the development of the Koup 1 grid connection hat cannot be reduced to a low significance. As such, there are no fatal flaws associated with the development and no terrestrial ecological considerations that should prevent it from proceeding.

NEMA Checklist

NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) AND ENVIRONMENTAL IMPACT REGULATIONS, 2014 (AS AMENDED) - REQUIREMENTS FOR SPECIALIST REPORTS (APPENDIX 6)

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	**Section of Report**
1. (1) A specialist report prepared in terms of these Regulations must contain- a) details of- i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	Appendix 5
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page V
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1
(cA) an indication of the quality and age of base data used for the specialist report;	Section 1.4
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 5
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 1.4
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 1.4
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 5, Section 6
g) an identification of any areas to be avoided, including buffers;	Section 6
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 6
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 2

j) a description of the findings and potential implications of such findings on the impact of the proposed activity, (including identified alternatives on the environment) or activities;	Section 6
k) any mitigation measures for inclusion in the EMPr;	Section 6
l) any conditions for inclusion in the environmental authorisation;	Section 6
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 6
n) a reasoned opinion- i. (as to) whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Section 8
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	
q) any other information requested by the competent authority.	
2) Where a government notice *gazetted* by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	

SPECIALIST INFORMATION

Specialist Company Name:	3Foxes Biodiversity Solutions			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	100%
Specialist name:	Simon Todd			
Specialist Qualifications:	BSc. (Zool. & Bot.), BSc Hons (Zool.), MSc (Cons. Biol.)			
Professional affiliation/registration:	SACNASP 400425/11			
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DECLARATION BY THE SPECIALIST

I, _____Simon Todd_____, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

3Foxes Biodiversity Solutions

Name of Company:

Date:

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FAUNA & FLORA SPECIALIST STUDY

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1. INTRODUCTION

Genesis Enertrag Koup 1 Wind (Pty) Ltd (hereafter referred to as "Genesis"), has appointed SiVEST Environmental (hereafter referred to as "SiVEST") to undertake the required EIA / BA Processes for the proposed construction of the Koup 1 Wind Energy Facility (WEF) and associated grid connection infrastructure near Beaufort West in the Western Cape Province of South Africa. It is anticipated that the proposed Koup 1 WEF will comprise twenty-eight (28) wind turbines with a maximum total energy generation capacity of up to approximately 140MW. The electricity generated by the proposed WEF development will be fed into the national grid via a 132kV overhead power line. A Battery Energy Storage System (BESS) will be located next to the onsite 33/132kV substation. The entire project site is located within the Beaufort West Renewable Energy Development Zones (REDZ). Due to the location of the project site within the REDZ, a Basic Assessment (BA) process will be undertaken in accordance with GN114 as formally gazetted on 16 February 2018.

Genesis Enertrag Koup 1 Wind has appointed SiVEST as the independent Environmental Assessment Practitioner (EAP) to undertake the required environmental authorisation process for the proposed Koup 1 Wind Energy Facility and associated grid connection. Genesis has appointed 3Foxes Biodiversity Solutions to provide a specialist terrestrial fauna and flora specialist impact assessment study of the proposed development as part of the BA process.

The purpose of the Koup 1 WEF terrestrial fauna and flora specialist Environmental Impact Assessment study is to describe and detail the ecological features of the proposed site, provide an assessment of the ecological sensitivity of the site, and identify and assess the likely impacts associated with the proposed development of a wind energy facility on the site. A desktop review of the available ecological information for the area as well as a number of site visits and a field assessment is used to identify and characterise the ecological features of the site. This information is used to derive an ecological sensitivity map that presents the ecological constraints for development at the site and which has been used to inform the layout of the facility. Impacts are assessed for the construction, operation, and decommissioning phases of the development. Cumulative impacts on the broader area are also considered and assessed. A variety of avoidance and mitigation measures associated with each identified impact are recommended to reduce the likely impact of the development, which should be included in the Environmental Management Programme (EMPr) for the

development. Finally, a statement is made as to the general ecological acceptability of the Koup 1 Wind Farm and whether or not the development should be authorised. The full scope of study is detailed in Section 1.1 below.

1.1 Terms of Reference

The scope of the study includes the following activities:

- a description of the environment that may be affected by a specific activity and the manner in which the environment may be affected by the proposed project;
- a description and evaluation of environmental issues and potential impacts (including assessment of direct, indirect and cumulative impacts) that have been identified;
- a statement regarding the potential significance of the identified issues based on the evaluation of the issues/impacts;
- an indication of the methodology used in determining the significance of potential environmental impacts;
- an assessment of the significance of direct, indirect and cumulative impacts of the development;
- a description and comparative assessment of all alternatives including cumulative impacts;
- recommendations regarding practical mitigation measures for potentially significant impacts, for inclusion in the Environmental Management Programme (EMPr);
- an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;
- a description of any assumptions uncertainties and gaps in knowledge; and
- an environmental impact statement which contains:
    - a summary of the key findings of the environmental impact assessment;
    - an assessment of the positive and negative implications of the proposed activity; and
    - a comparative assessment of the positive and negative implications of identified alternatives.

General Considerations for the study included the following:

- Disclose any gaps in information (and limitations in the study) or assumptions made.
- Identify recommendations for mitigation measures to minimize impacts.
- Outline additional management guidelines.
- Provide monitoring requirements, mitigation measures and recommendations in a table format as input into the EMPr for faunal or flora related issues.
- The assessment of the potential impacts of the development and the recommended mitigation measures provided have been separated into the following project phases:
    - Pre-construction
    - Construction

- Operational
- Decommissioning

1.2 Assessment Approach & Philosophy

This assessment is conducted according to the 2014 EIA Regulations (Government Notice Regulation 982) in terms of the National Environmental Management Act (Act 107 of 1998) as amended (NEMA), as well as the recently promulgated notice issued in terms of NEMA, *"National Environmental Management Act, 1998 (Act No. 107 Of 1998): Procedures to be followed for the assessment and minimum criteria for reporting of identified environmental themes in terms of section 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation [G 43110 – GN 320]*". The applicable site verification report as required, is included under Annex 5 of this report and the required *Protocols for the assessment and reporting of environmental impacts on terrestrial animal species, plant species and terrestrial biodiversity are* provided in Annex 6-8. It should however be noted that this assessment does not need to be aligned with the protocols, since the DEA has indicated that irrespective of whether an EA application for a development has been submitted, if an assessment started before the protocols came into effect on 9 May 2020 the protocols are not applicable and the assessment should adhere Appendix 6 of the EIA regulations. Since this assessment commenced in 2019, the study should comply with Appendix 6. However, the content of this report is aligned to be compliant to Appendix 6 and protocols.

In terms of NEMA, this report assesses how the proponent intends to comply with the principles contained in Section 2 of NEMA, which amongst other things, indicates that environmental management should:

- (In order of priority) aim to: avoid, minimise or remedy disturbance of ecosystems and loss of biodiversity;
- Avoid degradation of the environment;
- Avoid jeopardising ecosystem integrity;
- Pursue the best practicable environmental option by means of integrated environmental management;
- Protect the environment as the people's common heritage;
- Control and minimise environmental damage; and
- Pay specific attention to management and planning procedures pertaining to sensitive, vulnerable, highly dynamic or stressed ecosystems.

1.3 Specialist Credentials

Please see Annex 5.

1.4 Assessment Methodology

1.4.1 Data Sourcing and Review

Data sources from the literature consulted and used where necessary in the study includes the following:

Vegetation:

- Vegetation types and their conservation status were extracted from the South African National Vegetation Map (Mucina and Rutherford 2012 and SANBI 2018 update).
- Information on plant and animal species recorded for the wider area was extracted from the SABIF/SIBIS database hosted by SANBI. Data was extracted for a significantly larger area than the study area, but this is necessary to ensure a conservative approach as well as counter the fact that the site itself has not been well sampled in the past.
- The IUCN conservation status of the species in the list was also extracted from the database and is based on the Threatened Species Programme, Red List of South African Plants (2021).

Ecosystem:

- Freshwater and wetland information was extracted from the National Freshwater Ecosystem Priority Areas assessment, NFEPA (Nel et al. 2011).
- Critical Biodiversity Areas in the study area were obtained from the 2017 Western Cape Biodiversity Spatial Plan (WC-BSP), for the Prince Albert and Beaufort West municipalities, which cover the study area.

Fauna

- Lists of mammals, reptiles and amphibians which are likely to occur at the site were derived based on distribution records from the literature and the ADU databases (ReptileMap, Frogmap and MammalMap) http://vmus.adu.org.za.
- Literature consulted includes Branch (1988) and Alexander and Marais (2007) for reptiles, Du Preez and Carruthers (2009) for amphibians, EWT & SANBI (2016) and Skinner and Chimimba (2005) for mammals.
- The faunal species lists provided are based on species which are known to occur in the broad geographical area, as well as an assessment of the availability and quality of suitable habitat at the site.
- The conservation status of mammals is based on the IUCN Red List Categories (EWT/SANBI 2016), while reptiles are based on the South African Reptile Conservation Assessment (Bates et al. 2013) and amphibians on Minter et al. (2004) as well as the IUCN (2018).

1.4.2 Site Visits & Field Assessment

The site was visited twice for the current study. An initial site visit was conducted over three days from the 10th to the 12th of March 2020 and a second, follow-up field assessment over two days from the 10th-11th June 2021. During the site visits, the different biodiversity features, habitat, and landscape units present at the site were identified, mapped and characterised in the field. Specific attention was paid to the presence of species of conservation concern (SCC) as well as other species which are considered to be of ecological significance. In terms of fauna, active searches were conducted for reptiles and amphibians across the site, within habitats where such species are likely to be encountered. This included specific attention to the presence and distribution of potential habitat of the Karoo Padloper and Riverine Rabbit. Specific features of potential concern visible on the satellite imagery of the site were also marked for field inspection and were verified and assessed during the site visit. Walk-through-surveys were conducted within representative areas across the different habitat units identified and all plant and animal species observed were recorded.

1.4.3 Sensitivity Mapping & Assessment

An ecological sensitivity map of the site was produced by integrating the results of the site visits with the available ecological and biodiversity information in the literature and various spatial databases as described above. As a starting point, sensitive features such as wetlands, drainage lines, rocky hills and steep slopes were mapped and buffered where appropriate to comply with legislative requirements or ecological considerations. Additional sensitive areas were then identified and delineated based on the results of the field assessment and satellite imagery of the site. All the different layers created were then merged to create a single coverage. The ecological sensitivity of the different units identified in the mapping procedure was rated according to the scale as indicated below.

- **Low** – Areas of natural or transformed habitat with a low sensitivity where there is likely to be a negligible impact on ecological processes and terrestrial biodiversity. Most types of development can proceed within these areas with little ecological impact.
- **Medium**- Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impact such as erosion low. These areas usually comprise the bulk of habitats within an area. Development within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.
- **High** – Areas of natural or transformed land where a high potential impact is anticipated due to the high biodiversity value, sensitivity or important ecological role of the area. These areas may contain or be important habitat for faunal species or provide important ecological services such as water flow regulation or forage provision. Development within these areas is less desirable and should proceed with caution (such as specific consideration of the footprint within these areas and field verification of the acceptability of development within these potentially sensitive areas) as it may not be possible to mitigate all impacts appropriately.

- **Very High** – Critical and unique habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These areas are essentially no-go areas from a developmental perspective and should be avoided as much as possible.

1.4.4 Limits of Acceptable Change

Over and above the ecological sensitivity mapping, a further level of impact reduction is applied by using limits of acceptable change within each of these sensitivity ratings. Limits of acceptable change for each sensitivity category are indicated below and refer to the extent of on-site habitat loss within each sensitivity category that is considered acceptable before significant ecological impact that is difficult to mitigate and which may compromise the development is likely to occur. This provides a guide for the developer in terms of ensuring that the spatial distribution of impact associated with the development is appropriate with respect to the sensitivity of the site. In addition, it provides a benchmark against which impacts can be assessed and represents an explicit threshold that when exceeded indicates that potentially unacceptable impacts may have occurred. In terms of this latter criterion, exceeding the limits of acceptable change for either High or Very High sensitivity areas is considered to represent an immediate fatal flaw, while the limits within either Low or Medium sensitivity areas could potentially be exceeded, provided that the total footprint in these two areas combined does not exceed the overall combined acceptable loss within these classes. However, in the latter case, this would raise significant concern regarding the suitability of the development and the exact spatial configuration of the development and the likely impacts on ecological processes would need to be considered.

It is important to note that irrespective of the limits of acceptable change and whether the development is within the limits, the specialist may still identify areas within the site that are unacceptable for development and will require the turbines and/or infrastructure to be moved outside these areas.

Table 1. Limits of acceptable change associated with the wind farm development, within each of the sensitivity categories as defined below.

Sensitivity	Acceptable Loss	Description
Low	10%	Units with a low sensitivity where there is likely to be a low impact on ecological processes and terrestrial biodiversity. This category represents transformed or natural areas where the impact of development is likely to be local in nature and of low significance with standard mitigation measures.
Medium	5%	Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impacts such as erosion low. Development within these areas can proceed with

		relatively little ecological impact provided that appropriate mitigation measures are taken.
High	1%	Areas of natural or transformed land where a potentially high impact is anticipated due to the high biodiversity value, sensitivity or important ecological role of the area. Development within these areas is less desirable and should proceed with caution. Where roads are required through these areas, existing access roads should preferably be used as this reduces both the impact and the footprint of any access roads. Turbines in these areas may be acceptable but each turbine location is individually evaluated in this regard.
Very High/No Go	<0.5%	Critical and unique habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These areas are essentially no-go areas from a developmental perspective and should be avoided as much as possible. Where linear Very High sensitivity features need to be traversed, existing roads or disturbance footprints should be used as far as possible. As it is not possible to entirely avoid these features, some low-level impact is acceptable subject to evaluation by the specialist of the locations where this occurs and the nature of the infrastructure present.

2. ASSUMPTIONS AND LIMITATIONS

The current study is based on a number of site visits as well as an associated desktop study. The conditions at the time of both site visits are considered reasonably good and adequate for the field assessment. There had been some rainfall preceding the site visits and the vegetation was in an adequate condition in terms of condition and growing status, with forbs and annuals relatively abundant in the 2021 field assessment. As such, there are few limitations with regards to the vegetation assessment and the results of the field assessment are considered reliable and comprehensive. In terms of fauna, the presence of some fauna is difficult to verify in the field as these may be shy or rare and their potential presence at the site must be evaluated based on the literature and available databases. In many cases, these databases are not intended for fine-scale use and the reliability and adequacy of these data sources relies heavily on the extent to which the area has been sampled in the past. In addition, many remote areas have not been well sampled with the result that the species lists derived for the area do not always adequately reflect the actual fauna and flora present at the site. In order to reduce this limitation, and ensure a conservative approach, the species lists derived for the site from the literature were obtained from an area significantly larger than the study site. In addition, the nearby Trakas and Beaufort West wind energy facilities were extensively camera trapped in 2017 and this information is used to inform the current development as appropriate.

3. TECHNICAL DESCRIPTION

3.1 Project Location

The proposed WEF and associated grid connection infrastructure is located approximately 55km south of Beaufort West in the Western Cape Province and is within the Beaufort West and Prince Albert Local Municipalities, in the Central Karoo District Municipality (**Error! Reference source not found.**).

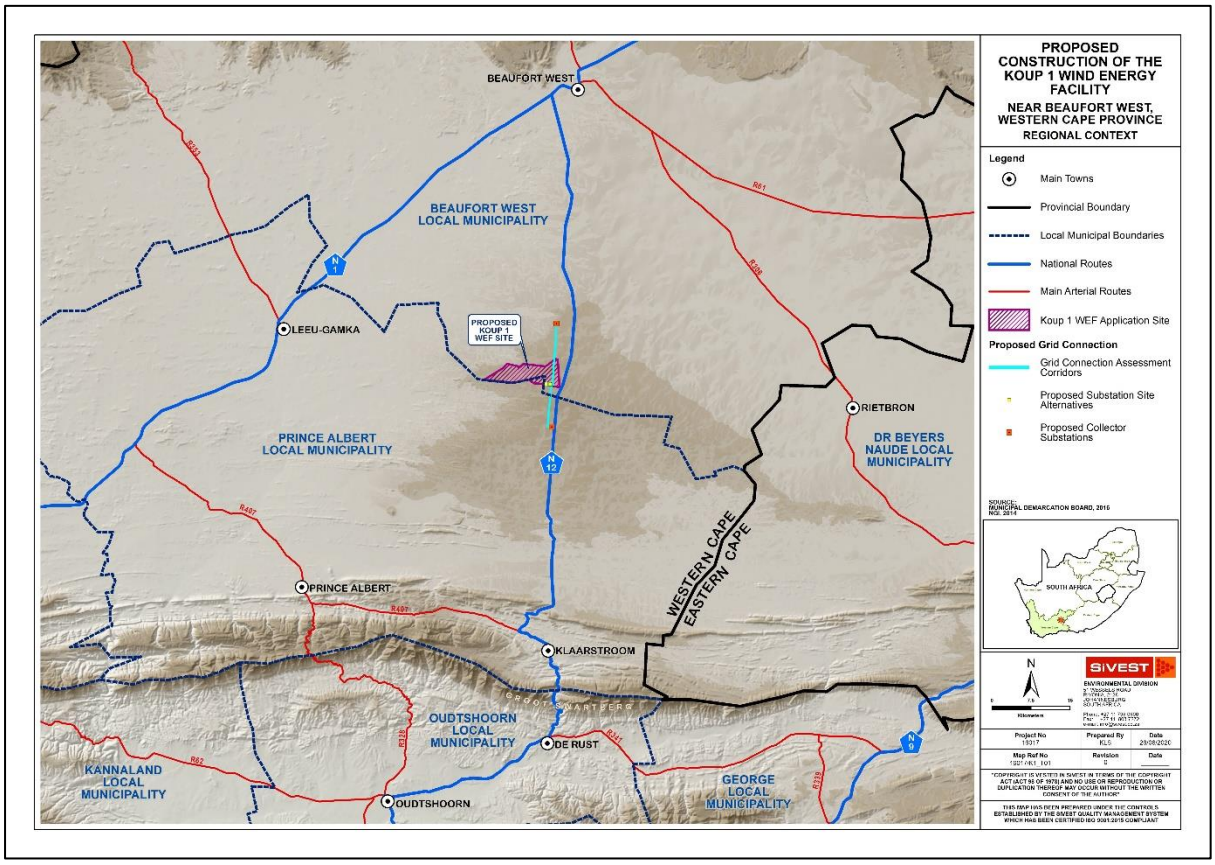

Figure 1: Regional Context Map, showing the location of the Koup1 site between Beaufort West and Klaarstroom.

3.1.1 WEF

The WEF application site as shown on the locality map below (**Figure *2***) is approximately 4279.398 hectares (ha) in extent and incorporates the following farm portions:

- The Farm Riet Poort No 231
- Portion 11 Of The Farm Brits Eigendom No 374
- Portion 15 Of The Farm Brits Eigendom No 374
- Portion 5 Of Farm 380
- Portion 10 Of Farm 380
- Portion 11 Of Farm 380

A smaller buildable area (2445.667 ha) has however been identified as a result of a preliminary suitability assessment undertaken by Genesis and this area is likely to be further refined with the exclusion of sensitive areas determined through various specialist studies being conducted as part of the EIA process.

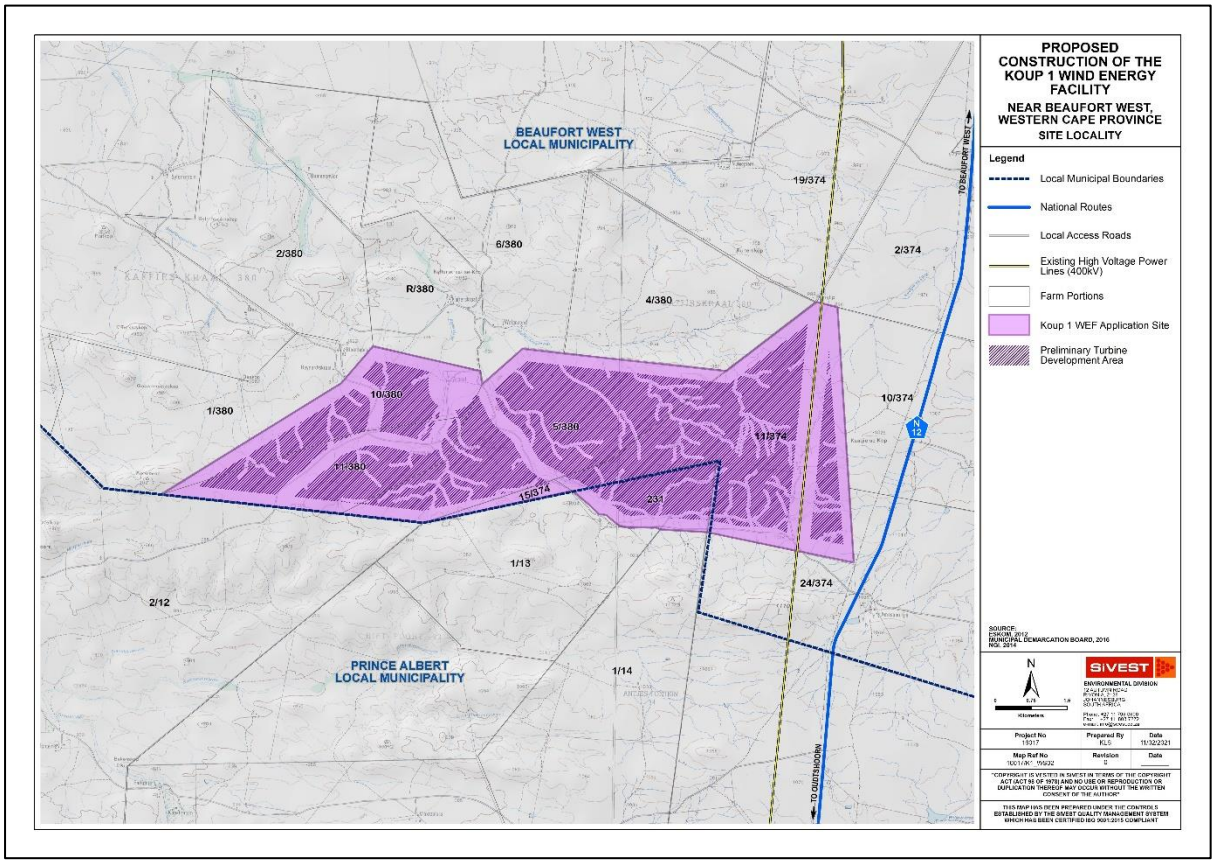

Figure 2: Koup 1 WEF Site Locality, showing the location of the site west of the N12.

3.1.2 Grid Connection

At this stage, it is proposed that a 132kV overhead power line will connect the Koup 1 WEF on-site switching substation / collector to the national grid either by way of an off-site collector substation, or via a direct tie-in to existing 400kV transmission lines that traverse the Koup 1 WEF project site (**Figure** 3).

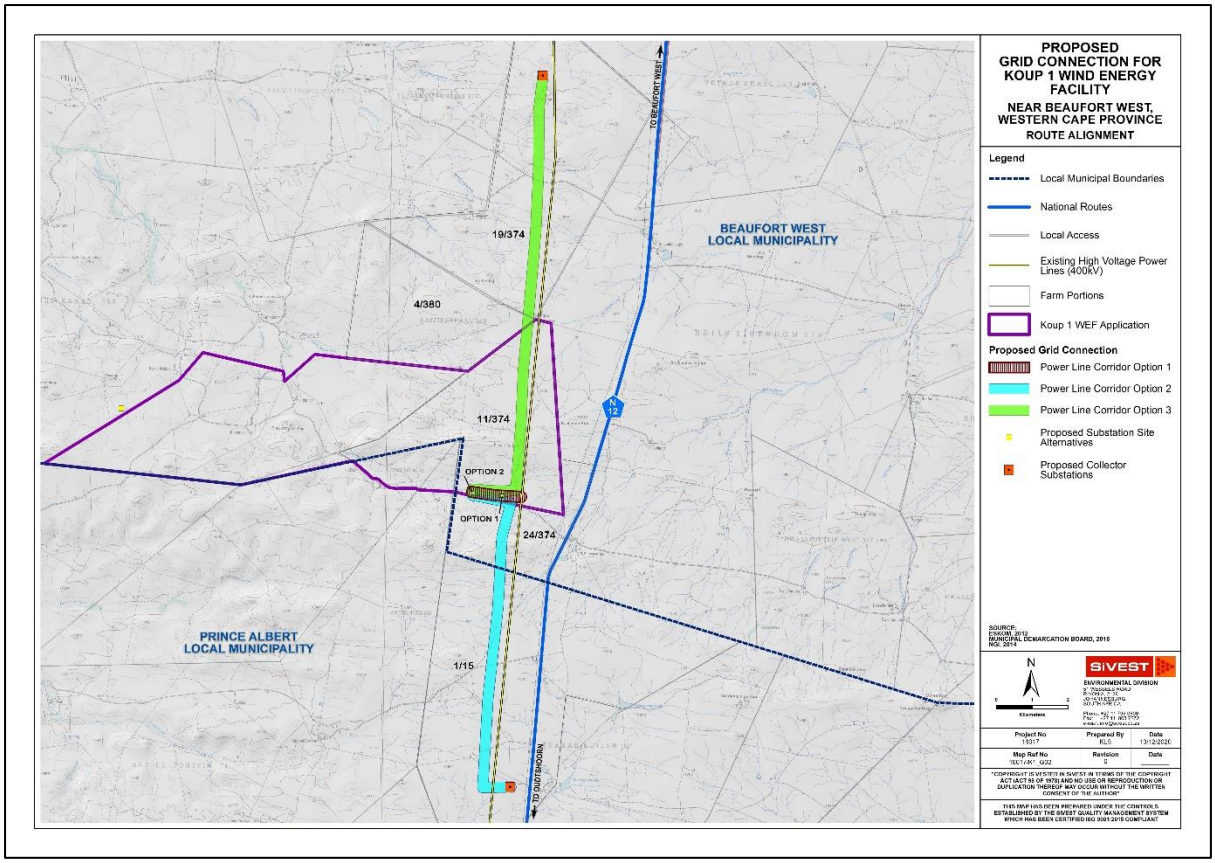

Figure 3: Proposed 132kV Power Line Route Alignment, showing the three grid connection corridors being considered. In the final study, Power Line Corridor Option 2 has been selected as the proposed grid connection for approval.

3.2 Project Description

It is anticipated that the proposed Koup 1 WEF will comprise twenty-eight (28) wind turbines with a maximum total energy generation capacity of up to approximately 140MW. The electricity generated by the proposed WEF development will be fed into the national grid via a 132kV overhead power line. A Battery Energy Storage System (BESS) will be located next to the onsite 33/132kV substation. The storage capacity and type of technology would be determined at a later stage during the development phase, but most likely will comprise an array of containers, outdoor cabinets and/or storage tanks.

3.2.1 Wind Farm Components

- Up to 28 wind turbines, each between 5.6MW and 6.6MW, with a maximum export capacity of approximately 140MW. This will be subject to allowable limits in terms of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). The final number of turbines and

layout of the WEF will, however, be dependent on the outcome of the Specialist Studies conducted during the EIA process;

- Each wind turbine will have a hub height and rotor diameter of up to approximately 200m;
- Permanent compacted hardstanding areas / platforms (also known as crane pads) of approximately 90m x 50m (total footprint of approx. 4 500m^2) per turbine during construction and for on-going maintenance purposes for the lifetime of the proposed development;
- Each wind turbine will consist of a foundation of up to approximately 15m x 15m in diameter. In addition, the foundations will be up to approximately 3m in depth;
- Electrical transformers adjacent to each wind turbine (typical footprint of up to approximately 2m x 2m) to step up the voltage to 33kV;
- One (1) new 33/132kV on-site substation and/or combined collector substation, occupying an area of approximately 1.5 ha . The proposed substation will be a step-up substation and will include an Eskom portion and an IPP portion, hence the substation has been included in the WEF EIA and in the grid infrastructure BA (substation and 132kV overhead power line) to allow for handover to Eskom. Following construction, the substation will be owned and managed by Eskom. The current applicant will retain control of the low voltage components (i.e. 33kV components) of the substation, while the high voltage components (i.e. 132kV components) of this substation will likely be ceded to Eskom shortly after the completion of construction ;
- The wind turbines will be connected to the proposed substation via medium voltage (33kV) cables. Cables will be buried along access roads wherever technically feasible.
- A Battery Energy Storage System (BESS) will be located next to the onsite 33/132kV substation. The storage capacity and type of technology would be determined at a later stage during the development phase, but most likely will comprise an array of containers, outdoor cabinets and/or storage tanks;
- Internal roads with a width of between 8m and 10m will provide access to each wind turbine. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. It should be noted that the proposed application site will be accessed via an existing gravel road from the N12 National Route;
- One (1) construction laydown / staging area of up to approximately 2.25ha. It should be noted that no construction camps will be required in order to house workers overnight as all workers will be accommodated in the nearby town;
- One (1) permanent Operation and Maintenance (O&M) building, including an on-site spares storage building, a workshop and an operations building to be located on the site identified for the construction laydown area.
- A wind measuring lattice (approximately 120m in height) mast has already been strategically placed within the wind farm application site in order to collect data on wind conditions;
- No new fencing is envisaged at this stage. Current fencing is standard farm fence approximately 1-1.5m in height. Fencing might be upgraded (if required) to be up to approximately 2m in height; and

- Water will either be sourced from existing boreholes located within the application site or will be trucked in, should the boreholes located within the application site be limited.

3.2.2 Grid Components

The proposed grid connection infrastructure to serve the Koup 1 WEF will include the following components:

- One (1) new 33/132kV on-site substation and/or collector substation, occupying an area of up to approximately 1.5 ha. The proposed substation will be a step-up substation and will include an Eskom portion and an IPP portion, hence the substation has been included in both the EIA for the WEF and in the BA for the grid infrastructure to allow for handover to Eskom. The applicant will remain in control of the low voltage components (i.e. 33kV components) of the substation, while the high voltage components (i.e. 132kV components) of this substation will likely be ceded to Eskom shortly after the completion of construction; and
- One (1) new 132kV overhead power line connecting the on-site and/or collector substation either to an off-site collector substation, or via a direct tie-in to the existing 400kV overhead power lines and thereby feeding the electricity into the national grid. Power line towers being considered for this development include self-supporting suspension monopole structures for relatively straight sections of the line and angle strain towers where the route alignment bends to a significant degree. Maximum tower height is expected to be approximately 25m.

3.3 Layout alternatives

3.3.1 Wind Energy Facility

Design and layout alternatives will be considered and assessed as part of the EIA. These include alternatives for the Substation locations and also for the construction / laydown area. The proposed site alternatives are shown in **Error! Reference source not found.** below.

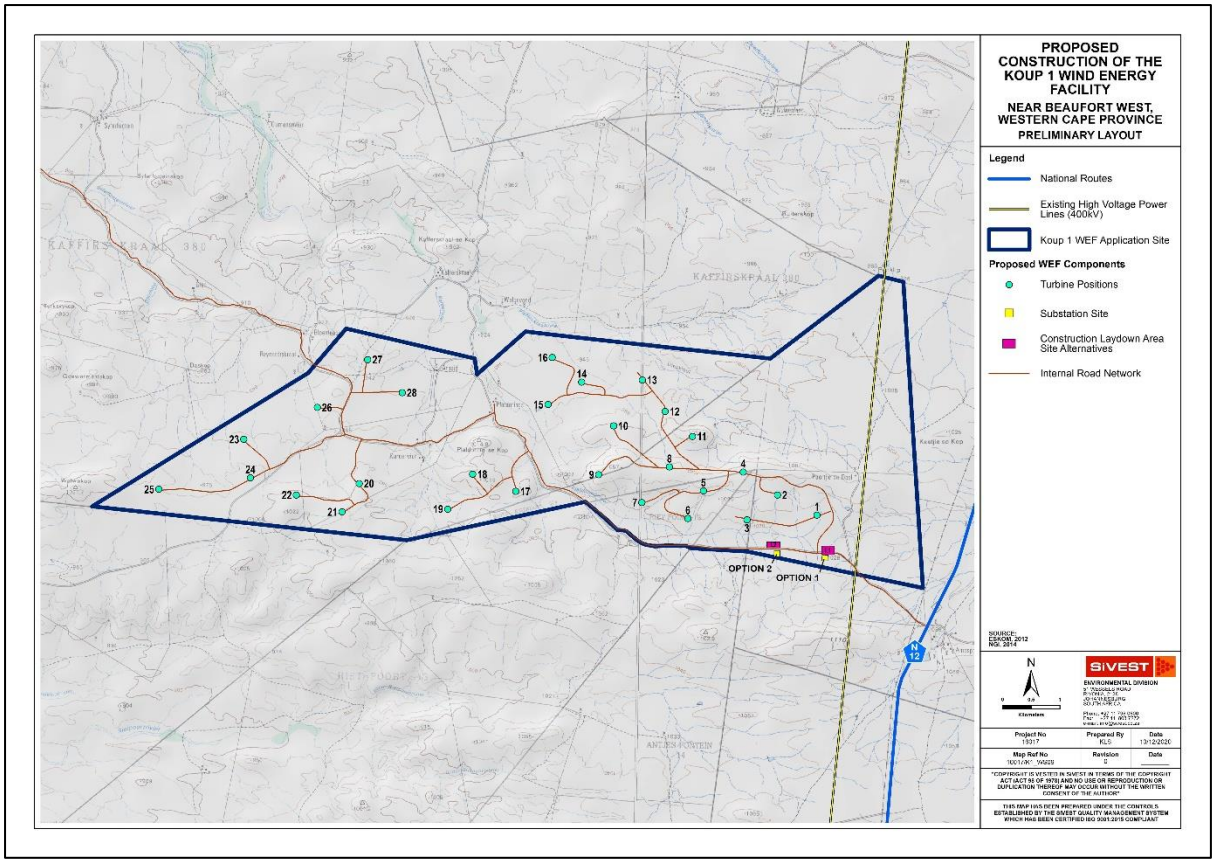

Figure 4: Alternatives proposed as part of the Koup 1 WEF. In the final assessment, the laydown and substation Option1 has been selected as the preferred option for approval.

3.3.2 Grid Components

The grid connection infrastructure proposals include two (2) switching and collector substation site alternatives and three (3) power line route alignment alternatives (Figure 3). These alternatives will be considered and assessed as part of the BA process and will be amended or refined to avoid identified environmental sensitivities.

All three (3) power line route alignments will be assessed within a 300m wide assessment corridor (150m on either side of power line). These alternatives are described below:

- Power Line Corridor Option 1 is approximately 1.3km in length, linking either substation / collector Option 1 or Option 2 to the existing 400kV transmission lines.
- Power Line Corridor Option 2 is approximately 9.9km in length, linking either substation / collector Option 1 or Option 2 to a proposed Collector Substation to the south, adjacent to the existing 400kV transmission lines.
- Power Line Corridor Option 3 is approximately 12.9km in length, linking either substation / collector Option 1 or Option 2 to a proposed Collector Substation to the north, adjacent to the existing 400kV transmission lines.

In the final assessment, only Power Line Corridor Option 2 was considered viable due to technical and environmental constraints.

3.3.3 No-go Alternative

The 'no-go' alternative is the option of not undertaking the proposed WEF and / or grid connection infrastructure projects. Hence, if the 'no-go' option is implemented, there would be no development. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report.

4. LEGAL REQUIREMENT AND GUIDELINES

4.1 National Permitting

In terms of national permits, a protected tree clearing permit is potentially required under the National Forests Act. The Notice of the List of Protected Tree Species Under the National Forests Act, 1998 (ACT NO 84 OF 1998) can be obtained from this location: https://www.gov.za/documents/national-forests-act-list-protected-tree-species-7. This list has not been changed since it was last published in 2014. However, no protected tree species were observed present within the Koup 1 WEF site and as such, no tree clearing permit would be required.

Threatened Or Protected Species (TOPS) permits for the carrying out of restricted activities in terms of the National Environmental Management: Biodiversity Act 2004 (No. 10 of 2004) may be required. However, TOPS permits are submitted to either the national minister or the provincial minister. In terms of the legislation, the relevant issuing authority for the current project would be the office of the MEC of the province. In terms of TOPS, the Western Cape government is not currently in compliance with these regulations as it does not require or integrate TOPS permits into its own permitting requirements despite being the authority for such permits. However, in principle a TOPS permit would be required should it be necessary that a TOPS-listed species needs to be translocated, trapped or relocated. The most recent lists of tops species and associated legislation is available in the National Environmental Management: Biodiversity Act, 2004 (ACT NO. 10 of 2004), Threatened or Protected Species Regulations Notice 255 of 2015. In terms of these lists, species that this might be required for, would include the Aardvark, Bat-eared Fox and Cape Fox. There are also some plant species likely to be present at the site that would require a TOPS permit such as *Pachypodium succulentum* and *Sceletium tortuosum*. In addition to these species, SANBI maintains a national list of the IUCN conservation status of all plant species in South Africa. Any endangered (VU, EN, CR) species under this list are also subject to the TOPS regulations.

4.2 Provincial Permitting

In terms of Western Cape provincial permits, a protected flora clearing permit from CapeNature would most likely be required. This permit must list the number and location of all individuals of protected plants as listed in the provincial ordinance (Western Cape Nature Conservation Laws Amendment Act, 2000) as well as those plants listed as being of conservation concern by the Red List of South African Plants (http://redlist.sanbi.org/index.php). This permit requires a full walk-through of the final approved wind farm development footprint, following which the number of individuals of protected species that would be affected by the development can be quantified and used to populate the permit application. Depending on the identity of the species concerned, some would be destroyed, while other species would need to be translocated within the site to a safe site outside the development footprint, based on the recommendations of the walk-through study. Once submitted, the permit is usually issued by CapeNature within less than 30 days.

The Western Cape Nature Conservation Laws Amendment Act of 2000 also provides lists of protected fauna that should not be harmed without a permit. Usually, important faunal features within the development footprint can be avoided through micro-siting of roads and turbine positions. However, sometimes it is not possible to avoid burrows of protected species and it is necessary to trap and translocate the affected species. In such cases, a permit is also required from CapeNature for the capture and translocation of such protected species. Captured individuals of species should not be relocated to other areas, but released on the same property as they were captured. As with protected plant permits, faunal permits are usually issued within 30 days of submitting the permit of CapeNature.

5. DFFE SITE VERIFICATION

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. The outcomes of the Site Verification Report determine the level of assessment required for the site. The outputs of the Screening Tool are illustrated and briefly discussed below for each theme as relevant to the current study

5.1 Animal Species Theme Sensitivity

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY

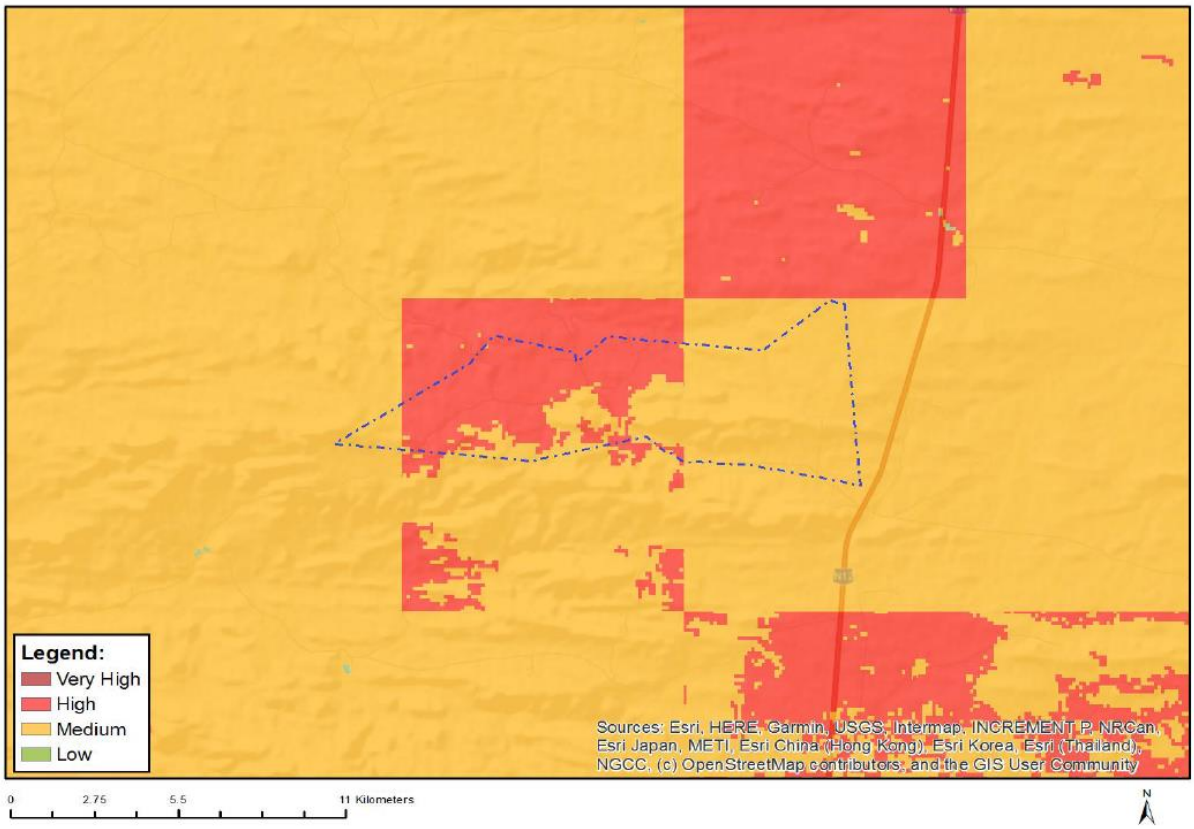

Figure 5. Animal Species Theme for the Koup 1 site.

The DFFE Screening Tool identified the Koup site as having a medium animal sensitivity due to the modelled potential presence of the Karoo Padloper. In addition, parts of the site are mapped as High sensitivity due to the presence of various avifauna. Avifauna have been assessed separately and are not discussed any further here. Refer to the Table 3 below and Figure 2 above for the Animal Theme results.

The outputs of the Screening Tool are based on existing biodiversity information, which for many areas such as the Koup area, is very sparse and not well-populated, with the result that this consists largely of modelled data and the potential presence of species of concern which then need to be verified through the field assessment and site verification exercise. Apart from the Padloper, the site also falls within the broader distribution of the Riverine Rabbit (CR) raising potential concern that this species could be impacted by the development. The results of the site verification indicate that the site can be considered low sensitivity for both the Padloper and Riverine Rabbit. The riparian habitat at the site is sparse and rocky and is not considered suitable for the Riverine Rabbit. The low sensitivity of the site for the Riverine Rabbit was also confirmed through communication with the EWT Drylands Programme which confirmed that there are no records from the Koup area. In terms of the Padloper, this species would occur on the rocky hills of the site, but despite extensive searching for this species, it was not found within the site. As the vegetation cover and

extent of rocky crevices where this species could shelter are limited, the site is considered low sensitivity for the Karoo Padloper.

Table 2. Animal Species Theme Features for the Koup 1 site.

Sensitivity	Feature(s)
High	Aves-*Neotis ludwigii*
Medium	Aves-*Neotis ludwigii*
Medium	Aves-*Aquila verreauxii*
Medium	Reptilia-*Chersobius boulengeri*

5.2 Plant Species Theme Sensitivity

The plant species theme sensitivity map for the site is illustrated below and indicates that the site is mapped is mapped as Medium sensitivity for the plant theme due to the potential presence of three plant species of conservation concern. The un-named species identity was obtained from SANBI and is a small succulent. None of these species were observed at the site during the numerous site visits and it is concluded that these species are not present within the site or if present are highly localised and not likely to be impacted by the development. Due the failure to detect any plant species of conservation concern at the site, the site is considered low sensitivity for flora.

MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY

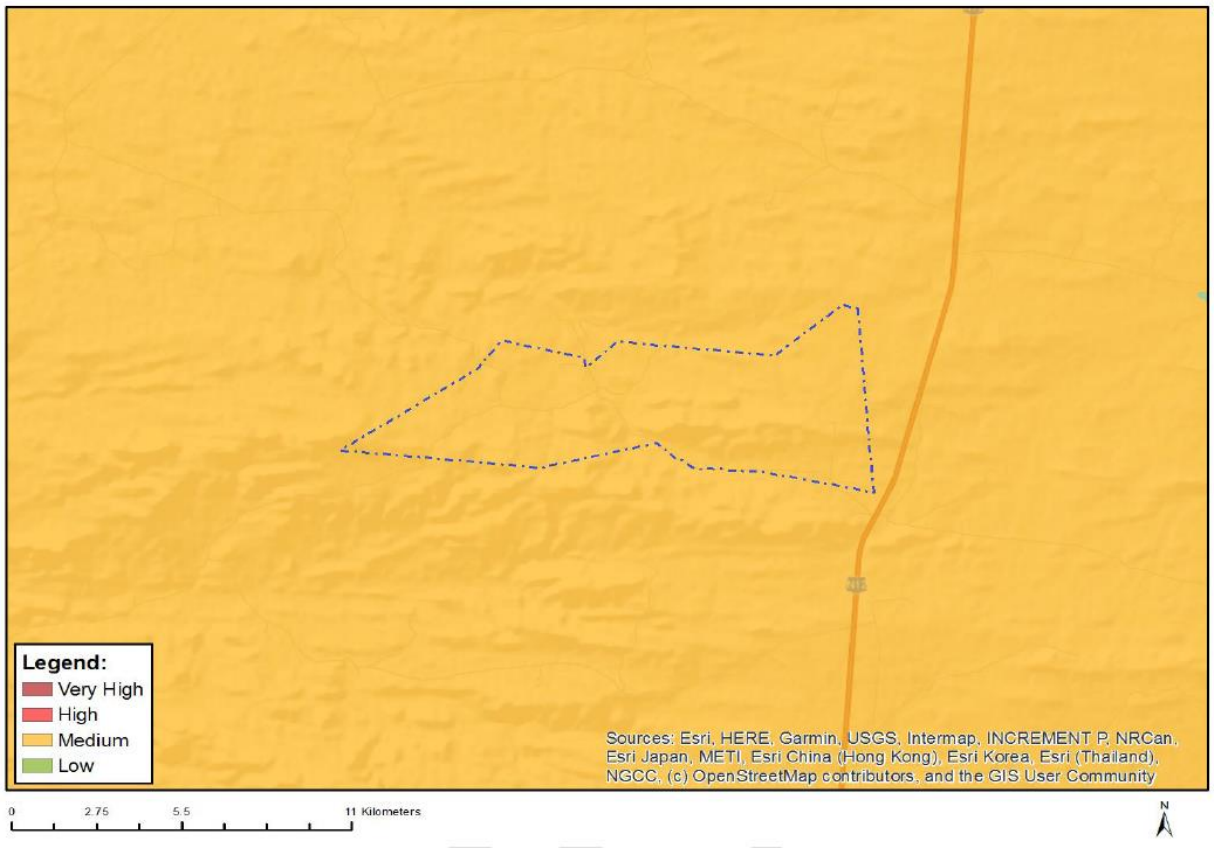

Figure 6. Plant Species Theme for the Koup 1 site.

Table 3. Plant Species Theme Features for the Koup 1 site.

Sensitivity	Feature(s)
Medium	Sensitive species 383
Medium	*Peersia frithii*
Medium	*Tritonia florentiae*

5.3 Terrestrial Biodiversity Theme Sensitivity.

The overall combined Terrestrial Biodiversity theme for Koup site indicates that the site consists largely of low sensitivity areas with occasional areas of Very High sensitivity associated with the CBAs, NFEPA Catchments and drainage features of the site. While the conservation planning features of the site are difficult to confirm or dispute based on the site verification, the development entirely avoids this area, with the result that the Very High sensitivity status of that part of the site does not need to be confirmed or disputed. As such, the study takes a conservative approach and does not dispute the Very High sensitivity of this area, and confirms the general low sensitivity of the rest of the site. The development does not encroach near to the very high sensitivity area and would not directly impact on this area in any way.

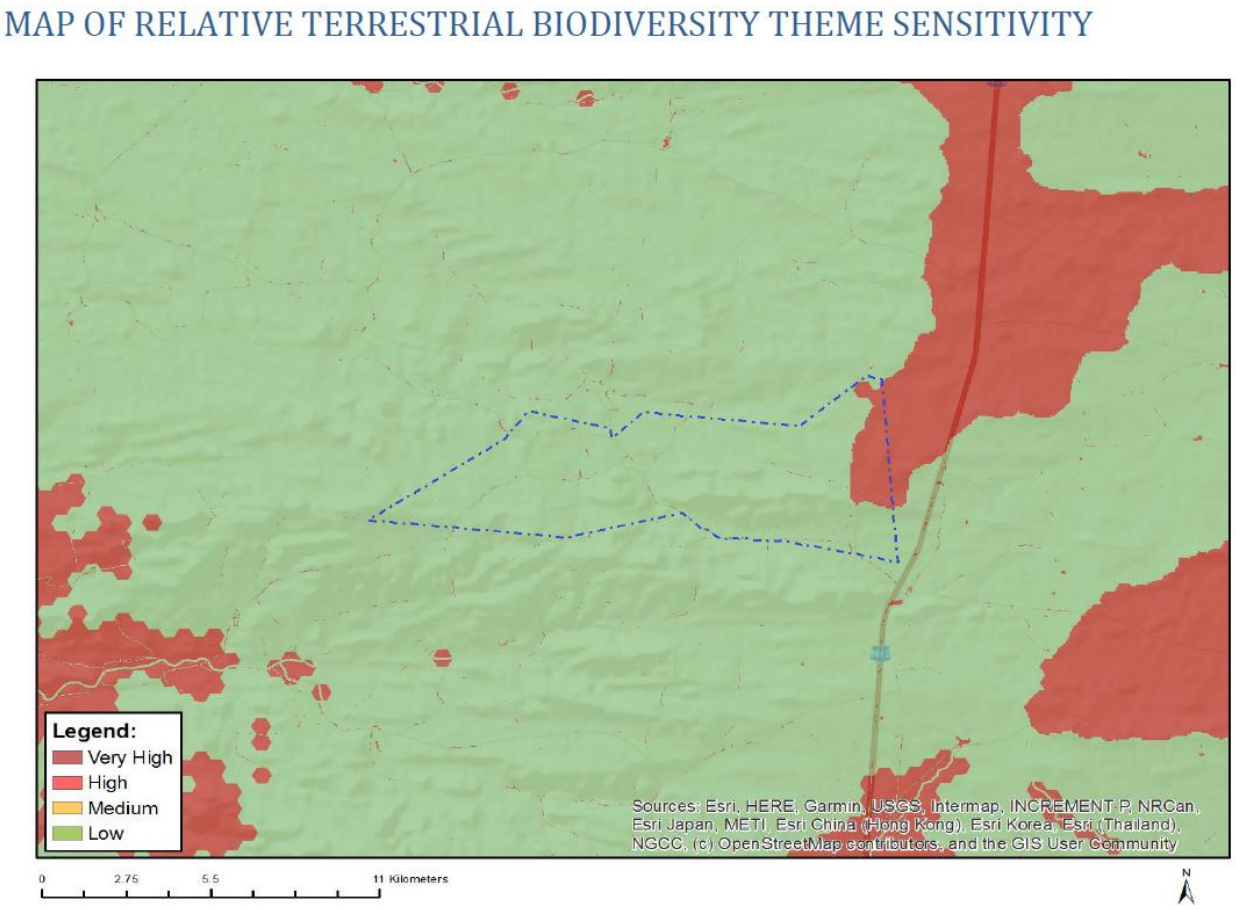

Figure 7. Terrestrial Biodiversity Theme sensitivity map for the site, showing that the majority of the site is low sensitivity except for the far eastern section of the site which is mapped as Very High sensitivity due to the presence of CBAs and FEPA Subcatchments in this area.

Table 4. Terrestrial Biodiversity Theme Features for the Koup 1 site.

Sensitivity	Feature(s)
Low	Low Sensitivity
Very High	Critical Biodiversity area 1
Very High	Ecological support area 2
Very High	FEPA Subcatchments

6. DESCRIPTION OF THE RECEIVING ENVIRONMENT

6.1 Vegetation Types

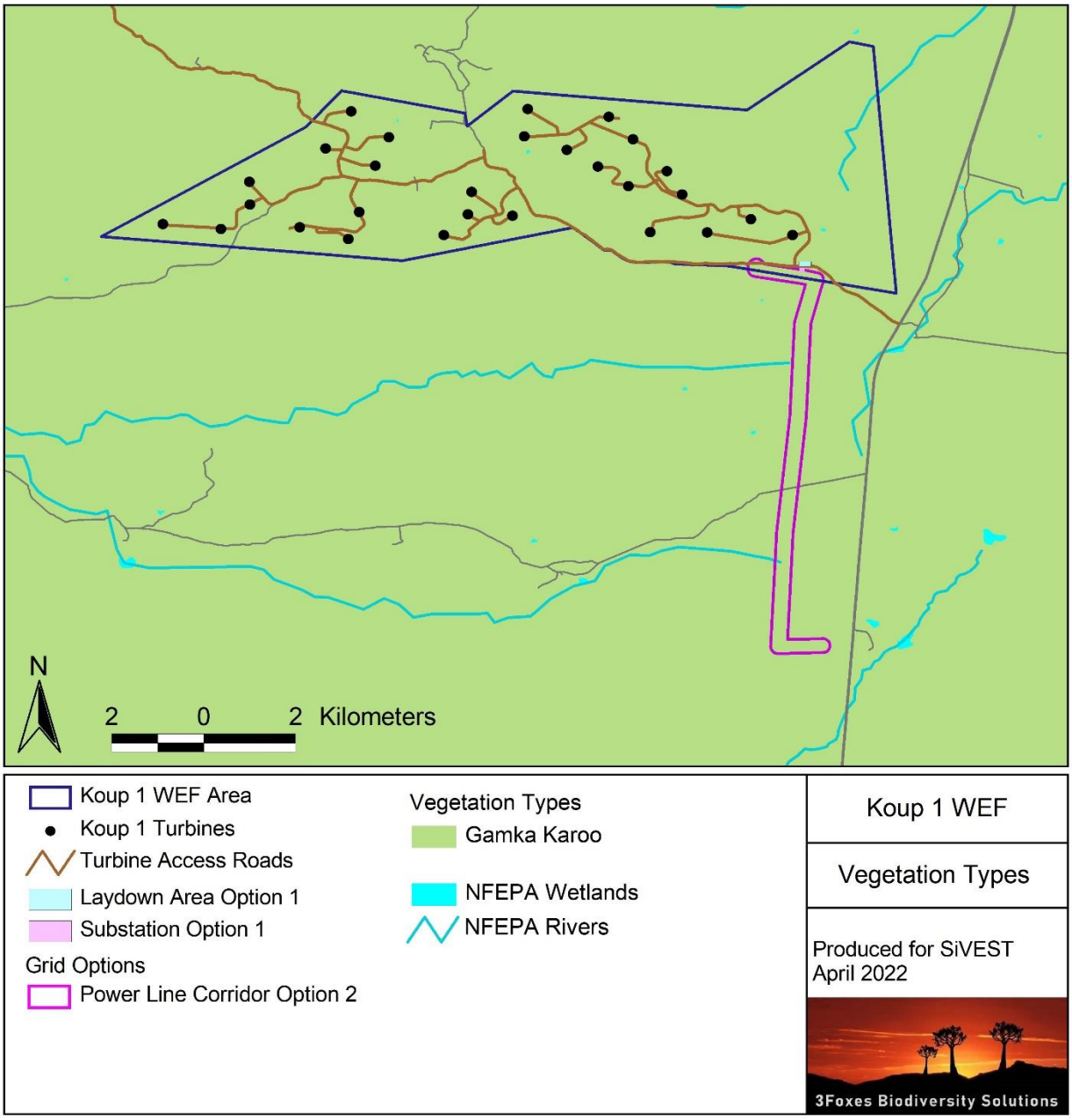

Figure 8. National vegetation map for the study area, showing that the whole area falls within the Gamka Karoo vegetation type.

Gamka Karoo

The site falls entirely within the Gamka Karoo vegetation type (Figure 8), with no other vegetation types for some distance from the site. Gamka Karoo occurs in the Western Cape and Eastern Cape Provinces and marginally into the Northern Cape Province. It occupies the large basin between the Great Escarpment (Nuweveld Mountains) in the north and northwest and Cape Fold Belt Mountains (mostly Swartberg Mountains) in the south. From approximately the edge of the Gamka basin catchment area (i.e. of the Dwyka River tributary) in the west to about the Kariega River in the east. The landscape typically consists of extremely irregular to slightly undulating plains covered with dwarf spiny shrubland dominated by Karoo dwarf shrubs with rare low trees (e.g. *Euclea undulata*). Geology is primarily mudstones and sandstones of the Beaufort Group (Adelaide Subgroup) with some Ecca (Fort Brown Formation) shales supporting very shallow and stony soils of the Glenrosa and/or Mispah forms. Mucina et al. (1996) list *Chasmatophyllum stanleyi*, *Hereroa incurva*, *Hoodia dregei*, *Ruschia beaufortensis*. *Jamesbrittenia tenuifolia*, *Manulea karrooica* and *Piaranthus comptus* as species endemic to this vegetation type. Gamka Karoo is classified as Least threatened and less than 1% has been lost to transformation.

Within the site and along the power line corridor, two basic communities can be recognised; the rocky hills and low ridges and then the plains of the site. The plains tend to be homogenous with few features of significance present and are dominated by low woody and succulent shrubs with occasional areas of calcrete or sandy soils where grasses are more abundant. The rocky hills are more heterogenous and have a higher abundance of larger woody species than the plains and may also contain localised communities of low succulents. In general the rocky hills are considered more sensitive than the surrounding plains as the diversity of the hills is usually higher than the plains.

Figure 9. Typical Gamka Karoo plains vegetation as present in the east of the Koup 1 WEF site near the proposed substation location. Dominant species include *Pentzia incana, Hirpicium alienatum, Ruschia beaufortensis, Lycium cinereum, Stipagrostis ciliata, S.obtusa, Aristida congesta, Thesium lineatum, Enneapogon desvauxii, Asparagus capensis, Asparagus glauca, Fingerhutia afrcana, Euphorbia mauritanica, Limeum aethiopicum* and *Aloe claviflora*.

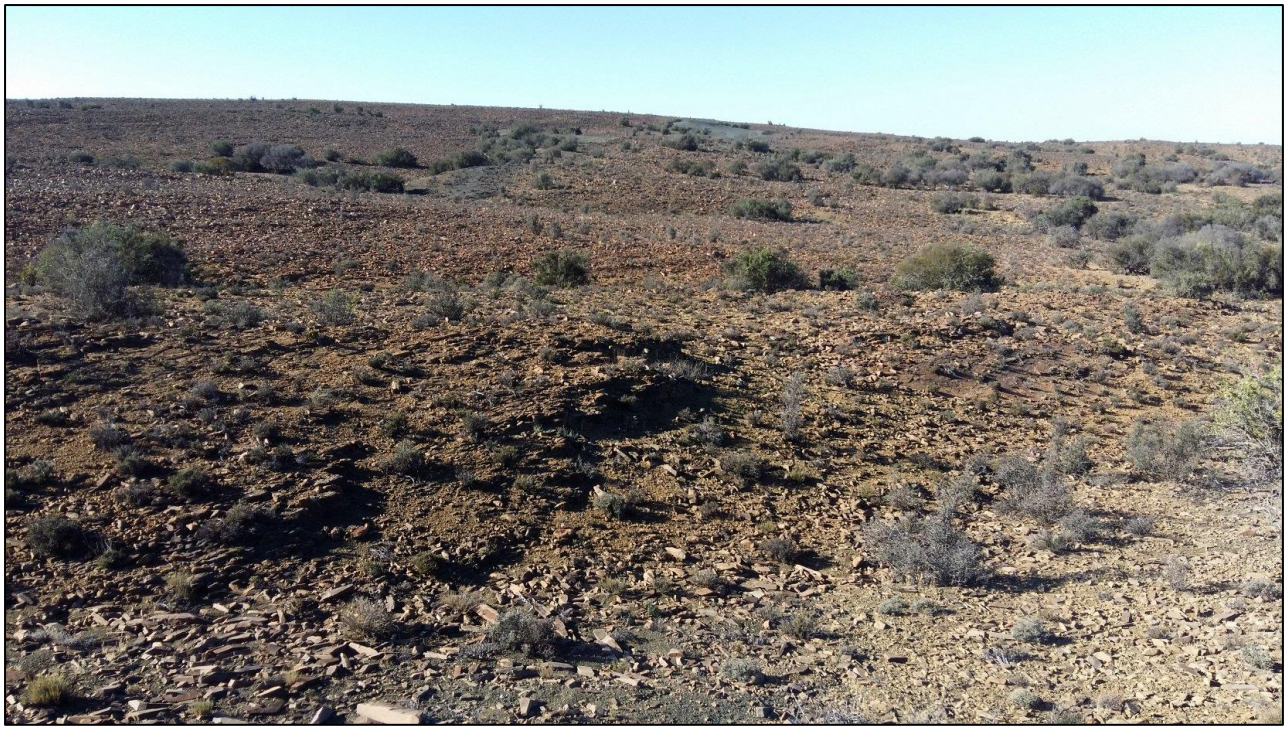

Figure 10. Typical Gamka Karoo vegetation on the stony hills of the Koup 1 site. Common and dominant species include *Carissa haematocarpa, Euclea undulata, Nenax microphylla, Thesium lineatum, Tragus koelerioides, Hermannia cueneifolia, H.desertorum, Eriocephalus microcephalus*, *Searsia burchellii, Hirpicium alienatum, Galenia fruticosa, Pteronia glomerata, Dianthus namaquensis, Rhigozum obovatum, Helichrysum zeyheri, Cissempelos capensis, Pegolettia retrofracta, Garuleum bipinnatum, KIeinia longiflora, Cotyledon orbiculata, Enneapogon scaber, Asparagus striatus, Astroloba corrugata* and *Pteronia incana*.

Figure 11. View midway along grid connection Option 2, showing the typical Gamka Karoo gravelly plains of the area with low hills in the distance.

Southern Karoo Riviere

Although the VegMap maps only Gamka Karoo in the area, the larger drainage systems of the site with well-developed woody vegetation should be considered to be the Southern Karoo Riviere vegetation type. The Southern Karoo Riviere vegetation type is associated with the rivers of the central karoo such as the Buffels, Bloed, Dwyka, Gamka, Sout, Kariega and Sundays Rivers. About 12% has been transformed as a result of intensive agriculture and the construction of dams. Although it is classified as Least Threatened, it is associated with rivers and drainage lines and as such represents areas that are considered ecologically significant. Typical and dominant species observed from the drainage lines of the site includes *Vachellia karroo*, *Salsola aphylla*, *Lycium prunus-spinosa*, *Atriplex vestita*, *Zygophyllum retrofractum*, *Stipagostis namaquensis*, *Lycium pumilum*, *Lycium cinereum*, *Artemisia africana* and *Derverra denudata*. These areas are generally considered sensitive due to the ecological role that riparian areas and drainage systems play. Although the site falls within the broader range of the Riverine Rabbit, the riparian habitat is sparse and stony with little habitat present that would suggest that the habitat within the site is suitable for this species.

Figure 12. Typical larger drainage line from within the Koup 1 WEF site, with *Vachellia karroo* dominating the banks. Common and dominant species in the drainage lines and within the adjacent floodplain vegetation include *Sporobolus ioclados*, *Drosanthemum lique*, *Salsola aphylla*, *Tribulis terrestris*, *Felicia muricata*, *Atriplex vestita, Zygophyllum retrofractum*, *Cynodon dactylon*, *Stipagostis namaquensis*, *Lycium pumilum*, *Lycium cinereum*, *Artemisia africana*, *Tripteris spinescens*, *Exomis microphylla*.

6.2 Faunal Communities

Mammals

The study area and broad surroundings have not been well-sampled historically for mammals, with the result that the records from the existing databases do not provide a comprehensive picture of the mammalian community of the area. In order to counter this problem, the lists of mammals were extracted for a considerably larger area including the two quarter degree squares north of the site, which are considered to be those most similar to the site. Based on this larger sample area, the mammalian community is estimated at approximately 30 species. Common species observed at the site or on nearby sites that have been previously sampled, include Cape Porcupine, Steenbok, Greater Kudu, Vervet Monkey, Chacma Baboon, Cape Hare, Bat-eared Fox, Cape Fox, Black-backed Jackal, Aardwolf, Caracal, Common Duiker, Yellow Mongoose, Cape Grey Mongoose, Striped Polecat, Common Genet, Meerkat, Aardvark and Ground Squirrel. This represents a typical mammalian community for the Koup area and the lower Nama Karoo in general.

The only species of conservation concern that may be present on the site is the Riverine Rabbit *Bunolagus monticularis* which is listed as Critically Endangered. The field assessment of the site indicated that there is minimal suitable habitat for the Riverine Rabbit present within the Koup site. The drainage lines within the Koup site are gravelly or stony in nature with very little floodplain vegetation and a general lack of silty banks with dense vegetation that provide the usual suitable habitat for this species. Specific camera trapping for Riverine Rabbit on the adjacent Beaufort West and Trakas wind farms, which has more suitable habitat than the Koup site did not pick any Riverine Rabbits indicating that this species is very unlikely to be present. In addition, the EWT Riverine Rabbit records database indicates that there have not been any historical sightings from the site or immediate surrounds. As such, the site is considered low sensitivity for this species and an impact on this species is not expected to occur.

In general, impacts on mammals would occur due to disturbance and habitat loss. During the construction phase there would be significant disturbance at the site due to construction-related activities. During operation, there would be some disturbance at the wind farm due to noise generated by the wind turbines and some disturbance related to more general operational activities. The long-term habitat loss related to the development is estimated at 50 ha, which in context of the surrounding landscape is considered relatively minor. More mobile or disturbance-sensitive species are likely to be displaced during construction but would likely move back into the affected areas once the facility is operational. Many species are likely to become at least partly habituated to the presence and operation of the wind turbines. In general, the major long-term impacts of the development would be about 50 ha of direct habitat loss for the resident mammals and some disturbance associated with noise and human activity associated with turbine construction and operation, which would have a greater extent, dependent on the specific response of the affected species.

A potential but little-known impact may occur as a result of the noise and infra-sound generated by the wind turbines. A major source of background infrasound in the natural environment is wind-generated, with the

result that increasing levels of infrasound generated by wind turbines occur simultaneously with increasing levels of natural background noise as the wind speed increases. The contribution of wind turbines to infrasound appears to become undetectable from background levels, even in rural environments within 1.5km of wind farms (Evans et al. 2013). Apart from the infrasound, audible noise generated by the turbines may have a negative impact on noise-sensitive species. Although this impact has not been well-documented and warrants investigation, it is plausible that species that use sound for prey detection or predator avoidance may be negatively affected by the noise generated by the wind turbines. There are however no species of high conservation concern that are likely to be affected by noise at the site, so this impact is likely to be of limited extent and restricted to a subset of the fauna present. In addition, studies of noise impacts on fauna have demonstrated that many faunal species are able to use various behavioural adaptations to reduce the impact of noise on their activities.

Reptiles

Reptile diversity in the Koup area is expected to be moderate to low, which can be ascribed to the relative homogeneity of the habitats present and the lack of moist, well-vegetated environments or significant escarpment and cliff habitats. Based on the ReptileMap database, approximately 25 species are known from the area (Annex 4). The only species of potential concern known from the area is the Karoo Padloper (EN). This small tortoise is seldom observed, even when specifically targeted during herpetofaunal surveys as it is usually active for less than 15 minutes a day (or largely entirely inactive during cold or dry conditions). They are associated with dolerite ridges and rocky outcrops of the southern Succulent and Nama Karoo biomes. Threats to this species include habitat degradation due to agricultural activities and overgrazing, and predation by the Pied Crows which in recent decades have expanded in distribution range. The habitat on site is considered broadly unsuitable for the Karoo Padloper, but within some localised koppies and outcrops with sufficient rock cover to provide the shelter that this species requires. The development would however largely avoid the rocky shelter sites of this species with the result that direct habitat loss would be low. In addition, tortoises are one of the few species that have been specifically studied with regards to their responses to wind energy development and no significant negative impacts have been detected within population's resident on wind farms (Agha et al. 2015, Lovich et al. 2011). There is potential concern that the development could result in tortoises, including the Karoo Padloper being run over by vehicles on the site. While this is a potential concern during construction due to the large number of vehicles present, during operation, this impact would be low and restricted to maintenance activities. Although tortoises could be kept off the wind farm roads by fencing or similar structures, this is not recommended as this would also function to limit tortoise movement across the landscape. In addition, the vegetation cover on the site is already very low and the reptile species present are species adapted to low-cover conditions with the result that the open areas created by the roads of the site would be represent significant obstacles for the species present.

In general, the major impacts on reptiles associated with the development would be disturbance and habitat loss during construction. However, there do not appear to be any species that would be especially affected.

The most important areas for reptiles are likely to be the occasional steeper rocky outcrops and the larger drainage lines with some woody vegetation which offer some cover for those species less able to deal with the low vegetation cover of most of the site. The footprint within these areas would be low and as such there do not appear to be any significant limitations or red-flag issues associated with reptiles and the development of the wind farm.

Figure 13. Reptiles observed on the Koup site include the Leopard Tortoise and Purcell's Gecko.

Amphibians

The diversity of amphibians in the study area is relatively low with only six species having being recorded in the area (Annex 3). Species observed at the site include the Karoo Toad and and Poynton's River Frog. There are no listed amphibian species known from the area although the Giant Bull Frog *Pyxicephalus adspersus* was previously listed as Near Threatened but has revised to Least Concern (Annex 3). This species is associated with temporary pans in the Karoo, Grassland and Savannah Biomes, but is not commonly recorded in the study area and its presence at the site is considered unlikely as there is no suitable breeding habitat present within the site. Although there is no permanent water within the site, there are a few larger drainage lines present or small earth dams that would have temporary pools that can be used by toads and frogs for seasonal breeding purposes. The impact of the development on these breeding sites would be very low and a direct impact on these habitats is unlikely. Given the localised nature of important amphibian habitats at the site as well as the generally arid nature of the site and the low overall abundance of amphibians, a significant long-term impact on amphibians is unlikely.

6.3 Critical Biodiversity Areas & Broad-Scale Processes

In terms of the 2017 Western Cape Biodiversity Spatial Plan, there is a CBA along the drainage line that occurs in the east of the site and many smaller Ecological Support Areas along the minor drainage lines of the site. There are no turbines in or access roads that would traverse the CBA, with the result that potential impacts on the CBA would be minimal. Although there would be some impact on the ESAs where the wind farm roads traverse the drainage lines, with the appropriate mitigation, the overall impact on the ESAs would be low and is considered acceptable. The impact of the Koup 1 WEF and gid connection on CBAs and ESAs is thus concluded to be minor and is therefore considered acceptable.

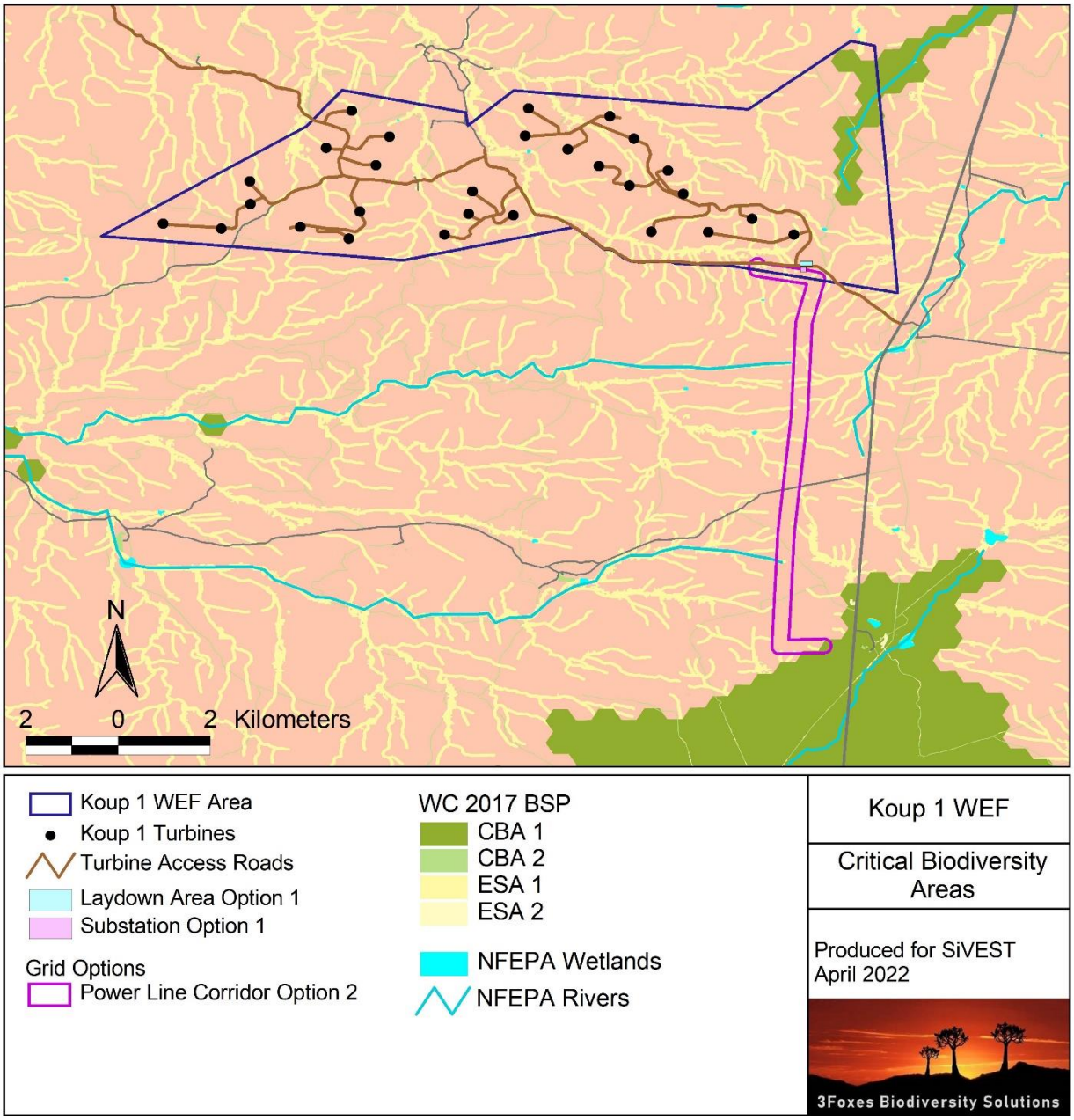

Figure 14. Critical Biodiversity Areas map for the Koup 1 study area, showing that there is a small CBA associated with a drainage line in the east of the site, but that this would not be impacted under the final layout.

6.4 Cumulative Impacts

Where other renewable energy developments occur within 30km of a site, a cumulative impact assessment is required. This includes a general assessment of cumulative impact as well as an assessment of different potential cumulative impact sources and an indication of the size or extent of the identified cumulative impact.

In terms of existing impacts in the area (Figure 15), the nearby Beaufort West and Trakas Wind Farms are of most relevance as they are closest to the site and hence would potentially contribute the most to cumulative impact in the area. Although these two wind farms are close to the site, there is some difference in habitat with the Beaufort West and Trakas sites being on deeper soils than the Koup site with the result that the vegetation cover on Koup is significantly lower than Trakas and Beaufort West. This is likely to result in some differences in faunal and plant community structure between the two areas. The total footprint of the Trakas and Beaufort West WEFs is approximately 100ha each. Further afield, there are the three Kwagga WEFs east of the site as well as the Lombaardskraal PV facility which are all still in process. The Kwagga WEFs can be assumed to have a footprint of approximately 100ha each, while the Lombaardskraal PV facility would have a capacity of 20MW and would be approximately 50ha in extent. The Leeu Gamka PV facility is also still currently in process and while the footprint of this facility is not known, it can be assumed as a worst-case scenario of 200ha. The Koup 2 WEF is being developed in parallel to the Koup 1 WEF and would have a footprint of less than 50ha. Thus, the total approved development footprint in the area can be estimated at no more than 200ha and the potential footprint of projects currently underway including the current project is no more than 550ha. Given the overwhelmingly intact nature of the area which has experienced very little habitat loss to date apart from some development of intensive agriculture along the Gamka River and other major water courses, the contribution of the Koup 1 project at less than 50ha is not considered highly significant. Current cumulative impacts in the area are thus considered to be low and acceptable.

Table 5*:* Renewable energy developments proposed within a 35km radius of the Koup 1 WEF application site.

Project	DEA Reference No	Technology	Capacity	Status of Application / Development
Proposed Beaufort West Wind Farm	12/12/20/1784/1	Wind	140MW	Approved
Proposed Trakas Wind Farm	12/12/20/1784/2	Wind	140MW	Approved
Proposed Wind and Solar Facility on the Farm Lombardskraal 330	14/12/16/3/3/2/406	Solar	20MW	EIA in Process
Proposed Leeu Gamka Solar Power Plant	12/12/20/2296	Solar	-	EIA in Process
Proposed Koup 2 WEF	TBA	Wind	140MW	EIA in Process
Proposed Kwagga WEF 1	14/12/16/3/3/2/2070	Wind	279MW	EIA in Process
Proposed Kwagga WEF 2	14/12/16/3/3/2/2071	Wind	341MW	EIA in Process
Proposed Kwagga WEF 3	14/12/16/3/3/2/2072	Wind	204.6MW	EIA in Process

In terms of the recommended mitigation measures associated with the different projects, the consultant has worked on both the Trakas and Beaufort West projects, with the result that the findings of these studies has already been included and integrated into the current study. The other solar PV projects are still in process and the ecological reports are currently not available for review. Given the features of the area, the most

important mitigation and avoidance measures associated with the different projects include minimizing impact on the drainage lines of the area and avoiding impact on protected plant and animal species. Similar mitigation and avoidance has been recommended and implemented in terms of the layout of the Koup 1 WEF and as such, the Koup 1 WEF project is considered aligned and consistent with the mitigation and avoidance that has been recommended on other projects in the immediate environment.

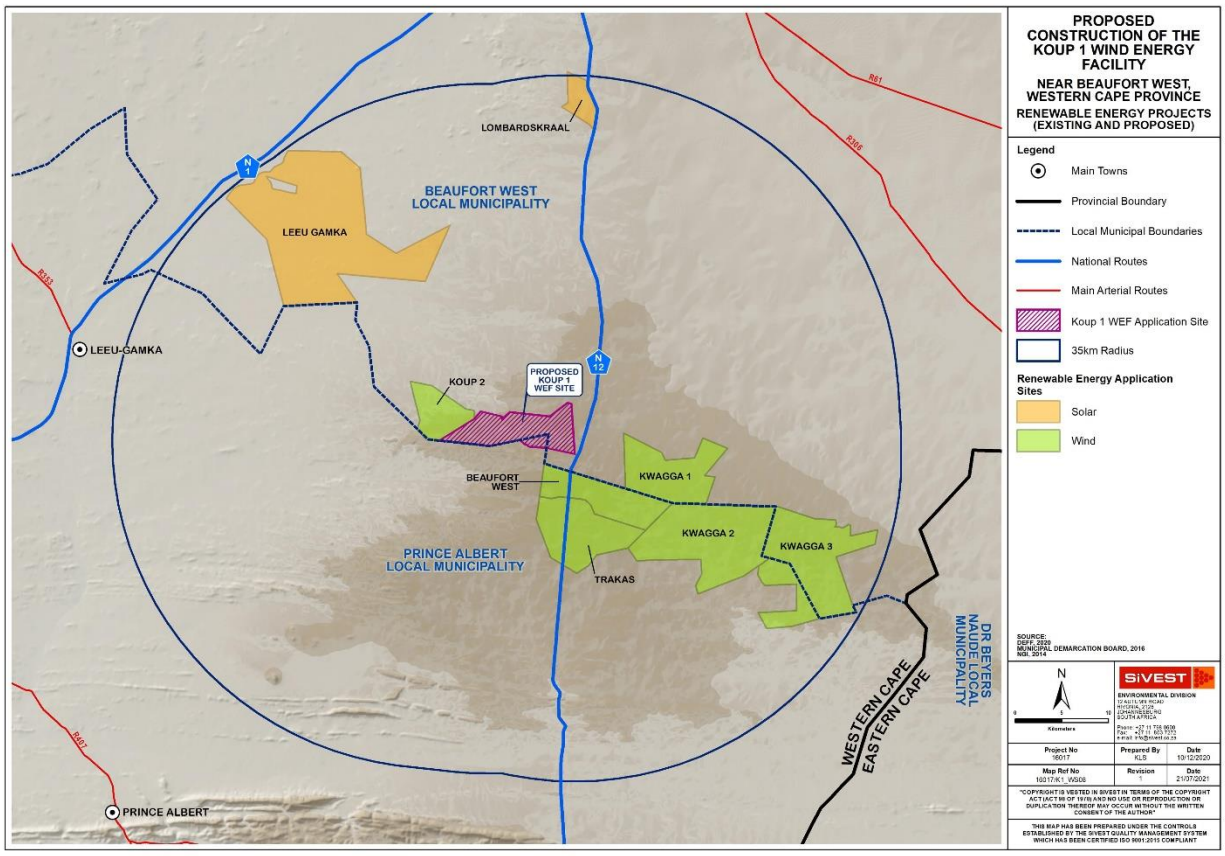

Figure 15. Map of other renewable energy developments in the broad area around the Koup 1 site.

7. SPECIALIST FINDINGS

7.1 Koup 1 Sensitivity Assessment

The sensitivity map for the Koup 1 WEF area is depicted below in Figure 16. Overall, the site is considered generally favourable for development of the wind farm. Although there are some areas which should be excluded from development or in which the development footprint should be constrained, there are large tracts of the site that are considered low sensitivity and where development would have a low impact. The mapped no-go and high sensitivity areas have been used to inform the development layout as described in Table 4 below. The dominant feature of very high sensitivity considered unsuitable for the placement of turbines,

buildings and substations (and associated battery facility) within the site is the major drainage systems. There are also numerous slopes present which are considered high sensitivity and which are considered unsuitable for buildings, substations and temporary lay-down areas. These slopes are however considered acceptable for the placement of some turbines and associated access roads subject to the stated limits of acceptable change. The development footprint of the wind farm in relation to the sensitivity categories as mapped are listed below (Table 6). The footprint within the low and medium sensitivity areas is well within the limits of acceptable change. Within the very high sensitivity areas, margin is slimmer, but nonetheless still within limits of acceptable change. From an ecological perspective, the footprint within the Very High sensitivity areas is considered acceptable and given that this would be restricted to river crossings of the wind farm access roads, most of which are at existing road crossing points, the potential to mitigate impacts on these features is high. Overall, it is clear that the development is within the stated limits of acceptable change and is considered acceptable from an ecological point of view.

Table 6. The extent of the development footprint within the different sensitivity categories of the Koup 1 site.

Sensitivity	Acceptable Loss (%)	Extent within site (ha)	Acceptable Loss (ha)	Predicted Loss (ha)
Low	5	2093.62	104.68	20.28
Medium	2	1495.79	29.92	19.90
High	1	376.66	3.77	1.58
Very High	0.5	352.7	1.76	1.42
Totals			140.13	43.18

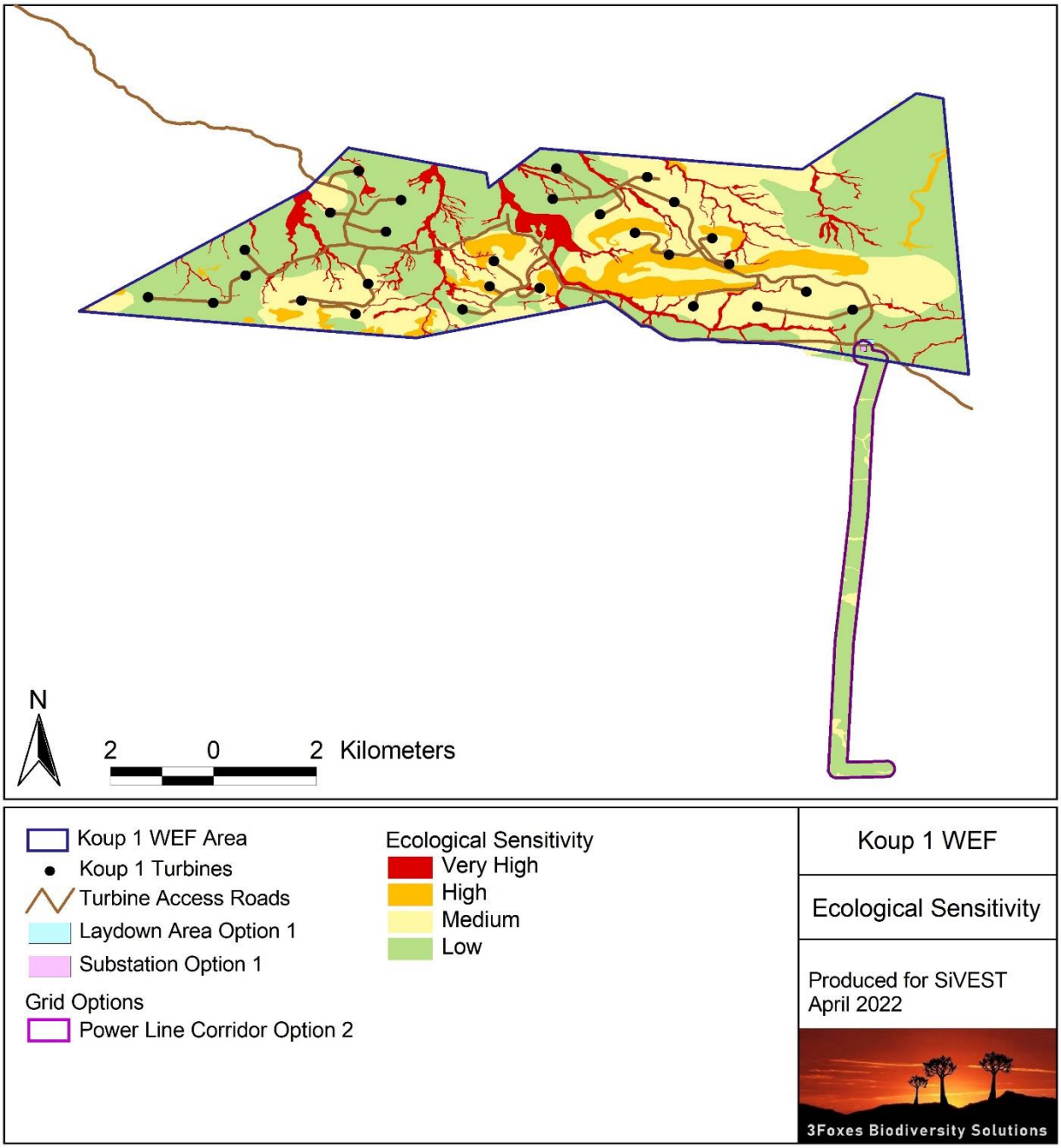

Figure 16. Sensitivity map for the Koup 1 site, showing the final layout of the 28-turbine layout provided for the assessment as well as the preferred grid connection option.

7.2 Identification of Potential Impacts

The development of the Koup 1 Wind Farm, is likely to result in a variety of impacts, associated largely with the disturbance, loss and transformation of intact vegetation and faunal habitat to hard infrastructure such as

turbine foundations and service areas, roads, operations buildings etc. The likely impacts on the terrestrial ecology of the site resulting from the development of the Koup 1 Wind Farm and associated grid connection are identified and discussed below with reference to the characteristics and features of the site. The major risk factors and contributing activities associated with the development are identified and briefly outlined and summarised below before the impacts are assessed for the construction, operation and cumulative impacts of the wind farm. The wind farm is assessed separately from the grid connection.

Impact 1. Impacts on vegetation and listed or protected plant species

The development would require vegetation clearing for turbines, roads and other hard infrastructure. Apart from the direct loss of vegetation within the development footprint, listed and protected species are highly likely to be impacted. These impacts would occur largely during the construction phase of the development, with additional vegetation impacts during operation likely to be low. This impact is therefore assessed for the facility, for the construction phase only.

Impact 2. Direct Faunal Impacts

Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna are likely to move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed if proper management and monitoring is not in place. Traffic at the site during all phases of the project would pose a risk of collisions with fauna. Slower types such as tortoises, snakes and certain mammals would be most susceptible and the impact would be largely concentrated to the construction phase when vehicle activity was high. Some mammals and reptiles would be vulnerable to illegal collection or poaching during the construction phase as a result of the large number of construction personnel that are likely to be present. During the operational phase, noise generated by the operation of the turbines is likely to negatively affect at least some fauna. Faunal impacts will therefore be assessed during the construction and operational phase of the facility.

Impact 3. Increased Erosion Risk

The large amount of disturbance created during construction would leave the site vulnerable to wind and water erosion. Soil disturbance associated with the development will render the impacted areas vulnerable to erosion and measures to limit erosion will need to be implemented. This impact is likely to manifest during construction but would largely be expressed during the operational phase and will therefore be assessed for the oeprational phase.

Impact 4. Alien Plant Invasion

The disturbance associated with the construction phase of the project will render the disturbed areas vulnerable to alien plant invasion. Some woody aliens are already present in the area and additional alien

plant invasion following construction is highly likely and regular alien plant clearing activities would be required. Once the natural vegetation has returned to the disturbed areas, the site will be less vulnerable to alien plant invasion, however, the roadsides and turbine service areas are likely to remain foci of alien plant invasion for years. This impact would manifest during the operational phase, although some of the required measures to reduce this impact are required during construction.

Impact 5. Cumulative Impact 1. Impacts on CBAs and ESAs

The development will result in some habitat loss and fragmentation within a CBAs and ESAs. In addition, the presence of the wind turbines and daily operational activities at the site may deter certain species from the area, or result in habitat degradation for certain noise or disturbance-sensitive faunal species. This impact would persist for the life of the facility and is thus assessed for the operation phase of the wind farm.

Impact 6. Cumulative Impact 1. Cumulative Impacts on broad-scale ecological processes

The development will contribute to cumulative impacts on habitat loss and fragmentation in the area and potentially the ability to meet future conservation targets. In addition, the presence of the wind turbines and daily operational activities at the site may deter certain species from the area, resulting in a loss in broad-scale landscape connectivity.

7.3 Assessment of Impacts – Koup 1 WEF

7.3.1 Planning & Construction

Impacts associated with the Planning and Construction phase of the Koup 1 WEF are assessed below.

Table 7: Impact on Vegetation and Plant SCC due to construction

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Construction/ Decommissioning Phase																				
Vegetation and protected plant species	Vegetation clearing for access roads, turbines and their service areas and other infrastructure will impact on vegetation and protected plant species.	2	4	2	2	3	3	39	-	Medium	**See Below**	2	4	2	1	3	2	24	-	Low
Recommended Mitigation Measures	1) There should be no turbines within the Very High Sensitivity areas. 2) The footprint within drainage lines should be minimized as much as possible. 3) Preconstruction walk-though of the approved development footprint to ensure that sensitive habitats and species are avoided where possible. 4) Ensure that lay-down and other temporary infrastructure is within low sensitivity areas, preferably previously transformed areas if possible. 5) Minimise the development footprint as far as possible and rehabilitate disturbed areas that are no longer required by the operational phase of the development. 6) A large proportion of the impact of the development stems from the access roads and the number of roads should be reduced to the minimum possible and routes should also be adjusted to avoid areas of high sensitivity as far as possible, as informed by a preconstruction walk-though survey.																			

	7) Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes topics such as no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc. 8) Demarcate all areas to be cleared with construction tape or other appropriate and effective means. However, caution should be exercised to avoid using material that might entangle fauna.

Table 8: Impact on fauna due to construction activities

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Construction/ Decommissioning Phase																				
Faunal disturbance and habitat loss	Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna are likely to move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed.	2	4	2	2	2	3	36	-	Medium	**See Below**	2	4	2	1	2	3	33	-	Medium
Recommended Mitigation Measures	1) Preconstruction walk-through of the facility to micro-site roads and turbines. 2) During construction any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person. 3) The illegal collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the construction site.																			

	4) No fires should be allowed within the site as there is a risk of runaway veld fires. 5) No fuelwood collection should be allowed on-site. 6) If any parts of site such as construction camps must be lit at night, this should be done with low-UV type lights (such as most LEDs) as far as practically possible, which do not attract insects and which should be directed downwards. 7) All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. 8) No unauthorized persons should be allowed onto the site and site access should be strictly controlled 9) All construction vehicles should adhere to a low-speed limit (40km/h for cars and 30km/h for trucks) to avoid collisions with susceptible species such as snakes and tortoises and rabbits or hares. Speed limits should apply within the facility as well as on the public gravel access roads to the site. 10) All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and snakes which are often persecuted out of fear or superstition.

7.3.2 Operation

Impacts associated with the operational phase of the Koup 1 WEF are assessed below.

Table 9: Impacts on fauna due to operational activities

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Operation Phase																				
Faunal disturbance and habitat degradation	Fauna will be negatively affected by the operation of the wind farm due to the human disturbance, the presence of vehicles on the site and possibly by noise generated by	2	3	2	2	3	3	36	-	Medium	**See Below.**	2	3	2	2	3	2	24	-	Low

	the wind turbines as well.																				

Recommended Mitigation Measures	1) Management of the site should take place within the context of an Open Space Management Plan. 2) No unauthorized persons should be allowed onto the site. 3) Any potentially dangerous fauna such snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location. 4) The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden by anyone except landowners or other individuals with the appropriate permits and permissions where required. 5) If any parts of the site need to be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs or HPS bulbs) as far as possible, which do not attract insects. 6) All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. 7) All vehicles accessing the site should adhere to a reduced speed limit (30km/h for heavy vehicles and 40km/h for light vehicles) to avoid collisions with susceptible species such as snakes and tortoises. 8) If parts of the facility such as the substation are to be fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences as they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks. Alternatively, the electrified strands should be placed on the inside of the fence and not the outside.

Table 10: Increased erosion risk during operation

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Operation Phase																				
Increased potential for soil erosion	Following construction, the site will remain vulnerable to soil erosion for some time due to the disturbance created by site clearing and likely low	2	3	2	2	3	3	36	-	Medium	**See Below.**	2	2	2	2	2	2	20	-	Low

	natural revegetation of disturbed areas thereafter. It is important to note that while the site is arid, such areas can experience significant soil erosion as plant cover is low and occasional heavy showers generate large amounts of runoff.																			
Recommended Mitigation Measures	1) Erosion management at the site should take place according to the Erosion Management Plan and Rehabilitation Plan. 2) All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. 3) Regular monitoring for erosion post construction to ensure that no erosion problems have developed as result of the disturbance, as per the Erosion Management and Rehabilitation Plans for the project. Monitoring should take place every 6 months in the first year after construction and annually thereafter. 4) All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. 5) All cleared areas should be revegetated with indigenous perennial shrubs and succulents from the local area. Dead material from site clearing can be used to encourage this process and can be set aside during clearing and later placed on the cleared areas to encourage recovery.																			

Table 11: Increased alien plant invasion during operation

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Operation Phase																				
Ecological degradation due to alien plant invasion.		1	3	2	2	3	3	33	-	Medium	**See Below.**	1	2	1	1	2	2	14	-	Low
Recommended Mitigation Measures	1) There should be regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from the facility as there are also likely to be prone to invasion problems. Monitoring every 6 months for the first 2 years post-construction is recommended, followed by annual monitoring thereafter.																			

	2) Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.

Table 12: Impact on CBAs and ESAs due to presence and operation of the WEF

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS	S		E	P	R	L	D	I / M	TOTAL	STATUS	S
Operation Phase																				
Negative impact on ESAs, CBAs and broad-scale ecological processes.	Transformation and presence of the facility will contribute to cumulative habitat loss within CBAs and impacts on broad-scale ecological processes such as fragmentation.	2	3	3	2	3	2	26	-	Medium	**See Below.**	1	2	2	2	3	2	20	-	Low
Recommended Mitigation Measures	1) Minimise the development footprint within the high sensitivity areas. 2) There should be an integrated management plan for the development area during operation, which is beneficial to fauna and flora. 3) All disturbed areas that are not used such as excess road widths, should be rehabilitated with locally occurring shrubs and grasses after construction to reduce the overall footprint of the development. 4) Noise and disturbance on the site should be kept to a minimum during operation and maintenance activities.																			

7.3.3 Decommissioning

Impacts associated with the decommissioning phase of the Koup 1 WEF are assessed below.

Table 13: Impact on fauna due to decommissioning activities

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Construction/ Decommissioning Phase																				
Faunal disturbance and habitat loss	Fauna will be negatively affected by the decommissioning of the wind farm due to the human disturbance, the presence and operation of vehicles and heavy machinery on the site and the noise generated.	1	4	1	2	1	3	27	-	Medium	**See Below**	1	3	1	1	1	3	21	-	Low
Recommended Mitigation Measures	1) Any potentially dangerous fauna such as snakes or fauna threatened by the decommissioning activities should be removed to a safe location prior to the commencement of decommissioning activities. 2) All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. 3) All vehicles accessing the site should adhere to a low-speed limit (40km/h max) to avoid collisions with susceptible species such as snakes and tortoises. 4) No excavated holes or trenches should be left open for extended periods as fauna may fall in and become trapped. 5) All above-ground infrastructure should be removed from the site. Below-ground infrastructure such as cabling can be left in place if it does not pose a risk, as removal of such cables may generate additional disturbance and impact, however, this should be in accordance with the facilities' decommissioning and recycling plan, and as per the agreements with the land owners concerned.																			

Table 14: Increased erosion risk due to decommissioning

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Operation Phase																				
Increased potential for soil erosion	Following decommissioning, the site will be highly vulnerable to soil erosion due to the disturbance created by the removal of infrastructure from the site.	2	3	2	2	3	3	36	-	Medium	**See Below.**	2	2	2	2	2	2	20	-	Low
Recommended Mitigation Measures	1) Any roads that will not be rehabilitated should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. 2) There should be regular monitoring (annual) for erosion for at least 5 years after decommissioning by the applicant to ensure that no erosion problems develop as a result of the disturbance, and if they do, to immediately implement erosion control measures. 3) All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. 4) All disturbed and cleared areas should be revegetated with indigenous perennial shrubs and grasses from the local area.																			

Table 15: Increased alien plant invasion following decommissioning

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Operation Phase																				
Ecological degradation due to alien plant invasion.		1	3	2	2	3	3	33	-	Medium	**See Below.**	1	2	1	1	2	2	14	-	Low

Recommended Mitigation Measures	1) Wherever excavation is necessary for decommissioning, topsoil should be set aside and replaced after construction to encourage natural regeneration of the local indigenous species. 2) Due to the disturbance at the site alien plant species are likely to be a long-term problem at the site following decommissioning and regular control will need to be implemented until a cover of indigenous species has returned. 3) Annual monitoring for alien plants within the disturbed areas for at least three years after decommissioning or until alien invasives are no longer a problem at the site. 4) Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.

7.4 Assessment of Impacts – Koup 1 Grid Connection

7.4.1 Planning & Construction

Impacts associated with the Planning and Construction phase of the Koup 1 Grid Connection are assessed below. Impacts are assessed for Option 2 as this is the preferred option and the other two alternatives originally included in the assessment were ultimately not viable due to technical and environmental constraints.

Table 16: Impact on Vegetation and Plant SCC due to construction

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Construction/ Decommissioning Phase																				
Vegetation and protected plant species	Vegetation clearing for access roads, turbines and their service areas and other infrastructure will impact on vegetation and protected plant species.	1	4	2	2	3	2	24	-	Medium	**See Below**	1	3	2	1	2	2	18	-	Low

Recommended Mitigation Measures	1) Pre-construction walk-through of the facility's final layout in order to locate species of conservation concern that can be translocated as well as comply with the Cape Nature permit conditions. 2) Search and rescue for identified species of concern before construction. 3) Vegetation clearing to commence only after walk-through has been conducted and necessary permits obtained. 4) Pre-construction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, remaining within demarcated construction areas etc. 5) Contractor's Environmental Officer (EO) to provide supervision and oversight of vegetation clearing activities within sensitive areas. 6) Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared. 7) All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside of the construction area. 8) Temporary laydown areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity. These areas should be rehabilitated after use.

Table 17: Impact on fauna due to construction activities

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Construction/ Decommissioning Phase																				
Faunal disturbance and habitat loss	Disturbance, transformation and loss of habitat will have a negative effect on resident fauna during construction. Due to noise and operation of heavy machinery, faunal disturbance will extend well beyond the footprint and extend into adjacent areas. This will however	1	3	2	2	1	3	27	-	Medium	**See Below**	1	3	1	1	1	3	21	-	Low

	be transient and restricted to the construction phase.
Recommended Mitigation Measures	1) All personnel should undergo environmental induction with regards to fauna and, in particular, awareness about not harming or collecting species such as snakes, tortoises and owls, which are often persecuted out of superstition. 2) Any fauna threatened by the construction activities should be removed to safety by an appropriately qualified environmental officer. 3) All construction vehicles should adhere to a low speed limit (30km/h) to avoid collisions with susceptible species such as snakes and tortoises. 4) All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. 5) If trenches need to be dug for pylons or other purpose, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are standing open should have places where there are soil ramps allowing fauna to escape the trench.

7.4.2 Operation

Impacts associated with the operational phase of the Koup 1 Grid Connection are assessed below.

Table 18: Impacts on fauna due to operational activities

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Operation Phase																				
Faunal disturbance and habitat degradation	The operation and presence of the power line may lead to disturbance or persecution of fauna during maintenance activities.	1	3	1	2	3	2	20	-	Low	**See Below.**	1	2	1	1	3	2	16	-	Low

Recommended Mitigation Measures	1) Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location. 2) If the site must be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs), which do not attract insects. 3) All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. 4) All vehicles accessing the site should adhere to a low speed limit (30km/h max for heavy vehicles and 40km/h for light vehicles) to avoid collisions with susceptible species such as snakes and tortoises. 5) If any parts of the facility are to be fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences because they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks. Alternatively, the electrified strands should be placed on the inside of the fence and not the outside.

Table 19: Habitat Degradation due to Erosion and Alien Plant Invasion

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Operation Phase																				
Increased potential for soil erosion	Disturbance created during construction will leave the site and its immediate surroundings vulnerable to erosion and alien plant invasion for several years into the operational phase	2	3	2	2	3	2	24	-	Medium	**See Below.**	1	2	2	2	2	2	18	-	Low
Recommended Mitigation Measures	1) Erosion management at the site should take place according to the Erosion Management Plan and Rehabilitation Plan. This should make provision for annual monitoring and rehabilitation.																			

	2) All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. 3) There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous perennial shrubs, grasses and trees from the local area. 4) Alien management at the site should take place according to the Alien Invasive Management Plan. 5) Regular (annual) monitoring for alien plants during operation to ensure that no alien invasive problems have developed as result of the disturbance, as per the Alien Management Plan for the project. 6) Woody aliens should be controlled on at least an annual basis using the appropriate alien control techniques as determined by the species present.

Table 20: Increased alien plant invasion during operation

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Operation Phase																				
Ecological degradation due to alien plant invasion.		1	3	2	2	3	3	33	-	Medium	**See Below.**	1	2	1	1	2	2	14	-	Low
Recommended Mitigation Measures	3) There should be regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from the facility as there are also likely to be prone to invasion problems. Monitoring every 6 months for the first 2 years post-construction is recommended, followed by annual monitoring thereafter. 4) Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.																			

Table 21: Impact on CBAs and ESAs due to presence and operation of the grid connection and associated infrastructure

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Operation Phase																				
Negative impact on ESAs and broad-scale ecological processes.	Transformation and presence of the grid connection and associated infrastructure will contribute to cumulative habitat loss within ESAs and impact on broad-scale ecological processes such as fragmentation.	2	3	2	2	3	2	24	-	Medium	**See Below.**	1	2	2	1	3	2	18	-	Low
Recommended Mitigation Measures	1) The ESAs along the power line routes should be avoided or if they cannot be avoided, then the footprint in these areas should be minimized as much as possible. 2) There should be no pylons within the areas mapped as High Sensitivity along the drainage lines. 3) There should be an integrated management plan for the development area during operation, which is beneficial to fauna and flora. 4) All disturbed areas that are not used such as excess road widths, should be rehabilitated with locally occurring shrubs and grasses after construction to reduce the overall footprint of the development. 5) Disturbance on the site should be kept to a minimum during operation and maintenance activities.																			

7.4.3 Decommissioning

Impacts associated with the decommissioning phase of the Koup 1 Grid Connection are assessed below.

Table 22: Impact on fauna due to decommissioning activities

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Construction/ Decommissioning Phase																				
Faunal disturbance and habitat loss	Due to disturbance, noise and the operation of heavy machinery, faunal disturbance due to decommissioning will extend beyond the footprint and impact adjacent areas to some degree. This will however be transient and restricted to the period while machinery is operational. In the long term, decommissioning should restore the ecological functioning and at least some habitat value to the affected areas.	1	2	1	2	1	3	21	-	Low	**See Below**	1	2	1	1	1	3	18	-	Low
Recommended Mitigation Measures	1) All personnel should undergo environmental induction with regards to fauna and, in particular, awareness about not harming or collecting species such as snakes, tortoises and owls, which are often persecuted out of superstition. 2) Any fauna threatened by the decommissioning activities should be removed to safety by an appropriately qualified environmental officer. 3) All vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.																			

	4) All hazardous materials should be stored in the appropriate manner to prevent contamination of the site and ultimately removed from the site as part of decommissioning. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. 5) The site should be rehabilitated with locally occurring species to restore ecosystem structure and function. 6) No excavated holes or trenches should be left open for extended periods as fauna may fall in and become trapped. 7) All above-ground infrastructure should be removed from the site. Below-ground infrastructure such as cabling can be left in place if it does not pose a risk, as removal of such cables may generate additional disturbance and impact, however, this should be in accordance with the facilities' decommissioning and recycling plan, and as per the agreements with the land owners concerned.

Table 23: Increased erosion risk due to decommissioning

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Operation Phase																				
Increased potential for soil erosion	Following decommissioning, the site will be highly vulnerable to soil erosion due to the disturbance created by the removal of infrastructure from the site.	2	3	2	2	3	3	36	-	Medium	**See Below.**	2	2	2	2	2	2	20	-	Low
Recommended Mitigation Measures	5) Any roads that will not be rehabilitated should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. 6) There should be regular monitoring (annual) for erosion for at least 5 years after decommissioning by the applicant to ensure that no erosion problems develop as a result of the disturbance, and if they do, to immediately implement erosion control measures. 7) All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. 8) All disturbed and cleared areas should be revegetated with indigenous perennial shrubs and grasses from the local area.																			

Table 24: Habitat Degradation due to Erosion and Alien Plant Invasion

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Operation Phase																				
Disturbance created during decommissioning will leave the site vulnerable to erosion and alien plant invasion for several years.		1	2	2	2	2	3	27	-	Medium	**See Below.**	1	2	1	1	2	2	14	-	Low
Recommended Mitigation Measures	1) Erosion management at the site should take place according to the Erosion Management Plan and Rehabilitation Plan. This should make provision for monitoring of the site for at least 3 years after decommissioning. 2) All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. 3) There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous perennial shrubs, grasses and trees from the local area. 4) Alien management at the site should take place according to the Alien Invasive Management Plan. This should make provision for alien monitoring and management for at least 3 years after decommissioning. 5) Regular (annual) monitoring for alien plant during operation to ensure that no erosion problems have developed as result of the disturbance, as per the Alien Management Plan for the project. 6) Woody aliens should be controlled on at least an annual basis using the appropriate alien control techniques as determined by the species present.																			

7.5 Cumulative Impacts – Koup 1 WEF and Associated Infrastructure

Table 25: Cumulative impact on ecological processes

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S
CumulativePhase																				
Cumulative impacts on fauna and flora	Wind energy development in the wider area around the Koup 1 site will generate cumulative impacts on habitat loss and fragmentation for fauna and flora.	2	3	2	2	3	2	24	-	Medium	**See Below**	2	2	2	2	3	2	22	-	Low
	1) There should be no turbines within the Very High Sensitivity areas. 2) The footprint within drainage lines should be minimized as much as possible. 3) Preconstruction walk-though of the approved development footprint to ensure that sensitive habitats and species are avoided where possible. 4) Ensure that lay-down and other temporary infrastructure is within low sensitivity areas, preferably previously transformed areas if possible. 5) Minimise the development footprint as far as possible and rehabilitate disturbed areas that are no longer required by the operational phase of the development. 6) A large proportion of the impact of the development stems from the access roads and the number of roads should be reduced to the minimum possible and routes should also be adjusted to avoid areas of high sensitivity as far as possible, as informed by a preconstruction walk-though survey. 7) Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes topics such as no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc. 8) Demarcate all areas to be cleared with construction tape or other appropriate and effective means. However, caution should be exercised to avoid using material that might entangle fauna.																			

8. COMPARATIVE ASSESSMENT OF ALTERNATIVES

A comparative assessment of the grid connection alternatives, substation site alternatives and laydown area alternatives is detailed below and includes the identification of the preferred alternatives in each case. Ultimately, only Substation Option 1 and Construction Laydown Area Option 1 were included in the final assessment, while Grid Connection Option 2 was the only grid connection option that was considered to be technically and environmentally acceptable.

Alternative	Preference	Reasons (incl. potential issues)
SUBSTATION SITE ALTERNATIVES		
Substation Option 1	Preferred	There is not a large difference between Option 1 and Option 2 but Option 1 is preferred as the site is marginally flatter and is in an area where the vegetation is considered to be low sensitivity.
Substation Option 2	Favourable	Somewhat less preferable than Option 1 as the site is marginally steeper and appears to be in area vulnerable to sheet wash.
CONSTRUCTION LAYDOWN AREA SITE ALTERNATIVES		
Construction Laydown Area Option 1	Preferred	Option 1 is preferred as the site is located in an area considered to be low sensitivity and there are no significant features that would be impacted at this location.
Construction Laydown Area Option 2	Least Preferred	There is some erosion damage in this area and the use of this area for the laydown area would be undesirable. It is likely that the use of this site would lead to erosion damage as it will be difficult to manage the site post-construction and rehabilitate the site sufficiently to guard against erosion.
KOUP 1 GRID CONNECTION		
Grid Connection Option 1 A/B	Preferred	This option is significantly shorter than the other alternatives and would generate low impacts on fauna and flora. This is the preferred alternative and would generate significantly lower impacts than the other two options.
Grid Connection Option 2 A/B	Acceptable	This alternative would generate higher impacts than alternative 1 but is considered acceptable and there are no impacts associated with this alternative that cannot be mitigated to an acceptable level.

Alternative	Preference	Reasons (incl. potential issues)
Grid Connection Option 3 A/B	Least Preferred	This is the least preferred alternative and since this option would generate higher impacts than either of other two alternatives, it is not considered viable in the face of the other alternatives.

8.1 No-Go Alternative

Under the no-go alternative, the current landuse consisting of extensive livestock grazing would continue. When applied correctly, such livestock grazing is considered to be largely compatible with long-term biodiversity conservation, although in practice there are some negative effects associated with such landuse such as predator control and negative impacts on habitat availability for the larger ungulates that would historically have utilised the area. Under the current circumstances, the no-go alternative is considered to represent a low long-term negative impact on the environment. The development is however not an alternative landuse for the site, but rather represents an additional stressor that would additively and cumulatively contribute to ecological impacts on the site.

9. CONCLUSION and SUMMARY

9.1 Summary of Findings

The Koup 1 site falls entirely within the Gamka Karoo vegetation type and consists of open gravel plains and low hills dissected by numerous drainage lines. Vegetation cover is generally very low and dominated by low shrubs and scattered low trees. In general, the vegetation of the Koup 1 site is considered low sensitivity and there are few species of concern present. In terms of fauna, the diversity of mammals, reptiles and amphibians is considered relatively low, even by Karoo standards. Although the site falls within the broad distribution of the Riverine Rabbit, the drainage lines of the site do not have extensive floodplains with dense riparian vegetation that represent the typical habitat of this species in the area. The Koup 1 site is therefore considered unsuitable for this species and the development is considered highly unlikely to have any impact on the Riverine Rabbit. The site also falls within the range of the Karoo Padloper and if present it would be associated with the hills of the site with sufficient loose rock and coarse rubble to provide shelter. The low vegetation cover and paucity of such habitat suggests that the site is not an important area for this species and no evidence of this species was observed on the site.

While the smaller drainage features of the site are classified as Ecological Support Areas, there is only one small area of CBA in the east of the site that not be directly impacted by the development. As such impacts on CBAs are considered acceptable for the wind farm and the Grid Connection. In terms of cumulative impacts, the wider area currently has a low development impact from renewable energy and the contribution of the Koup 1 WEF to cumulative impact at less than 50ha is considered relatively low and would not generate significant broad-scale impact. The contribution of the grid connection to cumulative impact would be low and considered acceptable.

In terms of the sensitivity mapping and the set limits of acceptable change, the development is within the limits of acceptable change for all of the sensitivity categories. Consequently, the development is considered to meet the proposed limits of acceptability in terms of the distribution of impact across the different sensitivity categories of the site and there are no fatal flaws in this regard.

9.2 Conclusion and Impact Statement

Koup1 WEF

There are no impacts associated with the Koup 1 Wind Energy Facility that cannot be mitigated to an acceptable level. With the application of relatively simple mitigation and avoidance measures, the impact of the Koup 1 Wind Farm on the local environment can be reduced to a low and acceptable magnitude. The contribution of the Koup 1 Wind Farm development to cumulative impact in the area would be low and is considered acceptable. Overall, there are no specific long-term impacts likely to be associated with the development of the Koup 1 wind farm that cannot be reduced to a low significance. As such, there are no fatal flaws associated with the development and no terrestrial ecological considerations that should prevent it from proceeding.

Koup 2 Grid Connection

There are no impacts associated with the Koup 1 Grid Connection Option 2 and associated infrastructure that cannot be mitigated to an acceptable level. With the application of relatively simple mitigation and avoidance measures, the impact of the Koup 1 Grid Connection on the local environment can be reduced to a low and acceptable magnitude. The contribution of the Koup 1 Grid Connection development to cumulative impact in the area would be low and is considered acceptable. Overall, there are no specific long-term impacts likely to be associated with the development of the Koup 1 grid connection hat cannot be reduced to a low significance. As such, there are no fatal flaws associated with the development and no terrestrial ecological considerations that should prevent it from proceeding.

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11. Annex 1. List of Plants

List of plant species recorded from the area, based on the SANBI POSA database.

Family	Genus	Species	Sub species		IUCN Status
Acanthaceae	*Acanthopsis*	*hoffmannseggiana*			DD
Aizoaceae	*Chasmatophyllum*	*nelii*			LC
Aizoaceae	*Galenia*	*africana*			LC
Aizoaceae	*Galenia*	*secunda*			LC
Aizoaceae	*Galenia*	*glandulifera*			LC
Aizoaceae	*Hereroa*	*crassa*			LC
Aizoaceae	*Rhinephyllum*	*graniforme*			LC
Aizoaceae	*Cylindrophyllum*	*tugwelliae*			LC
Aizoaceae	*Lampranthus*	*fergusoniae*			VU
Amaranthaceae	*Sericocoma*	*avolans*			LC
Amaryllidaceae	*Boophone*	*disticha*			LC
Amaryllidaceae	*Nerine*	*marincowitzii*			VU
Apocynaceae	*Stapeliopsis*	*pillansii*			LC
Apocynaceae	*Carissa*	*bispinosa*			LC
Apocynaceae	*Gomphocarpus*	*filiformis*			LC
Asparagaceae	*Asparagus*	*capensis*	var.	*capensis*	LC
Asparagaceae	*Asparagus*	*recurvispinus*			LC
Asparagaceae	*Asparagus*	*suaveolens*			LC
Asparagaceae	*Asparagus*	*exuvialis*	forma	*exuvialis*	NE
Asteraceae	*Pteronia*	*glauca*			LC
Asteraceae	*Lasiopogon*	*glomerulatus*			LC
Asteraceae	*Garuleum*	*bipinnatum*			LC
Asteraceae	*Leysera*	*tenella*			LC
Asteraceae	*Cotula*	*australis*			LC
Asteraceae	*Ursinia*	*nana*	subsp.	*nana*	LC
Asteraceae	*Gazania*	*jurineifolia*	subsp.	*jurineifolia*	LC
Asteraceae	*Helichrysum*	*pumilio*	subsp.	*pumilio*	LC
Asteraceae	*Chrysocoma*	*ciliata*			LC
Asteraceae	*Metalasia*	*trivialis*			LC
Asteraceae	*Cotula*	*sororia*			LC
Bignoniaceae	*Rhigozum*	*obovatum*			LC
Brassicaceae	*Heliophila*	*crithmifolia*			LC
Crassulaceae	*Crassula*	*pyramidalis*			LC
Ebenaceae	*Euclea*	*undulata*			LC
Euphorbiaceae	*Euphorbia*	*rhombifolia*			LC
Fabaceae	*Leobordea*	*platycarpa*			LC
Fabaceae	*Indigofera*	*sessilifolia*			LC
Fabaceae	*Vicia*	*sativa*	subsp.	*sativa*	NE
Iridaceae	*Moraea*	*cookii*			LC
Iridaceae	*Gladiolus*	*permeabilis*	subsp.	*permeabilis*	LC
Iridaceae	*Gladiolus*	*permeabilis*	subsp.	*edulis*	LC

Iridaceae	*Moraea*	*karroica*			LC
Limeaceae	*Limeum*	*aethiopicum*			LC
Lobeliaceae	*Wimmerella*	*pygmaea*			LC
Malvaceae	*Hermannia*	*desertorum*			LC
Malvaceae	*Hermannia*	*cernua*			LC
Malvaceae	*Grewia*	*robusta*			LC
Malvaceae	*Hermannia*	*filifolia*	var.	*grandicalyx*	NE
Menispermaceae	*Cissampelos*	*capensis*			LC
Orobanchaceae	*Hyobanche*	*rubra*			LC
Poaceae	*Digitaria*	*argyrograpta*			LC
Poaceae	*Eragrostis*	*homomalla*			LC
Poaceae	*Aristida*	*vestita*			LC
Poaceae	*Schismus*	*barbatus*			LC
Poaceae	*Eragrostis*	*bicolor*			LC
Poaceae	*Eragrostis*	*procumbens*			LC
Poaceae	*Pentameris*	*airoides*	subsp.	*airoides*	LC
Poaceae	*Ehrharta*	*delicatula*			LC
Poaceae	*Ehrharta*	*calycina*			LC
Rubiaceae	*Nenax*	*cinerea*			LC
Rubiaceae	*Anthospermum*	*dregei*	subsp.	*dregei*	LC
Santalaceae	*Viscum*	*rotundifolium*			LC
Santalaceae	*Viscum*	*hoolei*			LC
Scrophulariaceae	*Lyperia*	*tenuiflora*			LC
Scrophulariaceae	*Zaluzianskya*	*venusta*			LC
Scrophulariaceae	*Chaenostoma*	*macrosiphon*			LC
Scrophulariaceae	*Chaenostoma*	*archeri*			LC
Scrophulariaceae	*Aptosimum*	*indivisum*			LC
Scrophulariaceae	*Diascia*	*runcinata*			LC
Solanaceae	*Lycium*	*horridum*			LC
Solanaceae	*Lycium*	*cinereum*			LC
Thymelaeaceae	*Gnidia*	*juniperifolia*			LC

12. Annex 2. List of Mammals

List of mammals known to occur in the broader area based on the MammalMap database for the quarter degree squares 3222CD, 3222DC, 3222CB, 3222DA.

Family	Scientific name	Common name	Red List	QDSs	Records
Bovidae	*Antidorcas marsupialis*	Springbok	Least Concern (2016)	2	2
Bovidae	*Raphicerus campestris*	Steenbok	Least Concern (2016)	1	2
Bovidae	*Tragelaphus strepsiceros*	Greater Kudu	Least Concern (2016)	1	1
Bovidae	*Sylvicapra sp.*	Common Duiker		1	1
Bovidae	*Oryx gazella*	Gemsbok	Least Concern (2016)	2	2
Canidae	*Canis mesomelas*	Black-backed Jackal	Least Concern (2016)	3	19
Canidae	*Vulpes chama*	Cape Fox	Least Concern (2016)	1	2
Cercopithecidae	*Chlorocebus pygerythrus*	Vervet Monkey	Least Concern (2016)	1	1
Cercopithecidae	*Papio ursinus*	Chacma Baboon	Least Concern (2016)	3	3
Felidae	*Caracal caracal*	Caracal	Least Concern (2016)	1	4
Gliridae	*Graphiurus (Graphiurus) ocularis*	Spectacled African Dormouse	Least Concern	1	1
Herpestidae	*Herpestes pulverulentus*	Cape Gray Mongoose	Least Concern (2016)	1	1
Herpestidae	*Suricata suricatta*	Meerkat	Least Concern (2016)	1	1
Hyaenidae	*Proteles cristata*	Aardwolf	Least Concern (2016)	1	1
Hystricidae	*Hystrix africaeaustralis*	Cape Porcupine	Least Concern	1	1
Leporidae	*Lepus saxatilis*	Scrub Hare	Least Concern	1	1
Macroscelididae	*Elephantulus edwardii*	Cape Elephant Shrew	Least Concern (2016)	1	1
Muridae	*Desmodillus auricularis*	Cape Short-tailed Gerbil	Least Concern (2016)	1	2
Muridae	*Rhabdomys pumilio*	Xeric Four-striped Grass Rat	Least Concern (2016)	1	23
Muridae	*Parotomys brantsii*	Brants's Whistling Rat	Least Concern (2016)	2	4
Muridae	*Parotomys littledalei*	Littledale's Whistling Rat	Near Threatened (2016)	1	1
Muridae	*Aethomys namaquensis*	Namaqua Rock Mouse	Least Concern	1	15
Muridae	*Myomyscus verreauxi*	Verreaux's Mouse	Least Concern	1	1

Muridae	*Otomys unisulcatus*	Karoo Bush Rat	Least Concern (2016)	1	1
Orycteropodidae	*Orycteropus afer*	Aardvark	Least Concern (2016)	1	2
Procaviidae	*Procavia capensis*	Cape Rock Hyrax	Least Concern (2016)	1	22
Soricidae	*Myosorex varius*	Forest Shrew	Least Concern (2016)	1	12
Soricidae	*Myosorex varius*	Forest Shrew	Least Concern (2016)	1	12
Viverridae	*Genetta genetta*	Common Genet	Least Concern (2016)	1	1

13. Annex 3. List or Reptiles

List of reptiles known to occur in the broader area based on the ReptileMap database for the quarter degree squares 3222CD, 3222DC, 3222CB, 3222DA.

Family	Scientific name	Common name	Red List	QDSs	Records	Last recorded
Agamidae	*Agama aculeata aculeata*	Common Ground Agama	Least Concern	1	2	1900/06/15
Chamaeleonidae	*Chamaeleo namaquensis*	Namaqua Chameleon	Least Concern	1	2	2019/02/06
Cordylidae	*Karusasaurus polyzonus*	Karoo Girdled Lizard	Least Concern	1	1	2015/10/12
Elapidae	*Naja nivea*	Cape Cobra	Least Concern	2	2	1900/06/15
Gekkonidae	*Chondrodactylus angulifer angulifer*	Common Giant Ground Gecko	Least Concern	1	1	2015/10/20
Gekkonidae	*Chondrodactylus bibronii*	Bibron's Gecko	Least Concern	1	1	2018/04/28
Gekkonidae	*Pachydactylus capensis*	Cape Gecko	Least Concern	1	1	2016/07/26
Gekkonidae	*Pachydactylus latirostris*	Quartz Gecko	Least Concern	1	1	2015/10/13
Gekkonidae	*Pachydactylus maculatus*	Spotted Gecko	Least Concern	1	1	2015/10/20
Gekkonidae	*Pachydactylus mariquensis*	Marico Gecko	Least Concern	1	2	1983/09/14
Gekkonidae	*Pachydactylus purcelli*	Purcell's Gecko	Least Concern	1	1	2007/06/13
Gekkonidae	*Ptenopus garrulus maculatus*	Spotted Barking Gecko	Least Concern	1	1	2007/12/15
Lacertidae	*Pedioplanis lineoocellata pulchella*	Common Sand Lizard	Least Concern	2	5	2016/07/26
Lacertidae	*Pedioplanis namaquensis*	Namaqua Sand Lizard	Least Concern	2	2	2015/10/16
Lamprophiidae	*Psammophis notostictus*	Karoo Sand Snake	Least Concern	1	1	2000/06/15
Pelomedusidae	*Pelomedusa galeata*	South African Marsh Terrapin	Not evaluated	1	1	2015/10/16
Scincidae	*Trachylepis sulcata sulcata*	Western Rock Skink	Least Concern	1	1	2018/04/28
Scincidae	*Trachylepis variegata*	Variegated Skink	Least Concern	1	1	1900/06/15
Testudinidae	*Chersina angulata*	Angulate Tortoise	Least Concern	3	11	2015/10/12

Testudinidae	*Chersobius boulengeri*	Karoo Padloper	Near Threatened	1	2	2007/06/13
Testudinidae	*Psammobates tentorius tentorius*	Karoo Tent Tortoise	Least Concern	4	27	2019/03/07
Testudinidae	*Psammobates tentorius verroxii*	Verrox's Tent Tortoise		2	2	2010/07/27
Testudinidae	*Stigmochelys pardalis*	Leopard Tortoise	Least Concern	3	17	2016/11/16
Viperidae	*Bitis arietans arietans*	Puff Adder	Least Concern	1	1	2017/10/11

14. Annex 4. List of Amphibians

List of amphibians known to occur in the broader area based on the FrogMap database for the quarter degree squares 3222CD, 3222DC, 3222CB, 3222DA.

Family	Scientific name	Common name	Red List	QDSs	Records	Last recorded
Bufonidae	*Vandijkophrynus gariepensis gariepensis*	Karoo Toad (subsp. gariepensis)	Least Concern	4	8	2015/10/12
Pipidae	*Xenopus laevis*	Common Platanna	Least Concern	1	1	2001/09/22
Pyxicephalidae	*Amietia fuscigula*	Cape River Frog	Least Concern	4	5	2001/11/18
Pyxicephalidae	*Cacosternum boettgeri*	Common Caco	Least Concern	4	8	2015/10/12
Pyxicephalidae	*Pyxicephalus adspersus*	Giant Bull Frog	Least Concern	1	3	2007/12/04
Pyxicephalidae	*Tomopterna delalandii*	Cape Sand Frog	Least Concern	3	3	2001/11/18

15. Annex 5. Short CV/Summary of Expertise – Simon Todd

Simon Todd Pr.Sci.Nat
Director & Principle Scientist
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Ecological Solutions for People & the Environment

Simon Todd is Director and principal scientist at 3Foxes Biodiversity Solutions and has over 20 years of experience in biodiversity measurement, management and assessment. He has provided specialist ecological input on more than 200 different developments distributed widely across the country, but with a focus on the three Cape provinces. This includes input on the Wind and Solar SEA (REDZ) as well as the Eskom Grid Infrastructure (EGI) SEA and Karoo Shale Gas SEA. He is on the National Vegetation Map Committee as representative of the Nama and Succulent Karoo Biomes. Simon Todd is a recognised ecological expert and is a past chairman and current deputy chair of the Arid-Zone Ecology Forum. He is registered with the South African Council for Natural Scientific Professions (No. 400425/11).

Skills & Primary Competencies

- Research & description of ecological patterns & processes in Nama Karoo, Succulent Karoo, Thicket, Arid Grassland, Fynbos and Savannah Ecosystems.
- Ecological Impacts of land use on biodiversity
- Vegetation surveys & degradation assessment & mapping
- Long-term vegetation monitoring
- Faunal surveys & assessment.
- GIS & remote sensing

Tertiary Education:

- 1992-1994 – BSc (Botany & Zoology), University of Cape Town
- 1995 – BSc Hons, Cum Laude (Zoology) University of Natal
- 1996-1997- MSc, Cum Laude (Conservation Biology) University of Cape Town

Employment History

- 2009 – Present – Sole Proprietor of Simon Todd Consulting, providing specialist ecological services for development and research.

- 2007 Present – Senior Scientist (Associate) – Plant Conservation Unit, Department of Botany, University of Cape Town.
- 2004-2007 – Senior Scientist (Contract) – Plant Conservation Unit, Department of Botany, University of Cape Town
- 2000-2004 – Specialist Scientist (Contract) - South African National Biodiversity Institute
- 1997 – 1999 – Research Scientist (Contract) – South African National Biodiversity Institute

A selection of recent work is as follows:

Strategic Environmental Assessments

Co-Author. Chapter 7 - Biodiversity & Ecosystems - Shale Gas SEA. CSIR 2016.

Co-Author. Chapter 1 Scenarios and Activities – Shale Gas SEA. CSIR 2016.

Co-Author – Ecological Chapter – Wind and Solar SEA. CSIR 2014.

Co-Author – Ecological Chapter – Eskom Grid Infrastructure SEA. CSIR 2015.

Contributor – Ecological & Conservation components to SKA SEA. CSIR 2017.

Recent Specialist Ecological Studies in the Vicinity of the Current Site

Nuweveld East, Nuweveld North, Nuweveld West Wind Energy Facilities. Fauna and Flora Specialist Impact Assessment Study. Zutari 2021.

Nuweveld Grid Connection. Fauna and Flora Specialist Impact Assessment Study. Zutari 2021.

Phezukomoya and San Kraal Wind Energy Facilities and associated grid connection. Fauna and Flora specialist studies. Arcus Consulting 2018.

Kokerboom Wind Energy Facilities (1-4) and associated grid connections. Fauna and Flora specialist studies. Aurecon 2017.

Grid Connection Infrastructure for the Mainstream Sutherland Wind Energy Facilities. Fauna & Flora Specialist Study. CSIR, 2019.

Basic Assessment for the Great Karoo Battery Energy Storage System (Bess), Northern Cape Province. Fauna & Flora Specialist Study. Savannah Environmental, 2020.

Beaufort West And Trakas WEF's - Terrestrial Fauna Camera Trap Monitoring Study. Mainstream South Africa, 2016.

Tooverberg Wind Farm Near Touwsrivier. Fauna & Flora Specialist Study. Sivest 2018.