GENESIS ENERTRAG KOUP 1 WIND (PTY) LTD

Proposed Construction of the Koup 1 Wind Energy Facility and Associated Grid Connection Infrastructure near Beaufort West, Western Cape Province

Visual Impact Assessment Report – EIA Phase

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Confidentiality Statement

National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) 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**
(a) details of the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a *curriculum vitae*;	**Section 1.3** **Appendix B**
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	**Appendix B**
(c) an indication of the scope of, and the purpose for which, the report was prepared;	**Section 1.2** **Appendix A**
(cA) an indication of the quality and age of base data used for the specialist report;	**Section 1.4** **Section 1.5**
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	**Section 6** **Section 8**
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	**Section 1.4** **Section 2**
(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** **Appendix E**
(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 6**
(g) an identification of any areas to be avoided, including buffers;	**Section 6.3** **Section 8**
(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 6.3**
(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 8.5** **Section 9**
(k) any mitigation measures for inclusion in the EMPr;	**Section 8.5**
(l) any conditions for inclusion in the environmental authorisation;	No specific conditions relating to the visual environment need to be included in the environmental authorisation (EA)
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	**Section 8.5**

(n) a reasoned opinion— i. 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 or Environmental Authorization, and where applicable, the closure plan;	**Section 10.1**
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	No feedback has yet been received from the public participation process regarding the visual environment
(p) any other information requested by the competent authority	No information regarding the visual study has been requested from the competent authority to date.
(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.	**N/A**

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VISUAL IMPACT ASSESSMENT REPORT – EIA PHASE

Executive Summary

Genesis Enertrag Koup 1 Wind (Pty) Ltd (hereafter referred to as Genesis) is proposing to construct the 140MW Koup 1 Wind Energy Facility (WEF) and associated grid connection infrastructure near Beaufort West in the Western Cape Province. The proposed WEF development will be subject to a full Environmental Impact Assessment (EIA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended and EIA Regulations, 2014 (as amended). Accordingly, an EIA process as contemplated in terms of the EIA Regulations (2014, as amended) is being undertaken in respect of the proposed WEF project. The competent authority for this EIA is the national Department of Forestry, Fisheries and Environment (DFFE). Grid connection infrastructure for the WEF will be subject to a separate Basic Assessment (BA) Process as contemplated in terms of regulation 19 and 20 of the Environmental Impact Assessment Regulations, 2014, which is currently being undertaken in parallel to the EIA process. This combined Visual Impact Assessment (VIA) is being undertaken as part of the EIA and BA processes.

The VIA has determined that the study area has a largely natural visual character with some pastoral elements. The area has however seen very limited transformation or disturbance and as such the proposed Koup1 WEF development is expected to alter the visual character of the area and contrast significantly with the typical land use and / or pattern and form of human elements present.

A broad-scale assessment of visual sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a **low to moderate** visual sensitivity. However, an important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs.

The area is not typically valued or extensively utilised for its tourism significance and there is limited human habitation resulting in relatively few sensitive or potentially sensitive receptors in the area. A total of forty six (46) potentially sensitive receptors were identified in the combined study area, three (3) of which are considered to be sensitive receptors as they are linked to leisure/nature-based tourism activities in the area. None of the sensitive receptors are however

expected to experience high levels of visual impact from either the proposed WEF facility or the grid connection infrastructure.

The remaining forty three (43) identified receptors are all assumed to be farmsteads which are regarded as potentially sensitive visual receptors as they are located within a mostly rural setting and the the proposed development will likely alter natural vistas experienced from these locations. Only seven (7) of these receptors are expected to experience high levels of visual impact as a result of the WEF development. This sensitivity rating relates largely to the fact that these receptors are located in in close proximity to the boundary of the Koup 1 WEF application site and they are in zones of high contrast, with little natural screening present. Two of these receptors, namely VR12 and VR31 are in fact located within the proposed Koup- 1 WEF development area and as such, these properties form part of the WEF project. Thus it is assumed that the owners have a vested interest in the WEF development and would not perceive the development in a negative light. Furthermore, none of these receptors are tourism-related facilities and as such they are not considered to be Sensitive Receptors.

Thirty-two (32) potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed Koup 1 WEF development, while the remaining two (2) receptor locations will be subjected to low levels of visual impact.

Nine (9) potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed power line, while the remaining two (2) would be subjected to low levels of visual impact.

Although the N12 receptor road traverses the study area, motorists travelling along this route are only expected to experience moderate impacts from the proposed Koup 1 WEF and from the grid connection infrastructure associated with the project.

An overall impact rating was also conducted as part of the scoping phase in order to allow the visual impact to be assessed alongside other environmental parameters. The assessment revealed that impacts associated with the proposed Koup 1 WEF and associated grid connection infrastructure will be of low significance during both construction and decommissioning phases. During operation, visual impacts from the WEF would be of medium significance with relatively few mitigation measures available to reduce the visual impact. Visual impacts associated with the grid connection infrastructure during operation would be of low significance.

Although other proposed renewable energy developments and infrastructure projects were identified within a 35km radius of the Koup 1 WEF project, it was determined that six (6) of these would have any significant impact on the landscape within the visual assessment zone, namely Beaufort West WEF, Trakas WEF, Kwagga 1, 2 and 3 WEFs and Koup 2 WEF. These proposed WEFs, in conjunction with the associated grid connection infrastructure, will inevitably introduce an increasingly industrial character into a largely natural, pastoral landscape, thus giving rise to significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and

mitigation measures stipulated for each of these developments by the visual specialists. In light of this and the relatively low level of human habitation in the study area however, cumulative impacts have been rated as medium.

A comparative assessment of site alternatives for the on-site WEF infrastructure and also for the grid connection alternatives was undertaken in order to determine which of the alternatives would be preferred from a visual perspective. No fatal flaws were identified in respect of any of the alternatives for the proposed on-site substation / BESS facilities or for the construction laydown and O&M areas and all alternatives were found to be favourable.

No fatal flaws were identified for any of the grid connection infrastructure alternatives. Power Line Corridor Option 1 was identified as the Preferred Alternative, while Power Line Corridor Options 2 and 3 were found to be favourable.

From a visual perspective therefore, the proposed Koup 1 WEF and associated grid infrastructure project is deemed acceptable and the Environmental Authorization (EA) should be granted. SiVEST is of the opinion that the visual impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

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VISUAL IMPACT ASSESSMENT REPORT – EIA PHASE

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GLOSSARY OF TERMS

ABBREVIATIONS

BA	Basic Assessment
DBAR	Draft Basic Assessment Report
DEIAR	Draft Environmental Impact Assessment Report
DFFE	Department of Forestry, Fisheries and Environment
DM	District Municipality
DoE	Department of Energy
DSR	Draft Scoping Report
DTM	Digital Terrain Model
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
FEIAR	Final Environmental Impact Assessment Report
FSR	Final Scoping Report
GIS	Geographic Information System
I&AP	Interested and/or Affected Party
IPP	Independent Power Producer
LM	Local Municipality
kV	Kilovolt
MW	Megawatt
NGI	National Geo-Spatial Information
REF	Renewable Energy Facility
REIPPP	Renewable Energy Independent Power Producer Programme
SACAA	South African Civil Aviation Authority
SANBI	South African National Biodiversity Institute
SEF	Solar Energy Facility
VIA	Visual Impact Assessment
VR	Visual Receptor
WEF	Wind Energy Facility

DEFINITIONS

Anthropogenic feature: An unnatural feature resulting from human activity.

Cultural landscape: A representation of the combined worlds of nature and of man illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal (World Heritage Committee, 1992).

Sense of place: The unique quality or character of a place, whether natural, rural or urban. It relates to uniqueness, distinctiveness or strong identity.

Scenic route: A linear movement route, usually in the form of a scenic drive, but which could also be a railway, hiking trail, horse-riding trail or 4x4 trail.

Sensitive visual receptors: An individual, group or community that is subject to the visual influence of the proposed development and is adversely impacted by it. They will typically include locations of human habitation and tourism activities.

Sky Space: The area in which the turbine rotors would rotate.

Slope Aspect: Direction in which a hill or mountain slope faces.

Study area / Visual Assessment Zone: The area with a zone of 10km from the outer boundary of the proposed WEF application site, and 5km from the proposed grid connection corridor alternatives.

Viewpoint: A point in the landscape from where a particular project or feature can be viewed.

Viewshed / Visual Envelope: The geographical area which is visible from a particular location.

Visual character: The pattern of physical elements, landforms and land use characteristics that occur consistently in the landscape to form a distinctive visual quality or character.

Visual contrast: The degree to which the development would be congruent with the surrounding environment. It is based on whether or not the development would conform with the land use, settlement density, forms and patterns of elements that define the structure of the surrounding landscape.

Visual exposure: The relative visibility of a project or feature in the landscape.

Visual impact: The effect of an aspect of the proposed development on a specified component of the visual, aesthetic or scenic environment within a defined time and space.

Visual receptors: An individual, group or community that is subject to the visual influence of the proposed development but is not necessarily adversely impacted by it. They will typically include commercial activities, residents and motorists travelling along routes that are not regarded as scenic.

Visual sensitivity: The inherent sensitivity of an area to potential visual impacts associated with a proposed development. It is based on the physical characteristics of the area (visual character), spatial distribution of potential receptors, and the likely value judgements of these receptors towards the new development, which are usually based on the perceived aesthetic appeal of the area.

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1 INTRODUCTION

Genesis Enertrag Koup 1 Wind (Pty) Ltd (hereafter referred to as Genesis) is proposing to construct the 140MW Koup 1 Wind Energy Facility (WEF) and associated grid connection infrastructure near Beaufort West in the Western Cape Province. The proposed WEF development will be subject to a full Environmental Impact Assessment (EIA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended and EIA Regulations, 2014 (as amended). Accordingly, an EIA process as contemplated in terms of the EIA Regulations (2014, as amended) is being undertaken in respect of the proposed WEF project. The competent authority for this EIA is the national Department of Forestry, Fisheries and Environment (DFFE).

Grid connection infrastructure for the WEF will be subject to a separate Basic Assessment (BA) Process as contemplated in terms of regulation 19 and 20 of the Environmental Impact Assessment Regulations, 2014, which is currently being undertaken in parallel to the EIA process.

Specialist studies have been commissioned to assess and verify the proposed development under the new Gazetted specialist protocols[1].

1.1 Scope and Objectives

This combined Visual Impact Assessment (VIA) is being undertaken as part of the EIA and BA processes. The aim of the VIA is to identify potential visual issues associated with the development of the proposed WEF and associated infrastructure, as well as to determine the potential extent of visual impacts. This will be achieved by determining the character of the visual environment and identifying areas of potential visual sensitivity that may be subject to visual impacts. The visual assessment focuses on the potentially sensitive visual receptor

[1] Formally gazetted on 20 March 2020 (GN No. 320)

locations, and provides an assessment of the magnitude and significance of the visual impacts associated with the WEF and the associated infrastructure.

1.2 Terms of Reference

The terms of reference for this VIA are included in **Appendix A**.

1.3 Specialist Credentials

This VIA was undertaken by Kerry Schwartz, a GIS specialist with more than 20 years' experience in the application of GIS technology in various environmental, regional planning and infrastructural projects undertaken by SiVEST. Kerry's GIS and spatial analysis skills have been extensively utilised in projects throughout South Africa and in other Southern African countries. Kerry has also undertaken many VIAs in recent years and the relevant VIA project experience is listed in the table below.

A Curriculum Vitae and a signed specialist statement of independence are included in Appendix- B of this specialist assessment.

Table 1: Relevant Project Experience

Environmental Practitioner	SiVEST (Pty) Ltd – Kerry Schwartz
Contact Details	kerrys@sivest.co.za
Qualifications	BA (Geography), University of Leeds 1982
Expertise to carry out the Visual Impact Assessment.	**Visual Impact Assessments:** ▪ VIA (EIA) for the proposed Oya Energy Facility near Matjiesfontein, Western Cape Province; ▪ VIA (BA) for the proposed construction of 132kV power lines to serve the authorised Loeriesfontein 3 PV Solar Energy Facility near Loeriesfontein, Northern Cape Province; ▪ VIA (BA) for the proposed construction of the Oya 132kV power line near Matjiesfontein, Northern and Western Cape Provinces; ▪ VIAs (BA) for the proposed Gromis WEF and associated Grid Connection Infrastructure, near Komaggas, Northern Cape Province. ▪ VIAs (BA) for the proposed Komas WEF and associated Grid Connection Infrastructure, near Komaggas, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Mooi Plaats, Wonderheuvel and Paarde Valley solar PV plants near Noupoort in the Northern and Eastern Cape Provinces. ▪ VIAs (Scoping and Impact Phase) for the proposed Sendawo 1, 2 and 3 solar PV energy facilities near Vryburg, North West Province.

	▪ VIAs (Scoping and Impact Phase) for the proposed Tlisitseng 1 and 2 solar PV energy facilities near Lichtenburg, North West Province. ▪ VIA for the proposed Nokukhanya 75MW Solar PV Power Plant near Dennilton, Limpopo Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Helena 1, 2 and 3 75MW Solar PV Energy Facilities near Copperton, Northern Cape Province. ▪ VIA (EIA) for the proposed Paulputs WEF near Pofadder in the Northern Cape Province. ▪ VIA (EIA) for the proposed development of the Rondekop WEF near Sutherland in the Northern Cape Province. ▪ VIA (BA) for the proposed development of the Tooverberg WEF near Touws Rivier in the Western Cape Province. ▪ VIA (BA) for the proposed development of the Kudusberg WEF near Sutherland, Northern and Western Cape Provinces. ▪ VIA (Scoping and Impact Phase) for the proposed development of the Kuruman Wind Energy Facility near Kuruman, Northern Cape Province. ▪ VIA (Scoping and Impact Phase) for the proposed development of the Phezukomoya Wind Energy Facility near Noupoort, Northern Cape Province. ▪ VIA (Scoping and Impact Phase) for the proposed development of the San Kraal Wind Energy Facility near Noupoort, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Graskoppies Wind Farm near Loeriesfontein, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Hartebeest Leegte Wind Farm near Loeriesfontein, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Ithemba Wind Farm near Loeriesfontein, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Xha! Boom Wind Farm near Loeriesfontein, Northern Cape Province ▪ Visual Impact Assessments for 5 Solar Power Plants in the Northern Cape ▪ Visual Impact Assessments for 2 Wind Farms in the Northern Cape ▪ Visual Impact Assessment for Mookodi Integration Project (132kV distribution lines)

1.4 Assessment Methodology

This VIA is based on a combination of desktop-level assessment supported by field-based observation.

1.4.1 Physical landscape characteristics

Physical landscape characteristics such as topography, vegetation and land use are important factors influencing the visual character and visual sensitivity of the study area. Baseline information about the physical characteristics of the study area was initially sourced from spatial databases provided by NGI, the South African National Biodiversity Institute (SANBI) and the South African National Land Cover Dataset (Geoterraimage – 2018). The characteristics identified via desktop means were later verified during the site visit.

1.4.2 Identification of sensitive receptors

Visual receptor locations and routes that are sensitive and/or potentially sensitive to the visual intrusion of the proposed development were identified and assessed in order to determine the impact of the proposed development on these receptor locations.

1.4.3 Fieldwork and photographic review

A four (4) day site visit was undertaken between the 21st and the 24th of June 2021 (mid winter). The purpose of the site visit was to:

- verify the landscape characteristics identified via desktop means;
- conduct a photographic survey of the study area;
- verify, where possible, the sensitivity of visual receptor locations identified via desktop means;
- eliminate receptor locations that are unlikely to be influenced by the proposed development;
- identify any additional visually sensitive receptor locations within the study area; and
- inform the impact rating assessment of visually sensitive receptor locations (where possible).

1.4.4 Visual / Landscape Sensitivity

GIS technology was used to identify any specific areas of potential visual sensitivity within the Koup 1 WEF development site and also within the power line assessment corridors. These would be areas where the placement of wind turbines or the establishment of a new power line would result in the greatest probability of visual impacts on potentially sensitive visual receptors.

In addition, the National Environmental Screening Tool[2] was examined to determine any relative landscape sensitivity in respect of the proposed development.

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

1.4.5 Impact Assessment

A rating matrix was used to provide an objective evaluation of the significance of the visual impacts associated with the proposed development, both before and after implementing mitigation measures. Mitigation measures were identified (where possible) in an attempt to minimise the visual impact of the proposed development. The rating matrix considers a number of different factors including geographical extent, probability, reversibility, irreplaceable loss of resources, duration and intensity, in order to assign a level of significance to the visual impact of the project.

A separate rating matrix was used to assess the visual impact of the proposed development on each visual receptor location (both sensitive and potentially sensitive), as identified. This matrix is based on three (3) parameters, namely the distance of an identified visual receptor from the proposed development, the presence of screening factors and the degree to which the proposed development would contrast with the surrounding environment.

1.4.6 Consultation with I&APs

Continuous consultation with Interested and Affected Parties (I&APs) undertaken during the public participation process will be used (where available) to help establish how the proposed development will be perceived by the various receptor locations and the degree to which the impact will be regarded as negative. This report has been updated to include all relevant feedback received to date.

1.5 Sources of Information

The main sources of information utilised for this VIA included:

- Project description for the proposed development provided by Genesis;
- Elevation data from 25m Digital Elevation model (DEM) from the National Geo-Spatial Information (NGI);
- 1:50 000 topographical maps of South Africa from the NGI;
- Land cover and land use data extracted from the 2018 South African National Land-Cover Dataset provided by GEOTERRAIMAGE;
- Vegetation classification data extracted from the South African National Biodiversity Institute's (SANBI's) VEGMAP 2018 dataset;
- Google Earth Satellite imagery 2021;
- South African Renewable Energy EIA Application Database from Department of Environmental Affairs (incremental release Quarter 3 2020);
- The National Web-Based Environmental Screening Tool, Department of Forestry, Fisheries and Environment (DFFE);
- VIA for the proposed Beaufort West Renewable Energy Facilities, Bernard Oberholzer, 2010.

2 ASSUMPUMPTIONS AND LIMITATIONS

- Wind turbines are very large structures and could impact on visual receptors that are located relatively far away, particularly in areas where the terrain is very flat. Given the nature of the receiving environment and the height of the proposed wind turbines, the study area or visual assessment zone is assumed to encompass an area of 10km from the proposed WEF – i.e. an area of 10km from the boundary of the WEF application site. The application of the 10km limit on the visual assessment zone relates to the fact that visual impacts decrease exponentially over distance. Thus although the WEF may still be visible beyond 10km, the degree of visual impact would diminish considerably. As such, the need to assess the impact on potential receptors beyond this distance would not be warranted.
- In assessing the potential visual impacts for the proposed 132kV power line, the visual assessment zone is assumed to encompass a zone of 5km from the outer boundary of the power line assessment corridors.
- The identification of visual receptors involved a combination of desktop assessment as well as field-based observation. Initially Google Earth imagery was used to identify potential receptors within the study area. Where possible, these receptor locations were verified and assessed during a site visit which was undertaken between the 21st and the 24th of June 2021. Due to the extent of the study area however, and the fact that many of the identified receptors are farm houses on private property, it was not possible to visit or verify every potentially sensitive visual receptor location. As such, a number of broad assumptions have been made in terms of the likely sensitivity of the receptors to the proposed development. Sensitive receptor locations typically include sites such as tourism or recreational facilities and scenic locations within natural settings which are likely to be adversely affected by the visual intrusion of the proposed development. It should be noted however that not all receptor locations would necessarily perceive the proposed development in a negative way. This is usually dependent on the use of the facility, the economic dependency of the occupants on the scenic quality of views from the facility and on people's perceptions of the value of "Green Energy". Thus the presence of a receptor in an area potentially affected by the proposed development does not necessarily mean that any visual impact will be experienced.
- The potential visual impact at each visual receptor location was assessed using a matrix developed for this purpose. The matrix is based on three main parameters relating to visual impact and, although relatively simplistic, it provides a reasonably accurate indicative assessment of the degree of visual impact likely to be experienced at each receptor location as a result of the proposed development. It is however important to note the limitations of quantitatively assessing a largely subjective or qualitative type of impact and as such the matrix should be seen merely as a representation of the likely visual impact at a receptor location.

- The exact status of all the receptors could not be verified during the field investigation and as such the receptor impact rating was largely undertaken via desktop means.
- Receptors that were assumed to be farmsteads were still regarded as being potentially sensitive to the visual impacts associated with the proposed development and were thus assessed as part of the VIA.
- Based on the project description provided by Genesis, all analysis for this VIA is based on a worst-case scenario where turbine heights are assumed to be 300 m at the blade tip and power line tower heights are assumed to be 25m. Substation, Battery Energy Storage (BESS) facilities and office building heights are assumed to be less than 25m in height.
- Due to the varying scales and sources of information; maps may have minor inaccuracies. Terrain data for this area, derived from the National Geo-Spatial Information (NGI)'s 25m Digital Elevation Model (DEM), is fairly coarse and somewhat inconsistent and as such, localised topographic variations in the landscape may not be reflected on the DEM used to generate the viewshed(s) and visibility analysis conducted in respect of the proposed development.
- In addition, the viewshed / visibility analyses does not take into account any existing vegetation cover or built infrastructure which may screen views of the proposed development. This analysis should therefore be seen as a conceptual representation or a worst-case scenario.
- No feedback regarding the visual environment has been received from the public participation process to date. Any feedback from the public during the review period of the Draft Scoping Report (DSR) for the WEF and the Draft Basic Assessment Report (DBAR) for the grid connection will however be incorporated into further drafts of this report, if relevant.
- At the time of undertaking the visual study no information was available regarding the type and intensity of lighting that will be required for the proposed WEF and therefore the potential impact of lighting at night has not been assessed at a detailed level. However, lighting requirements are relatively similar for all WEFs and as such, general measures to mitigate the impact of additional light sources on the ambiance of the nightscape have been provided.
- At the time of undertaking the visual study no detailed information was available regarding the design and layout of services and infrastructure associated with the proposed development. The potential visual impact of the *typical* infrastructure associated with a wind farm has therefore been assessed.
- Photomontages will be compiled in respect of the proposed wind turbine layout in the EIA phase of the project.
- This study includes an assessment of the potential cumulative impacts of other renewable energy developments on the existing landscape character and on the identified sensitive receptors. This assessment is based on the information available at

the time of writing the report and where information has not been available, broad assumptions have been made as to the likely impacts of these developments.

- SiVEST has made every effort to obtain information for the surrounding planned renewable energy developments (including specialist studies, assessment reports and Environmental Management Programmes). However some of the documents are not currently publicly available for download. The available information was factored into the cumulative impact assessment (Section 8.4).
- It should be noted that the fieldwork for this study was undertaken in late June 2021, during mid-winter. However, the study area is typically characterised by low levels of rainfall all year round and therefore the season is not expected to affect the significance of the potential visual impact of the proposed Koup 1 WEF development and the associated grid connection infrastructure.
- The overall weather conditions in the study area have certain visual implications and are expected to affect the visual impact of the proposed development to some degree. Clear weather conditions tend to prevail throughout the year in the study area. In these clear conditions, the wind turbines would present a greater contrast with the surrounding environment than they would on an overcast day. Clear and overcast weather conditions were experienced during the field investigation and this factor was taken into consideration when undertaking this VIA.

3 TECHNICAL DESCRIPTION

3.1 Project Location

The proposed WEF is located approximately 55km south of Beaufort West in the Western Cape Province (**Figure 1**) and is within the Beaufort West Local Municipality, in the Central Karoo District Municipality.

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.

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**)

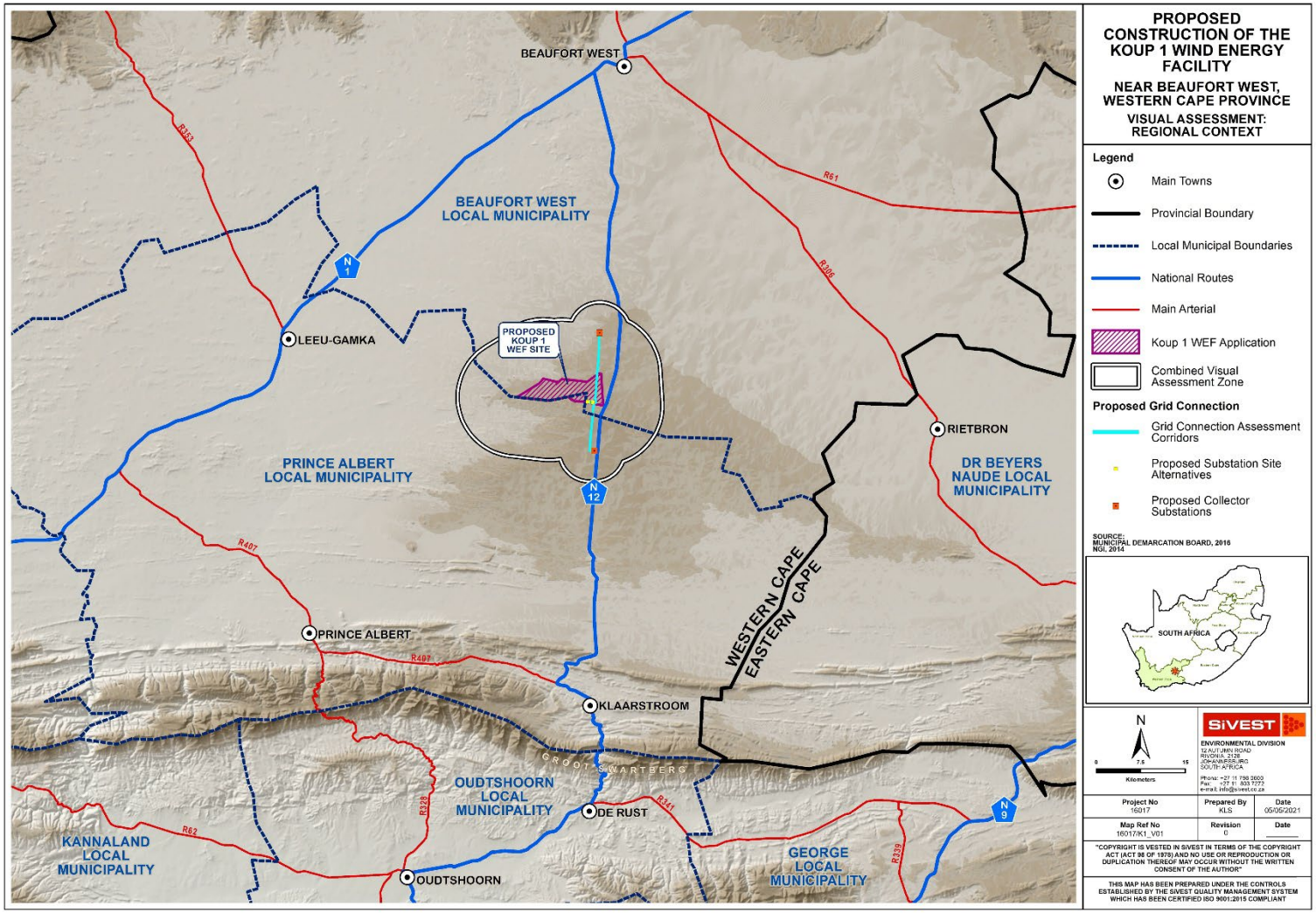


Figure 1: Koup 1 WEF in the Regional Context

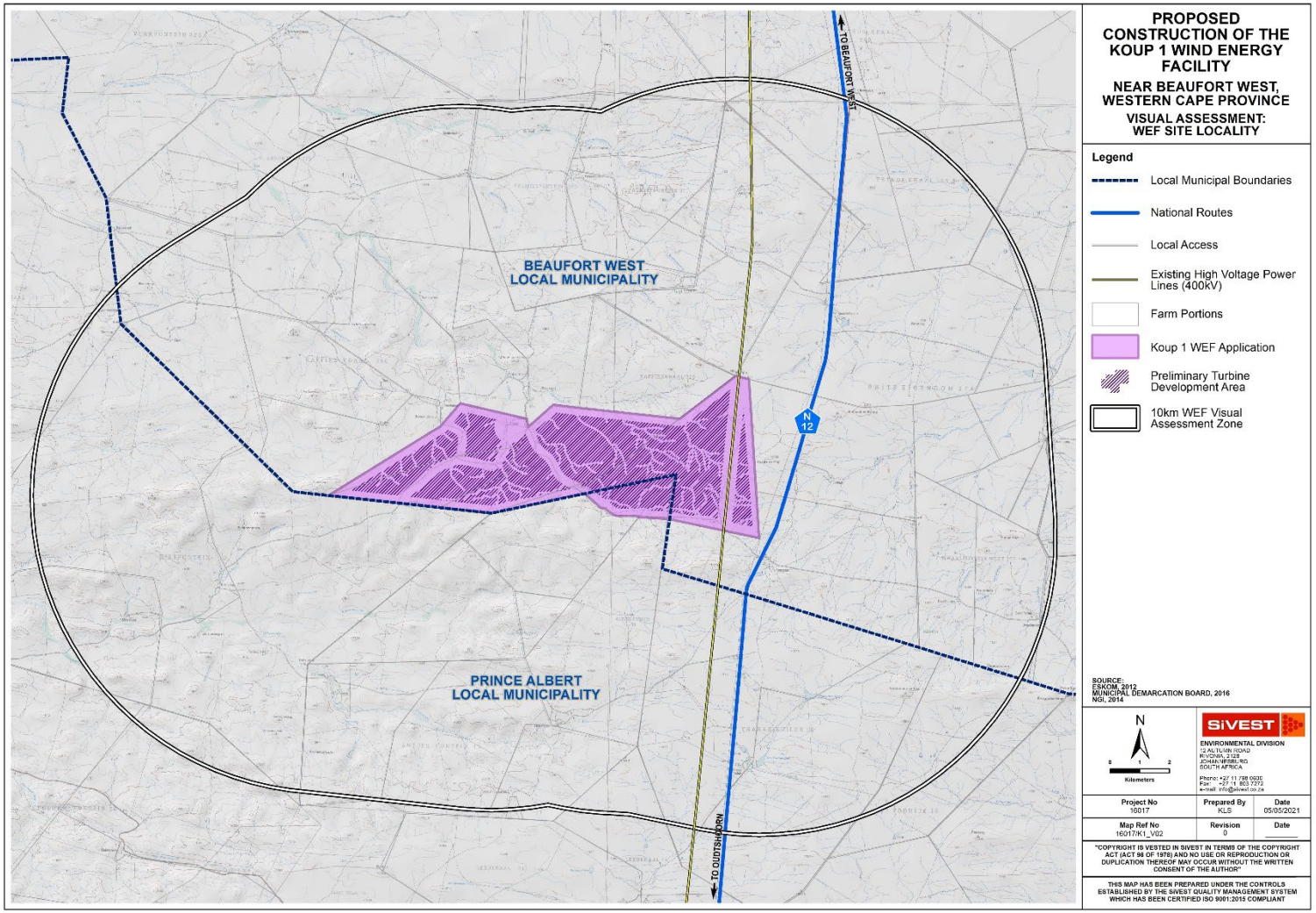


Figure 2: Koup 1 WEF Site Locality

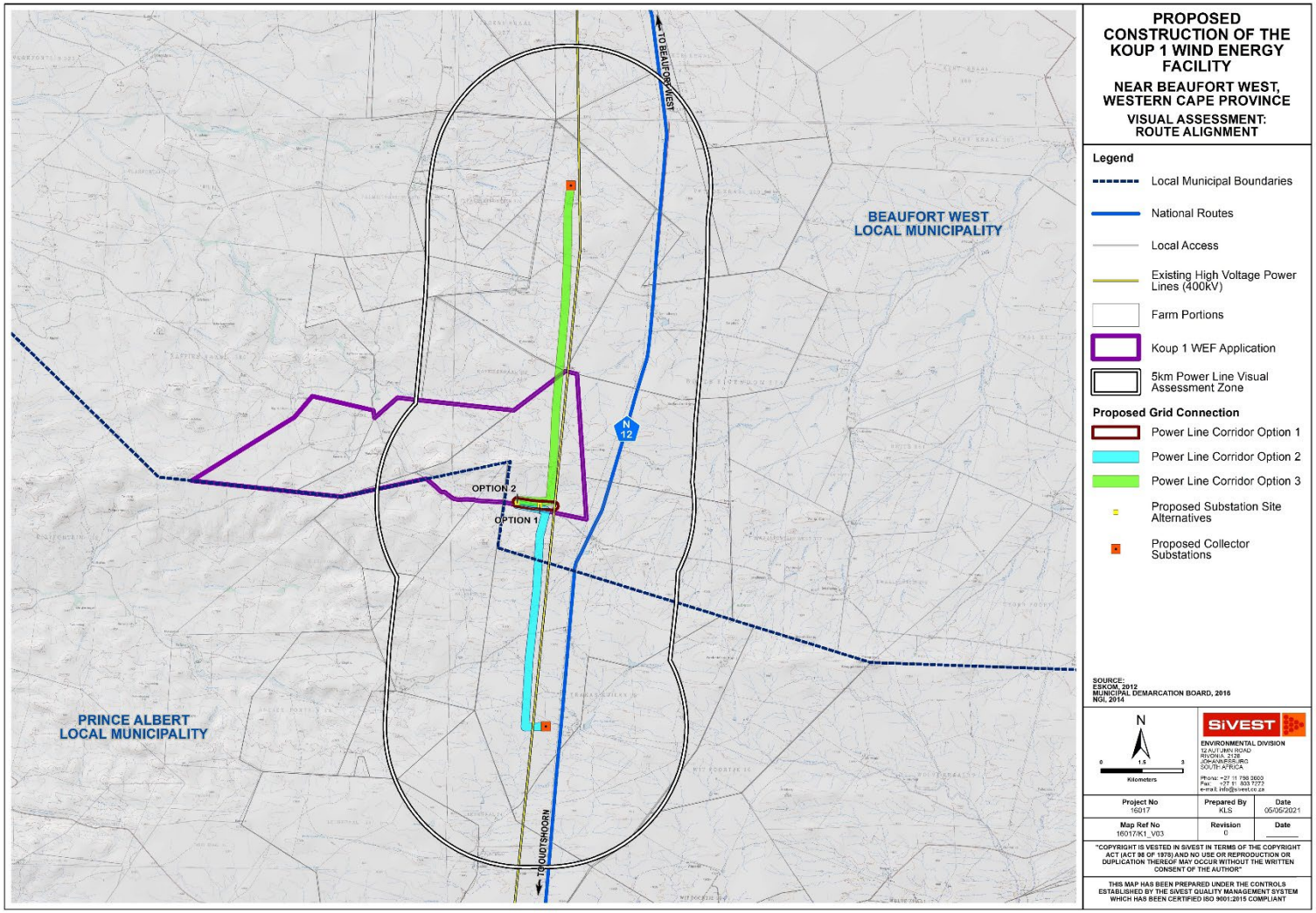


Figure 3: Proposed 132kV Power Line Route Alignment

3.2 Project Technical Details

3.2.1 Wind Farm Components

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. The 132kV overhead power line will however require a separate EA and is subject to a separate BA process, which is currently being undertaken in parallel to the EIA process. In summary, the proposed Koup 1 WEF will include the following 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 (**Figure 4**);
- Permanent compacted hardstanding areas / platforms (also known as crane pads) of approximately 90m x 50m (total footprint of approx. 4 500m2) 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.

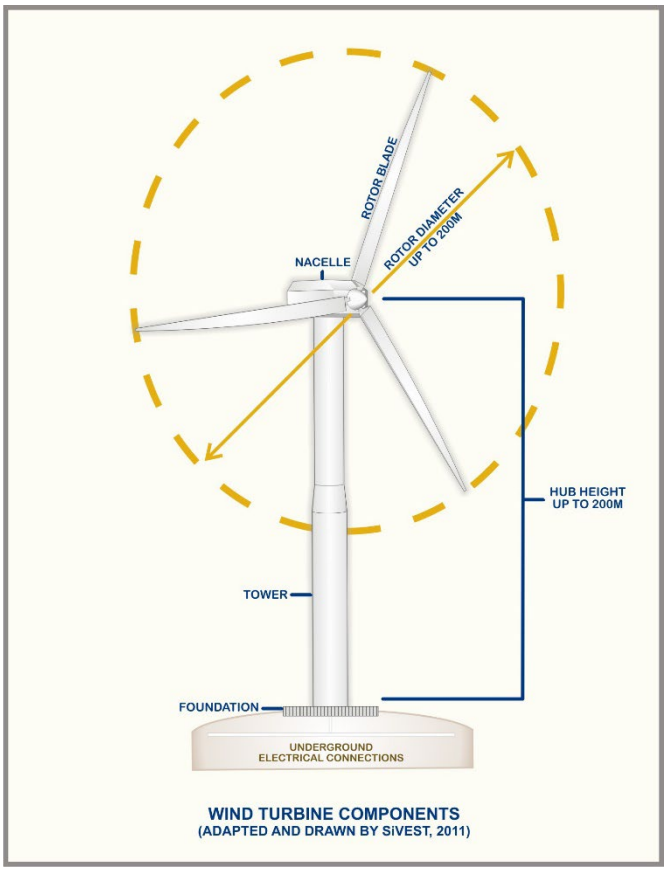


Figure 4: Typical components of a wind turbine

3.2.2 Grid Connection Infrastructure

Electricity generated by the proposed Koup 1 WEF will be fed into the national grid by way of a 132kV overhead power line, connecting the Koup 1 WEF on-site switching substation / collector

to an off-site collector substation, or by way of a direct tie-in to existing 400kV transmission lines that traverse the Koup 1 WEF project site. **Figure 5** below provides a conceptual diagram of the electricity generation process.

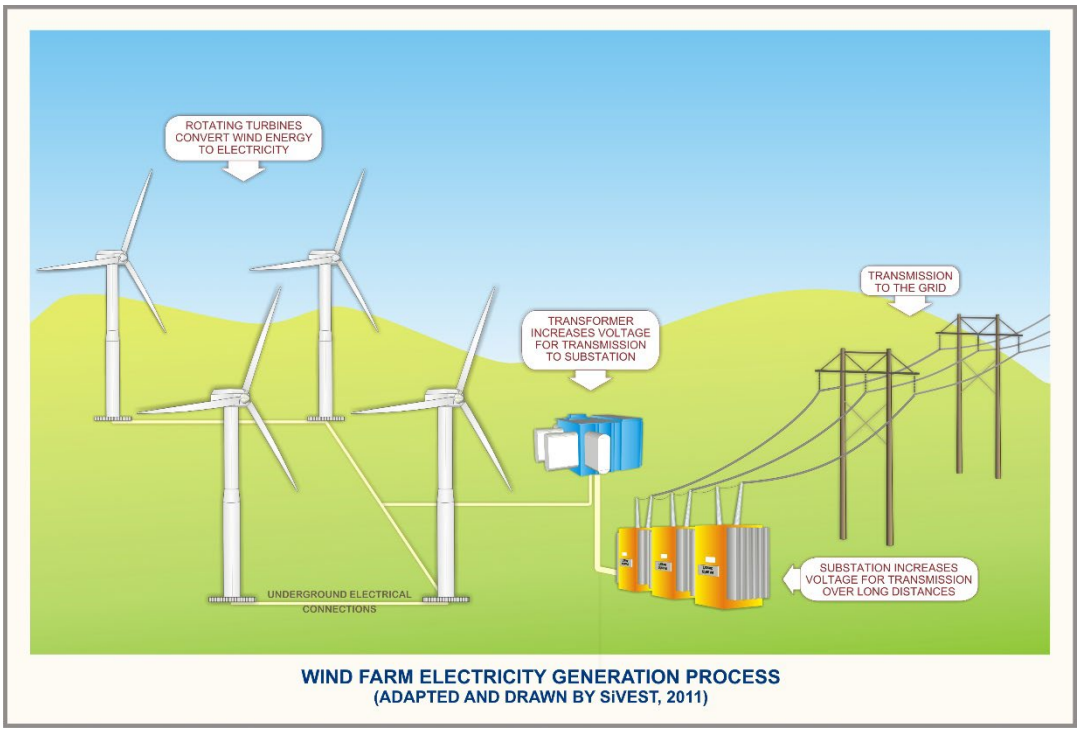


Figure 5: Conceptual WEF electricity generation process showing electrical connections

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.

3.2.3 EIA Layout Alternatives

Design and layout alternatives for the proposed WEF are being considered and assessed as part of the EIA. These include two alternatives for the Substation locations and two alternatives for the construction / laydown area (**Figure 6**).

3.2.4 BA Alternatives

The grid connection infrastructure proposals include two (2) switching and collector substation site alternatives and three (3) power line route alignment alternatives (**Figure 7**). 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.

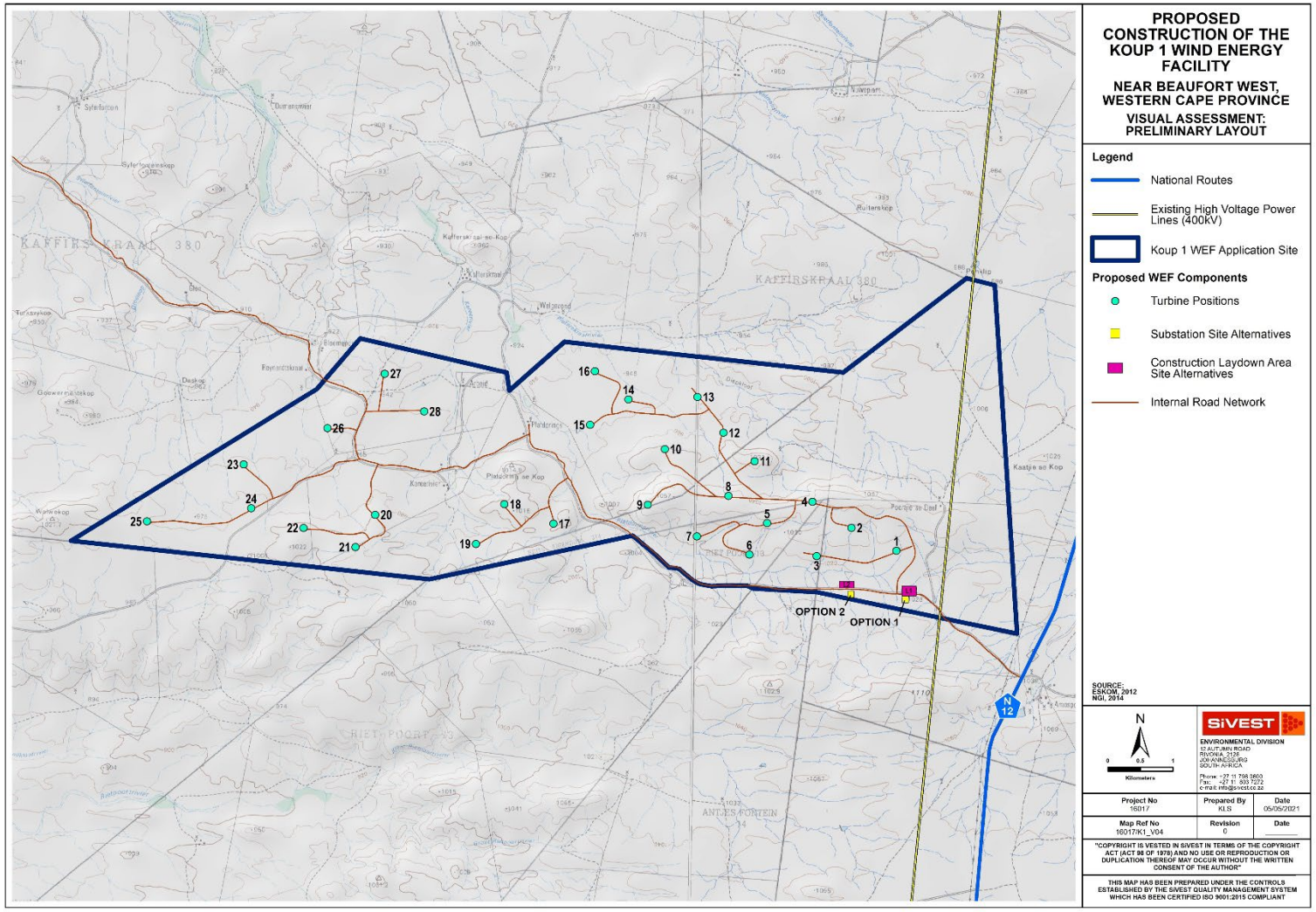


Figure 6: Preliminary Koup 1 WEF layout

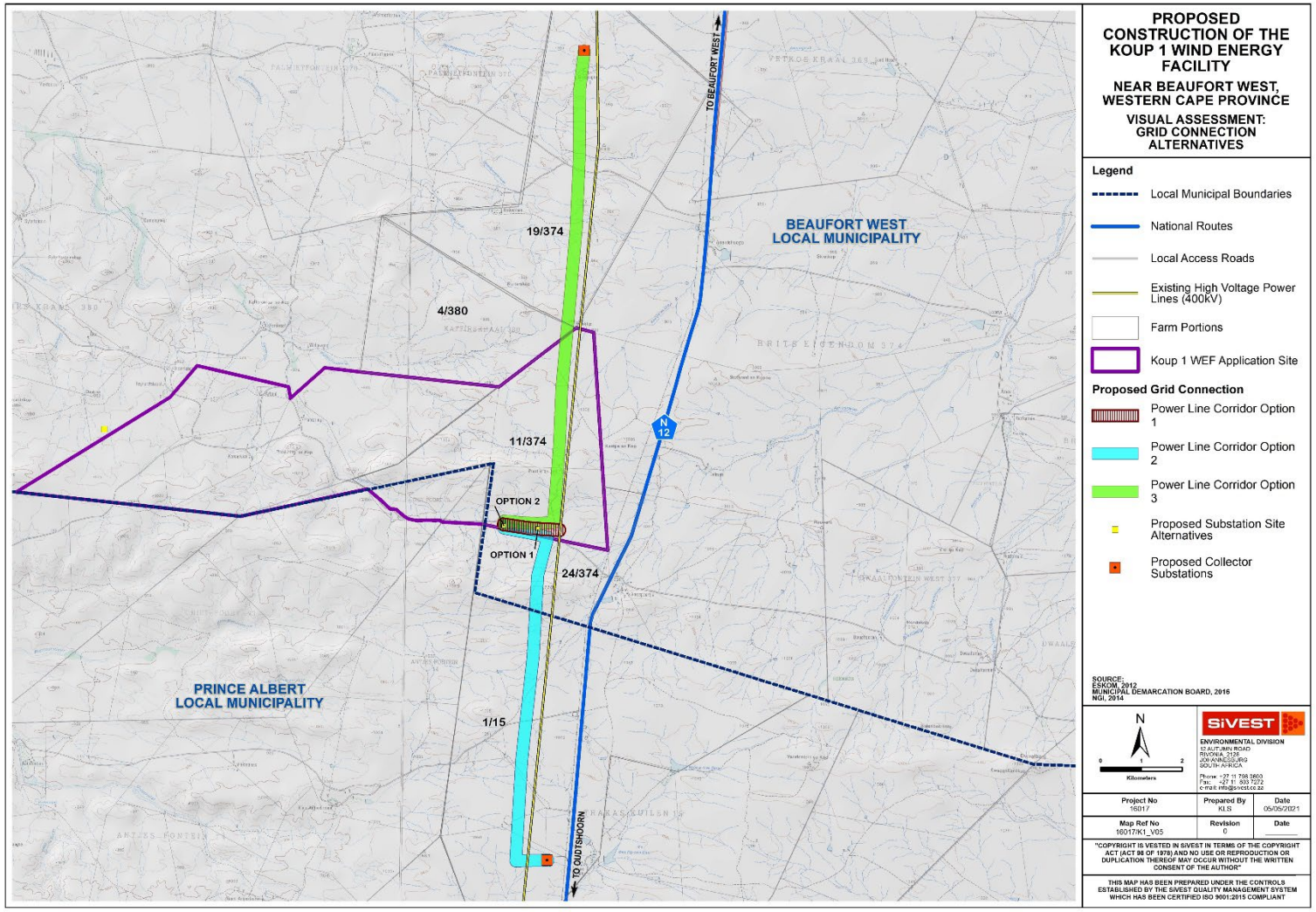


Figure 7: Grid Connection Alternatives

4 LEGAL REQUIREMENTS AND GUIDELINES

Key legal requirements pertaining to the proposed WEF development are outlined below.

In terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), (NEMA) and the EIA Regulations 2014 (as amended), the proposed development includes listed activities which require a full Environmental Impact Assessment (EIA) or a Basic Assessment (BA) to be undertaken. As part of the EIA and BA processes, the need for a VIA to be undertaken has been identified in order to assess the visual impact of the proposed WEF and grid connection infrastructure.

There is currently no legislation within South Africa that explicitly pertains to the assessment of visual impacts, however in addition to NEMA the following legislation has relevance to the protection of scenic resources:

- National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)
- National Heritage Resources Act, 1999 (Act No. 25 of 1999)

Based on these Acts protected or conservation areas and sites or routes with cultural or symbolic value have been taken into consideration when identifying sensitive and potentially sensitive receptor locations and rating the sensitivity of the study area.

Accordingly, this specialist visual assessment has been undertaken in compliance with Appendix 6 of 2014 NEMA EIA Regulations (as amended).

5 FACTORS INFLUENCING VISUAL IMPACT

The degree of visibility of an object informs the level and intensity of the visual impact, but other factors also influence the nature of the visual impact. The landscape and aesthetic context of the environment in which the object is placed, as well as the perception of the viewer are also important factors

5.1 Visual environment

WEF and power line developments are not features of the natural environment, but are rather a representation of human (anthropogenic) alteration. As such, these developments are likely to be perceived as visually intrusive when placed in largely undeveloped landscapes that have a natural scenic quality and where tourism activities are practised that are dependent on the enjoyment of, or exposure to, the scenic or aesthetic character of the area. Residents and visitors to these areas could perceive the development to be highly incongruous in this context and may regard the development as an unwelcome intrusion which degrades the natural character and scenic beauty of the area, and which could potentially even compromise the practising of tourism activities in the area. In this instance however, the area is not typically

valued for its tourism significance and no formal protected areas were identified in the broader area. In addition, very few, leisure-based tourism activities, and no recognised tourism routes were identified in the study area.

In addition, it should be noted that the experience of the viewer is highly subjective and there are those who may perceive wind turbines, for example, as striking elements in an otherwise barren landscape.

The presence of other anthropogenic features associated with the built environment may not only obstruct views but also influence the perception of whether a development is a visual impact. In industrial areas for example, where other infrastructure and built form already exists, the visual environment could be considered to be 'degraded' and thus the introduction of a WEF and associated grid connection infrastructure into this setting may be considered to be less visually intrusive than if there was no existing built infrastructure visible.

5.2 Subjective experience of the viewer

The perception of the viewer / receptor toward an impact is highly subjective and involves 'value judgements' on behalf of the receptor. The viewer's perception is usually dependent on the age, gender, activity preferences, time spent within the landscape and traditions of the viewer (Barthwal, 2002). Thus certain receptors may not consider a WEF and the associated grid connection infrastructure to be a negative visual impact as this type of development is often associated with employment creation, social up-liftment and the general growth and progression of an area, and could even have positive connotations.

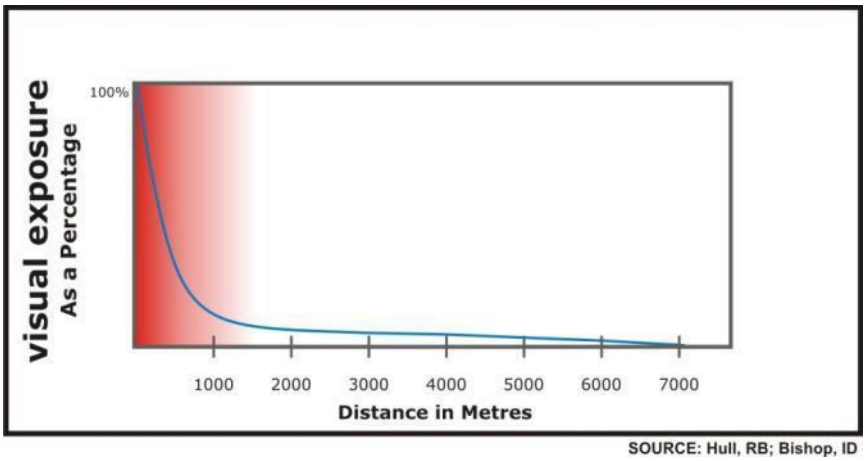
5.3 Type of visual receptor

Visual impacts can be experienced by different types of receptors, including people living or working, or driving along roads within the viewshed of the proposed development. The receptor type in turn affects the nature of the typical 'view', with views being permanent in the case of a residence or other place of human habitation, or transient in the case of vehicles moving along a road. The nature of the view experienced affects the intensity of the visual impact experienced.

It is important to note that visual impacts are only experienced when there are receptors present to experience this impact. Thus where there are no human receptors or viewers present, there are not likely to be any visual impacts experienced.

5.4 Viewing distance

Viewing distance is a critical factor in the experiencing of visual impacts, as beyond a certain distance, even large developments tend to be much less visible, and difficult to differentiate from the surrounding landscape. The visibility of an object is likely to decrease exponentially as one moves away from the source of impact, with the impact at 1 000m being considerably less than the impact at a distance of 500m **(Figure 8)**.



SOURCE: Hull, RB; Bishop, ID

Figure 8: Conceptual representation of diminishing visual exposure over distance

6 VISUAL CHARACTER AND SENSITIVITY OF THE STUDY AREA

Defining the visual character of an area is an important part of assessing visual impacts as it establishes the visual baseline or existing visual environment in which the development would be constructed. The visual impact of a development is measured by establishing the degree to which the development would contrast with, or conform to, the visual character of the surrounding area. The inherent sensitivity of the area to visual impacts or visual sensitivity is thereafter determined, based on the visual character, the economic importance of the scenic quality of the area, inherent cultural value of the area and the presence of visual receptors.

Physical and land use related characteristics, as outlined below, are important factors contributing to the visual character of an area.

6.1 Physical and Land Use Characteristics

6.1.1 Topography

The site proposed for the Koup 1 WEF development is located in an area largely characterised by flat to gently undulating plains interspersed with low ridges and dry river courses (**Figure 9**). Areas of greater relief are largely concentrated to the south east of the study area (**Figure 10**).

Flat to undulating terrain prevails across much of the WEF development site, although steep slopes associated with a low ridge in the south-eastern sector of the site result (**Figure 11**) in some areas of greater relief. All three grid assessment corridors are largely characterised by

relatively flat terrain, although Corridor Option 2 traverses a prominent ridge to the south of the WEF application site (**Figure 12**).

Maps showing the topography and slopes within and in the immediate vicinity of the combined assessment area are provided in **Figure 13** and **Figure 14.**

Figure 9: Typical terrain in the Koup 1 WEF study area including undulating plains interspersed with low ridges.

Figure 10: Areas of greater relief in the south-eastern sector of the study area.

Figure 11: Low ridge in the south-eastern sector of the Koup 1 WEF application site.

Figure 12: View of prominent ridge to the south of the Koup 1 WEF application site.

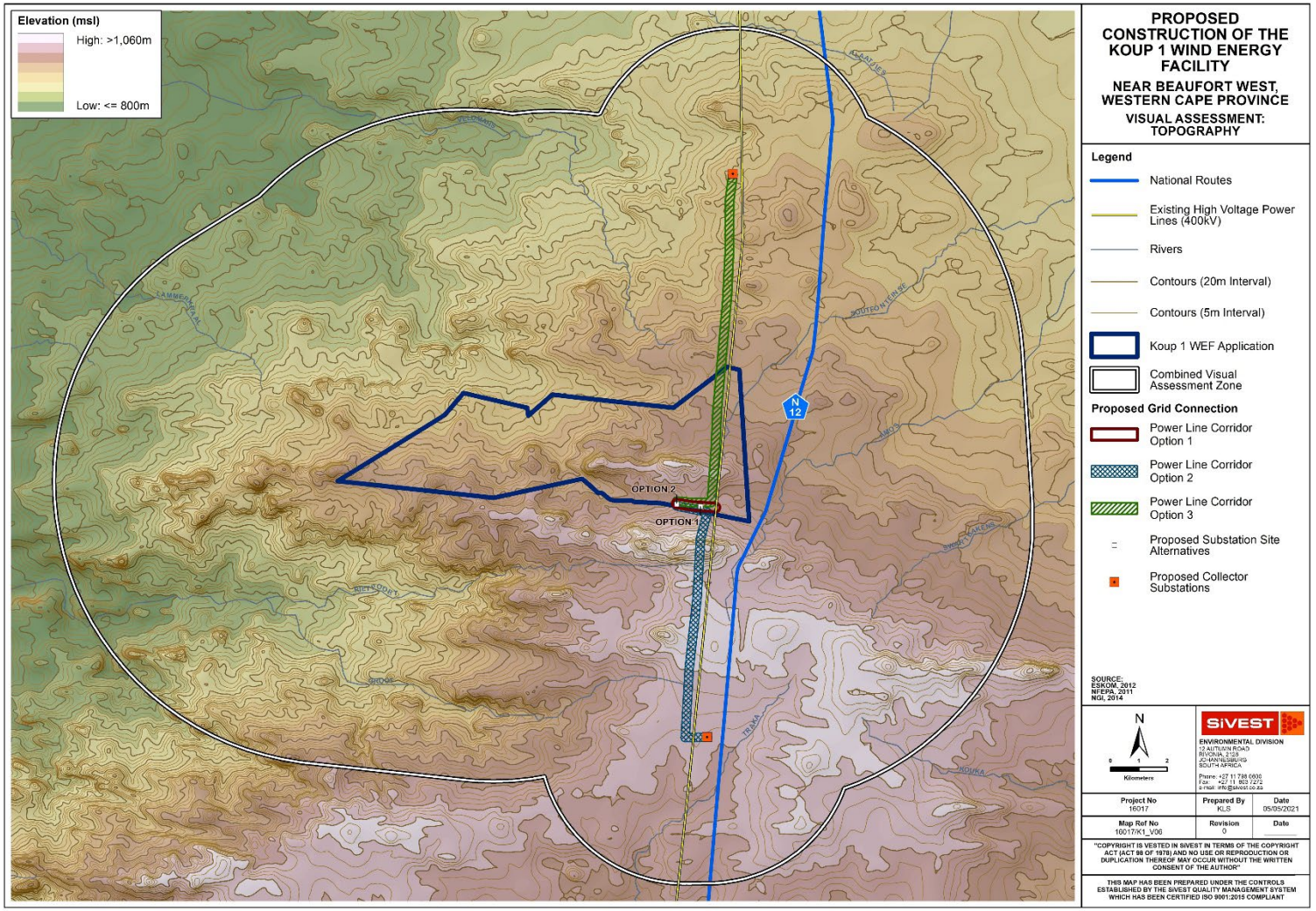


Figure 13: Topography of the study area

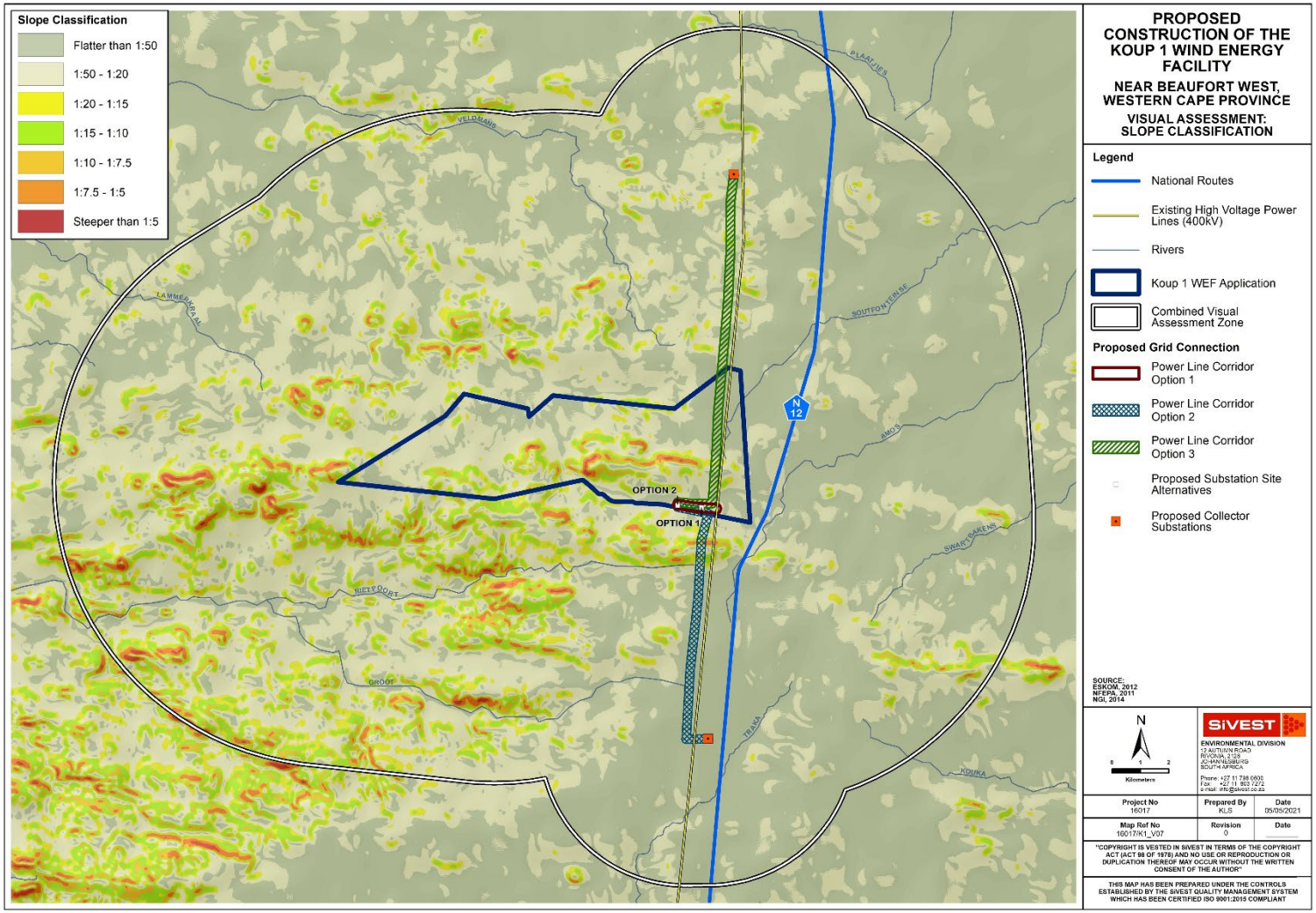


Figure 14: Slope classification

Visual Implications

Areas of flat relief, including the flat plains and higher-lying plateaus, are characterised by wide ranging vistas, although views southwards and eastwards will be somewhat constrained by the hilly terrain in the south-western sector of the study area. In the hillier and higher-lying terrain, the vistas will depend on the position of the viewer. Viewers located within some of the more incised valleys for example, would have limited vistas, whereas a much wider vista would be experienced by viewers on higher-lying ridge tops or slopes. Importantly in the context of this study, the same is true of objects placed at different elevations and within different landscape settings. Objects placed on high-elevation slopes or ridge tops would be highly visible, while those placed in valleys or enclosed plateaus would be far less visible.

Bearing in mind that wind turbines are very large structures (potentially up to 300m in height including the rotor blades), these could be visible from a considerable area around the site. Although localised topographic variations may limit views of wind turbines from some areas in the south-eastern sector of the study area, across the remainder of the study area there would be very little topographic shielding to lessen the visual impact of the turbines from any locally-occurring receptor locations.

The high degree of visibility was confirmed by way of a preliminary visibility analysis for the proposed turbine positions as provided by Genesis. A worst-case scenario was assumed when undertaking the analysis, in which the proposed turbines were assigned a maximum height 300 m (maximum height at blade tip). The resulting viewshed, as shown in **Figure 15**. indicates that the blade tips of wind turbines positioned on the application site would be visible from most parts of the study area.

Although the power line towers and the steel structures of the proposed substation are much smaller than wind turbines, at a maximum height of 25m, they are still likely to be visible from many of the locally-occurring receptor locations. In addition, sections of the proposed power line could impact on the skyline, particularly where they traverse ridges or areas of relatively higher elevation. A preliminary visibility analysis was undertaken for the proposed power line routes and substation sites, based on points at 250 m intervals along the centre line of the corridor alternatives, and assuming a tower height of 25 m. The resulting viewshed as per **Figure 16** below indicates that elements of the proposed grid connection infrastructure would be visible from most parts of the study area.

The visibility analysis is however based entirely on topography and does not does not consider any existing vegetation cover or built infrastructure which may screen views of the proposed development. In addition, detailed topographic data was not available for the broader study area and as such the visibility analysis does not take into account any localised topographic variations which may constrain views. This analysis should therefore be seen as a conceptual representation or a worst-case scenario.

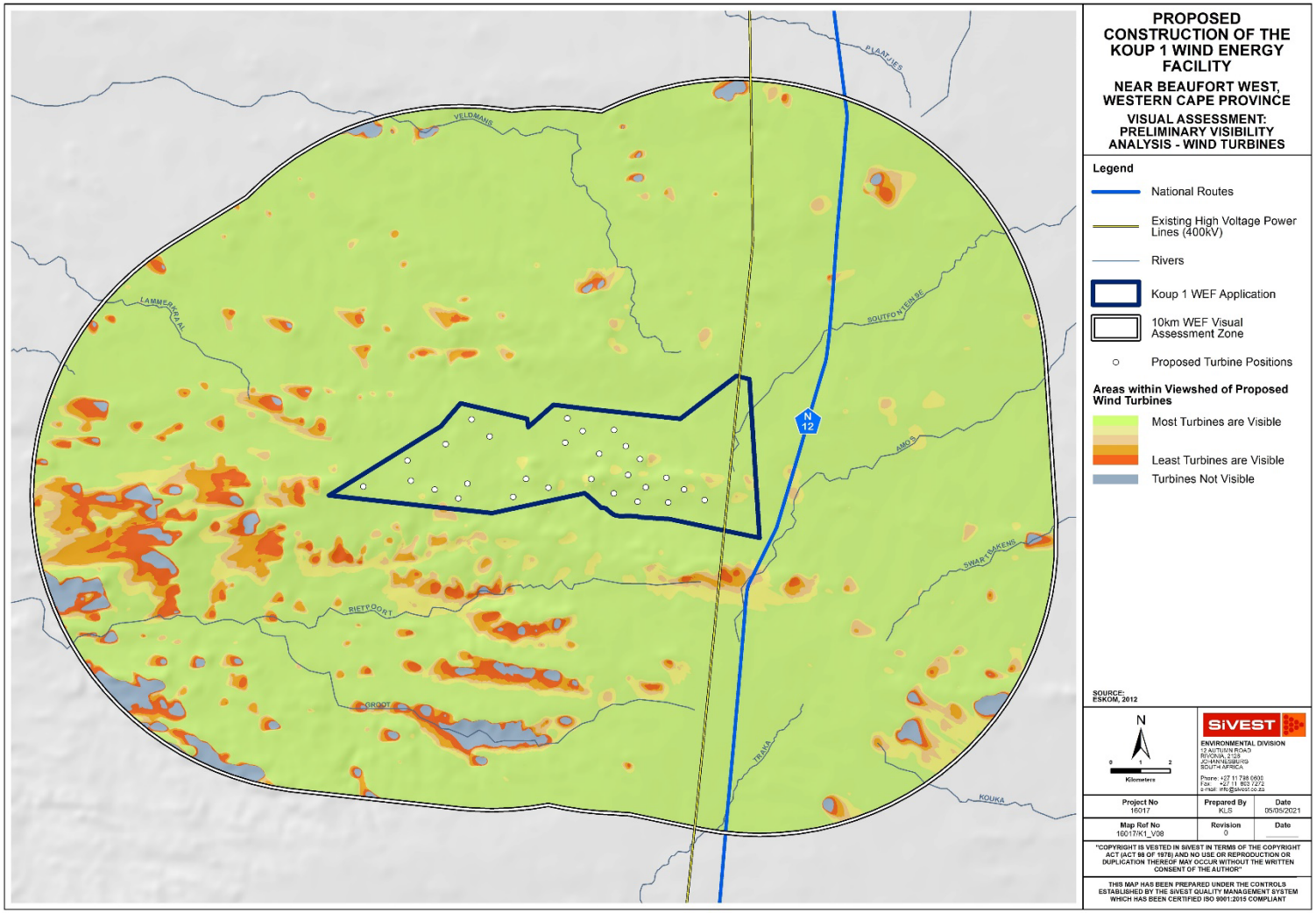


Figure 15: Potential visibility of wind turbines

Figure 16: Potential Visibility of Power Lines

6.1.2 Vegetation

According to Mucina and Rutherford (2006), the entire study area is covered by the Gamka Karoo vegetation type (**Figure 17**) which is characterised by dwarf spiny shrubland, with some rare low trees (Error! Reference source not found.).

Other vegetation cover includes exotic tree species and other typical garden vegetation established around farmsteads (**Figure 19**).

Much of the study area however is still characterised by natural low shrubland with transformation limited to a few isolated areas where pastoral activities such as livestock rearing and/or cultivation are taking place.

Visual Implications

Vegetation cover across the study area is predominantly short and sparse and thus will not provide any visual screening. In some instances however, tall exotic trees planted around farmhouses will restrict views from receptor locations (**Figure 19**).

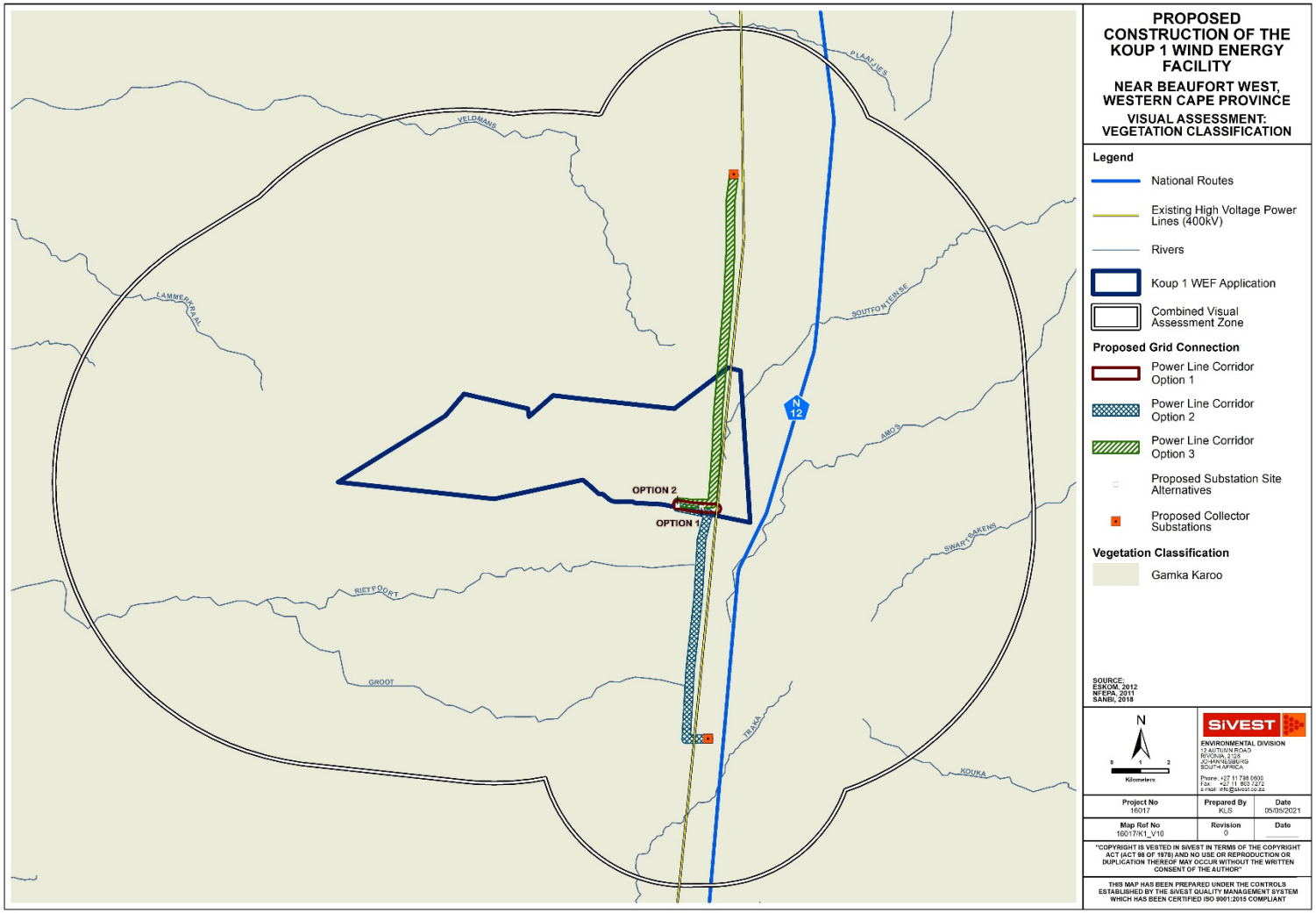


Figure 17: Vegetation Classification in the Study Area

Figure 18: Dwarf spiny shrubland, with some rare low trees typical of vegetation cover prevalent across the study area.

Figure 19: Example of exotic tree species and other typical garden vegetation established around farmsteads

6.1.3 Land Use

According to the South African National Land Cover dataset (Geoterraimage 2018), much of the visual assessment area is classified as “Bare / Barren Land”, interspersed with patches of low shrubland. While some of these bare / barren areas are representative of transformation due to human activity, in most cases these patches of land are merely undisturbed areas with very sparse vegetation cover. Small tracts of grassland and forested land occur along drainage lines throughout the study area (**Figure 20**).

Agricultural activity in the area is restricted by the arid nature of the local climate and areas of cultivation are largely confined to relatively limited areas distributed along drainage lines. As such, the natural vegetation has been retained across much of the study area. Livestock (mostly sheep) and game farming (**Figure 21**) is the dominant activity although the climatic and soil conditions have resulted in low densities of livestock and relatively large farm properties across the area. Thus the area has a very low density of rural settlement, with relatively few isolated farmsteads in evidence (**Figure 22**). Built form in much of the study area is limited to isolated farmsteads, including farm worker’s dwellings and ancillary farm buildings, gravel access roads, telephone lines, fences and windmills (**Figure 23**).

Further human influence is visible in the area in the form of the N12 national route which traverses the study area in a north to south direction (**Figure 24**). In addition, existing, power lines, both 22kV (**Figure 25**) and 400kV power lines (**Figure 26**) in this area are also significant man-made features in an otherwise undeveloped landscape. These lines bisect the study area in a north to south alignment, relatively close to the N12.

The closest built-up area is the town of Beaufort West which is situated approximately 55km north of the Koup 1 application site. The town is well outside the study area for this project and is thus not expected to have an impact on the visual character of the study area.

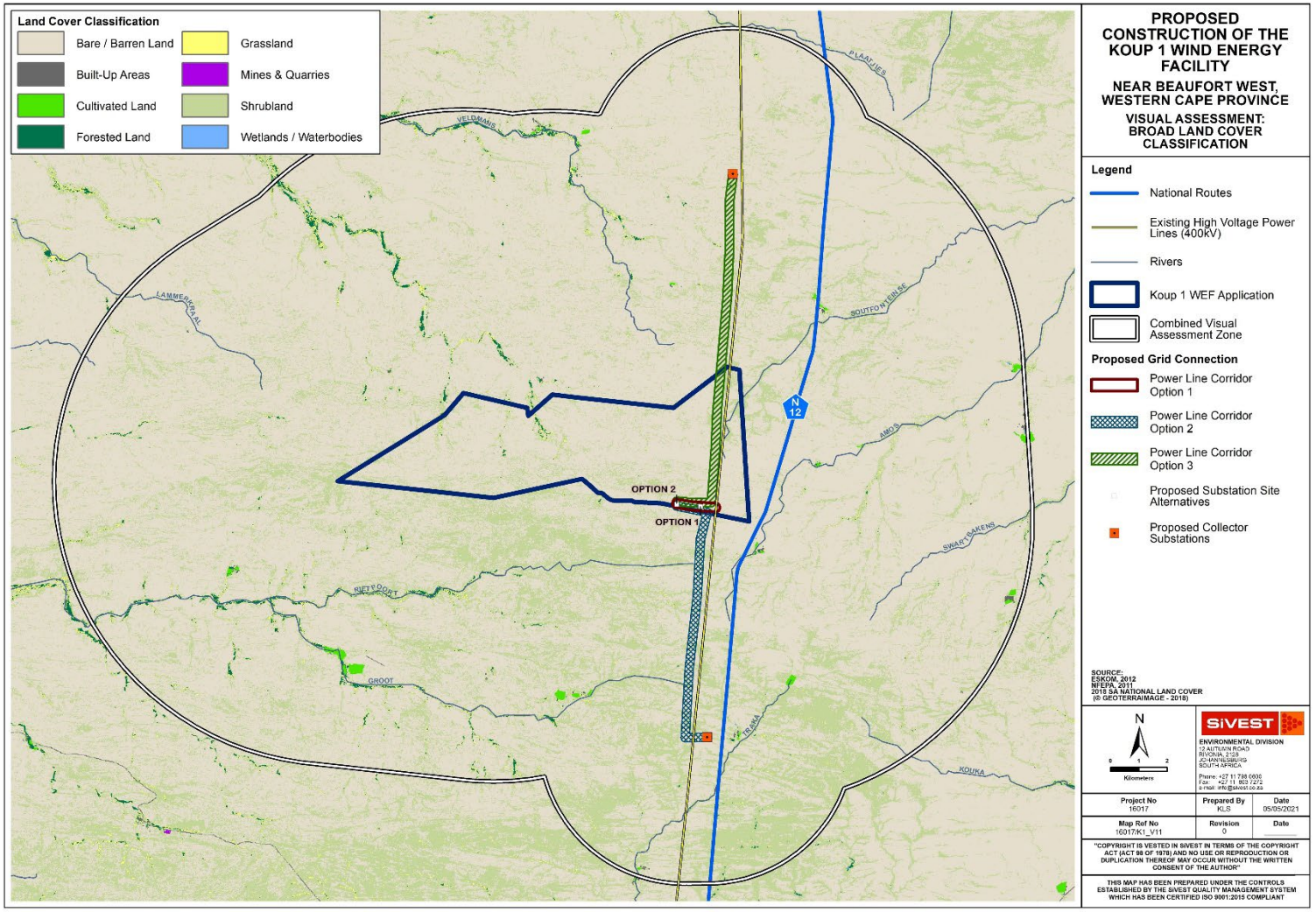


Figure 20: Land Cover Classification

Figure 21: Game farm just south of the Koup 1 WEF application site

Figure 22: Isolated farmsteads typical of the Koup 1 WEF study area

Figure 23: Farm buildings and associated infrastructure south-west of the Koup 1 WEF application site.

Figure 24: View southwards along the N12 National Route on the eastern boundary of Koup 1 WEF application site.

Figure 25: 22kV power lines and associated substation south of the Koup 1 WEF application site, adjacent to the N12.

Figure 26: View of 400kV power lines to the east of the Koup 1 WEF application site.

Visual Implications

Sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. In addition, there are no towns or settlements in the study area and

thus, there are very low levels of human transformation and visual degradation across much of the study area.

The short, scrubby or grassy vegetation that occurs over the entire study area offers no visual screening in itself, and thus terrain / topography is the most important factor in limiting vistas. Exceptions to this situation occur at some local farmsteads where trees and shrubs have been established around the farmstead, providing some screening from the surrounding areas.

The influence of the level of human transformation on the visual character of the area is described in more detail below.

6.2 Visual Character and Cultural Value

The physical and land use-related characteristics of the study area as described above contribute to its overall visual character. Visual character largely depends on the level of change or transformation from a natural baseline in which there is little evidence of human transformation of the landscape. Varying degrees of human transformation of a landscape would engender differing visual characteristics to that landscape, with a highly modified urban or industrial landscape being at the opposite end of the scale to a largely natural undisturbed landscape. Visual character is also influenced by the presence of built infrastructure including buildings, roads and other objects such as telephone or electrical infrastructure. The visual character of an area largely determines the **sense of place** relevant to the area. This is the unique quality or character of a place, whether natural, rural or urban which results in a uniqueness, distinctiveness or strong identity.

The predominant land use in the area (sheep farming) has not transformed the natural landscape across much of the study area to any significant degree and there are no towns or built-up areas in the study area influencing the overall visual character. Thus there are low levels of human transformation and visual degradation across a significant portion of the study area and the natural character has been retained.

There are however prominent anthropogenic elements in the study area however which include the N12 National Route and 400kV power lines. Other, less prominent elements present in the area include lower voltage power lines, telephone poles, windmills, gravel farm access roads and farm boundary fences. The presence of this infrastructure is an important factor in this context, as the introduction of the proposed WEF and associated grid connection infrastructure would result in less visual contrast where other anthropogenic elements are already present

The scenic quality of the landscape is also an important factor contributing to the visual character of an area or the inherent sense of place. Visual appeal is often associated with unique natural features or distinct variations in landform. As such, the largely natural landscapes which occur in the wider study area could potentially increase the scenic appeal and visual interest in the area.

The greater area surrounding the development site is an important component when assessing visual character. The area can be considered to be a typical Karoo or “platteland” landscape that would characteristically be encountered across the high-lying dry western and central interior of South Africa. Much of South Africa’s dry Karoo interior consists of wide-open, uninhabited spaces sparsely punctuated by widely scattered farmsteads and small towns. Over the last couple of decades, an increasing number of tourism routes have been established within the Karoo, and in a context of increasing urbanisation in South Africa’s major centres, the Karoo is being marketed as an undisturbed getaway. Examples of this may be found in the “Getaway Guide to Karoo, Namaqualand and Kalahari” (Moseley and Naude-Moseley, 2008).

The typical Karoo landscape can be considered a valuable 'cultural landscape' in the South African context. Although the cultural landscape concept is relatively new, it is becoming increasingly important in terms of the preservation and management of rural and urban settings across the world (Breedlove, 2002). In 1992 the World Heritage Committee[3] adopted the following definition for cultural landscapes:

Cultural landscapes represent the combined worlds of nature and of man illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal.

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

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

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

In light of this, it is important to assess whether the introduction of a WEF and associated infrastructure into the study area would be a degrading factor in the context of the natural Karoo character of the landscape. Broadly speaking, visual impacts on the cultural landscape in the area around the proposed development would be reduced by the fact that the area is relatively remote and there are few tourism or nature-based facilities in the study area. In addition, although the elements of the proposed Koup 1 WEF and grid connection infrastructure would potentially be visible from the N12 national route, the section of this route that traverses the study area does not form part of a designated scenic route and is not expected to experience heavy volumes of tourist traffic.

[3] UNESCO, 2005. Operational Guidelines for the Implementation of the World Heritage Convention. UNESCO World Heritage Centre. Paris

A further consideration is the fact that a number of WEFs have been developed or are likely to be developed across the Karoo, and as such it is conceivable that WEFs and their associated grid connection infrastructure may in the future become an integral part of the typical Karoo cultural landscape.

A more detailed assessment of the potential impacts of the proposed WEF and associated grid connection infrastructure on the cultural landscape has been included in the Heritage Impact Assessment (HIA) undertaken by PGS Heritage in respect of the proposed project.

6.3 Visual Sensitivity Analysis and Verification

Visual sensitivity can be defined as the inherent sensitivity of an area to potential visual impacts associated with a proposed development. It is based on the physical characteristics of the area (i.e. topography, landform and land cover), the spatial distribution of potential receptors, and the likely value judgements of these receptors towards a new development (Oberholzer: 2005). A viewer's perception is usually based on the perceived aesthetic appeal of an area and on the presence of economic activities (such as recreational or nature-based tourism) which may be based on this aesthetic appeal.

In order to assess the visual sensitivity of the area, SiVEST has developed a matrix based on the characteristics of the receiving environment which, according to the Guidelines for Involving Visual and Aesthetic Specialists in the EIA Processes, indicate that visibility and aesthetics are likely to be 'key issues' (Oberholzer: 2005).

Based on the criteria in the matrix (**Table 2**), the visual sensitivity of the area is broken up into a number of categories, as described below:

i) **High** - The introduction of a new development such as a WEF would be likely to be perceived negatively by receptors in this area; it would be considered to be a visual intrusion and may elicit opposition from these receptors.
ii) **Moderate** – Receptors are present, but due to the nature of the existing visual character of the area and likely value judgements of receptors, there would be limited negative perception towards the new development as a source of visual impact.
iii) **Low** - The introduction of a new development would not be perceived to be negative, there would be little opposition or negative perception towards it.

The table below outlines the factors used to rate the visual sensitivity of the study area. The ratings are specific to the visual context of the receiving environment within the study area.

Table 2: Environmental factors used to define visual sensitivity of the study area

FACTORS	DESCRIPTION	RATING									
		1	2	3	4	5	6	7	8	9	10
Pristine / natural / scenic character of the environment	Study area is largely natural with areas of scenic value and some pastoral elements.										
Presence of sensitive visual receptors	Relatively few sensitive receptors have been identified in the study area.										
Aesthetic sense of place / visual character	Visual character is typical of Karoo Cultural landscape.										
Irreplaceability / uniqueness / scarcity value	Although there are areas of scenic value within the study area, these are not rated as highly unique.										
Cultural or symbolic meaning	Much of the area is typical of a Karoo Cultural landscape.										
Protected / conservation areas in the study area	No protected or conservation areas were identified in the study area.										
Sites of special interest present in the study area	No sites of special interest were identified in the study area.										
Economic dependency on scenic quality	Relatively few tourism/leisure based facilities in the area										
International / regional / local status of the environment	Study area is typical of Karoo landscapes										
**Scenic quality under threat / at risk of change	Introduction of a WEF and associated infrastructure will alter the visual character and sense of place. In addition, the development of other renewable energy facilities in the broader area as planned will introduce an increasingly industrial character, giving rise to significant cumulative impacts										

**Any rating above '5' for this specific aspect will trigger the need to undertake an assessment of cumulative visual impacts.

Low				Moderate					High
10	20	30	40	50	60	70	80	90	100

Based on the above factors, the total score for the study area is 44, which according to the scale above, would result in the area being rated as having a low to moderate visual sensitivity. It should be stressed however that the concept of visual sensitivity has been utilised indicatively to provide a broad-scale indication of whether the landscape is likely to be sensitive to visual impacts, and is based on the physical characteristics of the study area, economic activities and land use that predominates. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs.

No formal protected areas were identified in the study area, and only two (2) leisure-based tourism activities or sensitive receptor locations were identified in the study area. In addition, relatively few *potentially* sensitive receptors were found to be present.

During the initial stages of the EIA, a site sensitivity assessment was undertaken to inform the site layout for the WEF and the power line route alignment. The aim of this exercise was to indicate any areas of the application site or grid assessment corridors which should be precluded from the development footprint. From a visual perspective, sensitive areas would be areas where the establishment of wind turbines, power lines or substations would result in the greatest probability of visual impacts on sensitive or potentially sensitive visual receptors.

6.3.1 WEF Site Sensitivity

Using GIS-based visibility analysis, it was possible to determine that the tip of at least one turbine blade (ie at a maximum height of 300m) would be visible from most identified potentially sensitive receptors in the study area and as such, no areas on the site are *significantly* more visible than the remainder of the site. It should be noted however that the visual prominence of a very tall structure such as a wind turbine would be exacerbated if located on a ridge top or a relatively high lying plateau. As such, it is recommended that wind turbines should preferably not be located on the highest ridges (= 1050msl) within the WEF development area. While these ridges could be seen as areas of potentially high visual sensitivity, the study area as a whole is rated as having a low to moderate visual sensitivity, and as such, the sensitivity rating would be reduced to “Medium-High”. Hence the ridges are not considered to be “no go areas”, but rather should be viewed as zones where turbine placement would be least preferred.

From a visual perspective, another concern is the direct visual impact of the turbines on any farmsteads or receptors located on the application site. Accordingly, a 1km visual sensitivity zone has been delineated around the existing residences on the application site and also around the two receptors located within 1km of the site boundary. This 1km buffer is in accordance with the flicker-sensitive buffers applied in the DFFE Screening Tool. In addition, it

is recommended that the following visual sensitivity zones are applied to main roads on or near the application site:

- N12 national route: 1km
- Main access roads on the site: 300m

The preclusion of turbine development from these zones would reduce the direct impact of the turbines on the occupants of the farmsteads and on passing motorists, especially those impacts related to shadow flicker (see **Section 7.1.1** below). At this stage however, the visual sensitivity zones are ***not*** considered "no go" areas, but rather should be viewed as zones where development should be limited. It should be stressed that these zones on the WEF development site apply to turbine development only. The visual impacts resulting from the associated on-site infrastructure are considered to have far less significance when viewed in the context of multiple wind turbines and as such the associated on-site infrastructure has been excluded from the sensitivity analysis.

The areas identified as visually sensitive to WEF development are shown in **Figure 27Error! Reference source not found.** below.

6.3.2 Power Line Route Sensitivity

GIS-based visibility analysis was again used to determine which sectors of the grid assessment corridors would be visible to the highest numbers of receptors in the study area. Although sections of the assessment corridors are expected to be visible from most of the identified receptor locations, one section of Corridor Option 2 is expected to be significantly more visible than all other sections. This section is located immediately south of the Koup 1 WEF application site where the proposed power line route alignment traverses a prominent ridge. While this could be seen as an area of potentially high visual sensitivity, given the low to moderate visual sensitivity rating of the study area as a whole, the sensitivity of the ridge would be reduced to "Medium-High". Hence this is not considered to be a "no go area", but rather should be viewed as a zone where power line development would be least preferred.

Additional areas of potential visual sensitivity have been delineated around the identified receptors located within 500m of the grid assessment corridor, these being VR 25 and VR45 which are farmsteads located on Portions 19 and 24 of the Farm Brits Eigendom No 374 respectively. Receptor VR25 is inside power line corridor Option 2, while VR45 is inside power line corridor Option 3. As such, these receptors would be subject to high levels of visual impact from the proposed power lines. The level of visual impact experienced would however be reduced as a result of the proximity of both of these farmsteads to the existing 400kV power lines. The level of impact would also largely depend on the sentiments of the owners/occupants of the farmsteads towards the proposed development and this is not known at this stage. As such, 500 m buffers around the sites were delineated as areas of potential visual sensitivity

The areas of visual sensitivity affecting the grid connection infrastructure are shown in **Figure 28Error! Reference source not found.** below.

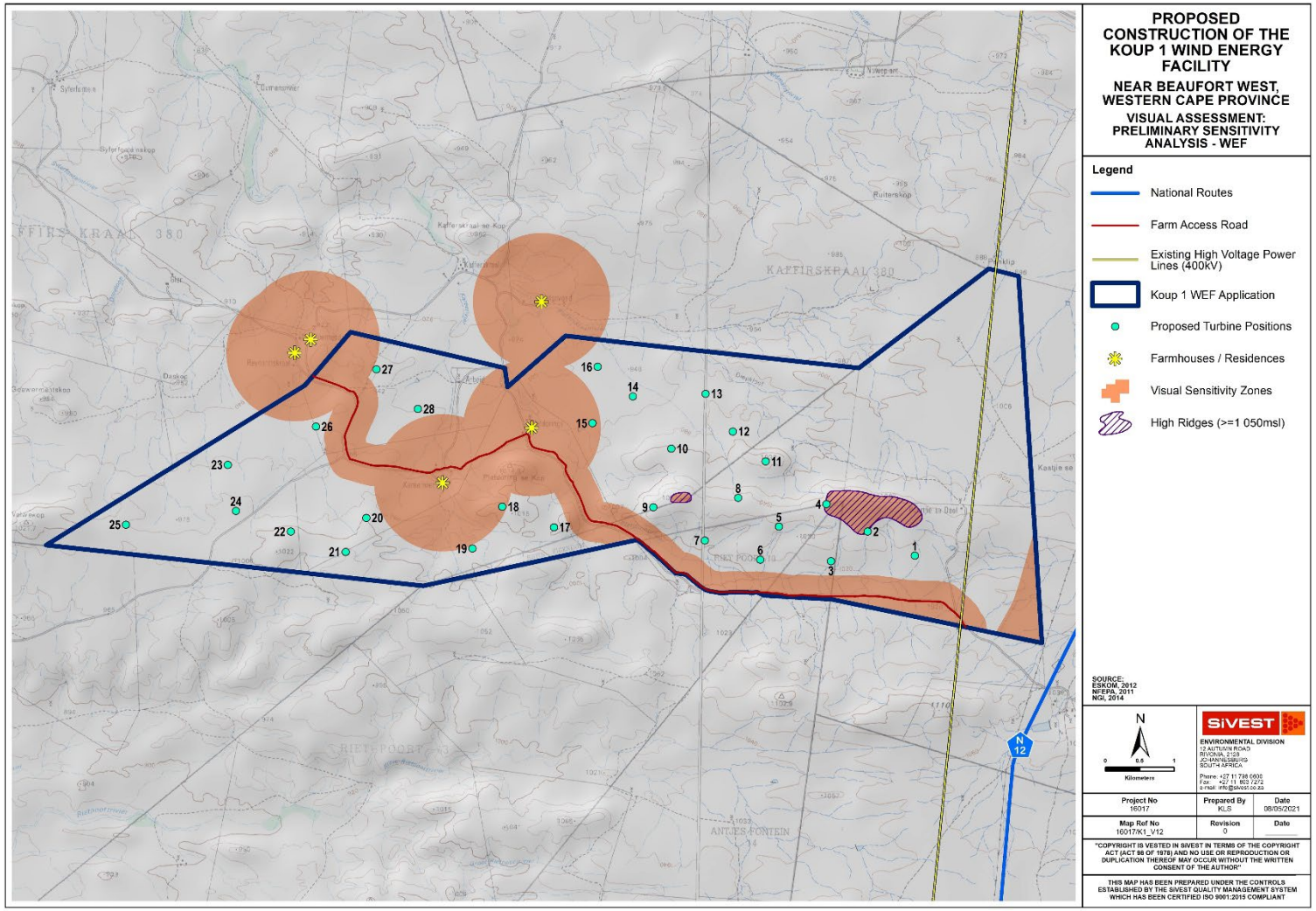


Figure 27: Visual sensitivity on the Koup 1 WEF Site

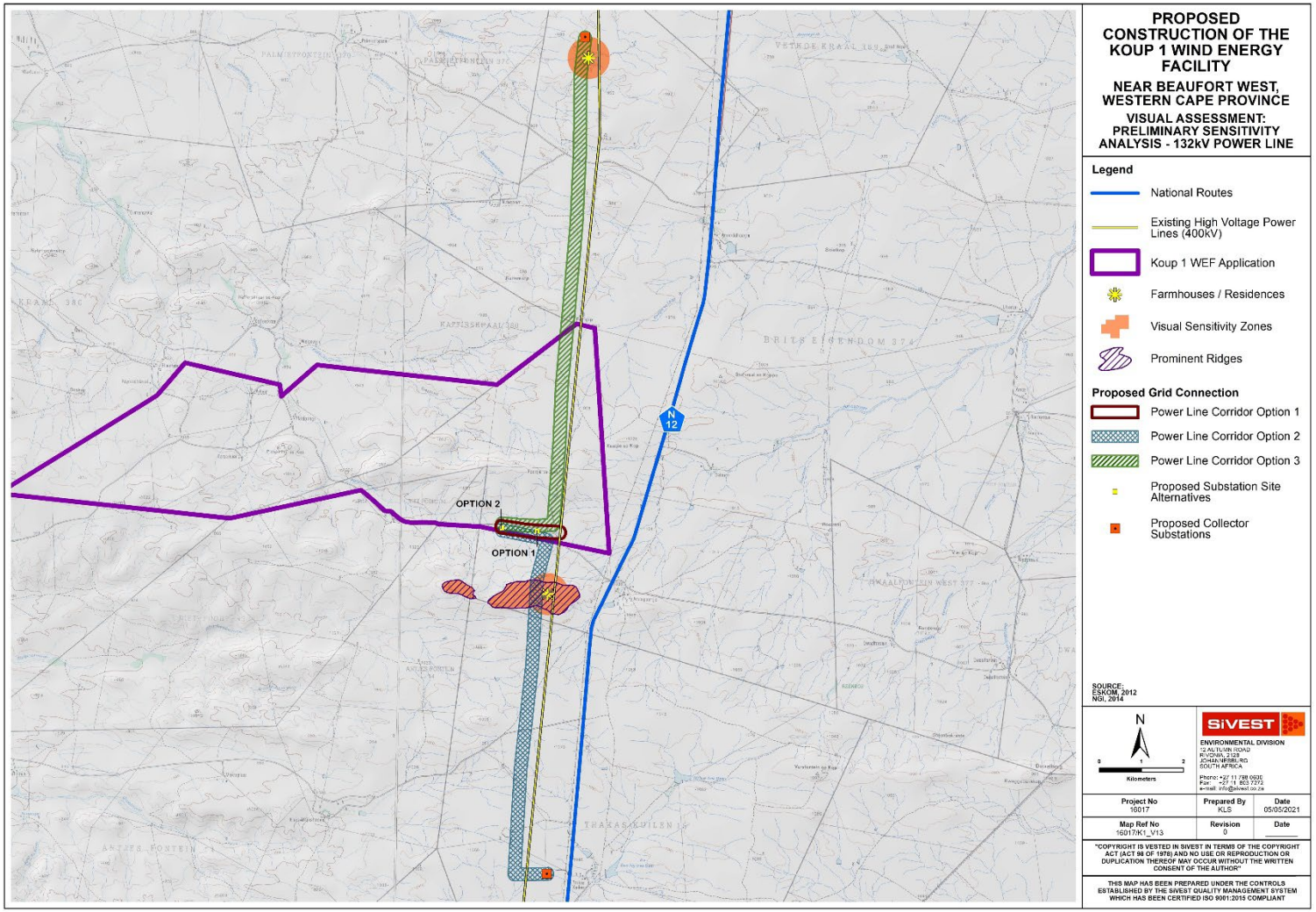


Figure 28: Visual sensitivity along the power line assessment corridors

6.3.3 Sensitivities identified by the National Screening Tool: WEF

In assessing visual sensitivity, consideration was given to the Landscape and Flicker Themes of the National Environmental Screening Tool. Under the Landscape Theme, as shown in **Figure 29** below, the tool identifies areas of Very High sensitivity in respect of WEF development on the Koup 1 WEF site. According to the Screening Tool, the high sensitivity rating applied to the Koup 1 WEF site is associated with the presence of natural features such as mountain tops, high ridges and steep slopes. Based on these criteria, a significant portion of the site would be ruled out for WEF development.

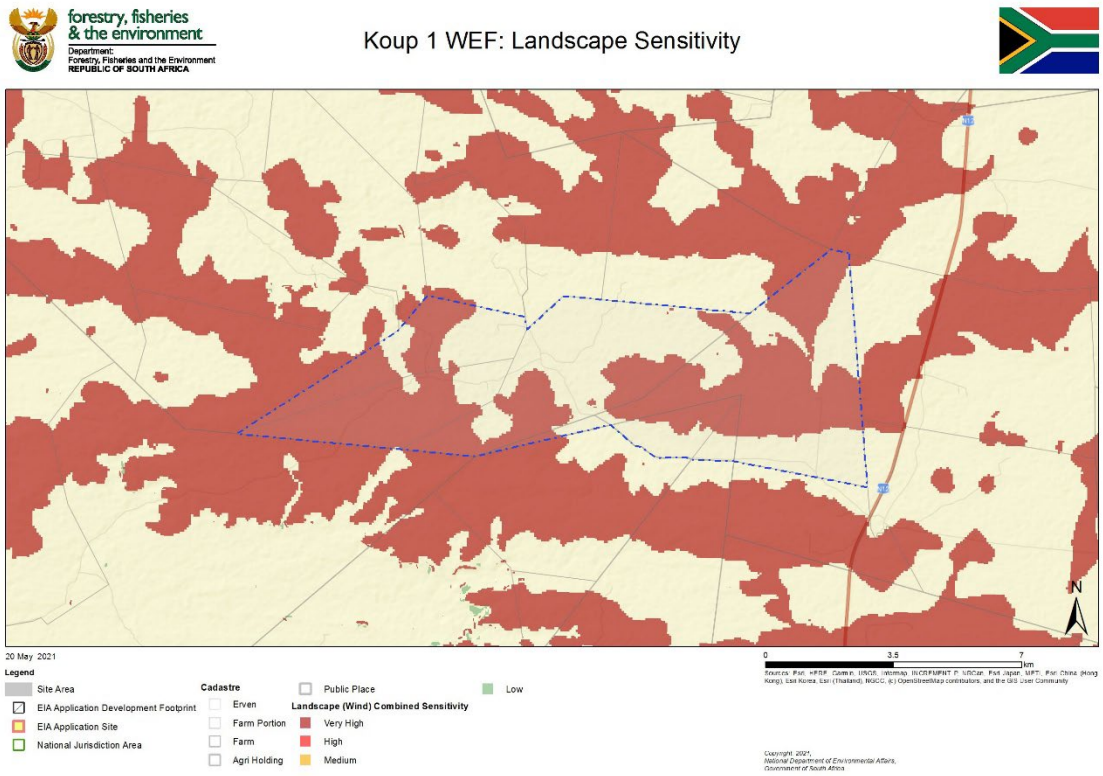


Figure 29: Relative Landscape Sensitivity (May 2021)

The flicker theme demarcates areas (1 km buffers) of sensitivity around identified receptors in the area (**Figure 30**). Under this theme, several “receptors” have been identified on the site, the majority of which are concentrated in the western portion of the site. As a result of the buffers demarcated around these receptors, a significant portion of the site has been assigned a “very high” sensitivity rating.

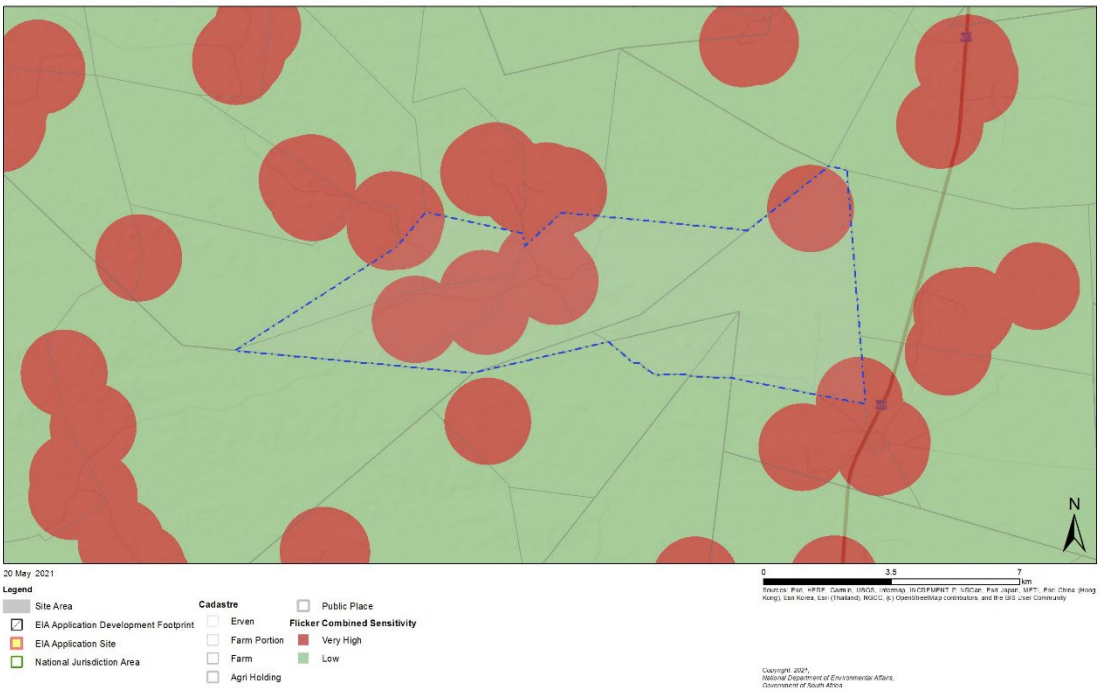


Figure 30: Flicker Sensitivity (May 2021)

The Screening Tool provides a very high level, desktop assessment and as such the results of the study must be viewed against the findings of the field investigation as well as factors affecting visual impact, such as:

- the presence of visual receptors;
- the distance of those receptors from the proposed development; and
- the likely visibility of the development from the receptor locations.

6.3.4 Sensitivity Analysis Summary for WEF Development

Although the Screening Tool identifies significant areas of very high landscape and flicker sensitivity, the site sensitivity verification exercise conducted in respect of this VIA (**Appendix E**) found little evidence to support this sensitivity rating. The desktop topographic assessment of the area did not indicate the presence of mountaintops, *high* ridges or any significantly steep slopes. This assessment, confirmed by the field investigation, showed the presence of a few ridges in a largely flat to gently undulating landscape. The sensitivity analysis above has recognised these ridges and identified the higher ridges as zones where development would be least preferred.

The presence of receptors, either on the Koup 1 WEF application, or within 1km of the site boundary, was confirmed by the site sensitivity verification exercise. However, an assessment of receptor locations using Google Earth showed that there were no receptors present at some

of the locations identified by the National Screening Tool. The remaining (confirmed) receptors were factored into the sensitivity analysis, together with a 1km buffer.

6.3.5 Sensitivities identified by the National Screening Tool: Power Line Route Alternatives

The National Environmental Screening Tool does not identify any landscape sensitivities in respect of the proposed grid connection.

6.4 Visual Absorption Capacity

Visual absorption capacity is the ability of the landscape to absorb a new development without any significant change in the visual character and quality of the landscape. The level of absorption capacity is largely based on the physical characteristics of the landscape (topography and vegetation cover) and the level of transformation present in the landscape.

The relatively flat topography in the study area and the relative lack of vegetation to provide screening would reduce the visual absorption capacity across much of the area. This would be offset to some degree where the landscape has already undergone significant transformation, specifically in the areas adjacent to the N12 National route and the 400kV power lines, thus increasing the overall visual absorption capacity of the landscape.

Visual absorption capacity in the study area is therefore rated as low to moderate.

7 TYPICAL VISUAL IMPACTS ASSOCIATED WITH WIND ENERGY FACILITES

In this section, the typical visual issues related to the establishment of a WEF and associated grid connection infrastructure as proposed are discussed. It is important to note that the renewable energy industry is still relatively new in South Africa and as such this report draws on international literature and web material (of which there is significant material available) to describe the generic impacts associated with WEFs.

7.1 Wind Energy Facilities

As previously mentioned, at this stage it is anticipated that the proposed project will consist of up to 28 wind turbines and associated infrastructure with a total generation capacity of up to approximately 140MW. The wind turbines will have a hub height of up to 200m and a rotor diameter of up to 200m. The height of the turbines and their location on relatively flat to gently undulating terrain would result in the development typically being visible over a large area (**Figure 31**).

Figure 31: Wind turbines at Noupoort Wind Farm, near Noupoort, Northern Cape Province.

Internationally, studies have demonstrated that there is a direct correlation between the number of turbines and the degree of objection to a wind farm, with less opposition being encountered when fewer turbines are proposed (Devine-Wright, 2005). Certain objectors to wind farms also mention the “sky space” occupied by the rotors of a turbine, this being the area in which the rotors would rotate.

The visual prominence of wind turbines would be exacerbated within natural settings, in areas of flat terrain or if located on ridge tops. Given the height of the turbines, even dense stands of wooded vegetation are only likely to offer partial visual screening.

7.1.1 Shadow Flicker

Shadow flicker may occur when the sun is low on the horizon and shines through the rotating blades of a wind turbine, resulting in a moving shadow. The rotating blades repeatedly cast a shadow which will be perceived as a “flicker” and this flicker effect can potentially impact on residents located near the wind turbines.

The effect of shadow flicker is however only likely to be experienced by people situated directly within the shadow cast by the blade of the wind turbine. As such, shadow flicker is only expected to have an impact on and cause health risks to people residing in houses located relatively close to a wind turbine and at a specific orientation, particularly in areas where there is little screening present. Shadow flicker may also be experienced by and impact on motorists if a wind turbine is located in close proximity to an existing road.

The impact of shadow flicker can be effectively mitigated by choosing the correct site and layout for the wind turbines, taking into consideration the orientation of the turbines relative to the nearby houses and the latitude of the site. Hence appropriate development restriction zones around residences will reduce the adverse effects of shadow flicker, while tall structures and trees will also obstruct shadows and prevent the effect of shadow flicker from impacting on surrounding residents.

7.1.2 Motion-based visual intrusion

An important component of the visual impacts associated with wind turbines is the *movement* of the rotors. Labelled as motion-based visual intrusion, this refers to the tendency of the viewer to focus on discordant, moving features when scanning the landscape. Evidence from surveys of public attitudes towards wind farms suggest that the viewing of moving blades is not necessarily perceived negatively (Bishop and Miller, 2006). The authors of the study suggest two possible reasons for this; firstly, when the turbines are moving they are seen as being ‘at work’, ‘doing good’ and producing energy. Conversely, when they are stationary they are regarded as a visual intrusion that has no evident purpose.

More interestingly, the second theory regarding this perception is related to the intrinsic value of wind in certain areas and how turbines may be an expression or extension of an otherwise ‘invisible’ presence. Famous winds across the world include the Mistral of the Camargue in France, the Föhn in the Alps, or the Bise in the Lavaux region of Switzerland. The wind, in these cases, is an intrinsic component of the landscape, being expressed in the shape of trees or drifts of sands, but being otherwise invisible. Bishop and Miller (2006) argue that wind turbines in these environments give expression, when moving, to this quintessential landscape element.

In a South African context, this phenomenon may well be experienced if wind farms are developed in areas where typical winds, like berg winds, or the south-easter in the Cape are an intrinsic part of the environment. In this way, it may even be possible that wind farms will, through time form part of the cultural landscape of an area, and become a representation of the opportunities presented by the natural environment.

7.2 Associated On-Site Infrastructure

The infrastructure associated with the proposed Koup 1 WEF will include the following:

- Electrical transformers adjacent to each wind turbine;
- A new 33/132kV on-site substation and/or combined collector substation, occupying an area of approximately 1.5 ha;
- Medium voltage (33kV) cables, buried along access roads wherever technically feasible;
- A Battery Energy Storage System (BESS) located next to the onsite 33/132kV substation, comprising an array of containers, outdoor cabinets and/or storage tanks;
- Internal roads with a width of between 8m and 10m;
- A construction laydown / staging area of up to approximately 2.25ha.
- A 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 which has already been erected.

Substations are generally large, highly visible structures which are more industrial in character than many other components of a WEF. As they are not features of the natural environment, but are representative of human (anthropogenic) alteration, substations will be perceived to be incongruous when placed in largely natural landscapes. Conversely, the presence of other anthropogenic objects associated with the built environment, especially other substations or power lines, may result in the visual environment being considered to be ‘degraded’ and thus the introduction of a substation into this setting may be less of a visual impact than if there was no existing built infrastructure visible. In this instance, the substation is intended to serve the proposed Koup 1 WEF project and as such, is likely to be perceived as part of the greater WEF development. Thus, the visual impact of the substation will be relatively minor when compared to the visual impact associated with the WEF development as a whole.

Surface clearance for cable trenches, access roads, laydown areas and other on-site infrastructure may result in the increased visual prominence of these features, thus increasing the level of contrast with the surrounding landscape. Buildings, BESS containers and associated infrastructure placed in prominent positions such as on ridge tops may break the natural skyline, drawing the attention of the viewer. In addition, security lighting on the site may impact on the nightscape (**Section 0**).

The visual impact of the on-site infrastructure associated with a WEF is generally not regarded as a significant factor when compared to the visual impact associated with wind turbines. The infrastructure would however increase the visual "clutter" on the WEF site and magnify the visual prominence of the development if located on ridge tops or flat sites in natural settings where there is limited tall wooded vegetation to conceal the impact.

7.3 Grid Connection Infrastructure

Grid connection infrastructure for this project includes an overhead 132kV power line linking the on-site substation to the National Grid.

Power line towers are by their nature very large objects and thus highly visible. It is understood that the maximum tower height envisaged for the proposed power line is expected to be 25m (approximately equivalent in height to an eight storey building). Although a tower structure would be less visible than a building, the height of the structure means that the tower would still typically be visible from a considerable distance. Visibility would be increased by the fact that the power line comprises a series of towers typically spaced approximately 200m to 400m apart in a linear alignment.

As power lines are not features of the natural environment, they could be perceived to be highly incongruous in the context of a largely natural landscape. The height and linear nature of the power line will exacerbate this incongruity, as the towers may impinge on views within the landscape. In addition, the practice of clearing taller vegetation from areas within the power line servitude can increase the visibility and incongruity of the power line. In a largely natural, bushy setting, vegetation clearance will cause fragmentation of the natural vegetation cover, thus making the power line more visible and drawing the viewer's attention to the servitude.

In this instance, the proposed grid connection infrastructure is intended to serve the proposed WEF and as such, will only be built if these projects go ahead. The power lines and substations are therefore likely to be perceived as part of the greater WEF development and the visual impact will be relatively minor when compared to the visual impact associated with the development as a whole.

8 SENSITIVE VISUAL RECEPTORS

A sensitive visual receptor location is defined as a location where receptors would potentially be impacted by a proposed development. Adverse impacts often arise where a new development is seen as an intrusion which alters the visual character of the area and affects the 'sense of place'. The degree of visual impact experienced will however vary from one receptor to another, as it is largely based on the viewer's perception.

A distinction must be made between a receptor location and a sensitive receptor location. A receptor location is a site from where the proposed development may be visible, but the receptor may not necessarily be adversely affected by any visual intrusion associated with the development. Less sensitive receptor locations include locations of commercial activities and certain movement corridors, such as roads that are not tourism routes. More sensitive receptor locations typically include sites that are likely to be adversely affected by the visual intrusion of the proposed development. They include tourism facilities, scenic sites and residential dwellings in natural settings.

The identification of sensitive receptors is typically based on a number of factors which include:

- the visual character of the area, especially taking into account visually scenic areas and areas of visual sensitivity;
- the presence of leisure-based (especially nature-based) tourism in an area;
- the presence of sites or routes that are valued for their scenic quality and sense of place;
- the presence of homesteads / farmsteads in a largely natural setting where the development may influence the typical character of their views; and
- feedback from interested and affected parties, as raised during the public participation process conducted as part of the EIA study.

As the visibility of the development would diminish exponentially over distance (refer to **section 5.4** above), receptor locations which are closer to the WEF or power line would experience greater adverse visual impacts than those located further away. Zones of visual impact were therefore delineated based on distance from the outer boundary of the application site and from the combined power line corridors.

The degree of visual impact experienced will however vary from one inhabitant to another, as it is largely based on the viewer's perception. Factors influencing the degree of visual impact experienced by the viewer include the following:

- Value placed by the viewer on the natural scenic characteristics of the area.
- The viewer's sentiments toward the proposed structures. These may be positive (a symbol of progression toward a less polluted future) or negative (foreign objects degrading the natural landscape).
- Degree to which the viewer will accept a change in the typical Karoo character of the surrounding area.

8.1 Receptor Identification

Preliminary desktop assessment of the **combined** study area for the proposed Koup 1 WEF and the associated grid connection infrastructure identified forty-six (46) potentially sensitive visual receptor locations, most of which appear to be existing farmsteads. It should be noted that, at this stage, all receptors identified within 10kms of the Koup 1 WEF application site have

been included in the visual assessment. This will however be revised in the EIA phase to exclude all receptors that are located more than 10kms from the nearest turbine position.

Forty-four (44) receptors are located within 10kms of the Koup 1 WEF development site while only fifteen (15) are located within 5kms of the power line assessment corridors. Although the findings of the desktop assessment were largely confirmed during the field investigation, it was not possible to confirm the presence of receptors at all the identified locations due to access restrictions. Notwithstanding this limitation, all the identified receptor locations were assessed as part of the VIA as they are still regarded as being potentially sensitive to the visual impacts associated with the proposed development.

Three of the receptors identified were found to be linked to leisure-based (specifically nature-based) tourism and are therefore considered to be *sensitive receptors*. These receptors are as follows:

- Rietpoort Game Farm;
- ROAM Safari Lodge; and
- Silwerkaroo Guest House.

All three of these receptors are within 10kms of the Koup 1 WEF development, while only two are within 5kms of the power line assessment corridors, namely ROAM Safari Lodge and Silwerkaroo Guest House.

As stated, the remaining receptors identified appear to be farmsteads which are regarded as potentially sensitive visual receptors as they are located within a mostly rural setting with natural vistas that will likely be altered by the proposed development. Local sentiments toward the proposed development are however unknown at this stage.

In many cases, roads along which people travel, are regarded as sensitive receptors. The primary thoroughfare in the study area is the N12 national route which links George and Knysna in the Western Cape with Kimberley in the north and Gauteng Province to the north-east. In the local context, the N12 is the primary access route to Beaufort West and the N1 to the north-east and also to Outdshoorn and the N9 in the south-west.

The section of the N12 traversing the study area is not considered part of a designated scenic route, although the route is an important link and is utilised, to some extent, for its tourism potential. As a result it is considered to be a potentially sensitive receptor road – i.e. a road being used by motorists who may object to the potential visual intrusion of the proposed WEF and associated infrastructure.

Other thoroughfares in the study area are primarily used as local access roads and do not form part of any scenic tourist routes. These roads are not specifically valued or utilised for their scenic or tourism potential and are therefore not regarded as visually sensitive.

The identified potentially sensitive visual receptor locations for the proposed WEF and grid connection are indicated in **Figure 32** and **Figure 33** respectively.

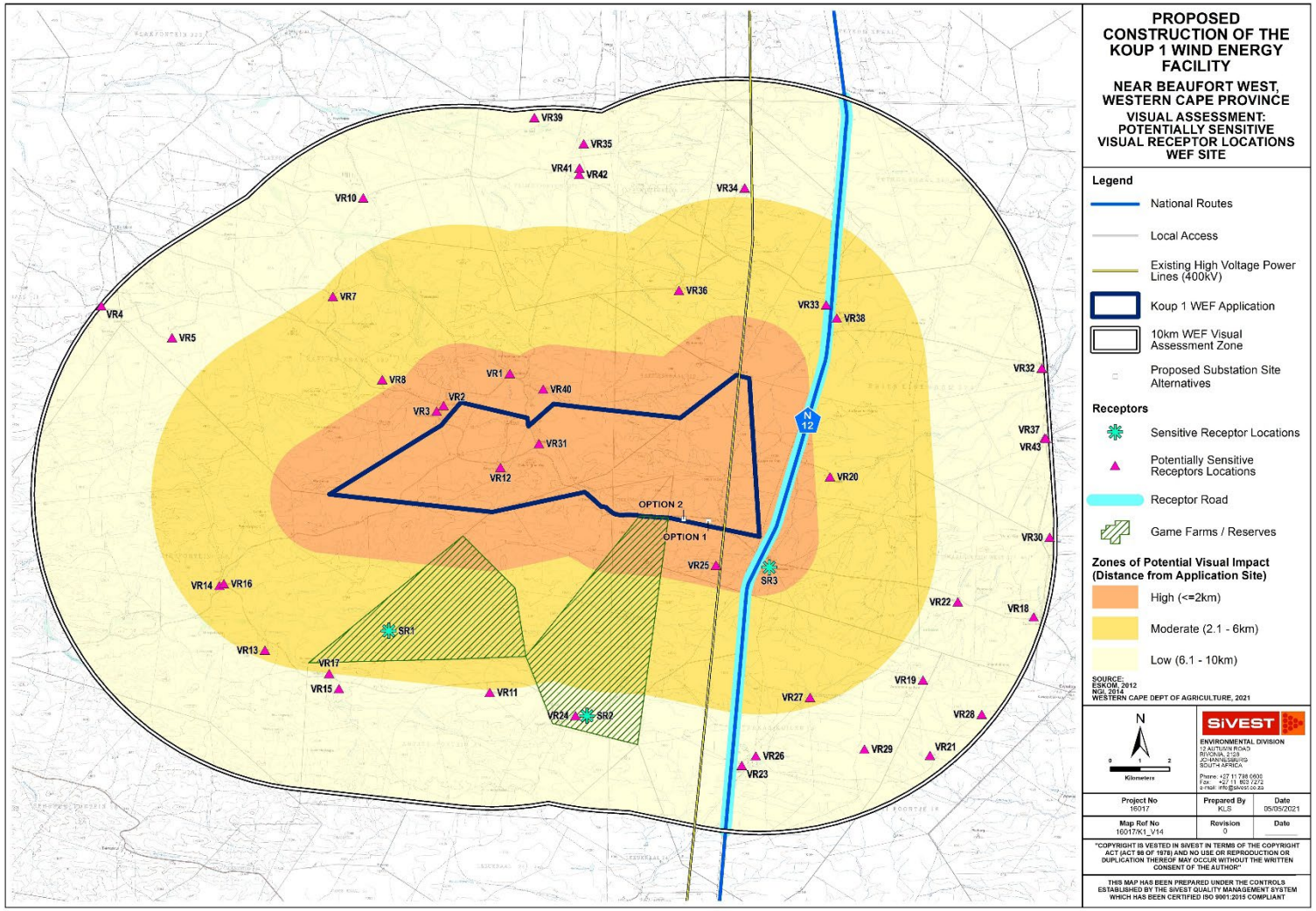


Figure 32: Potentially sensitive receptor locations within 10kms of the Koup 1 WEF application site

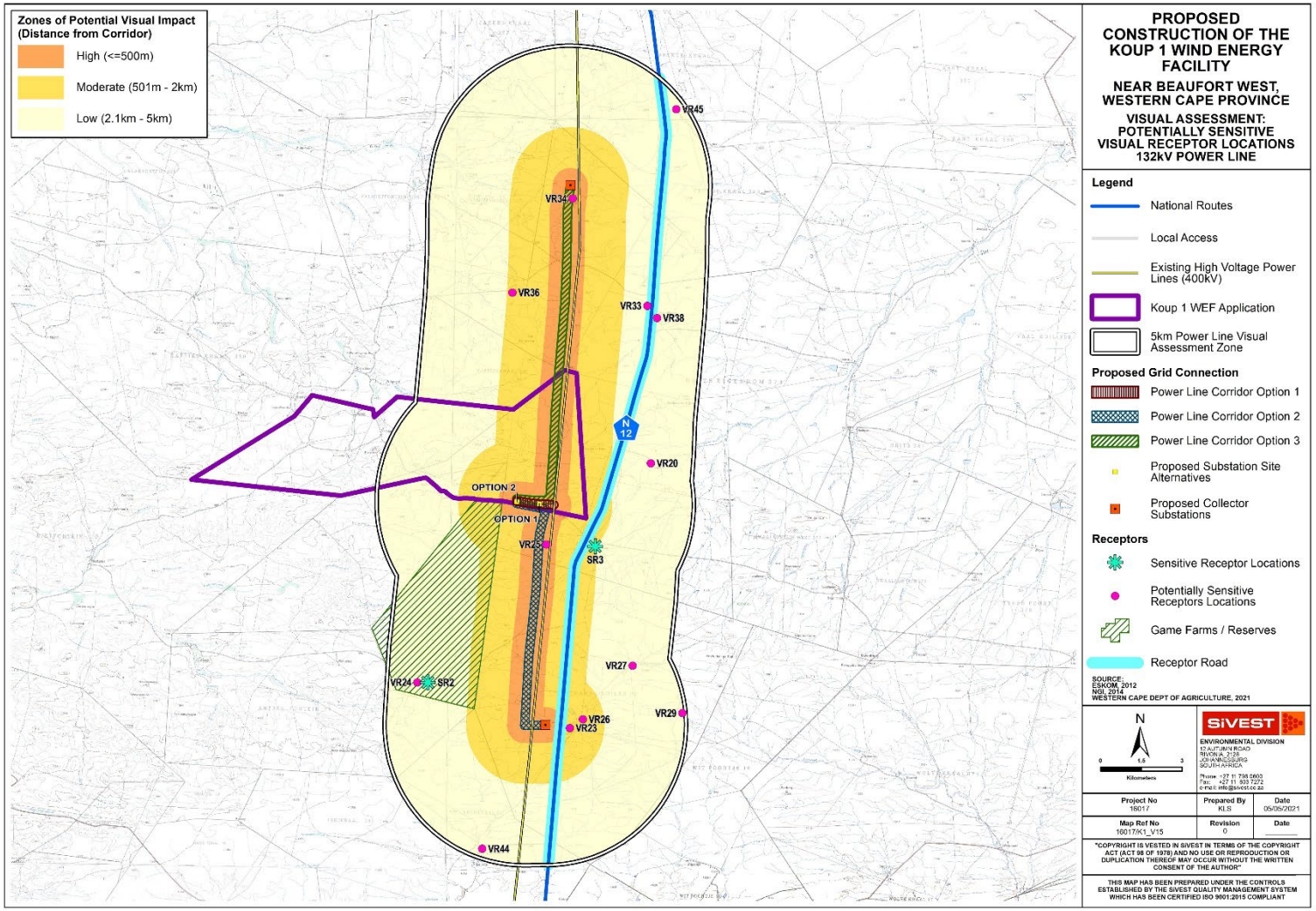


Figure 33: Potentially sensitive receptor locations within 5kms of the power line corridor

8.2 Receptor Impact Rating

In order to assess the impact of the proposed facilities on the identified potentially sensitive receptor locations, a matrix that takes into account a number of factors has been developed and is applied to each receptor location.

The matrix is based on the factors listed below:

- Distance of a receptor location away from the proposed development (zones of visual impact)
- Presence of screening elements (topography, vegetation etc.)
- Visual contrast of the development with the landscape pattern and form

These are considered to be the most important factors when assessing the visual impact of a proposed development on a potentially sensitive receptor location in this context. It should be noted that this rating matrix is a relatively simplified way of assigning a likely representative visual impact, which allows a number of factors to be considered. Experiencing visual impacts is however a complex and qualitative phenomenon, and is thus difficult to quantify accurately. The matrix should therefore be seen as a representation of the likely visual impact at a receptor location. Part of its limitation lies in the quantitative assessment of what is largely a qualitative or subjective impact.

8.2.1 Distance

As described above, distance of the viewer / receptor location from the development is an important factor in the context of experiencing visual impacts which will have a strong bearing on mitigating the potential visual impact. A high impact rating has been assigned to receptor locations that are located within 2km of the proposed WEF development and within 500m of the nearest power line assessment corridor. The visual impact of a WEF or power line diminishes beyond 10km and 5km respectively, as the development would appear to merge with the elements on the horizon. Any visual receptor locations beyond these distance limits have therefore not been assessed as they fall outside the study area and would not be visually influenced by the proposed development.

At this stage of the process, zones of visual impact for the proposed WEF have been delineated according to distance from the boundary of the WEF application site. Based on the height and scale of the WEF project, the distance intervals chosen for the zones of visual impact, as shown in **Figure 32**, are as follows:

- 0 – 2km (high impact zone);
- 2km – 6km (moderate impact zone);
- 6km - 10km (low impact zone).

This will however be refined during the EIA phase when the distance from the nearest proposed turbine position will be used to determine the zones of visual impact for the identified visual receptor locations.

Zones of visual impact for the proposed power lines have been delineated according to distance from the combined power line assessment corridors. Based on the likely height of the power line towers, the distance intervals chosen for the zones of visual impact, as shown in **Figure 33** are as follows:

- 0 - 500m (high impact zone);
- 500m – 2km (moderate impact zone);
- 2km - 5km (low impact zone).

8.2.2 Screening Elements

The presence of screening elements is an equally important factor in this context. Screening elements can be vegetation, buildings and topographic features. For example, a grove of trees or a series of low hills located between a receptor location and an object could completely shield the object from the receptor.

8.2.3 Visual Contrast

The visual contrast of a development refers to the degree to which the development would be congruent with the surrounding environment. This is based on whether or not the development would conform to the land use, settlement density, structural scale, form and pattern of natural elements that define the structure of the surrounding landscape. Visual compatibility is an important factor to be considered when assessing the impact of the development on receptors within a specific context. A development that is incongruent with the surrounding area could change the visual character of the landscape and have a significant visual impact on sensitive receptors.

In order to determine the likely visual compatibility of the proposed development, the study area was classified into the following zones of visual contrast:

- **High –** undeveloped / natural / rural areas.
- **Moderate –**
    - areas within 500m of any existing power line; in undeveloped / natural / rural area;
    - areas within 150m of cultivated land / plantations / farm buildings.
- **Low –** areas within 500m of N12 National Route.

These zones are depicted in **Figure 34** below.

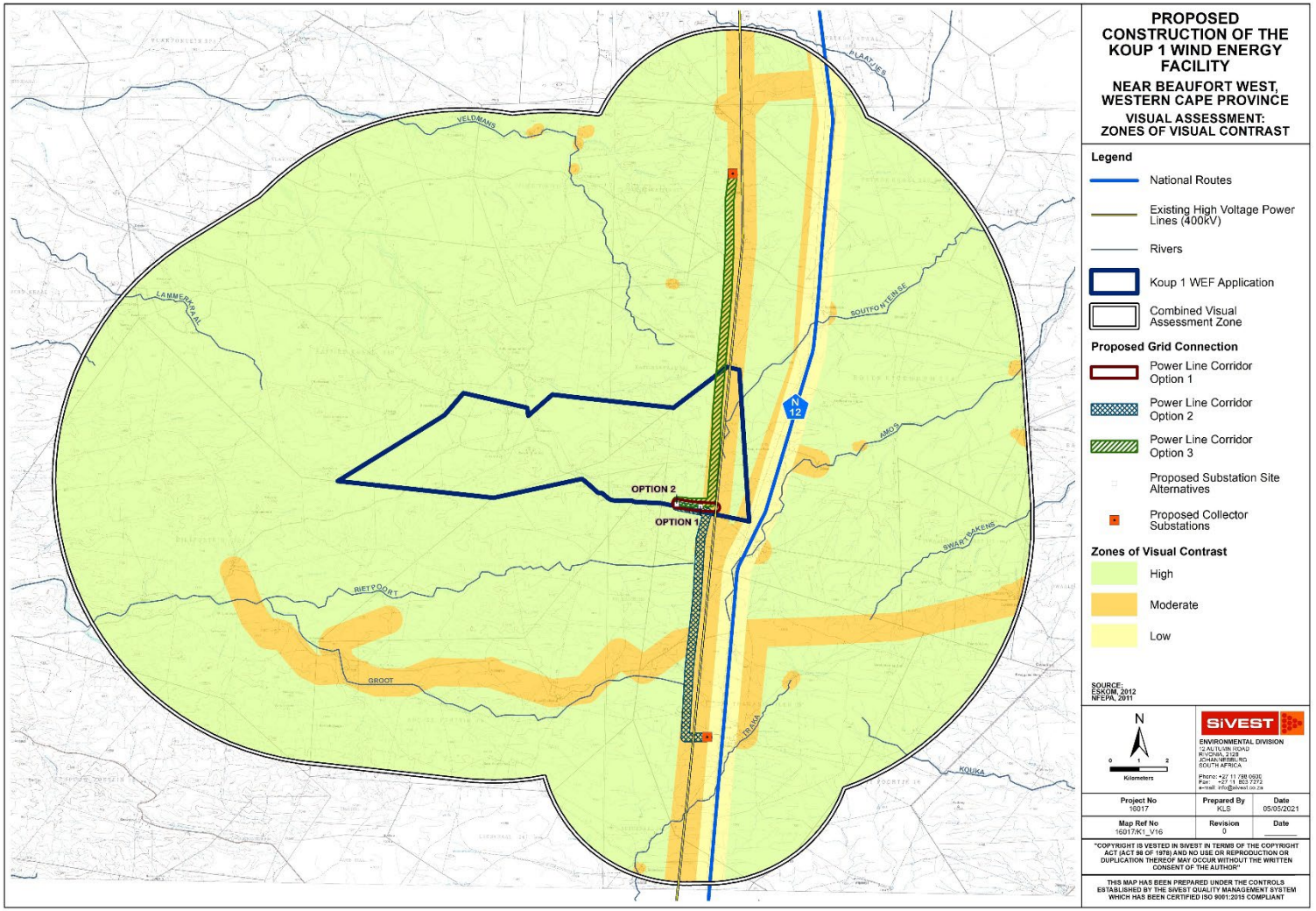


Figure 34: Zones of Visual Contrast

8.2.4 Impact Rating Matrix

The receptor impact rating matrix returns a score which in turn determines the visual impact rating assigned to each receptor location (**Error! Reference source not found.**) below.

Table 3: Rating scores

Rating	Overall Score
High Visual Impact	8-9
Moderate Visual Impact	5-7
Low Visual Impact	3-4
Negligible Visual Impact	(overriding factor)

An explanation of the matrix is provided in **Table 4** below.

Table 4: Visual assessment matrix used to rate the impact of the proposed development on potentially sensitive receptors

	VISUAL IMPACT RATING			
VISUAL FACTOR	**HIGH**	**MODERATE**	**LOW**	**OVERRIDING FACTOR: NEGLIGIBLE**
Distance of receptor away from proposed development	WEF: <= 2km Grid: <= 500m **Score 3**	WEF: 2 - 6km Grid: 500m - 2km **Score 2**	WEF: 6km - 10km Grid: 2km - 5km **Score 1**	WEF: >10km Grid: >5km
Presence of screening factors	No / almost no screening factors – development highly visible **Score 3**	Screening factors partially obscure the development **Score 2**	Screening factors obscure most of the development **Score 1**	Screening factors completely block any views towards the development, i.e. the development is not within the viewshed
Visual Contrast	**High contrast** with the pattern and form of the natural landscape elements (vegetation and land form), typical land use and/or human elements (infrastructural form) **Score 3**	**Moderate contrast** with the pattern and form of the natural landscape elements (vegetation and land form), typical land use and/or human elements (infrastructural form) **Score 2**	**Corresponds** with the pattern and form of the natural landscape elements (vegetation and land form), typical land use and/or human elements (infrastructural form) **Score 1**	

Table 5 below presents a summary of the overall visual impact of the proposed Koup 1 WEF on each of the potentially sensitive visual receptor locations identified within 10kms of the boundary of the Koup 1 WEF application site.

Table 5: Receptor impact rating for the proposed Koup 1 WEF Project

Receptor Location	Distance from WEF Site Boundary			Screening		Contrast		OVERALL IMPACT RATING	
	KMs	Rating		Rating		Rating		Rating	
SR1 - Rietpoort Game Farm	4.36	Mod	2	High	3	Mod	2	MODERATE	7
SR2 - ROAM Safari Lodge	6.86	Low	1	High	3	Mod	2	MODERATE	6
SR3 - Silwerkaroo Guest Farm	1.09	High	3	Mod	2	Low	1	MODERATE	6
VR1 - Farmstead	1.32	High	3	High	3	High	3	HIGH	9
VR2 - Farmstead	0.37	High	3	Mod	2	High	3	HIGH	8
VR3 - Farmstead	0.42	High	3	Mod	2	High	3	HIGH	8
VR4 - Farmstead	9.97	Low	1	Mod	2	High	3	MODERATE	6
VR5 - Farmstead	7.48	Low	1	High	3	High	3	MODERATE	7
VR7 - Farmstead	5.60	Mod	2	Mod	2	High	3	MODERATE	7
VR8 - Farmstead	2.35	Mod	2	Mod	2	High	3	MODERATE	7
VR10 - Farmstead	7.64	Low	1	Mod	2	High	3	MODERATE	6
VR11 - Farmstead	6.09	Low	1	Mod	2	Mod	2	MODERATE	5
*VR12 – Farmstead**	*0.00*	*High*	*3*	*Mod*	*2*	*High*	*3*	*HIGH*	*8*
VR13 - Farmstead	5.68	Mod	2	Mod	2	Mod	2	MODERATE	6
VR14 - Farmstead	4.81	Mod	2	Mod	2	Mod	2	MODERATE	6
VR15 - Farmstead	6.48	Low	1	Mod	2	Mod	2	MODERATE	5
VR16 - Farmstead	4.66	Mod	2	Mod	2	Mod	2	MODERATE	6
VR17- Farmstead	6.01	Low	1	Low	1	Mod	2	LOW	4
VR18 - Farmstead	9.65	Low	1	High	3	Mod	2	MODERATE	6
VR19 - Farmstead	7.34	Low	1	High	3	High	3	MODERATE	7
VR20 - Farmstead	2.51	Mod	2	Mod	2	Mod	2	MODERATE	6
VR21- Farmstead	9.36	Low	1	Mod	2	High	3	MODERATE	6
VR22 - Farmstead	7.05	Low	1	Mod	2	High	3	MODERATE	6
VR23 - Farmstead	7.75	Low	1	Mod	2	Low	1	LOW	4
VR24 - Farmstead	6.93	Low	1	Mod	2	Mod	2	MODERATE	5
VR25 - Farmstead	1.24	High	3	High	3	Mod	2	HIGH	8
VR26 - Farmstead	7.40	Low	1	High	3	Mod	2	MODERATE	6
VR27- Farmstead	5.69	Mod	2	High	3	Mod	2	MODERATE	7
VR28 - Farmstead	9.60	Low	1	High	3	High	3	MODERATE	7
VR29 - Farmstead	8.00	Low	1	High	3	High	3	MODERATE	7
VR30 - Farmstead	9.80	Low	1	Mod	2	High	3	MODERATE	6
*VR31- Farmstead**	*0.00*	*High*	*3*	*Mod*	*2*	*High*	*3*	*HIGH*	*8*

VR32 - Farmstead	9.87	Low	1	High	3	Mod	2	MODERATE	6
VR33 - Farmstead	3.59	Mod	2	Mod	2	Low	1	MODERATE	5
VR34 - Farmstead	6.32	Low	1	High	3	Mod	2	MODERATE	6
VR35 - Farmstead	8.84	Low	1	Mod	2	Mod	2	MODERATE	5
VR36 - Farmstead	3.44	Mod	2	Mod	2	Mod	2	MODERATE	6
VR37 - Farmstead	9.82	Low	1	High	3	High	3	MODERATE	7
VR38 - Farmstead	3.59	Mod	2	Mod	2	Low	1	MODERATE	5
VR39 - Farmstead	9.68	Low	1	Mod	2	High	3	MODERATE	6
VR40 - Farmstead	0.61	High	3	Mod	2	High	3	HIGH	8
VR41 - Farmstead	8.00	Low	1	Mod	2	Mod	2	MODERATE	5
VR42 - Farmstead	7.79	Low	1	Mod	2	Mod	2	MODERATE	5
VR43 - Farmstead	9.86	Low	1	Mod	2	High	3	MODERATE	6

**Farmstead is located within the proposed Koup 1 WEF application site. It is therefore assumed that the residents would have a vested interest in the development and would therefore not perceive the proposed WEF in a negative light.*

The table above shows that none of the three identified sensitive receptors would experience high levels of visual impact as a result of the proposed Koup 1 WEF development. All three of these receptors are expected to experience only moderate levels of visual impact. It is believed that two of these receptors, namely Rietpoort Game Farm (on Remainder of Rietpoort No 13) and ROAM Safari Lodge (on Portion 1 of Antjes Fontein No 14), provide leisure or nature-based tourist facilities utilising a significant portion of the respective farms. Details of the levels of activity on different sectors of the farms are not however known and as such, the impact rating matrix for these receptors is based on the assumed location of the main accommodation complex on each property. Accordingly, it should be noted that the northern-most section of ROAM Safari Lodge which lies on the boundary of the Koup 1 WEF application site, could be subjected to higher levels of visual impacts, depending on the location of the wind turbines in the final layout.

Seven (7) of the *potentially* sensitive receptor locations are expected to experience high levels of visual impact as a result of the proposed Koup 1 WEF. The high sensitivity rating relates largely to the fact that these receptors are located in in close proximity to the boundary of the Koup 1 WEF application site and they are in zones of high contrast, with little natural screening. Two of these receptors, namely VR12 and VR31 are in fact located within the proposed Koup 1 WEF development area and as such, these properties form part of the WEF project. Thus it is assumed that the owners have a vested interest in the WEF development and would not perceive the development in a negative light. Furthermore, none of these receptors are tourism-related facilities and as such they are not considered to be Sensitive Receptors. Hence the high impact rating assigned to these receptors will not affect the overall impact ratings determined in **Section 8.5.**

Thirty-two (32) potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed Koup 1 WEF development, while the remaining two (2) receptor locations will be subjected to low levels of visual impact.

It should be noted that these ratings will be re-examined in relation to the final turbine layout once this has been determined.

Table 6 below presents a summary of the overall visual impact of the proposed 132kV power line on each of the potentially sensitive visual receptor locations identified within 5kms of the boundary of the nearest assessment corridor.

Table 6: Receptor impact rating for the proposed 132kV Power Line

Receptor Location	Distance from nearest corridor alternative			Screening		Contrast		OVERALL IMPACT RATING	
	KMs	Rating		Rating		Rating		Rating	
SR2 - ROAM Safari Lodge	3.49	Low	1	High	3	Mod	2	MODERATE	6
SR3 - Silwerkaroo Guest Farm	1.93	Mod	2	Mod	2	Low	1	MODERATE	5
VR20 - Farmstead	3.45	Low	1	Mod	2	Mod	2	MODERATE	5
VR23 - Farmstead	0.74	Mod	2	Mod	2	Low	1	MODERATE	5
VR24 - Farmstead	3.88	Low	1	Mod	2	Mod	2	MODERATE	5
VR25 - Farmstead	0.13	High	3	High	3	Mod	2	HIGH	8
VR26 - Farmstead	1.22	Mod	2	High	3	Mod	2	MODERATE	7
VR27 - Farmstead	3.68	Low	1	High	3	Mod	2	MODERATE	6
VR29 - Farmstead	4.89	Low	1	High	3	High	3	MODERATE	7
VR33 - Farmstead	2.88	Low	1	Mod	2	Low	1	LOW	4
VR34 - Farmstead	*0.00*	*High*	*3*	*High*	*3*	*Mod*	*2*	*HIGH*	*8*
VR36 - Farmstead	1.80	Mod	2	Mod	2	Mod	2	MODERATE	6
VR38 - Farmstead	3.27	Low	1	Mod	2	Low	1	LOW	4
VR44 - Farmstead	4.65	Low	1	High	3	Mod	2	MODERATE	6
VR45 - Farmstead	4.66	Low	1	High	3	Low	1	MODERATE	5

**Farmstead is located within the 300m power line assessment corridor*

Neither of the two sensitive receptors identified within 5km of the power line assessment corridors would experience high levels of visual impact as a result of the proposed 132kV power line associated with the Koup 1 WEF development. These receptors are however expected to experience moderate levels of visual impact as a result of the power line development.

Two (2) of the potentially sensitive receptor locations are expected to experience high levels of visual impact as a result of the proposed power line. The high sensitivity rating relates largely to the fact that these receptors are located in in close proximity to the proposed power line route alignments. Both of these receptors are in fact also located close to existing 400kV power lines and this factor is expected to reduce the level of visual impact resulting from new power lines. Furthermore, neither of these receptors are tourism-related facilities and as such they are not considered to be Sensitive Receptors. Thus the high impact rating assigned will not affect the overall impact ratings determined in **Section 8.5.**

Nine (9) potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed power line, while the remaining two (2) would be subjected to low levels of visual impact.

As stated above, the N12 national route could be considered as a potentially sensitive receptor road and elements of both the WEF and the 132kV power line developments are expected to be visible to motorists travelling along this route. The degree of visibility is restricted to some extent along certain sections of the road by the topography and the likely visual impacts of the proposed development would depend on the location of the different elements on the site.

In light of this, visual impacts affecting the N12 are rated as moderate.

8.3 Photomontages

Photomontages (visual simulations) have been compiled to provide an indication of how the proposed Koup 1 WEF development would appear from selected view points within the visual assessment area (**Figure** 35). Photomontages for these locations were compiled by superimposing a 3 Dimensional model of the Koup 1 WEF turbine layout landscape onto photographs taken during the site visit.

Limitations associated with this exercise are outlined below.

- Access to areas off the main roads was restricted and as such, only a limited number of suitable viewpoints were photographed.
- Photomontages are specific to each location, and even sites in close proximity to one another may be affected in different ways by the proposed WEF development.
- The photomontages represent a visual environment that assumes that all vegetation cleared during construction will be restored to its current state after the construction phase. This is however an improbable scenario as some vegetation cover may be permanently removed which may reduce the accuracy of the models generated.
- Infrastructure associated with the WEF has not been included in the models.
- These photomontages have been provided merely as indicative illustrations and should not be seen as an accurate representation of the proposed Koup 1 WEF turbine layout.

However, the resulting photomontages are still considered relevant as they illustrate how views from each selected viewpoint could potentially be transformed by the proposed WEF development if the wind turbines are erected within the project area as proposed.

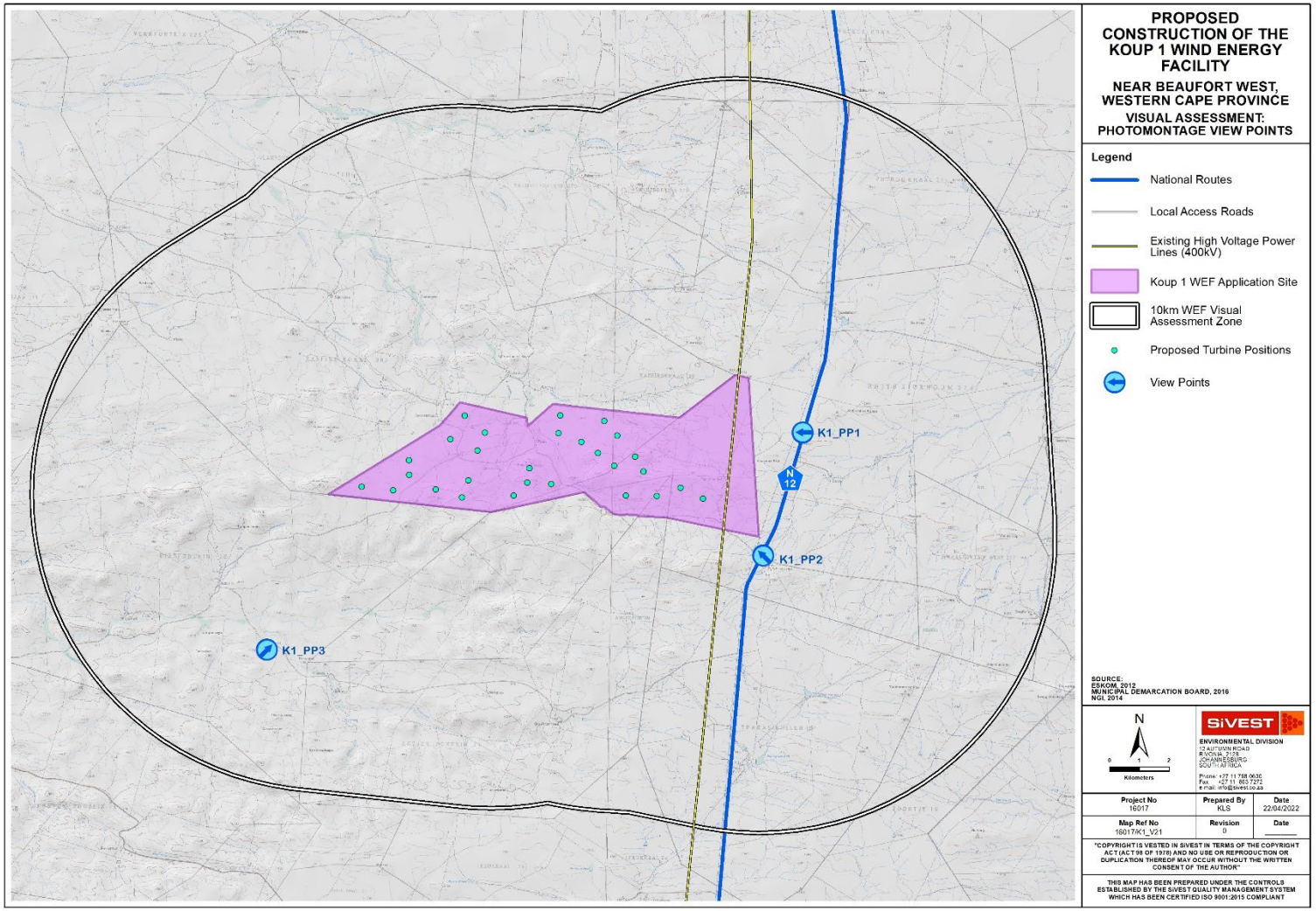


Figure 35: Photomontage viewpoints for the Koup 1 WEF layout

8.3.1 Viewpoint K1_PP1

This viewpoint is located on the N12, some 5.7 km from the nearest turbine placement in the view and is thus in a zone of moderate visual impact.

Figure 36: View west from Viewpoint K1_PP1 - Pre-Construction

Figure 37: View west from Viewpoint K1_PP1 - Post-Construction

8.3.2 Viewpoint K1_PP2

This viewpoint is located on the access road to the Silwerkaroo Guest House, close to the N12 and is some 3 km from the nearest turbine placement in the view and is thus in a zone of moderate visual impact.

Figure 38: View west from Viewpoint K1_PP2 - Pre-Construction

Figure 39: View west from Viewpoint K1_PP2 - Post-Construction

8.3.3 Viewpoint K1_PP3

This viewpoint is located to the south-west of Koup 1 WEF and is some 6.5 km from the nearest turbine placement in the view and is thus in a zone of low visual impact.

Figure 40: View north-east from Viewpoint K1_PP3 - Pre-Construction

Figure 41: View west from Viewpoint K1_PP3 - Post-Construction

8.4 Night-time Impacts

The visual impact of lighting on the nightscape is largely dependent on the existing lighting present in the surrounding area at night. The night scene in areas where there are numerous light sources will be visually degraded by the existing light pollution and therefore additional light sources are unlikely to have a significant impact on the nightscape. In contrast, introducing new light sources into a relatively dark night sky will impact on the visual quality of the area at night. It is thus important to identify a night-time visual baseline before exploring the potential visual impact of the proposed wind farm at night.

Much of the study area is characterised by natural areas with pastoral elements and low densities of human settlement. As a result, relatively few light sources are present in the broader area surrounding the proposed development site. The closest built-up area is the town of Beaufort West which is situated approximately 55km north of the application site and is thus too far away to have significant impacts on the night scene. At night, the general study area is therefore characterised by a picturesque dark starry sky and the visual character of the night environment across the broader area is largely 'unpolluted' and pristine. Sources of light in the area are limited to isolated lighting from surrounding farmsteads and transient light from the passing cars travelling along the N12 national route.

Given the scale of the proposed WEF, the operational and security lighting required for the proposed project is likely to intrude on the nightscape and create glare, which will contrast with the extremely dark backdrop of the surrounding area. In addition, red hazard lights placed on top of the turbines may be particularly noticeable as their colour will differ from the few lights typically found within the environment and the flashing will draw attention to them

Power lines and associated towers or pylons are not generally lit up at night and, thus light spill associated with the proposed grid connection infrastructure is only likely to emanate from the proposed on-site substation. Lighting from this facility is therefore expected to intrude on the nightscape to some degree. It should however be noted that the grid connection infrastructure will only be constructed if the proposed WEF is developed and thus the lighting impacts from the proposed substation would be subsumed by the glare and contrast of the lights associated with the WEF. As such, the grid connection infrastructure is not expected to result in significant lighting impacts.

8.5 Cumulative Impacts

Although it is important to assess the visual impacts of the proposed Koup 1 WEF and grid connection infrastructure specifically, it is equally important to assess the cumulative visual impact that could materialise if other renewable energy facilities (both wind and solar facilities) and associated infrastructure projects are developed in the broader area. Cumulative impacts occur where existing or planned developments, in conjunction with the proposed development, result in significant incremental changes in the broader study area. In this instance, such

developments would include renewable energy facilities and associated infrastructure development.

Renewable energy facilities have the potential to cause large scale visual impacts and the location of several such developments in close proximity to each other could significantly alter the sense of place and visual character in the broader region. Although power lines and substations are relatively small developments when compared to renewable energy facilities, they may still introduce a more industrial character into the landscape, thus altering the sense of place.

Eight renewable energy projects were identified within a 35 km radius of the proposed Koup 1 WEF and grid connection infrastructure (**Figure 35**). These projects, as listed in **Table 7** below, were identified using the DFFE's Renewable Energy EIA Application Database for SA in conjunction with information provided by Independent Power Producers operating in the broader region. It is assumed that all of these renewable energy developments include grid connection infrastructure, although details of this infrastructure were not available for all of the identified developments at the time of writing this report.

The number of renewable energy facilities within the surrounding area and their potential for large scale visual impacts could significantly alter the sense of place and visual character in the broader region, as well as exacerbate the visual impacts on surrounding visual receptors, once constructed.

Table 7: 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 and associated grid connection infrastructure	12/12/20/1784/1	Wind	140MW	Approved
Proposed Trakas Wind Farm and associated grid connection infrastructure	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 and associated grid connection infrastructure	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

As can be seen from this table, two (2) of these projects are Solar Energy facilities (SEFs), and the remaining six (6) projects are WEFs. Although SEFs are expected to have different impacts

when compared to WEF projects, these renewable energy developments are however relevant as they influence the cumulative visual impact of the proposed development.

The two SEFs, namely the proposed Leeu Gamka Solar Power Plant and the proposed SEF facility on the Farm Lombardskraal No 330 are located more than 20kms from the application site and in close proximity to the N1 and N12 National Routes respectively. Given the distance from the study area and the concentration of these facilities in close proximity to existing built infrastructure, it is not anticipated that these developments will result in any significant cumulative impacts affecting the landscape or the visual receptors within the assessment zone for the Koup 1 WEF project and associated grid connection infrastructure. It is noted that although the DFFE database reflects that EIAs for both these SEF projects have been "in process" for at least seven years, investigations have not found any information pertaining to either project.

The six (6) WEFs, namely Beaufort West WEF, Trakas WEF, Kwagga WEFs 1, 2 and 3 and Koup 2 WEF are all located in relatively close proximity to Koup 1 WEF. Beaufort West and Trakas WEFs are approximately 2kms and 6km south of Koup 1 respectively, while the three Kwagga WEFs are between 5km and 23km east of the Koup 1 WEF site. Koup 2 WEF, which lies on the western boundary of the Koup 1 WEF site, is the subject of a separate EIA process which is currently being undertaken in parallel to this EIA for the proposed Koup 1 WEF.

These proposed WEFs, in conjunction with the associated grid connection infrastructure, will inevitably introduce an increasingly industrial character into a largely natural, pastoral landscape, thus giving rise to significant cumulative impacts.

A cursory examination of the literature available for the environmental assessments undertaken for the proposed WEFs showed that the visual impacts identified and the recommendations and mitigation measures provided are largely consistent with those identified in this report. Where additional mitigation measures were provided in respect of the other renewable energy applications, these have been incorporated into this report where relevant.

From a visual perspective, the further concentration of renewable energy facilities as proposed will inevitably change the visual character of the area and alter the inherent sense of place, introducing an increasingly industrial character into the broader area, and resulting in significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures put forward by the visual specialists in their respective reports. In addition, it is possible that these developments in close proximity to each other could be seen as one large WEF rather than several separate developments. Although this will not necessarily reduce impacts on the visual character of the area, it could potentially reduce the cumulative impacts on the landscape.

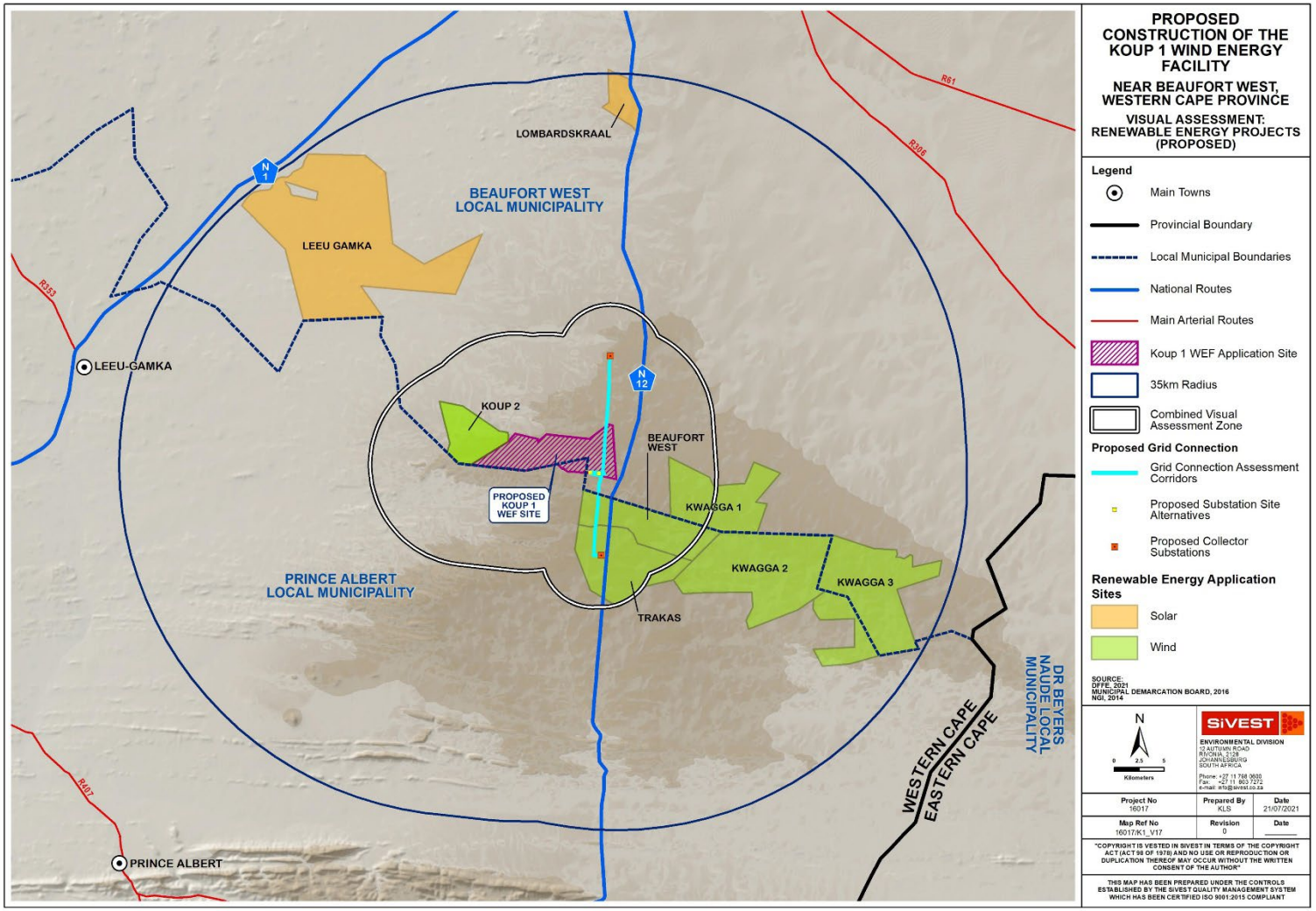


Figure 42: Renewable energy facilities proposed within a 35km radius of the Koup 1 WEF application sites.

8.6 Overall Visual Impact Rating

The EIA Regulations, 2014 (as amended) require that an overall rating for visual impact be provided to allow the visual impact to be assessed alongside other environmental parameters. The tables below present the impact matrix for visual impacts associated with the proposed construction and operation of the Koup 1 WEF and the associated grid connection infrastructure. Preliminary mitigation measures have been determined based on best practice and literature reviews.

Please refer to **Appendix C** for an explanation of the impact rating methodology.

8.6.1 Koup 1 WEF Project

KOUP 1 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 (+ OR -)**	**S**		**E**	**P**	**R**	**L**	**D**	**I / M**	**TOTAL**	**STATUS (+ OR -)**	**S**
Construction Phase																				
▪ Potential alteration of the visual character and sense of place ▪ Potential visual impact on receptors in the study area	▪ Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction. ▪ Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. ▪ Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	2	3	1	2	1	2	18	-	Low	▪ Carefully plan to mimimise the construction period and avoid construction delays. ▪ Inform receptors within 1km of the WEF development area of the construction programme and schedules. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Vegetation clearing should take place in a phased manner. ▪ Maintain a neat construction site by removing rubble and waste materials regularly. ▪ Position storage / stockpile areas in unobtrusive positions in the landscape, where possible. ▪ Where possible, underground cabling should be utilised. ▪ Make use of existing gravel access roads where possible. ▪ Limit the number of vehicles and trucks travelling to and from the construction site, where possible. ▪ Ensure that dust suppression techniques are implemented: ▪ on all access roads; ▪ in all areas where vegetation clearing has taken place; ▪ on all soil stockpiles.	2	2	1	2	1	2	16	-	Low

Operational Phase																				
▪ Potential alteration of the visual character and sense of place. ▪ Potential visual impact on receptors in the study area. ▪ Potential visual impact on the night time visual environment.	▪ The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ The proposed WEF and associated infrastructure will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts. ▪ Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. ▪ The night time visual environment will be altered as a result of operational and security lighting at the proposed WEF.	2	3	3	3	3	2	28	-	Medium	<u>*Design Phase*</u> ▪ Ensure that wind turbines are not located within 1km of any farmhouses in order to minimise visual impacts on these dwellings. ▪ Where possible, fewer but larger turbines with a greater output should be utilised rather than a larger number of smaller turbines with a lower capacity. ▪ Where possible, the operation and maintenance buildings and laydown areas should be consolidated to reduce visual clutter. ▪ Where possible, underground cabling should be utilised. <u>*Operational Phase*</u> ▪ Turbine colours should adhere to CAA requirements. Bright colours and logos on the turbines should be kept to a minimum. ▪ Inoperative turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work) (Vissering, 2011). ▪ If turbines need to be replaced for any reason, they should be replaced with the same model, or one of equal height and scale to lessen the visual impact. ▪ As far as possible, limit the number of maintenance vehicles which are allowed to access the site. ▪ Ensure that dust suppression techniques are implemented on all gravel access roads. ▪ As far as possible, limit the amount of security and operational lighting present on site. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Lighting fixtures should make use of minimum lumen or wattage. ▪ Mounting heights of lighting fixtures should be limited, or	2	3	3	2	2	2	24	-	Medium

											alternatively foot-light or bollard level lights should be used. ▪ If possible, make use of motion detectors on security lighting. ▪ Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter. ▪ The operations and maintenance (O&M) buildings should not be illuminated at night. ▪ The O&M buildings should be painted in natural tones that fit with the surrounding environment.									
Decommissioning Phase																				
▪ Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process; ▪ Potential visual impacts of increased dust emissions from decommissioning activities and related traffic; and ▪ Potential visual intrusion of any remaining infrastructure on the site.	▪ Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts. ▪ Decommissioning activities may be perceived as an unwelcome visual intrusion. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during decommissioning would expose bare soil (scarring) which could visually contrast with the surrounding environment. ▪ Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	2	3	1	2	1	2	18	-	Low	▪ All infrastructure that is not required for post-decommissioning use should be removed. ▪ Carefully plan to minimize the decommissioning period and avoid delays. ▪ Maintain a neat decommissioning site by removing rubble and waste materials regularly. ▪ Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. ▪ All cleared areas should be rehabilitated as soon as possible. ▪ Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.	2	2	1	2	1	2	16	-	Low
Cumulative																				
▪ Potential alteration of the visual character and sense of place in the broader area. ▪ Potential visual impact on receptors in the study area. ▪ Potential visual impact on the night time visual environment.	▪ Additional renewable energy developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. ▪ Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings. ▪ Additional renewable energy facilities in the area would generate additional	3	3	2	3	3	2	28	-	Medium	▪ Carefully plan to minimise the construction period and avoid construction delays. ▪ Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.	3	3	2	2	2	2	24	-	Medium

	traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. ▪ The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.									▪ Vegetation clearing should take place in a phased manner. ▪ Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter. ▪ As far as possible, limit the number of maintenance vehicles which are allowed to access the facility. ▪ Ensure that dust suppression techniques are implemented on all gravel access roads. ▪ As far as possible, limit the amount of security and operational lighting present on site. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Lighting fixtures should make use of minimum lumen or wattage. ▪ Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used. ▪ If possible, make use of motion detectors on security lighting. ▪ The operations and maintenance (O&M) buildings should not be illuminated at night. ▪ The O&M buildings should be painted in natural tones that fit with the surrounding environment.									

8.6.2 Koup 1 Grid Connection Infrastructure

KOUP 1 GRID CONNECTION 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**

Construction Phase																				
▪ Potential alteration of the visual character and sense of place. ▪ Potential visual impact on receptors in the study area	▪ Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction. ▪ Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ Dust emissions and dust plumes from increased traffic on gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. ▪ Vegetation clearance required for the construction of the proposed substation is expected to increase dust emissions and alter the natural character of the surrounding area, thus creating a visual impact. ▪ Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	2	3	1	2	1	2	18	-	Low	▪ Carefully plan to mimimise the construction period and avoid construction delays. ▪ Inform receptors within 500m of the proposed power line servitude of the construction programme and schedules. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Maintain a neat construction site by removing rubble and waste materials regularly. ▪ Position storage / stockpile areas in unobtrusive positions in the landscape, where possible. ▪ Make use of existing gravel access roads where possible. ▪ Limit the number of vehicles and trucks travelling to and from the construction site, where possible. ▪ Unless there are water shortages, ensure that dust suppression techniques are implemented: ▪ on all access roads; ▪ in all areas where vegetation clearing has taken place; ▪ on all soil stockpiles.	2	2	1	1	1	2	14	-	Low
Operational Phase																				
▪ Potential alteration of the visual character and sense of place. ▪ Potential visual impact on receptors in the study area.	▪ The proposed power line and substation could alter the visual character of the surrounding area and expose sensitive visual receptor locations to visual impacts. ▪ The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. ▪ The night time visual environment could be altered as a result of operational and security lighting at the proposed substation.	2	4	2	2	3	1	13	-	Low	▪ Where possible, limit the number of maintenance vehicles using access roads. ▪ Where possible, limit the amount of security and operational lighting present at the on-site substation. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Buildings on the substation site should be painted with natural tones that fit with the surrounding environment. ▪ Non-reflective surfaces should be utilised where possible.	2	4	2	2	3	1	13		Low

Decommissioning Phase																				
▪ Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process; ▪ Potential visual impacts of increased dust emissions from decommissioning activities and related traffic; and ▪ Potential visual intrusion of any remaining infrastructure on the site.	▪ Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts. ▪ Decommissioning activities may be perceived as an unwelcome visual intrusion. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. ▪ Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	2	3	1	2	1	2	18	-	Low	▪ All infrastructure that is not required for post-decommissioning use should be removed. ▪ Carefully plan to minimize the decommissioning period and avoid delays. ▪ Maintain a neat decommissioning site by removing rubble and waste materials regularly. ▪ Position storage / stockpile areas in unobtrusive positions in the landscape, where possible. ▪ Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. ▪ All cleared areas should be rehabilitated as soon as possible. ▪ Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.	2	2	1	2	1	2	16	-	Low
Cumulative																				
▪ Potential alteration of the visual character and sense of place in the broader area. ▪ Potential visual impact on receptors in the study area. ▪ Potential impact on the night time visual environment.	▪ Additional renewable energy and associated infrastructure developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. ▪ Visual intrusion of multiple renewable energy and infrastructure developments may be exacerbated, particularly in more natural undisturbed settings. ▪ Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. ▪ The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.	3	3	2	3	3	2	28	-	Medium	▪ Where possible, limit the number of maintenance vehicles using access roads. ▪ Non-reflective surfaces should be utilised where possible. ▪ Where possible, limit the amount of security and operational lighting present at the on-site substation. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill.	3	3	2	2	2	2	24	-	Medium

9 COMPARATIVE ASSESSMENT OF ALTERNATIVES

The layout alternatives for the proposed Koup 1 Substation and BESS site and the construction laydown and O&M area, as shown in **Figure 6,** are comparatively assessed in **Table 8** below.

As previously stated, three (3) grid connection infrastructure alternatives (**Figure 7**) have been provided to serve the proposed Koup 1 WEF project. These alternatives are comparatively assessed in **Table 8** below.

The aim of the comparative assessment is to determine which of the alternatives would be preferred from a visual perspective. Preference ratings for each alternative are provided in the tables below. The alternatives are rated as preferred; favourable, least-preferred or no-preference.

The degree of visual impact and the preference rating has been determined based on the following factors:

- The location of each alternative in relation to areas of high elevation, especially ridges, koppies or hills;
- The location of each alternative in relation to sensitive visual receptor locations; and
- The location of each alternative in relation to areas of natural vegetation (clearing site for the development increases the visibility).

Key

PREFERRED	The alternative will result in a low impact / reduce the impact
FAVOURABLE	The impact will be relatively insignificant
LEAST PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

9.1 WEF Infrastructure

Table 8: Comparative Assessment of Alternatives: WEF Infrastructure

Alternative	Preference	Reasons (incl. potential issues)
SUBSTATION AND BESS SITE		
Substation and BESS Site Option 1	Favourable	▪ Option 1 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest sensitive receptor to this alternative is approximately 1.3km away, this being the north-eastern boundary of Roam Safari Lodge. The visual impacts from Option

Alternative	Preference	Reasons (incl. potential issues)
		1 affecting this receptor are therefore rated as moderate. ▪ A second sensitive receptor is located approximately 2.5kms away, this being SR3. The visual impacts from Option 1 affecting this receptor are therefore rated as low. Visual impacts affecting SR3 are however likely to be reduced by the presence of the N12 and existing 400kV power lines located between the receptor and the proposed substation site. ▪ The closest potentially sensitive receptor to this alternative is approximately 1.5km away, this being VR25. The visual impacts from Option 1 affecting this receptor are therefore rated as moderate, although impacts are likely to be reduced by the proximity of the 400kV power lines to this receptor. The remaining receptors are all more than 4kms away and would only be subjected to low or negligible levels of impact. ▪ The N12 receptor road is more than 2kms from this site alternative, and as such visual impacts affecting motorists using this route would be rated as low. These impacts are however likely to be reduced by the presence of 400kV power lines located between the receptor and the proposed substation site. ▪ In light of the above, there are no fatal flaws associated with Option 1 and this alternative is considered favourable from a visual perspective.
Substation and BESS Site Option 2	Favourable	▪ Option 2 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest sensitive receptor to this alternative is approximately 450m away, this being the north-eastern boundary of Roam Safari Lodge. The visual impacts from Option 1 affecting this receptor are therefore rated as high, although it is not known whether this section of the Lodge property is extensively utilised for tourism or leisure activities. ▪ A second sensitive receptor is located approximately 3.3kms away, this being SR3. The visual impacts from Option 2 affecting this receptor are therefore rated as low. Visual impacts affecting SR3 are likely to be

Alternative	Preference	Reasons (incl. potential issues)
		reduced by the presence of the N12 and existing 400kV power lines located between the receptor and the proposed substation site. ▪ The closest potentially sensitive receptor to this alternative is approximately 1.9km away, this being VR25. The visual impacts from Option 2 affecting this receptor are therefore rated as moderate, although impacts are likely to be reduced by the proximity of the 400kV power lines to this receptor. The remaining receptors are all more than 5kms away and would only be subjected to negligible levels of impact.. ▪ The N12 receptor road is more than 2.9kms from this site alternative, and as such visual impacts affecting motorists using this route would be rated as low. These impacts are however likely to be reduced by the presence of 400kV power lines located between the receptor and the proposed substation site. ▪ In light of the above, there are no fatal flaws associated with Option 2 and this alternative is considered favourable from a visual perspective.
CONSTRUCTION LAYDOWN AND O&M AREAS		
Construction Laydown and O&M Area Option 1	Favourable	▪ Option 1 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest sensitive receptor to this alternative is approximately 1.3km away, this being the north-eastern boundary of Roam Safari Lodge. The visual impacts from Option 1 affecting this receptor are therefore rated as moderate. ▪ A second sensitive receptor is located approximately 2.5kms away, this being SR3. The visual impacts from Option 1 affecting this receptor are therefore rated as low. Visual impacts affecting SR3 are however likely to be reduced by the presence of the N12 and existing 400kV power lines located between the receptor and the proposed substation site. ▪ The closest potentially sensitive receptor to this alternative is approximately 1.6km away, this being VR25. The visual impacts from Option 1 affecting this receptor are therefore

Alternative	Preference	Reasons (incl. potential issues)
		rated as moderate, although impacts are likely to be reduced by the proximity of the 400kV power lines to this receptor. The remaining receptors are all more than 4kms away and would only be subjected to low or negligible levels of impact. ▪ The N12 receptor road is more than 2kms from this site alternative, and as such visual impacts affecting motorists using this route would be rated as low. These impacts are however likely to be reduced by the presence of 400kV power lines located between the receptor and the proposed laydown area. ▪ In light of the above, there are no fatal flaws associated with Option 1 and this alternative is considered favourable from a visual perspective.
Construction Laydown and O&M Area Option 2	Favourable	▪ Option 2 is located on relatively flat terrain and as such would only be moderately exposed on the skyline. ▪ The closest sensitive receptor to this alternative is approximately 350m away, this being the north-eastern boundary of Roam Safari Lodge. The visual impacts from Option 1 affecting this receptor are therefore rated as high, although it is not known whether this section of the Lodge property is extensively utilised for tourism or leisure activities. ▪ A second sensitive receptor is located approximately 3.3kms away, this being SR3. The visual impacts from Option 2 affecting this receptor are therefore rated as low. Visual impacts affecting SR3 are likely to be reduced by the presence of the N12 and existing 400kV power lines located between the receptor and the proposed substation site. ▪ The closest potentially sensitive receptor to this alternative is approximately 1.9km away, this being VR25. The visual impacts from Option 2 affecting this receptor are therefore rated as moderate, although impacts are likely to be reduced by the proximity of the 400kV power lines to this receptor. The remaining receptors are all more than 5kms away and would only be subjected to negligible levels of impact.

Alternative	Preference	Reasons (incl. potential issues)
		▪ The N12 receptor road is more than 2.9kms from this site alternative, and as such visual impacts affecting motorists using this route would be rated as low. These impacts are however likely to be reduced by the presence of 400kV power lines located between the receptor and the proposed substation site. ▪ In light of the above, there are no fatal flaws associated with Option 2 and this alternative is considered favourable from a visual perspective.

9.2 Grid Connection Infrastructure

Alternative	Preference	Reasons (incl. potential issues)
Power Line Corridor Option 1	Preferred	▪ Corridor Option 1 is 1.3km in length and is entirely within the Koup 1 WEF development site. Hence impacts from the power line would be minimal when compared with the impacts associated with the wind turbines. ▪ This corridor option is located on relatively flat terrain and does not traverse any ridges. As such the power lines would only be moderately exposed on the skyline. ▪ The closest sensitive receptor to this alternative is approximately 450m away, this being the north-eastern boundary of Roam Safari Lodge. The visual impacts from Option 1 affecting this receptor is therefore rated as high, although it is not known whether this section of the Lodge property is extensively utilised for tourism or leisure activities. ▪ A second sensitive receptor is located approximately 2.1kms away, this being SR3. The visual impacts from Corridor Option 1 affecting this receptor are therefore rated as low. Visual impacts affecting SR3 are likely to be reduced by the presence of the N12 and existing 400kV power lines located between the receptor and Corridor Option 1. ▪ The closest potentially sensitive receptor to this alternative is approximately 1.3kms away, this being VR25. The visual impacts from Corridor Option 1 affecting this receptor are therefore rated as moderate. The remaining receptors are all more than 4kms

Alternative	Preference	Reasons (incl. potential issues)
		away and would only be subjected to low or negligible levels of impact. ▪ The N12 receptor road is approximately 1.5km from this corridor alternative at its closest point, and as such visual impacts affecting motorists using this route would be rated as moderate. These impacts are however likely to be reduced by the presence of 400kV power lines located between the road and the power line assessment corridor. ▪ In light of the above, there are no fatal flaws associated with Corridor Option 1 and this alternative is considered preferred from a visual perspective.
Power Line Corridor Option 2	Favourable	▪ Corridor Option 2 is 9.9km in length with only a short section (1.3km) of that length being within the Koup 1 WEF development site. ▪ This corridor option traverses a prominent ridge just to the south of the Koup 1 WEF development site, and as such the power lines would be exposed on the skyline. ▪ Most of power line Corridor Option 2 runs adjacent to existing 400kV power lines and as such this section of the route alignment has already undergone a degree of transformation from its natural state. This would lessen the impacts of the new power line in this area. ▪ The closest sensitive receptor to this alternative is approximately 450m away, this being the north-eastern boundary of Roam Safari Lodge. The significance of the visual impacts from Option 1 affecting this receptor is therefore rated as high, although it is not known whether this section of the Lodge property is extensively utilised for tourism or leisure activities. ▪ A second sensitive receptor is located approximately 2.1kms away, this being SR3. The visual impacts from Corridor Option 1 affecting this receptor are therefore rated as low. Visual impacts affecting SR3 are likely to be reduced by the presence of the N12 and existing 400kV power lines located between the receptor and Corridor Option 2. ▪ The closest potentially sensitive receptor to this alternative is approximately 1.3kms away, this being VR25. The visual impacts

Alternative	Preference	Reasons (incl. potential issues)
		from Corridor Option 2 affecting this receptor are therefore rated as moderate. Two receptors at the southern end of the corridor are 900m and 1.4km from the corridor although visual impacts affecting these receptors are likely to be reduced by the presence of the N12 and existing 400kV power lines located between the receptors and the Corridor. The remaining receptors are all more than 2.4kms away and would only be subjected to low or negligible levels of impact. ▪ The N12 receptor road is approximately 1km from this corridor alternative at its closest point, and as such visual impacts affecting motorists using this route would be rated as moderate. These impacts are however likely to be reduced by the presence of 400kV power lines located between the road and the power line assessment corridor. ▪ In light of the above, there are no fatal flaws associated with Corridor Option 2 and this alternative is considered favourable from a visual perspective.
Power Line Corridor Option 3	Favourable	▪ Corridor Option 3 is 12.9km in length with only a short section (1.3km) of that length being within the Koup 1 WEF development site. ▪ This corridor option does not traverse any prominent ridges and as such the power lines would only be moderately exposed on the skyline. ▪ Most of power line Corridor Option 3 runs adjacent to existing 400kV power lines and as such this section of the route alignment has already undergone a degree of transformation from its natural state. This would lessen the impacts of the new power line in this area. ▪ The closest sensitive receptor to this alternative is approximately 450m away, this being the north-eastern boundary of Roam Safari Lodge. The visual impacts from Corridor Option 3 affecting this receptor are therefore rated as high, although it is not known whether this section of the Lodge property is extensively utilised for tourism or leisure activities.

Alternative	Preference	Reasons (incl. potential issues)
		▪ A second sensitive receptor is located approximately 2.1kms away, this being SR3. The visual impacts from Corridor Option 3 affecting this receptor are therefore rated as low. Visual impacts affecting SR3 are likely to be reduced by the presence of the N12 and existing 400kV power lines located between the receptor and Corridor Option 1. ▪ The closest potentially sensitive receptor to this alternative is VR34 which lies just inside the assessment corridor. The visual impacts from Corridor Option 3 affecting this receptor are therefore rated as high. The remaining receptors are all more than 1.8kms away and would only be subjected to moderate or low levels of impact. ▪ The N12 receptor road is approximately 1.7km from this corridor alternative at its closest point, and as such visual impacts affecting motorists using this route would be rated as moderate to low. These impacts are however likely to be reduced by the presence of 400kV power lines located between the road and the power line assessment corridor. ▪ In light of the above, there are no fatal flaws associated with Corridor Option 3 and this alternative is considered favourable from a visual perspective.

9.3 No-Go Alternative

The 'no-go' alternative is the option of not undertaking the proposed project. Hence, if the 'no-go' option is implemented, there would be no development. The area would thus retain its visual character and sense of place and no visual impacts would be experienced by any locally occurring receptors.

10 REVISED LAYOUT

Subsequent to the completion of all specialist studies, the developer has refined the proposed Koup 1 WEF layout in line with the recommendations of the various specialists. The refined layout (received on 08 November 2021) incorporates some minor amendments to the turbine locations and also shows Substation Option 1 and Construction Laydown Area Option 1 as the preferred site alternatives. The layout has been further refined (06 April 2022) to include some minor changes to the road layout. The resultant preferred layout (as per **Figure 43**), as well as the preferred grid connection alternatives (as per **Figure 44**), have been assessed from a visual perspective and it has been concluded that these amendments do not change the findings of this VIA.

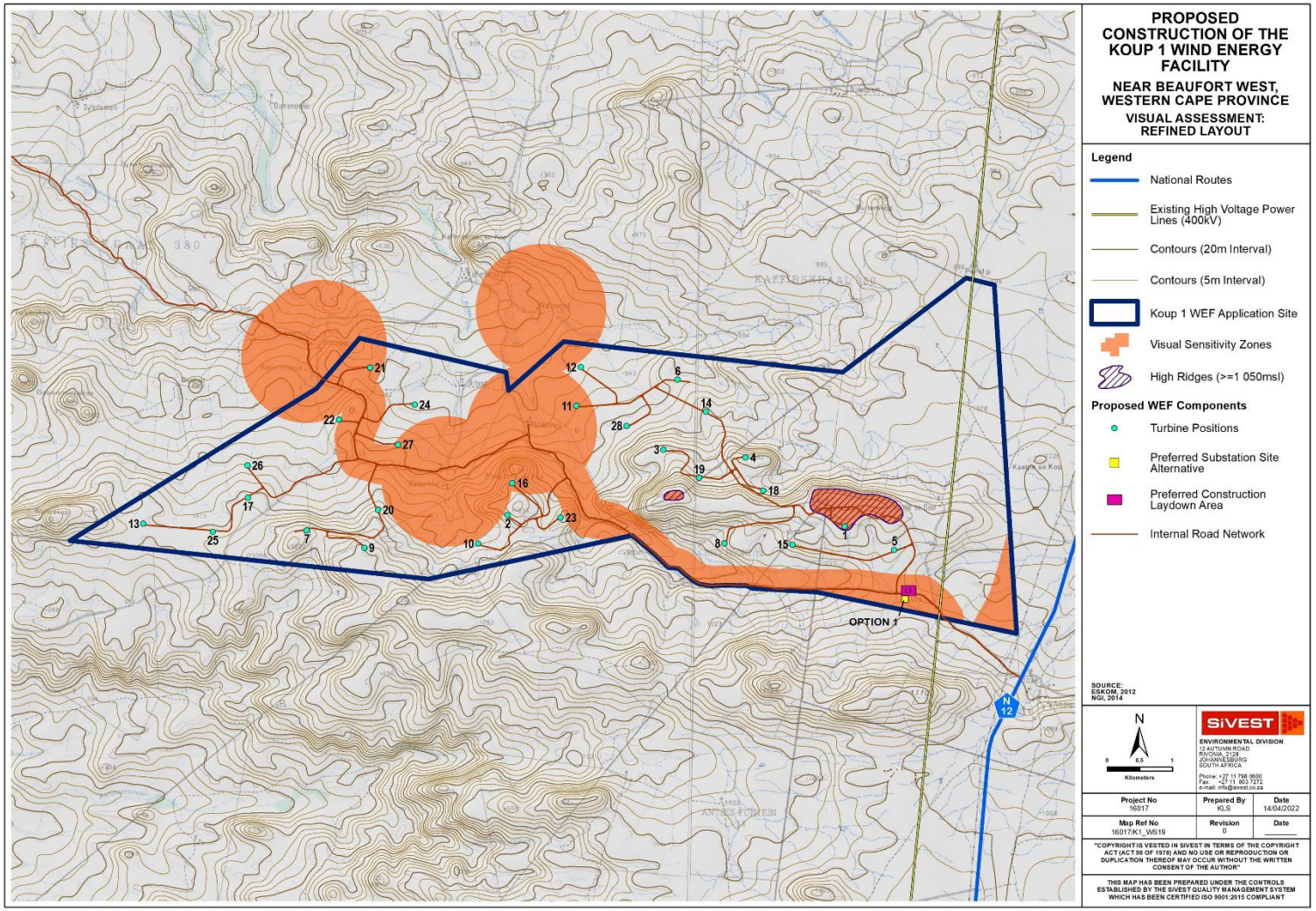


Figure 43: Refined Koup 1 WEF Layout

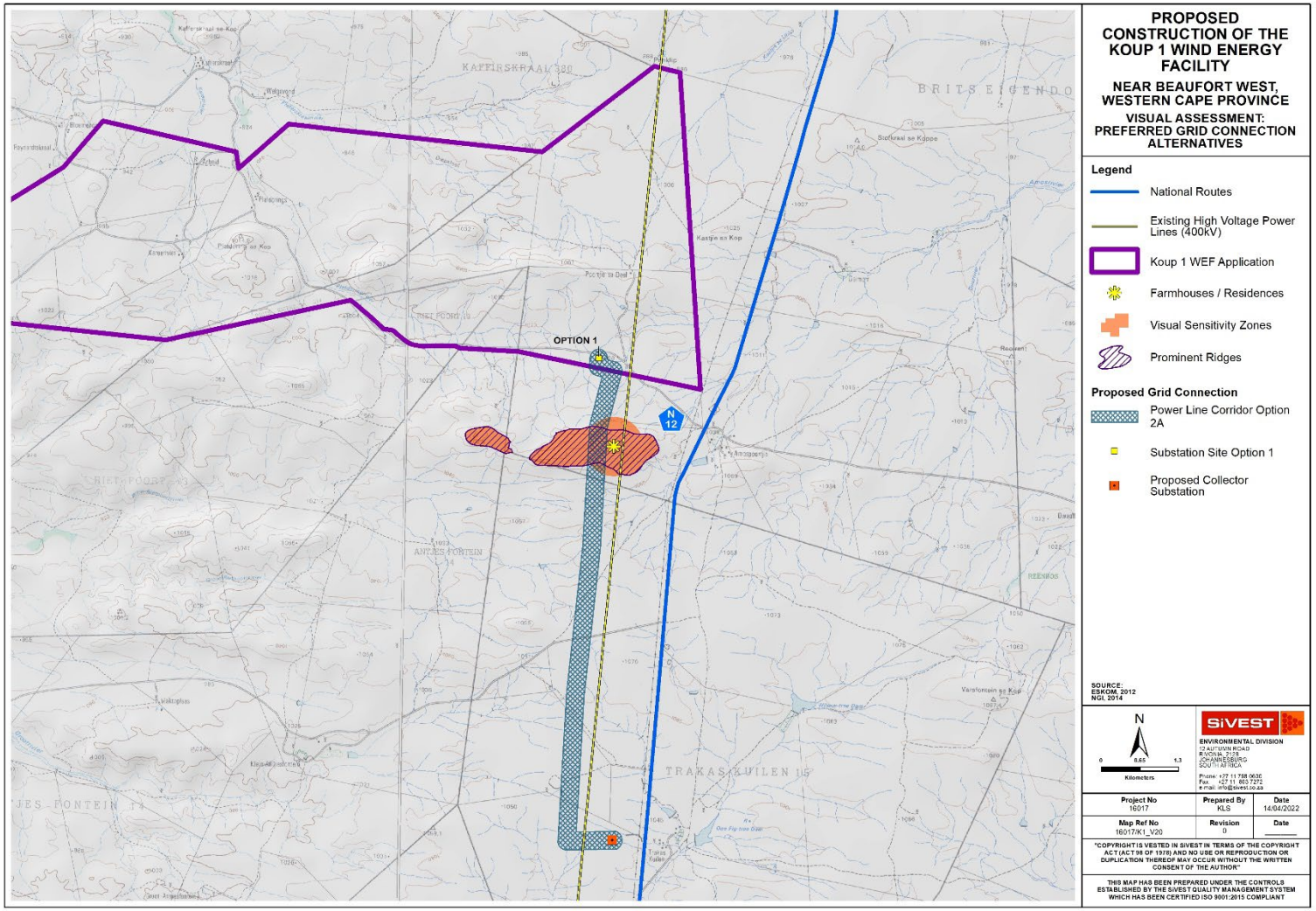


Figure 44: Preferred Grid Connection Alternatives for Koup 1 WEF

11 FEEDBACK FROM PUBLIC PARTICIPATION PROCESS

During the Comment Period for the Scoping Phase of the EIA, two comments received in respect of the avifaunal reports were also found to be relevant to the visual environment.

11.1 Comment 1

"Shadow flicker and blade glint impacts during the operational phase were categorised as social aspects in section 12.3.3 of the DSR. These impacts could possibly also affect animal breeding grounds or migration paths and ***could also be applicable as visual aspects*** *to both humans and animals. The distance of influence of the mentioned impacts should also be indicated."*

Shadow flicker is considered in Section 7.1.1 wherein it states that *"the impact of shadow flicker can be effectively mitigated by choosing the correct site and layout for the wind turbines, taking into consideration the orientation of the turbines relative to the nearby houses and the latitude of the site. Hence appropriate development restriction zones around residences will reduce the adverse effects of shadow flicker, while tall structures and trees will also obstruct shadows and prevent the effect of shadow flicker from impacting on surrounding residents."*

Shadow flicker is also taken into account in the site sensitivity assessment undertaken to inform the site layout for the WEF (Section 6.3). Accordingly, a 1km visual sensitivity zone has been delineated around the existing residences on the application site and also around the two receptors located within 1km of the site boundary. This 1km buffer is in accordance with the flicker-sensitive buffers applied in the DFFE Screening Tool. In addition, it is recommended that the following visual sensitivity zones are applied to main roads on or near the application site:

- N12 national route: 1km
- Main access roads on the site: 300m

The limiting of turbine development from these zones would reduce the direct impact of the turbines on the occupants of the farmsteads and on passing motorists, especially those impacts related to shadow flicker.

Blade glint, which results from the reflection of the sun from rotating turbine blades, is not generally a significant factor with current turbine types, provided that the blades are coated with non-reflective material.

11.2 Comment 2

"The potential visual impact will have a high negative significance due to the sparce vegetation, colour and height of these turbines. Photos should be included from strategic viewpoints such as the N12 (only short duration impact), any residential houses, and especially game farms or places where tourists will spend significant amounts of time. The maximum height and proposed position of the turbines should be graphically superimposed on the viewpoint photos.

Ideally, the EIA-phase Visual Impact Assessment should include a contour map of the proposed development site as this is also useful to identify potential sensitive visual receptors.".

Photomontages have been provided in Section 8.3 of this report and contours are shown on the refined layout map (Figure 43) , including views from the N12, will be included in the EIA Phase VIA report together with a contour map of the Koup 1 WEF development site.

12 CONCLUSION

A scoping level visual study was conducted to assess the magnitude and significance of the potential visual impacts associated with the development of the proposed Koup 1 WEF and associated grid connection infrastructure near Beaufort West in the Western Cape Province. Overall, sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. As such, a WEF development with associated grid connection infrastructure would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the broader study area. The level of contrast will however be reduced by the presence of the N12 national route and existing high voltage power lines traversing the study area.

A broad-scale assessment of visual sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a **low to moderate** visual sensitivity. However, an important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs.

The area is not typically valued for its tourism significance and there is limited human habitation resulting in relatively few sensitive or potentially sensitive receptors in the area. A total of forty-six (46) potentially sensitive receptors were identified in the combined study area, three (3) of which are considered to be sensitive receptors as they are linked to leisure/nature-based tourism activities in the area. None of the sensitive receptors are however expected to experience high levels of visual impact from either the proposed WEF facility or the grid connection infrastructure.

The remaining forty three (43) identified receptors are all assumed to be farmsteads which are regarded as potentially sensitive visual receptors as they are located within a mostly rural setting and the proposed development will likely alter natural vistas experienced from these locations. Only seven (7) of these receptors are expected to experience high levels of visual impact as a result of the WEF development. This sensitivity rating relates largely to the fact that these receptors are located in in close proximity to the boundary of the Koup 1 WEF application site and they are in zones of high contrast, with little natural screening present. Two of these receptors, namely VR12 and VR31 are in fact located within the proposed Koup 1 WEF development area and as such, these properties form part of the WEF project. Thus it is

assumed that the owners have a vested interest in the WEF development and would not perceive the development in a negative light. Furthermore, none of these receptors are tourism-related facilities and as such they are not considered to be Sensitive Receptors.

Thirty-two (32) potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed Koup 1 WEF development, while the remaining two (2) receptor locations will be subjected to low levels of visual impact.

Two (2) potentially sensitive receptor locations are expected to experience high levels of visual impact as a result of the proposed power line. The high sensitivity rating relates largely to the fact that these receptors are very close to the proposed power assessment corridors. Both of these receptors are in fact also located close to existing 400kV power lines this factor is expected to reduce the level of visual impact resulting from new power lines. Nine (9) potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed power line, while the remaining two (2) would be subjected to low levels of visual impact.

Although the N12 receptor road traverses the study area, motorists travelling along this route are only expected to experience moderate impacts from the proposed Koup 1 WEF and from the grid connection infrastructure associated with the project.

An overall impact rating was also conducted as part of the scoping phase in order to allow the visual impact to be assessed alongside other environmental parameters. The assessment revealed that impacts associated with the proposed Koup 1 WEF and associated grid connection infrastructure will be of low significance during both construction and decommissioning phases. During operation, visual impacts from the WEF would be of medium significance with relatively few mitigation measures available to reduce the visual impact. Visual impacts associated with the grid connection infrastructure during operation would be of low significance.

Although other proposed renewable energy developments and infrastructure projects were identified within a 35km radius of the Koup 1 WEF project, it was determined that six (6) of these would have any significant impact on the landscape within the visual assessment zone, namely Beaufort West WEF, Trakas WEF, Kwagga 1, 2 and 3 WEFs and Koup 2 WEF. These proposed WEFs, in conjunction with the associated grid connection infrastructure, will inevitably introduce an increasingly industrial character into a largely natural, pastoral landscape, thus giving rise to significant cumulative impacts.

It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists. In light of this and the relatively low level of human habitation in the study area however, cumulative impacts have been rated as medium.

A comparative assessment of site alternatives for the on-site WEF infrastructure and also for the grid connection alternatives was undertaken in order to determine which of the alternatives

would be preferred from a visual perspective. No fatal flaws were identified in respect of any of the alternatives for the proposed on-site substation / BESS facilities or for the construction laydown and O&M areas and all alternatives were found to be favourable.

No fatal flaws were identified for any of the grid connection infrastructure alternatives. Power Line Corridor Option 1 was identified as the Preferred Alternative, while Power Line Corridor Options 2 and 3 were found to be favourable.

12.1 Visual Impact Statement

It is SiVEST's opinion that the potential visual impacts associated with the proposed Koup 1 WEF and associated grid infrastructure development are negative and of moderate significance. Given the low level of human habitation and the absence of sensitive receptors however, the project is deemed acceptable from a visual perspective and the EA should be granted. SiVEST is of the opinion that the impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

13 REFERENCES

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Appendix A

TERMS OF REFERENCE

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) FOR THE PROPOSED KOUP 1 WIND ENERGY FACILITY AND BASIC ASSESSMENT (BA) FOR ASSOCIATED GRID CONNECTION INFRASTRUCTURE, NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

TERMS OF REFERENCE FOR SPECIALIST STUDIES

1 INTRODUCTION

The purpose of these Terms of Reference is to provide the specialist team with a consistent approach to the specialist studies that are required as part of the Environmental Impact Assessment (EIA) and Basic Assessment (BA) processes being conducted in respect of this Wind Energy Facility (WEF) and associated grid connection infrastructure. This will enable comparison of environmental impacts, efficient review and collation of the specialist studies into the EIA / BA reports, in accordance with the latest requirements of the EIA Regulations, 2014 (as amended).

2 PROCESS

The proposed WEF will be subject to a full Environmental Impact Assessment (EIA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended and EIA Regulations, 2014 (as amended). Accordingly, an EIA process as contemplated in terms of the EIA Regulations (2014, as amended) is being undertaken in respect of the proposed WEF project. The competent authority for this EIA is the national Department of Environment, Forestry and Fisheries (DEFF).

Grid connection infrastructure for the WEF will be subject to a separate Basic Assessment (BA) Process as contemplated in terms of regulation 19 and 20 of the Environmental Impact Assessment Regulations, 2014, which is being undertaken in parallel to the EIA process

3 PROJECT BACKGROUND

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.

The overall objective of the development is to generate electricity by means of renewable energy technology capturing wind energy to feed into the National Grid.

4 PROJECT DESCRIPTION

4.1 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 (**Figure *1***).

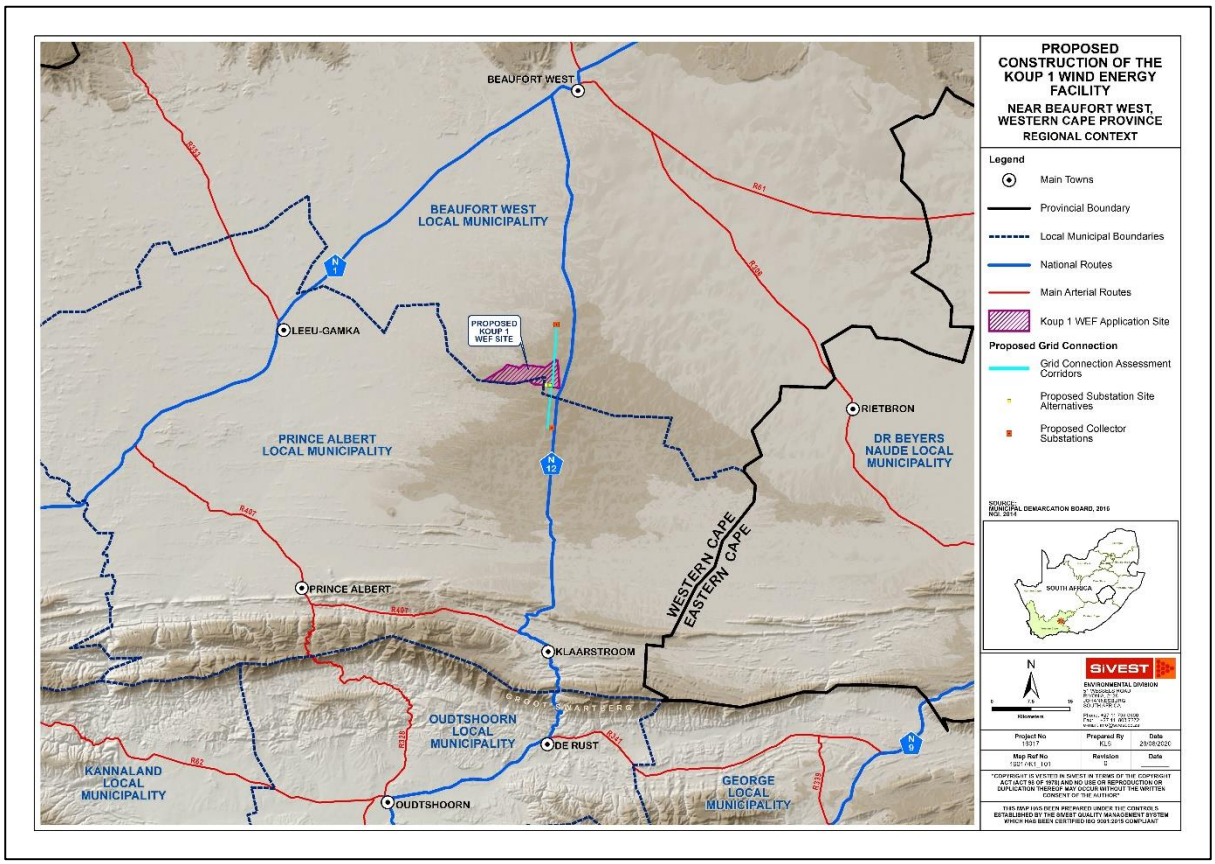

Figure 1: Regional Context

4.1.1 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.

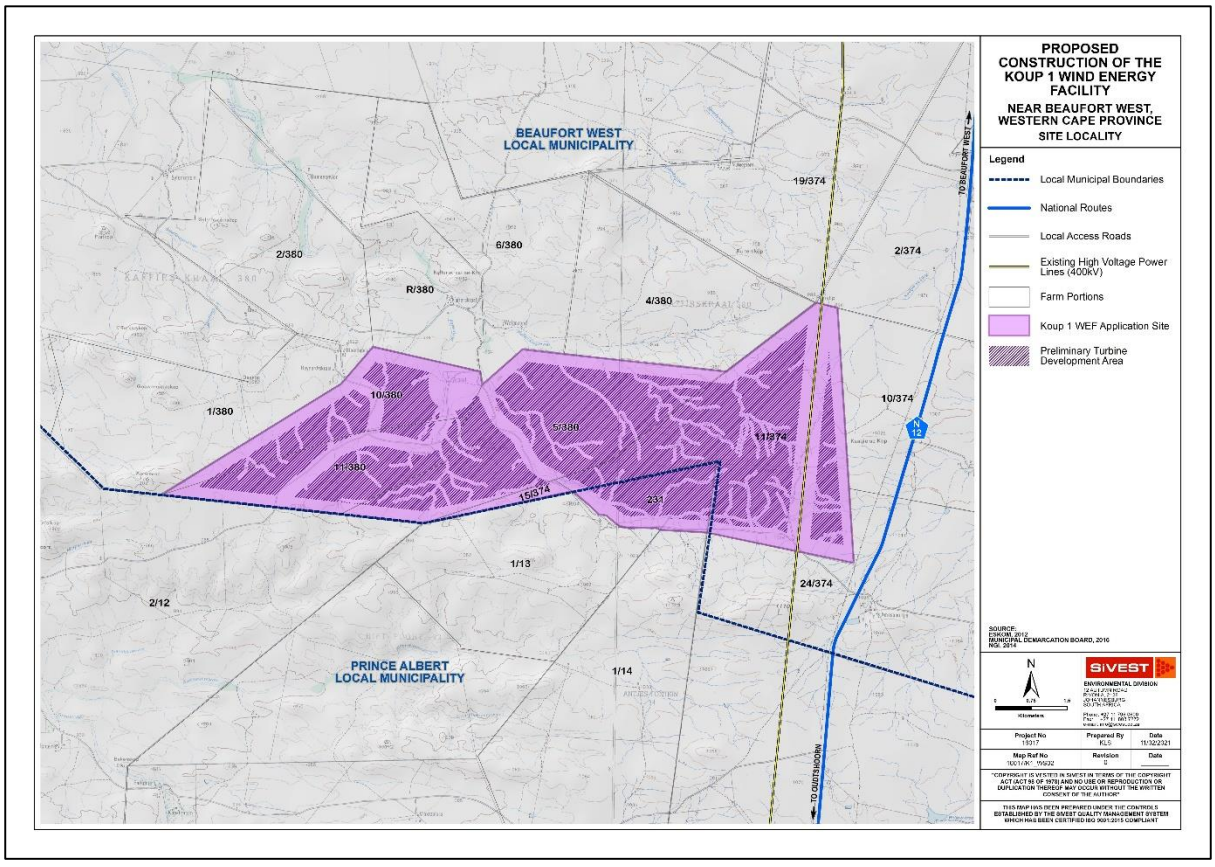

Figure 2: Koup 1 WEF Site Locality

4.1.2 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***).

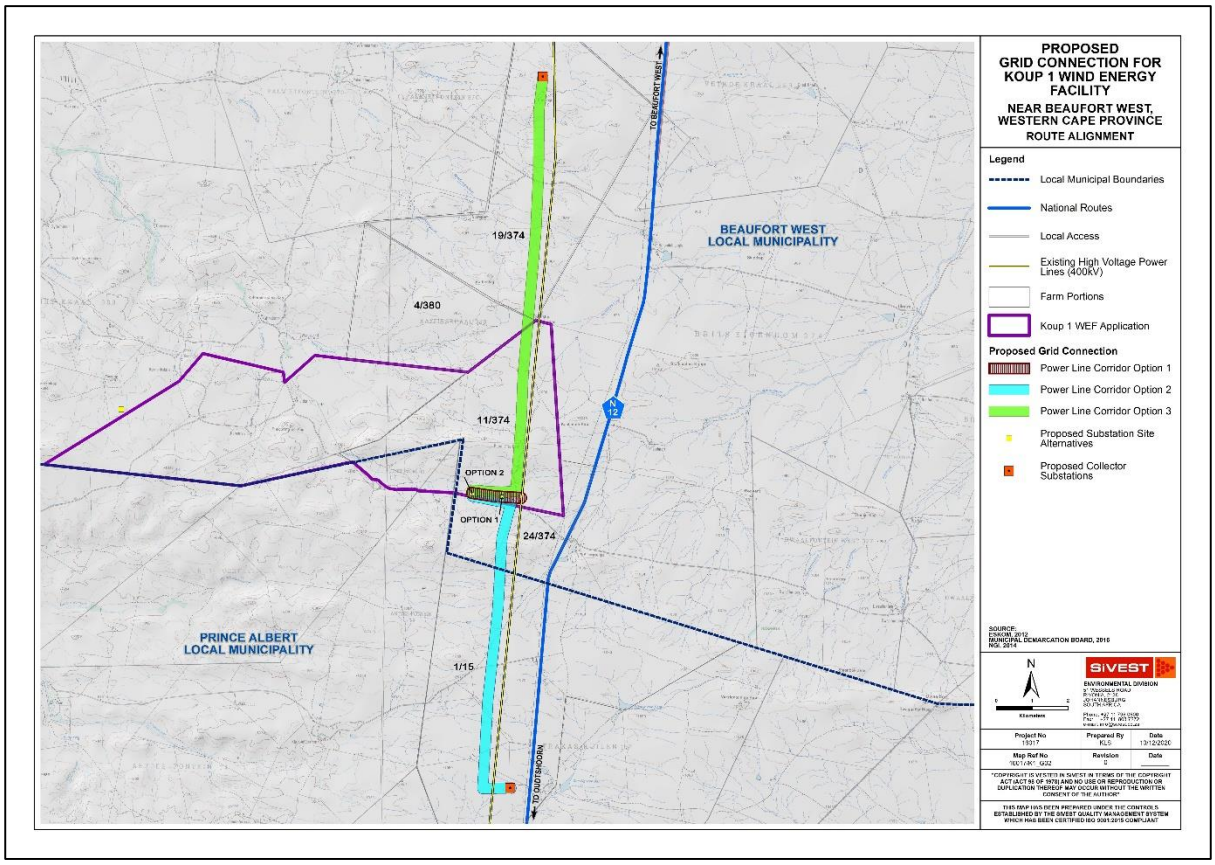

Figure 3: Proposed 132kV Power Line Route Alignment

4.2 Wind Farm Components

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. The 132kV overhead power line will however require a separate EA and is subject to a separate BA process, which is currently being undertaken in parallel to the EIA process. In summary, the proposed Koup 1 WEF will include the following 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 500m2) 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.

4.3 Grid Connection 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.

5 EIA ALTERNATIVES

5.1 Location Alternatives

No other activity alternatives are being considered. Renewable Energy development in South Africa is highly desirable from a social, environmental and development point of view and a wind energy installation is more suitable for this site due to the high wind resource.

5.2 Technology Alternatives

No other activity alternatives are being considered. Renewable Energy development in South Africa is highly desirable from a social, environmental and development point of view. Wind energy installations are more suitable for the site because of the high wind resource.

The choice of technology selected for the Koup 1 WEF was based on environmental constraints and technical and economic considerations. The size of the wind turbines will depend on the development area and the total generation capacity that can be produced as a result. Therefore, no technology alternatives will be considered. The choice of turbine to be used will ultimately be determined by technological and economic factors at a later stage.

5.3 WEF Layout Alternatives

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 **Figure 4** below.

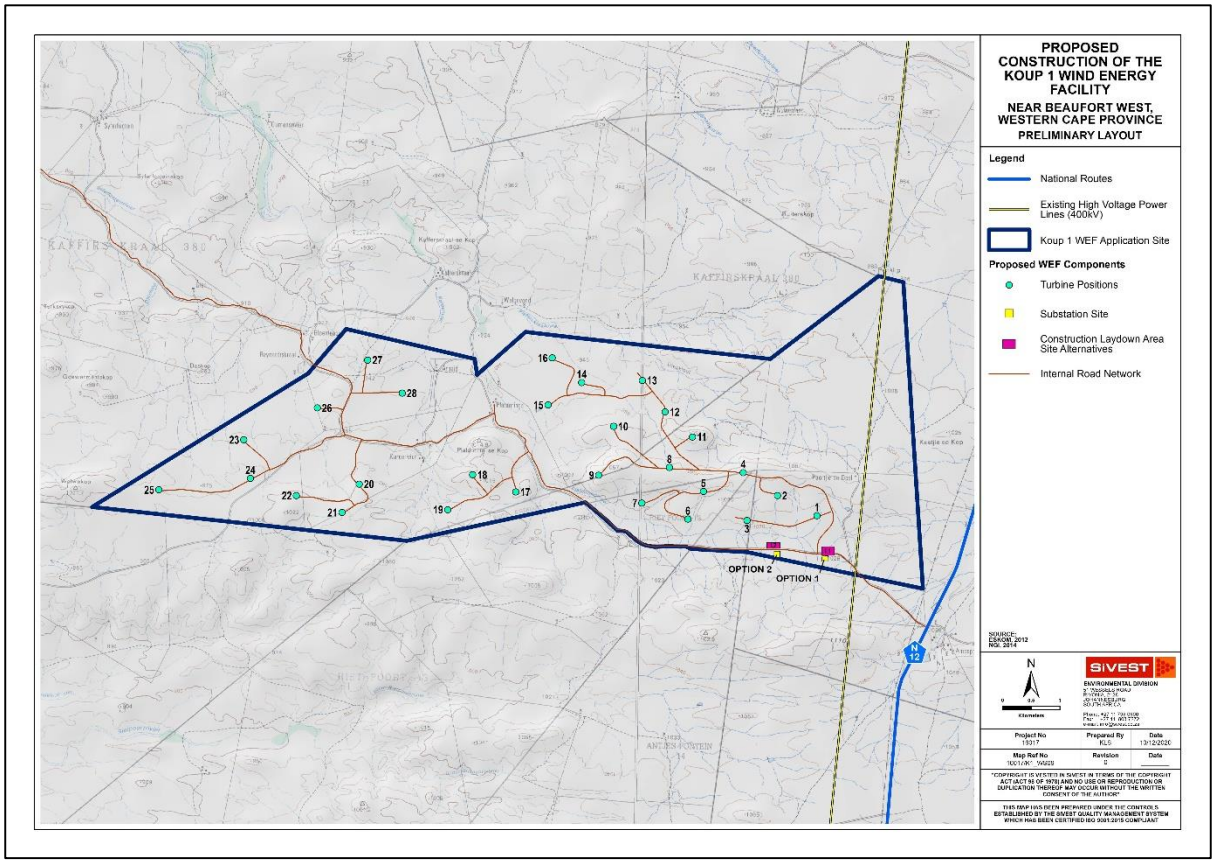

Figure 4: Preliminary Layout

6 BA ALTERNATIVES

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.

6.1 Power Line Route Alternatives

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.

7 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.

8 SPECIALIST REPORT REQUIREMENTS

8.1 Site Sensitivity Verification and Reporting

The requirements for Specialist Studies being undertaken in support of applications for Environmental Authorisation are specified in **Appendix 6** of the 2014 NEMA EIA Regulations (as amended), as well as the Assessment Protocols that were published on 20 March 2020, in Government Gazette 43110, GN 320. These protocols stipulate the Procedures for the Assessment and Minimum Criteria for reporting on identified environmental themes in terms of Sections 24(5)(A) and (H) and 44 of the NEMA, when applying for EA.

The Assessment Protocols as per GN320 are as follows:

- **PART A:** This relates to the Site Sensitivity Verification (SSV) and Reporting requirements where a Specialist Assessment is required but no specific Assessment Protocol has been prescribed. In this instance, specialist assessment must comply with **Appendix 6** of the 2014 NEMA EIA Regulations (as amended). However, the current use of the land and the environmental sensitivity of the site under consideration as identified by the DFFE Screening Tool must be verified and confirmed and an SSV report must be compiled and included as an appendix to the Specialist Assessment. Where there are no sensitivity layers on the Screening Tool for a particular Specialist Assessment, then this must be stated in the actual Specialist Assessment and in the accompanying SSV report.

- **PART B:** This relates to the Site Sensitivity Verification (SSV) and Reporting requirements where a Specialist Assessment is required and a specific Assessment Protocol has been prescribed. The following Assessment Protocols are relevant to the proposed project:

    - Agriculture
    - Terrestrial Biodiversity
    - Aquatic Biodiversity
    - Avifauna
    - Civil Aviation
    - Defence
    - Noise Assessment
    - Terrestrial Plant Species
    - Terrestrial Animal Species

8.2 Specialist Assessment Reports / Compliance Statements

Specialists are requested to provide ***one (1)*** scoping phase report and / or compliance statement that provides an assessment of the proposed Koup 1 WEF ***and*** the associated grid connection infrastructure (132kV overhead power line on-site switching / collector substation). The report should however include separate assessment and impact rating chapters/sections for the WEF and the grid connection proposals respectively.

During the EIA phase, specialists will be required to update the scoping phase specialist report to provide a review of their findings in accordance with revised site layouts and to address any comments or concerns arising from the public participation process.

The specialist assessment reports and / or compliance statements should include the following sections:

8.2.1 Project Description

The specialist report must include the project description as provided above.

8.2.2 Terms of Reference

The specialist report must include an explanation of the terms of reference (TOR) applicable to the specialist study. The gazetted Environmental Assessment Protocols of the NEMA EIA Regulations (2014, as amended), prescribes Procedures for the Assessment and Minimum Criteria for Reporting on the Identified Environmental Themes in terms of Sections 24(5)(A) and (H) and 44 of the National Environmental Management Act, 1998. These procedures must be considered.

Where a specialist assessment is required and no specific environmental theme protocol has been prescribed, the required level of assessment must be based on the findings of the site sensitivity

verification and must comply with Appendix 6 of the EIA Regulations; and any relevant legislation and guidelines deemed necessary

Where relevant, a table must be provided at the beginning of the specialist report, listing the requirements for specialist reports in accordance with Appendix 6 of the EIA Regulations, 2014 (as amended) and cross referencing these requirements with the relevant sections in the report. An MS Word version of this table will be provided by SiVEST.

8.2.3 Legal Requirements and Guidelines

The specialist report must include a thorough overview of all applicable best practice guidelines, relevant legislation, prescribed Assessment Protocols and authority requirements.

8.2.4 Methodology

The report must include a description of the methodology applied in carrying out the specialist assessment.

8.2.5 Specialist Findings / Identification of Impacts

The report must present the findings of the specialist studies and explain the implications of these findings for the proposed development (e.g. permits, licenses etc.). This section of the report should also identify any sensitive and/or 'no-go' areas on the development site or within the power line assessment corridors. These areas must be mapped clearly with a supporting explanation provided.

This section of the report should also specify if any further assessment will be required.

8.2.6 Environmental Impact Assessment

The impacts (both direct and indirect) of the proposed WEF and the proposed grid connection infrastructure (during the Construction, Operation and Decommissioning phases) are to be assessed and rated *separately* according to the methodology developed by SiVEST. Specialists will be required to make use of the impact rating matrix provided (in Excel format) for this purpose, and *separate tables* must be provided for the WEF and for the grid connection infrastructure respectively. **Please note that the significance of Cumulative Impacts should also be rated in this section.** Both the methodology and the rating matrix will be provided by SiVEST.

Please be advised that this section must include mitigation measures aimed at minimising the impact of the proposed development.

8.2.7 Input To The Environmental Management Programme (EMPr)

The report must include a description of the key monitoring recommendations for each applicable mitigation measure identified for each phase of the project for inclusion in the Environmental Management Programme (EMPr) or Environmental Authorisation (EA).

Please make use of the Impact Rating Table (in Excel format) for each of the phases i.e. Design, Construction, Operation and Decommissioning.

8.2.8 Cumulative Impact Assessment

Cumulative impact assessments must be undertaken for the proposed WEF and associated grid connection infrastructure to determine the cumulative impact that will materialise if other Renewable Energy Facilities (REFs) and large scale industrial developments are constructed within 35kms of the proposed development.

The cumulative impact assessment must contain the following:

- A cumulative environmental impact statement noting whether the overall impact is acceptable; and
- A review of the specialist reports undertaken for other REFs and an indication of how the recommendations, mitigation measures and conclusion of the studies have been considered.

In order to assist the specialists in this regard, SiVEST will provide the following documentation/data:

- A summary table listing all REFs identified within 35kms of the proposed WEF;
- A map showing the location of the identified REFs; and
- KML files.

It should be noted that it is the specialist's responsibility to source the relevant EIA / BA reports that are available in the public domain. SiVEST will assist, where possible.

8.2.9 No Go Alternative

Consideration must be given to the "no-go" option in the EIA process. The "no-go" option assumes that the site remains in its current state, i.e. there is no construction of a WEF and associated infrastructure in the proposed project area and the status quo would be preserved.

8.2.10 Comparative Assessment Of Alternatives

As mentioned, alternatives for the Substation location, construction / laydown area and power line route alignment have been identified. These alternatives are being considered as part of the EIA / BA processes and as such specialists are required to undertake a comparative assessment of the alternatives mentioned above as per the latest table provided by SiVEST.

8.2.11 Conclusion / Impact Statement

The conclusion section of the specialist report must include an Impact Statement, indicating whether any fatal flaws have been identified and ultimately whether the proposed development can be authorised or not (i.e. whether EA should be granted / issued or not).

8.2.12 Executive Summary

Specialists must provide an Executive Summary summarising the findings of their report to allow for easy inclusion in the EIA / BA reports.

8.2.13 Specialist Declaration of Independence

A copy of the Specialist Declaration of Interest (DoI) form, containing original signatures, must be appended to all Draft and Final Reports. This form will be provided to the specialists. ***Please note that the undertaking / affirmation under oath section of the report must be signed by a Commissioner of Oaths.***

9 DELIVERABLES

All specialists will need to submit the following deliverables:

- 1 x Specialist Assessment Report and / or Compliance statement for inclusion in Draft Scoping Report (DSR) and updated version based on EAP and applicant review;
- 1 x Updated Specialist Report and / or Compliance statement for inclusion in Final Environmental Impact Assessment Report (FEIAR) should updates and/or revisions be required as part of the public participation process;
- A copy of the specialist's Curriculum Vitae (CV);
- A copy of the completed Site Sensitivity Verification Report attached as an Appendix to the main report.
- A copy of the Specialist Declaration of Interest (DoI) form, containing original signatures. This form will be provided to the specialists. ***Please note that the undertaking / affirmation under oath section of the report must be signed by a Commissioner of Oaths***; and
- Delineated areas of sensitivity and 'No-Go' areas in KMZ or GIS format.

10 DEADLINES AND REPORT SUBMISSION

- Specialist Assessment Report and / or Compliance Statement for inclusion in DSR and DBAR no later than [25th June 2021] and
- Updated version based on EAP and applicant review no later than [9 July 2021] for the EIA and the BA; and

- Any changes identified as a result of stakeholder engagement no later than [20th of September 2021].

11 REPORT / DATA FORMATS

- All specialist reports must be provided in MS Word format.
- Where maps have been inserted into the report, we will require a separate map set in PDF format for inclusion in our submission.
- Where figures and/or photos have been inserted into the report, we will require the original graphic in jpg format for inclusion in our submission.
- Delineated areas of sensitivity must be provided in either ESRI shape file format or Google Earth KML format. **Sensitivity classes must be included in the attribute tables with a clear indication of which areas are "No-Go" areas.**

Appendix B

SPECIALIST CV AND DECLARATION

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

PROPOSED DEVELOPMENT OF THE KOUP 1 AND KOUP 2 WIND ENERGY FACILITIES AND ASSOCIATED GRID CONNECTION INFRASTRUCTURE NEAR BEAUFORT WEST IN THE WESTERN CAPE PROVINCE

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	SiVEST SA (Pty) Ltd			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	2	Percentage Procurement recognition	110
Specialist name:	Kerry Schwartz			
Specialist Qualifications:	BA			
Professional affiliation/registration:	SAGC (GISc Technician)			
Physical address:	12 Autumn St, Rivonia			
Postal address:	PO Box 2921, Rivonia			
Postal code:	2128	Cell:	082 469 5850	
Telephone:	011 798 0632	Fax:	011 798 0632	
E-mail:	kerrys@sivest.co.za			

2. DECLARATION BY THE SPECIALIST

I, **Kerry Schwartz**, 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.

K Schwartz

Signature of the Specialist

SiVEST SA (Pty) Ltd

Name of Company:

12 October 2021

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, **Kerry Schwartz**, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

K Schwartz

Signature of the Specialist

SiVEST SA (Pty) Ltd

Name of Company

12 October 2021

Date

Signature of the Commissioner of Oaths

12 October 2021

Date

Hlengiwe Innocentia Ntuli
COMMISSIONER OF OATHS

Signature:

PPP Administrator
RO-02/11/2020 ZA-GT-10/11/2020

Date 12/10/2021 **Place** Rivonia
Business Address: 12 Autumn Street, Rivonia 2128

CURRICULUM VITAE

Name	Kerry Lianne Schwartz
Profession	GIS Specialist
Name of Firm	SiVEST SA (Pty) Ltd
Present Appointment	Senior GIS Consultant: Environmental Division
Years with Firm	32 Years
Date of Birth	21 October 1960
ID No.	6010210231083
Nationality	South African

Professional Qualifications

BA (Geography), University of Leeds 1982

Membership to Professional Societies

South African Geomatics Council – GTc GISc 1187

Employment Record

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1994 – Present	SiVEST SA (Pty) Ltd - Environmental Division: GIS/Database Specialist.
1988 - 1994	SiVEST (formerly Scott Wilson Kirkpatrick): Town Planning Technician.
1984 – 1988	Development and Services Board, Pietermaritzburg: Town Planning Technician.

Language Proficiency

LANGUAGE	SPEAK	READ	WRITE
English	Fluent	Fluent	Fluent

Key Experience

Kerry is a GIS specialist with more than 25 years' experience in the application of GIS technology in various environmental, regional planning and infrastructural projects undertaken by SiVEST.

Kerry's GIS skills have been extensively utilised in projects throughout South Africa in other Southern African Countries. These projects have involved a range of GIS work, including:

- Design, compilation and management of a spatial databases in support of projects.
- Collection, collation and integration of data from a variety of sources for use on specific projects.
- Manipulation and interpretation of both spatial and alphanumeric data to provide meaningful inputs for a variety of projects.
- Production of thematic maps and graphics.
- Spatial analysis and 3D modelling.

Kerry further specialises in visual impact assessments (VIAs) and landscape assessments for various projects, including renewable energy facilities, power lines and mixed use developments.

Projects Experience

STRATEGIC PLANNING PROJECTS

Provision of database, analysis and GIS mapping support for the following:

- Database development for socio-economic and health indicators arising from Social Impact Assessments conducted for the Lesotho Highlands Development Association – Lesotho.
- Development Plans for the adjacent towns of Kasane and Kazungula and for the rural village of Hukuntsi in Botswana.
- Integrated Development Plans for various District and Local Municipalities in KwaZulu-Natal Province.
- Rural Development Initiative and Rural Roads Identification for uMhlathuze Local Municipality (KwaZulu-Natal).
- Tourism Initiatives and Master Plans for areas such as the Mapungubwe Cultural Landscape (Limpopo Province) and the Northern Cape Province.
- Spatial Development Frameworks for various Local and District Municipalities in KwaZulu-Natal and Mpumalanga and Free State Provinces.
- Land Use Management Plans/Systems (LUMS) for various Local Municipalities in KwaZulu-Natal.
- Land use study for the Johannesburg Inner City Summit and Charter.
- Port of Richards Bay Due Diligence Investigation.

BUILT INFRASTRUCTURE

- EIA and EMP for a 9km railway line and water pipeline for manganese mine – Kalagadi Manganese (Northern Cape Province).
- EIA and EMP for 5x 440kV Transmission Lines between Thyspunt (proposed nuclear power station site) and several substations in the Port Elizabeth area – Eskom (Eastern Cape Province).
- Initial Scoping for the proposed 750km multi petroleum products pipeline from Durban to Gauteng/Mpumalanga – Transnet Pipelines.
- Detailed EIA for multi petroleum products pipeline from Kendall Waltloo, and from Jameson Park to Langlaagte Tanks farms –Transnet Pipelines.
- Environmental Management Plan for copper and cobalt mine (Democratic Republic of Congo).
- EIA and Agricultural Feasibility study for Miwani Sugar Mill (Kenya).
- EIAs for Concentrated Solar and Photovoltaic power plants and associated infrastructure (Northern Cape, Free State, Limpopo and North West Province).
- EIAs for Wind Farms and associated infrastructure (Northern Cape and Western Cape).
- Basic Assessments for 132kV Distribution Lines (Free State, KwaZulu-Natal, Mpumalanga and North West Province).
- Environmental Assessment for the proposed Moloto Development Corridor (Limpopo).
- Environmental Advisory Services for the Gauteng Rapid Rail Extensions Feasibility Project.
- Environmental Screening for the Strategic Logistics and Industrial Corridor Plan for Strategic Infrastructure Project 2, Durban-Free State-Gauteng Development Region.

STATE OF THE ENVIRONMENT REPORTING

- 2008 State of the Environment Report for City of Johannesburg.
- Biodiversity Assessment – City of Johannesburg.

STRATEGIC ENVIRONMENTAL ASSESSMENTS AND ENVIRONMENTAL MANAGEMENT FRAMEWORKS

- SEA for Greater Clarens – Maloti-Drakensberg Transfrontier Park (Free State).
- SEA for the Marula Region of the Kruger National Park, SANParks.
- SEA for Thanda Private Game Reserve (KwaZulu-Natal).
- SEA for KwaDukuza Local Municipality (KwaZulu-Natal).
- EMF for proposed Renishaw Estate (KwaZulu-Natal).
- EMF for Mogale City Local Municipality, Mogale City Local Municipality (Gauteng).
- SEA for Molemole Local Municipality, Capricorn District Municipality (Limpopo).
- SEA for Blouberg Local Municipality, Capricorn District Municipality (Limpopo).
- SEA for the Bishopstowe study area in the Msunduzi Local Municipality (KwaZulu-Natal).

VISUAL IMPACT ASSESSMENTS

- VIAs for various Solar Power Plants and associated grid connection infrastructure (Northern Cape, Free State, Limpopo and North West Province) the most recent project being:
  - Mooi Plaats, Wonderheuvel and Paarde Valley Solar PV facilities near Nouport (Northern Cape).
  - Oya Energy Facility, near Touws River (Western Cape).
- VIAs for various Wind Farms and associated grid connection infrastructure (Northern Cape and Western Cape), the most recent projects including:
  - Paulputs WEF near Pofadder (Northern Cape)
  - Kudusberg WEF near Matjiesfontein (Western Cape);
  - Tooverberg WEF, near Touws River (Western Cape);
  - Rondekop WEF, near Sutherland (Northern Cape).
  - Gromis and Komas WEFs, near Kleinzee (Northerrn Cape).
- VIAs for various 132kV Distribution Lines (Free State, KwaZulu-Natal, Mpumalanga and North West Province).
- VIA for the proposed Rorqual Estate Development near Park Rynie on the South-Coast of KwaZulu-Natal Province.
- VIAs for the proposed Assagay Valley and Kassier Road North Mixed Use Development (KwaZulu-Natal).
- VIA for the proposed Tinley Manor South Banks Development (KwaZulu-Natal).
- VIA for the proposed Tinley Manor South Banks Beach Enhancement Solution, (KwaZulu-Natal).
- VIAs for the proposed Mlonzi Hotel and Golf Estate Development (Eastern Cape Province).

Appendix C

Impact Rating Methodology

1 ENVIRONMENTAL IMPACT ASSESSMENT (EIA) METHODOLOGY

The Environmental Impact Assessment (EIA) Methodology assists in evaluating the overall effect of a proposed activity on the environment. Determining of the significance of an environmental impact on an environmental parameter is determined through a systematic analysis.

1.1 Determination of Significance of Impacts

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale (i.e. site, local, national or global), whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in **Table 1**.

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

1.2 Impact Rating System

The impact assessment must take account of the nature, scale and duration of effects on the environment and whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the various project stages, as follows:

- Planning;
- Construction;
- Operation; and
- Decommissioning.

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

The significance of Cumulative Impacts should also be rated (As per the Excel Spreadsheet Template).

1.2.1 Rating System Used to Classify Impacts

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the possible mitigation of the impact. Impacts have been consolidated into one (1) rating. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

Table 1: Rating of impacts criteria

ENVIRONMENTAL PARAMETER		
A brief description of the environmental aspect likely to be affected by the proposed activity (e.g. Surface Water).		
ISSUE / IMPACT / ENVIRONMENTAL EFFECT / NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity (e.g. oil spill in surface water).		
EXTENT (E)		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	Site	The impact will only affect the site
2	Local/district	Will affect the local area or district
3	Province/region	Will affect the entire province or region
4	International and National	Will affect the entire country
PROBABILITY (P)		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
REVERSIBILITY (R)		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES (L)		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
DURATION (D)		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity.		

1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
INTENSITY / MAGNITUDE (I / M)		
Describes the severity of an impact (i.e. whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily).		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
SIGNIFICANCE (S)		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula: **Significance = (Extent + probability + reversibility + irreplaceability + duration) x magnitude/intensity.**		

The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	Impact Significance Rating	Description
5 to 23	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
5 to 23	Positive Low impact	The anticipated impact will have minor positive effects.
24 to 42	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
24 to 42	Positive Medium impact	The anticipated impact will have moderate positive effects.
43 to 61	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
43 to 61	Positive High impact	The anticipated impact will have significant positive effects.
62 to 80	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
62 to 80	Positive Very high impact	The anticipated impact will have highly significant positive effects.

The table below is to be represented in the Impact Assessment section of the report. The excel spreadsheet template can be used to complete the Impact Assessment.

Table 2: Rating of impacts template and example

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 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	**Outline/explain the mitigation measures to be undertaken to ameliorate the impacts that are likely to arise from the proposed activity. These measures will be detailed in the EMPr.**	2	4	2	1	3	2	24	-	Low

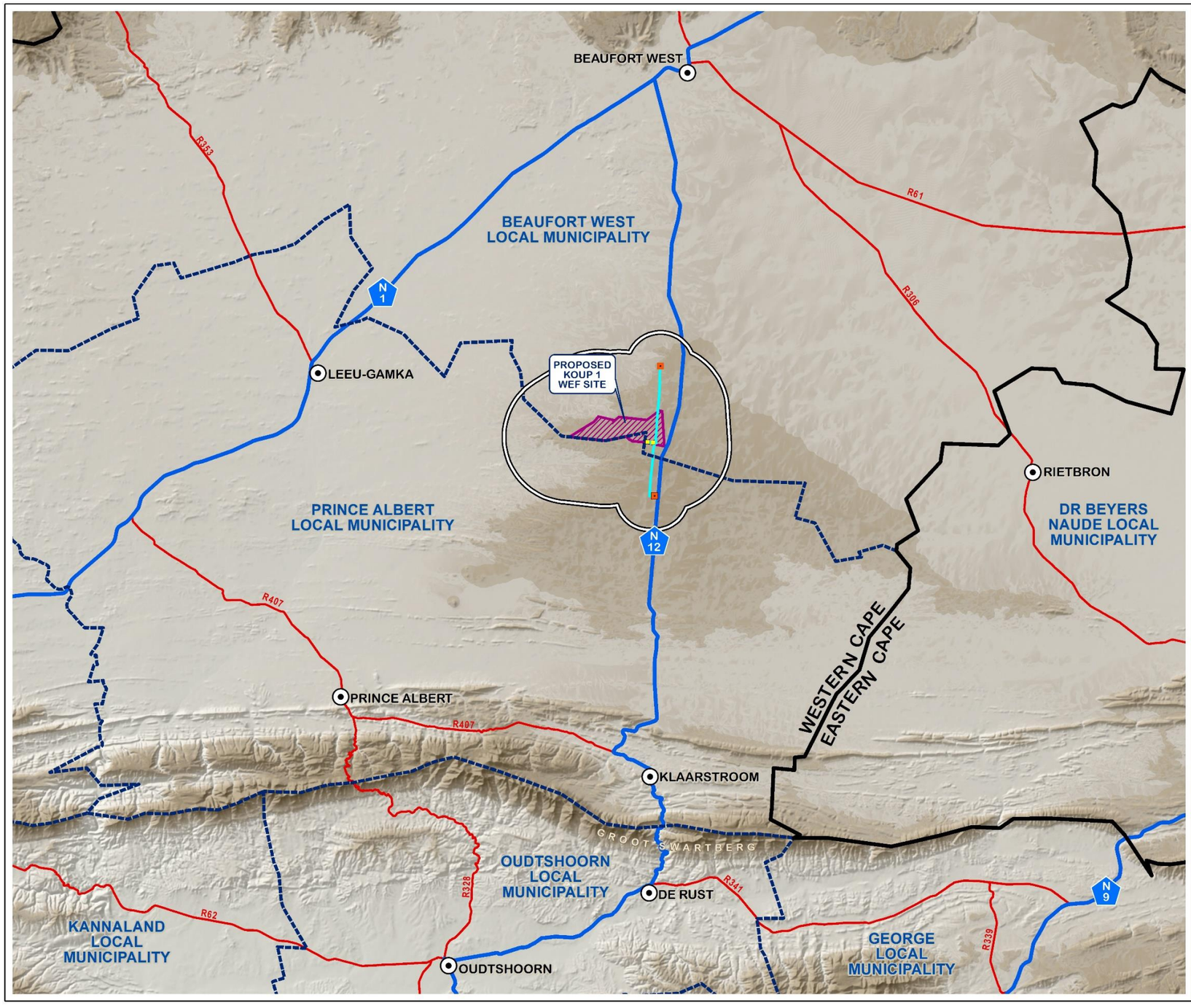
Operational Phase																				
Fauna	Fauna will be negatively affected by the operation of the wind farm due to the human disturbance, the presence of vehicles on the site and possibly by noise generated by the wind turbines as well.	2	3	2	1	4	3	36	-	Medium	**Outline/explain the mitigation measures to be undertaken to ameliorate the impacts that are likely to arise from the proposed activity. These measures will be detailed in the EMPr.**	2	2	2	1	4	2	22	-	Low
Decommissioning Phase																				
Fauna	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.	2	3	2	1	2	3	30	-	Medium	**Outline/explain the mitigation measures to be undertaken to ameliorate the impacts that are likely to arise from the proposed activity. These measures will be detailed in the EMPr.**	2	2	2	1	2	2	18	-	Low

Cumulative																				
Broad-scale ecological processes	Transformation and presence of the facility will contribute to cumulative habitat loss and impacts on broad-scale ecological processes such as fragmentation.	2	4	2	2	3	2	26	-	Medium	**Outline/explain the mitigation measures to be undertaken to ameliorate the impacts that are likely to arise from the proposed activity. These measures will be detailed in the EMPr.**	2	3	2	1	3	2	22	-	Low

Appendix D

Maps

MAP 1: Regional Context



PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY

NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: REGIONAL CONTEXT

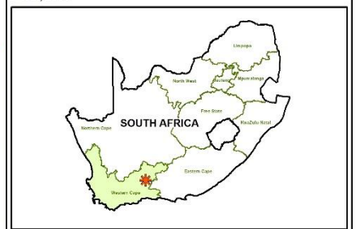
Legend

- Main Towns
- Provincial Boundary
- Local Municipal Boundaries
- National Routes
- Main Arterial
- Koup 1 WEF Application
- Combined Visual Assessment Zone

Proposed Grid Connection

- Grid Connection Assessment Corridors
- Proposed Substation Site Alternatives
- Proposed Collector Substations

SOURCE:
MUNICIPAL DEMARCATION BOARD, 2016
NGI, 2014



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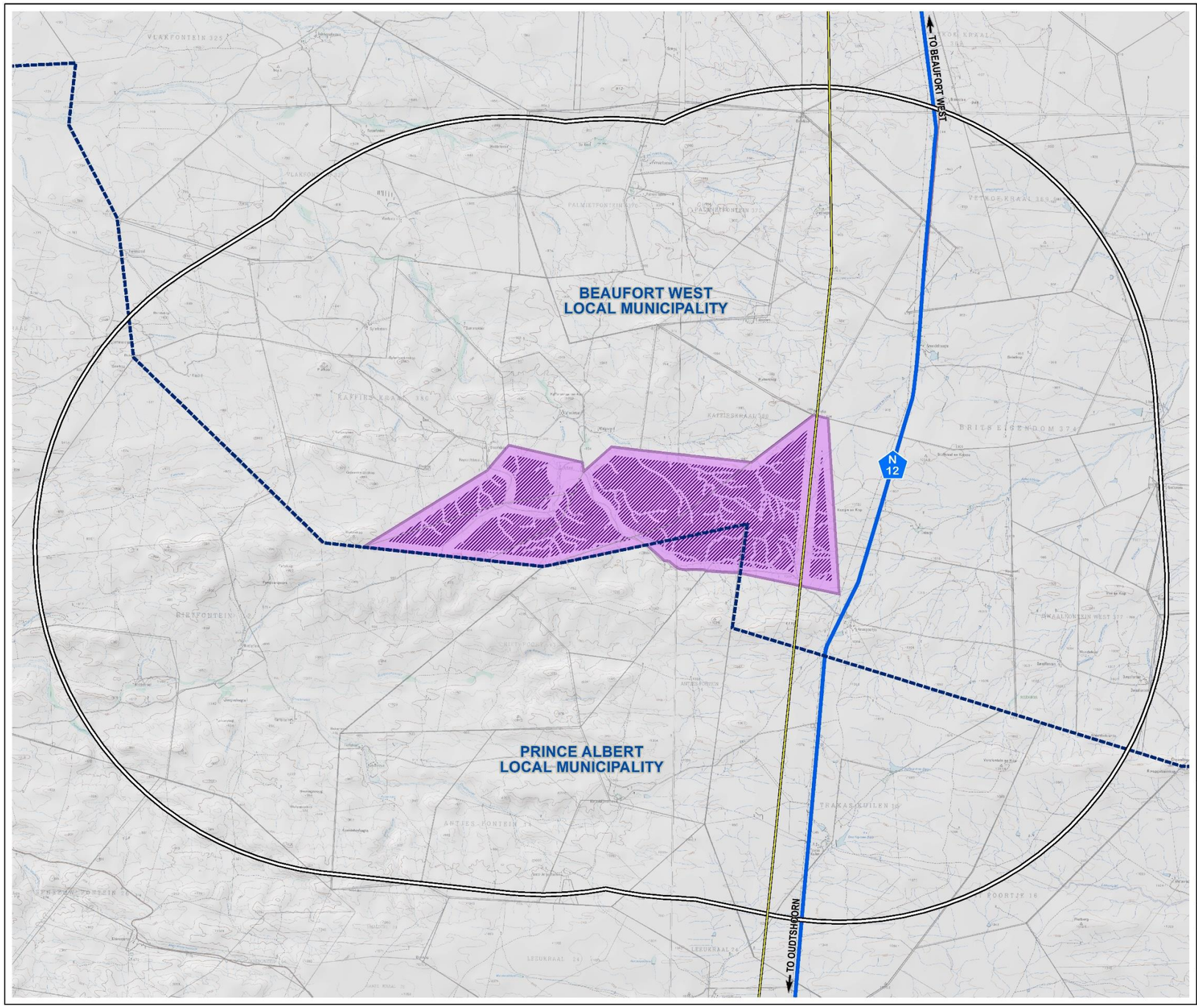
MAP 2: WEF Site Locality



PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY

NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: WEF SITE LOCALITY

Legend

- Local Municipal Boundaries
- National Routes
- Local Access
- Existing High Voltage Power Lines (400kV)
- Farm Portions
- Koup 1 WEF Application
- Preliminary Turbine Development Area
- 10km WEF Visual Assessment Zone

SOURCE:
ESKOM, 2012
MUNICIPAL DEMARCATION BOARD, 2016
NGI, 2014

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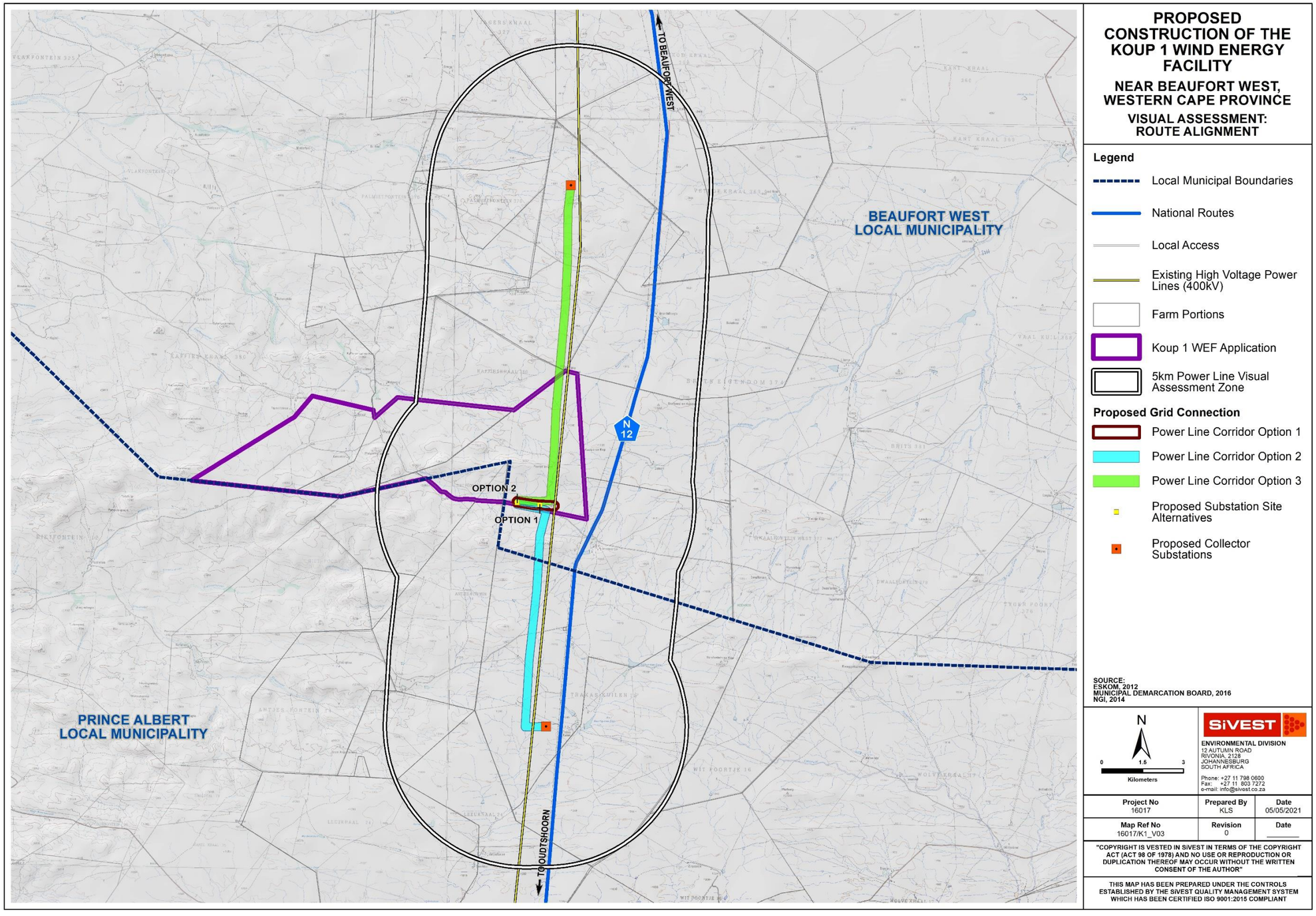
16017/K1_V02	0	

MAP 3: Route Alignment



PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY

NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: ROUTE ALIGNMENT

Legend

- Local Municipal Boundaries
- National Routes
- Local Access
- Existing High Voltage Power Lines (400kV)
- Farm Portions
- Koup 1 WEF Application
- 5km Power Line Visual Assessment Zone

Proposed Grid Connection

- Power Line Corridor Option 1
- Power Line Corridor Option 2
- Power Line Corridor Option 3
- Proposed Substation Site Alternatives
- Proposed Collector Substations

SOURCE:
ESKOM, 2012
MUNICIPAL DEMARCATION BOARD, 2016
NGI, 2014

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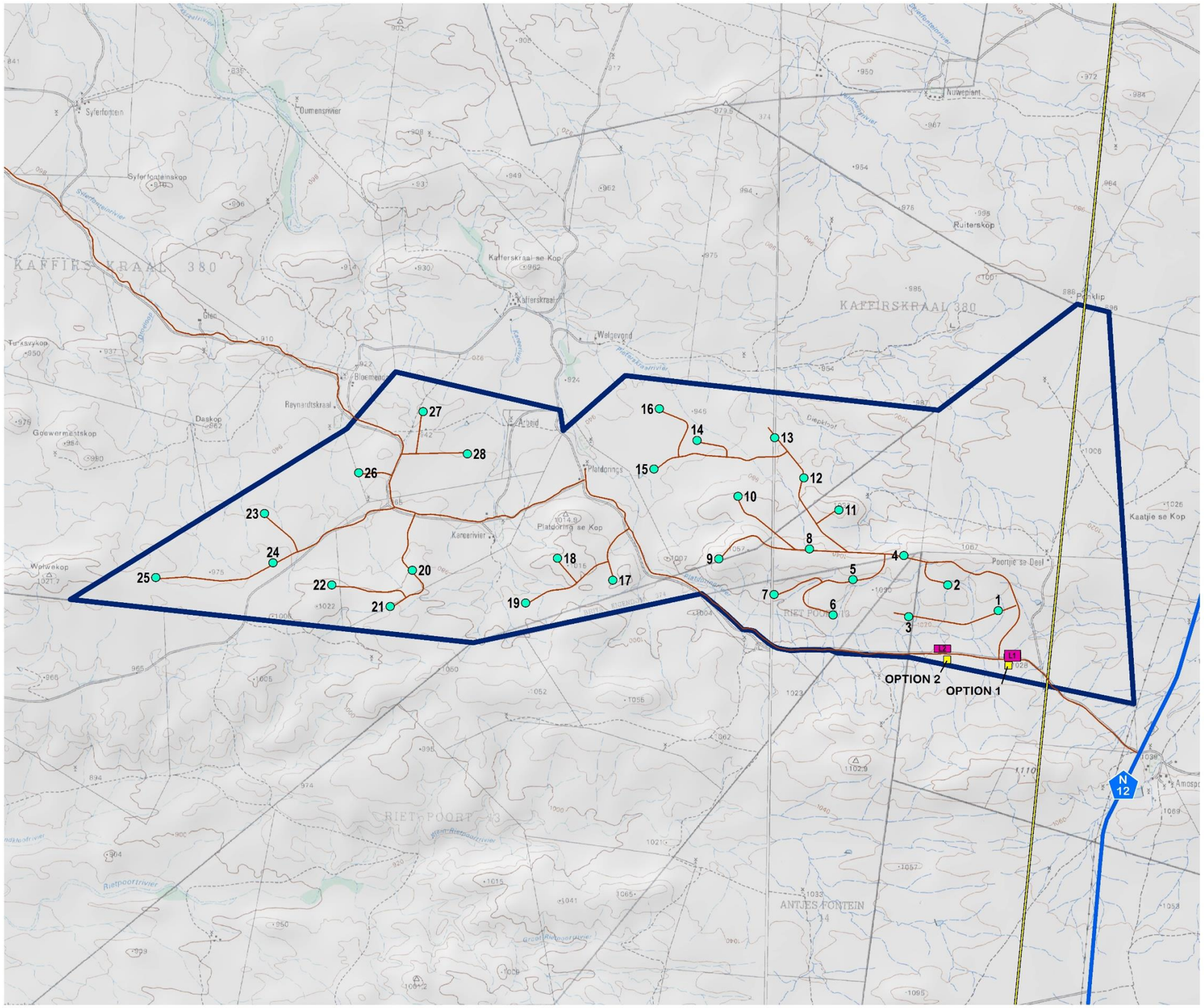
MAP 4: Preliminary WEF Layout



PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY

NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: PRELIMINARY LAYOUT

Legend

- National Routes
- Existing High Voltage Power Lines (400kV)
- Koup 1 WEF Application Site

Proposed WEF Components

- Turbine Positions
- Substation Site Alternatives
- Construction Laydown Area Site Alternatives
- Internal Road Network

SOURCE:
ESKOM, 2012
NGI, 2014

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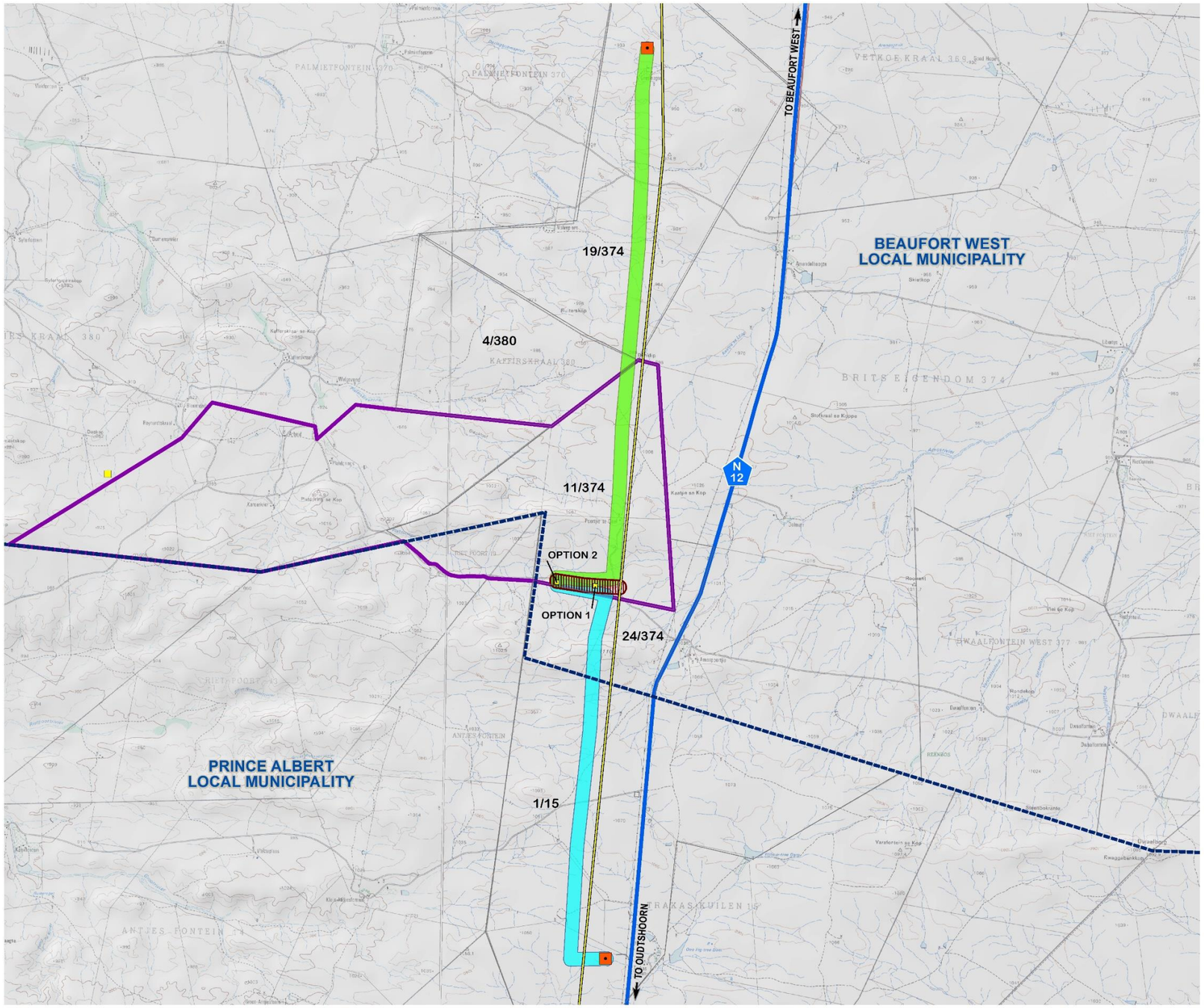
16017/K1_V04	0	_____

MAP 5: Grid Connection Alternatives



PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY

NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: GRID CONNECTION ALTERNATIVES

Legend

- Local Municipal Boundaries
- National Routes
- Local Access Roads
- Existing High Voltage Power Lines (400kV)
- Farm Portions
- Koup 1 WEF Application Site

Proposed Grid Connection

- Power Line Corridor Option 1
- Power Line Corridor Option 2
- Power Line Corridor Option 3
- Proposed Substation Site Alternatives
- Proposed Collector Substations

SOURCE:
ESKOM, 2012
MUNICIPAL DEMARCATION BOARD, 2016
NGI, 2014

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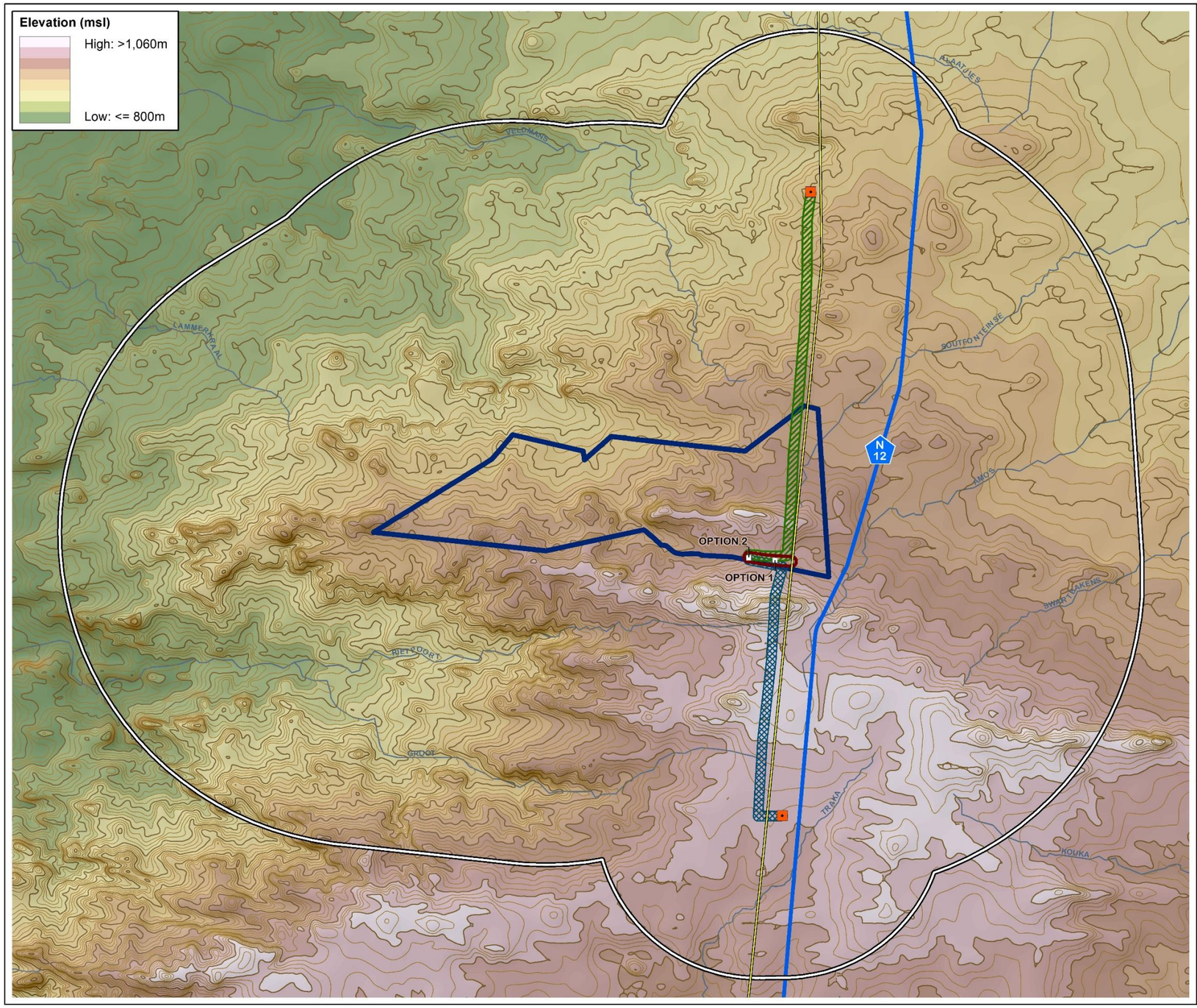
MAP 6: Topography



PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY

NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: TOPOGRAPHY

Legend

- National Routes
- Existing High Voltage Power Lines (400kV)
- Rivers
- Contours (20m Interval)
- Contours (5m Interval)
- Koup 1 WEF Application
- Combined Visual Assessment Zone

Proposed Grid Connection

- Power Line Corridor Option 1
- Power Line Corridor Option 2
- Power Line Corridor Option 3
- Proposed Substation Site Alternatives
- Proposed Collector Substations

SOURCE:
ESKOM, 2012
NFEPA, 2011
NGI, 2014

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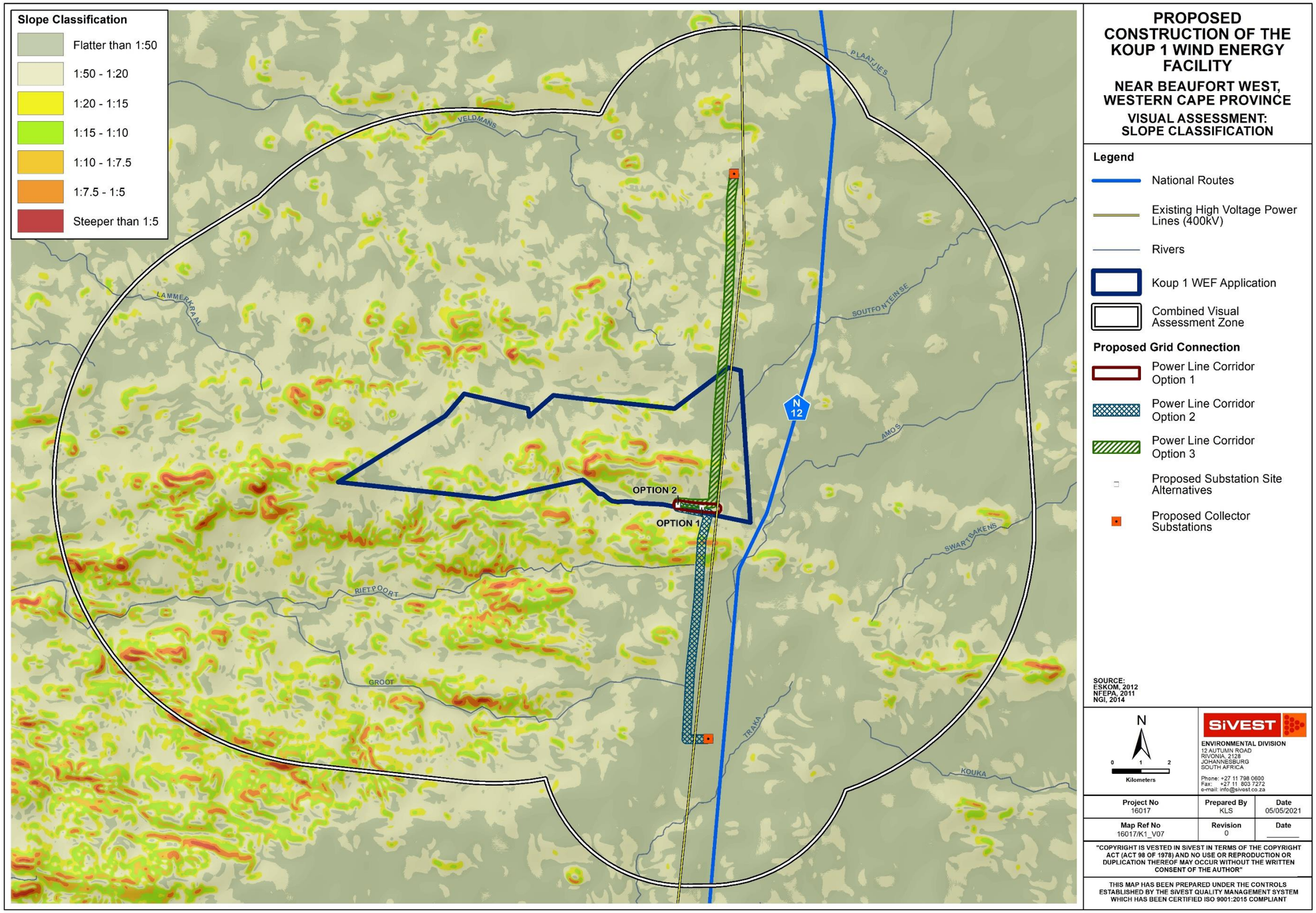
16017/K1_V06	0	

MAP 7: Slope Classification



PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY

NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: SLOPE CLASSIFICATION

Legend

- National Routes
- Existing High Voltage Power Lines (400kV)
- Rivers
- Koup 1 WEF Application
- Combined Visual Assessment Zone

Proposed Grid Connection

- Power Line Corridor Option 1
- Power Line Corridor Option 2
- Power Line Corridor Option 3
- Proposed Substation Site Alternatives
- Proposed Collector Substations

SOURCE:
ESKOM, 2012
NFEPA, 2011
NGI, 2014

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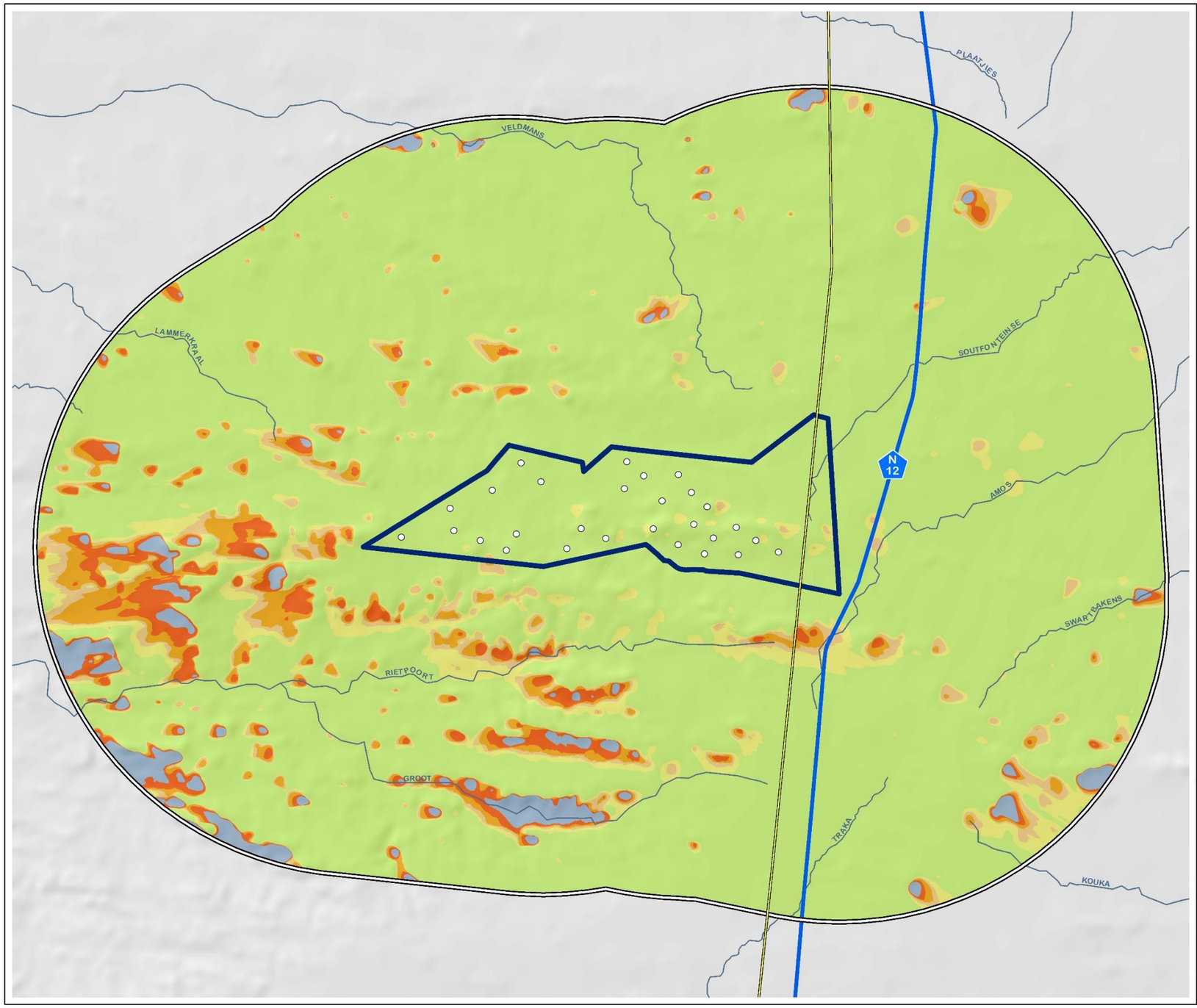
16017/K1_V07	0	

MAP 8: Potential Visibility of Wind Turbines



PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY

NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: PRELIMINARY VISIBILITY ANALYSIS - WIND TURBINES

Legend

- National Routes
- Existing High Voltage Power Lines (400kV)
- Rivers
- Koup 1 WEF Application
- 10km WEF Visual Assessment Zone
- Proposed Turbine Positions

Areas within Viewshed of Proposed Wind Turbines

- Most Turbines are Visible
- Least Turbines are Visible
- Turbines Not Visible

SOURCE:
ESKOM, 2012

N

0 1 2
Kilometers

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MAP 9: Potential Visibility of Power Lines

PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY

NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: PRELIMINARY VISIBILITY ANALYSIS - 132kV POWER LINE

Legend

- National Routes
- Existing High Voltage Power Lines (400kV)
- Koup 1 WEF Application
- 5km Power Line Visual Assessment Zone

Proposed Grid Connection

- Power Line Corridor Option 1
- Power Line Corridor Option 2
- Power Line Corridor Option 3
- Proposed Substation Site Alternatives
- Proposed Collector Substations

SOURCE:
ESKOM, 2012
MUNICIPAL DEMARCATION BOARD, 2016
NGI, 2014

N

0 1.5 3

Kilometers

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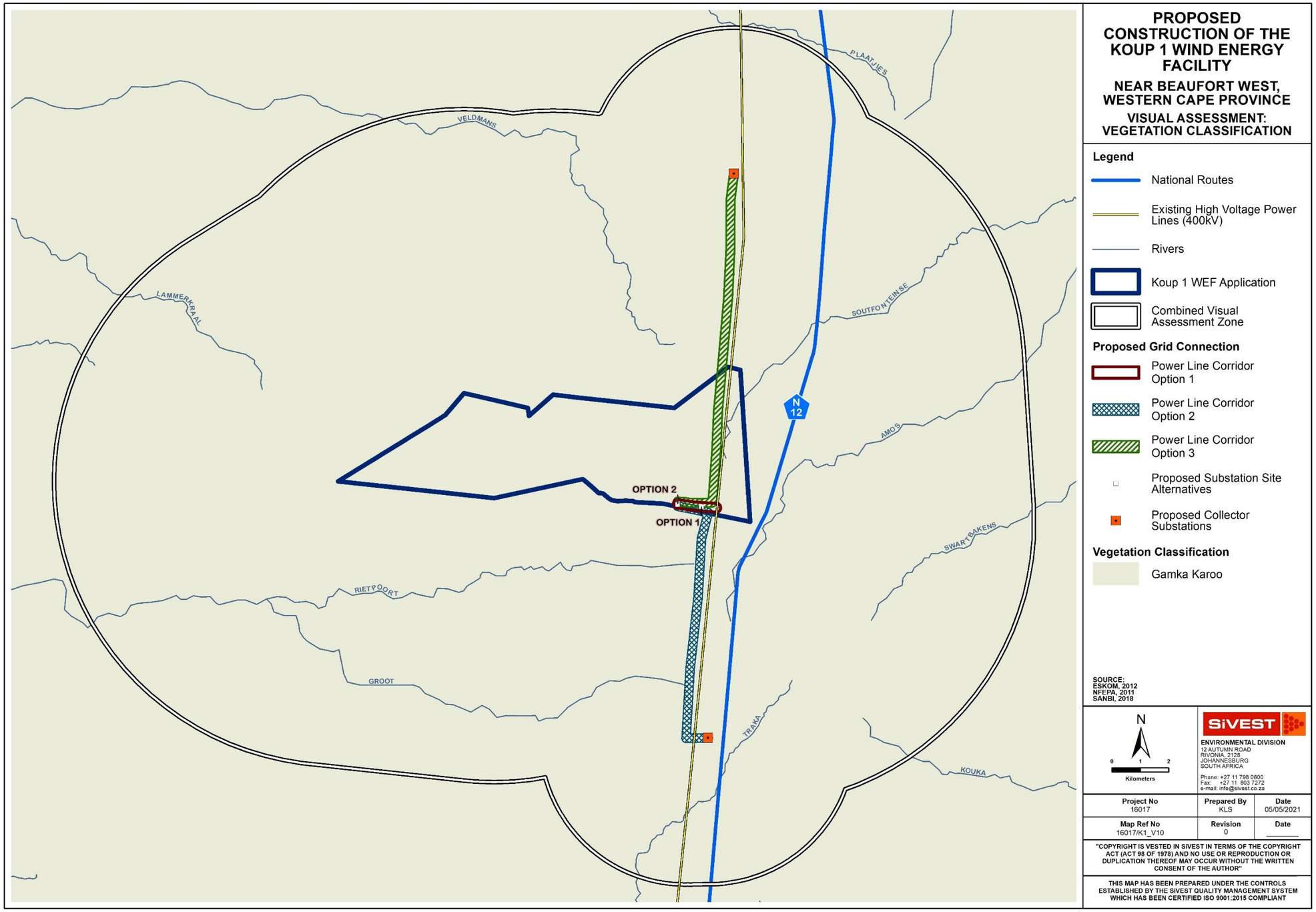
16017/K1_V09	0	_____

MAP 10: Vegetation Classification



PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY

NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: VEGETATION CLASSIFICATION

Legend

- National Routes
- Existing High Voltage Power Lines (400kV)
- Rivers
- Koup 1 WEF Application
- Combined Visual Assessment Zone

Proposed Grid Connection

- Power Line Corridor Option 1
- Power Line Corridor Option 2
- Power Line Corridor Option 3
- Proposed Substation Site Alternatives
- Proposed Collector Substations

Vegetation Classification

- Gamka Karoo

SOURCE:
ESKOM, 2012
NFEPA, 2011
SANBI, 2018

N

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Kilometers

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16017	KLS	05/05/2021
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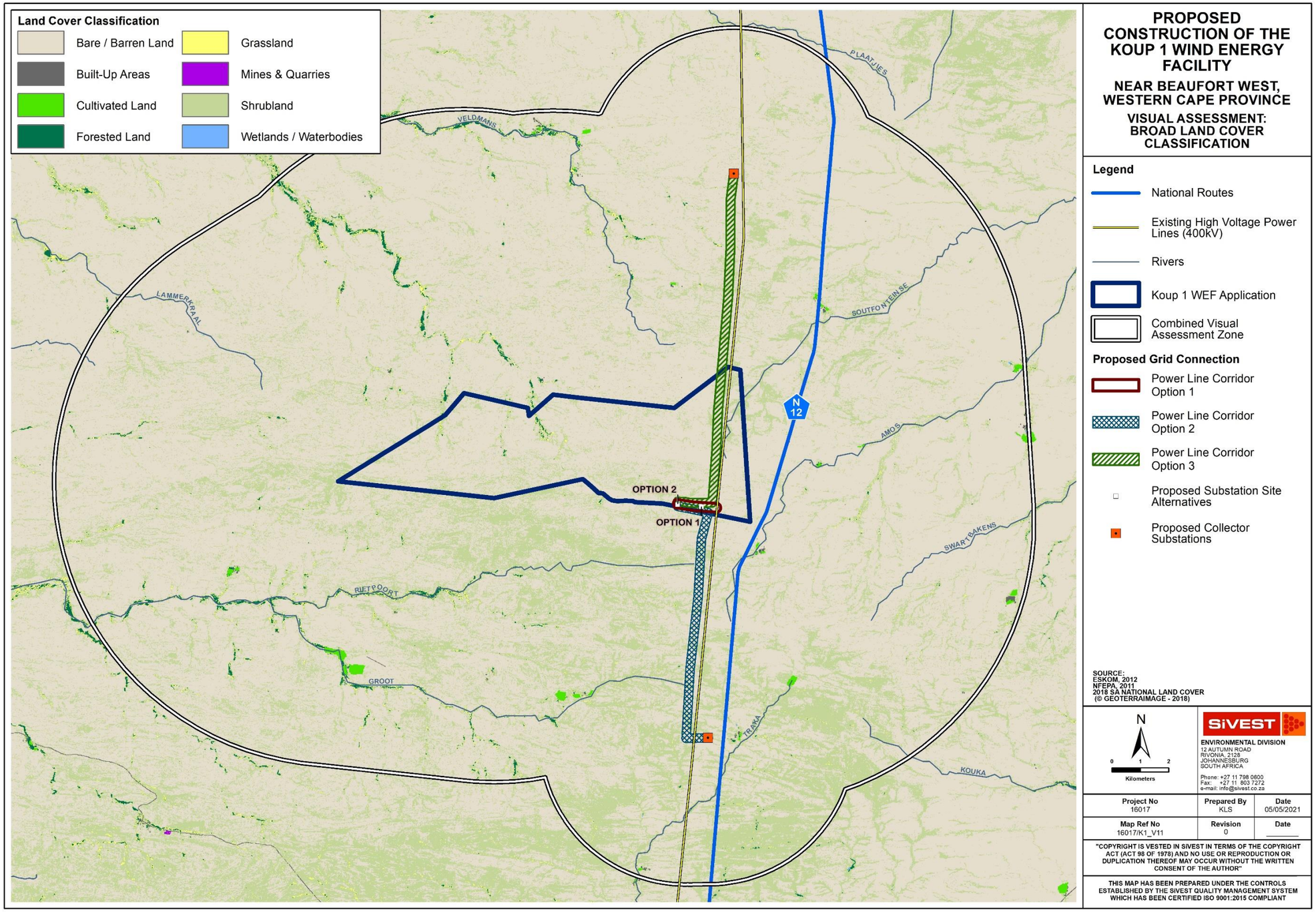
16017/K1_V10	0	

MAP 11: Land Cover Classification



PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY

NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: BROAD LAND COVER CLASSIFICATION

Legend

- National Routes
- Existing High Voltage Power Lines (400kV)
- Rivers
- Koup 1 WEF Application
- Combined Visual Assessment Zone

Proposed Grid Connection

- Power Line Corridor Option 1
- Power Line Corridor Option 2
- Power Line Corridor Option 3
- Proposed Substation Site Alternatives
- Proposed Collector Substations

SOURCE:
ESKOM, 2012
NFEPA, 2011
2018 SA NATIONAL LAND COVER
(© GEOTERRAIMAGE - 2018)

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Kilometers

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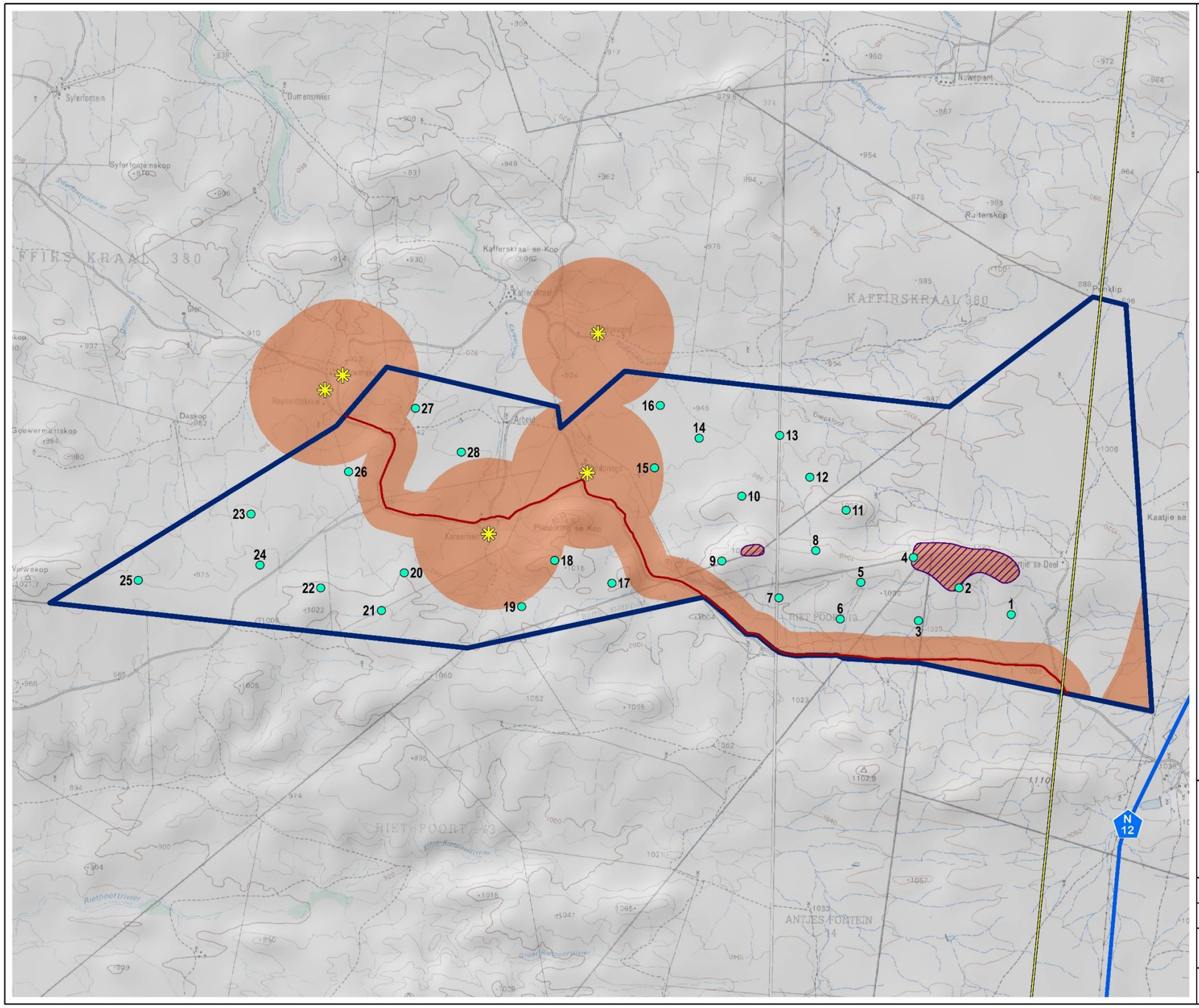
MAP 12: Visual Sensitivity on the Koup 1 WEF Site



PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY

NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: PRELIMINARY SENSITIVITY ANALYSIS - WEF

Legend

- National Routes
- Farm Access Road
- Existing High Voltage Power Lines (400kV)
- Koup 1 WEF Application
- Proposed Turbine Positions
- Farmhouses / Residences
- Visual Sensitivity Zones
- High Ridges (>=1 050msl)

SOURCE:
ESKOM, 2012
NFEPA, 2011
NGI, 2014

N

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Kilometers

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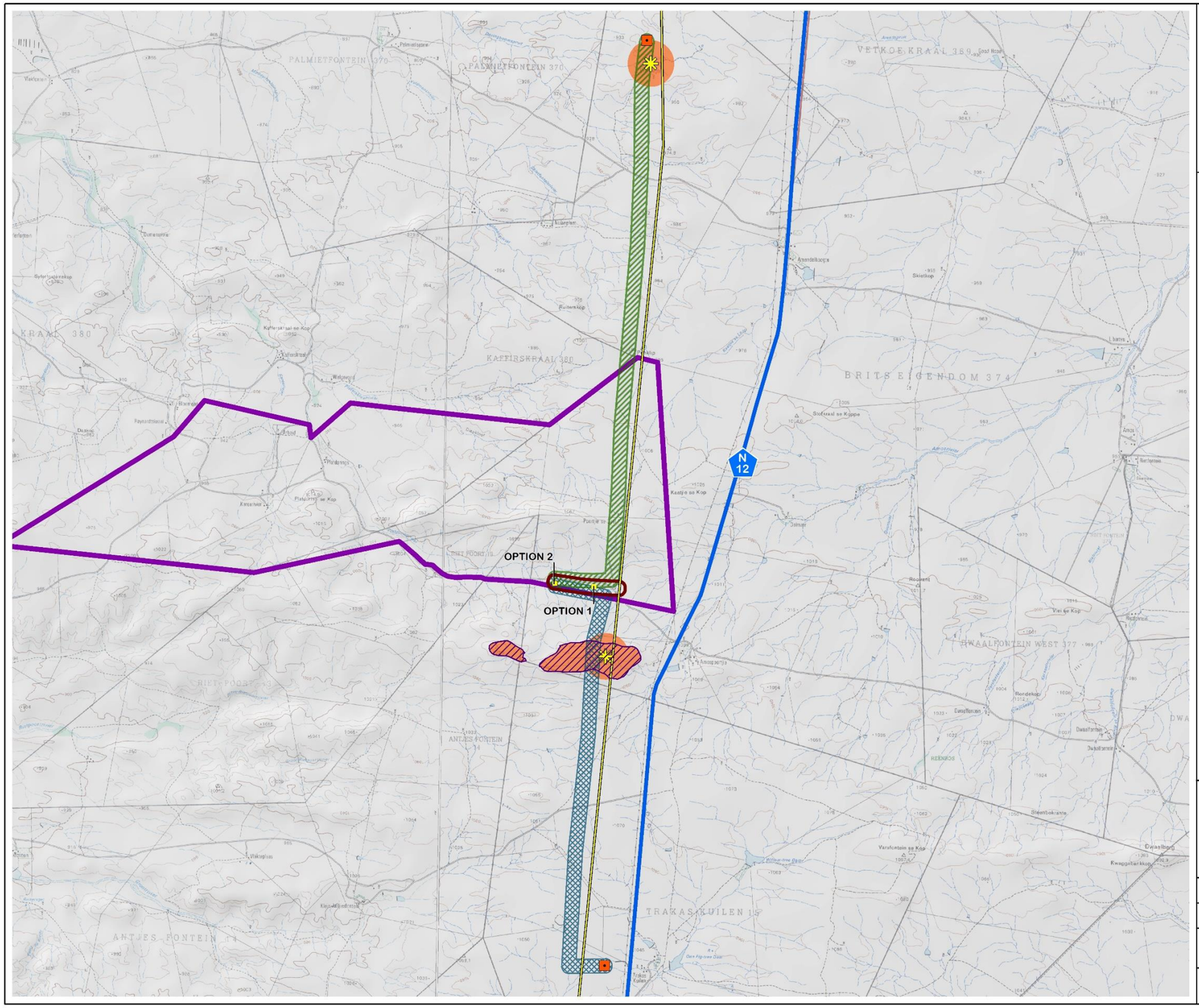
16017/K1_V12	0	

MAP 13: Visual Sensitivity along the Koup 1 Power Lines Assessment Corridors



PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY

NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: PRELIMINARY SENSITIVITY ANALYSIS - 132kV POWER LINE

Legend

- National Routes
- Existing High Voltage Power Lines (400kV)
- Koup 1 WEF Application
- Farmhouses / Residences
- Visual Sensitivity Zones
- Prominent Ridges

Proposed Grid Connection

- Power Line Corridor Option 1
- Power Line Corridor Option 2
- Power Line Corridor Option 3
- Proposed Substation Site Alternatives
- Proposed Collector Substations

SOURCE:
ESKOM, 2012
NGI, 2014

N

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Kilometers

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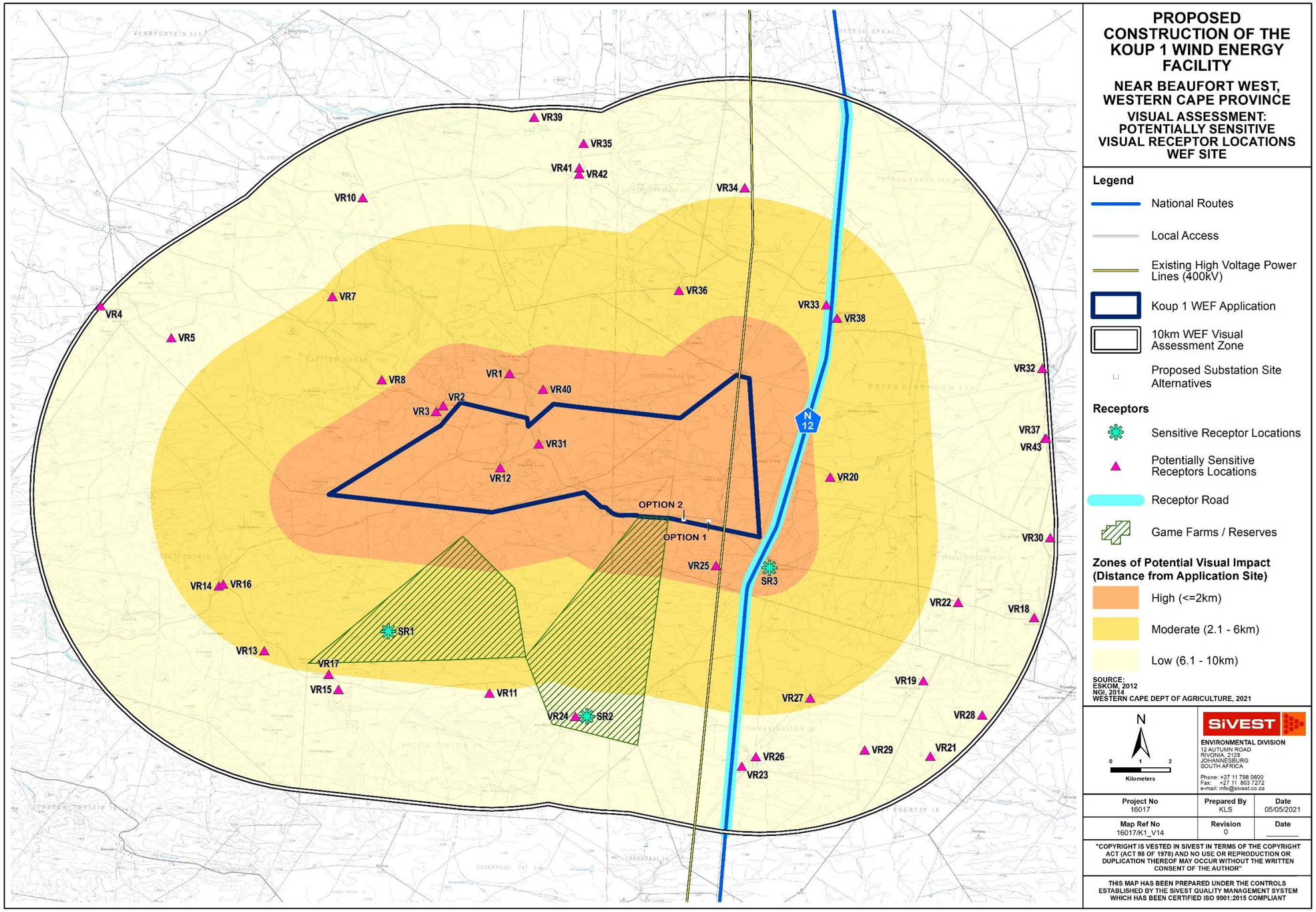
Project No	Prepared By	Date
16017	KLS	05/05/2021
Map Ref No	**Revision**	**Date**
16017/K1_V13	0	

MAP 14: Potentially Sensitive Receptor Locations within 10kms of the Koup 1 WEF Application Site



PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY

NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: POTENTIALLY SENSITIVE VISUAL RECEPTOR LOCATIONS WEF SITE

Legend

- National Routes
- Local Access
- Existing High Voltage Power Lines (400kV)
- Koup 1 WEF Application
- 10km WEF Visual Assessment Zone
- Proposed Substation Site Alternatives

Receptors

- Sensitive Receptor Locations
- Potentially Sensitive Receptors Locations
- Receptor Road
- Game Farms / Reserves

Zones of Potential Visual Impact (Distance from Application Site)

- High (<=2km)
- Moderate (2.1 - 6km)
- Low (6.1 - 10km)

SOURCE:
ESKOM, 2012
NGI, 2014
WESTERN CAPE DEPT OF AGRICULTURE, 2021

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Kilometers

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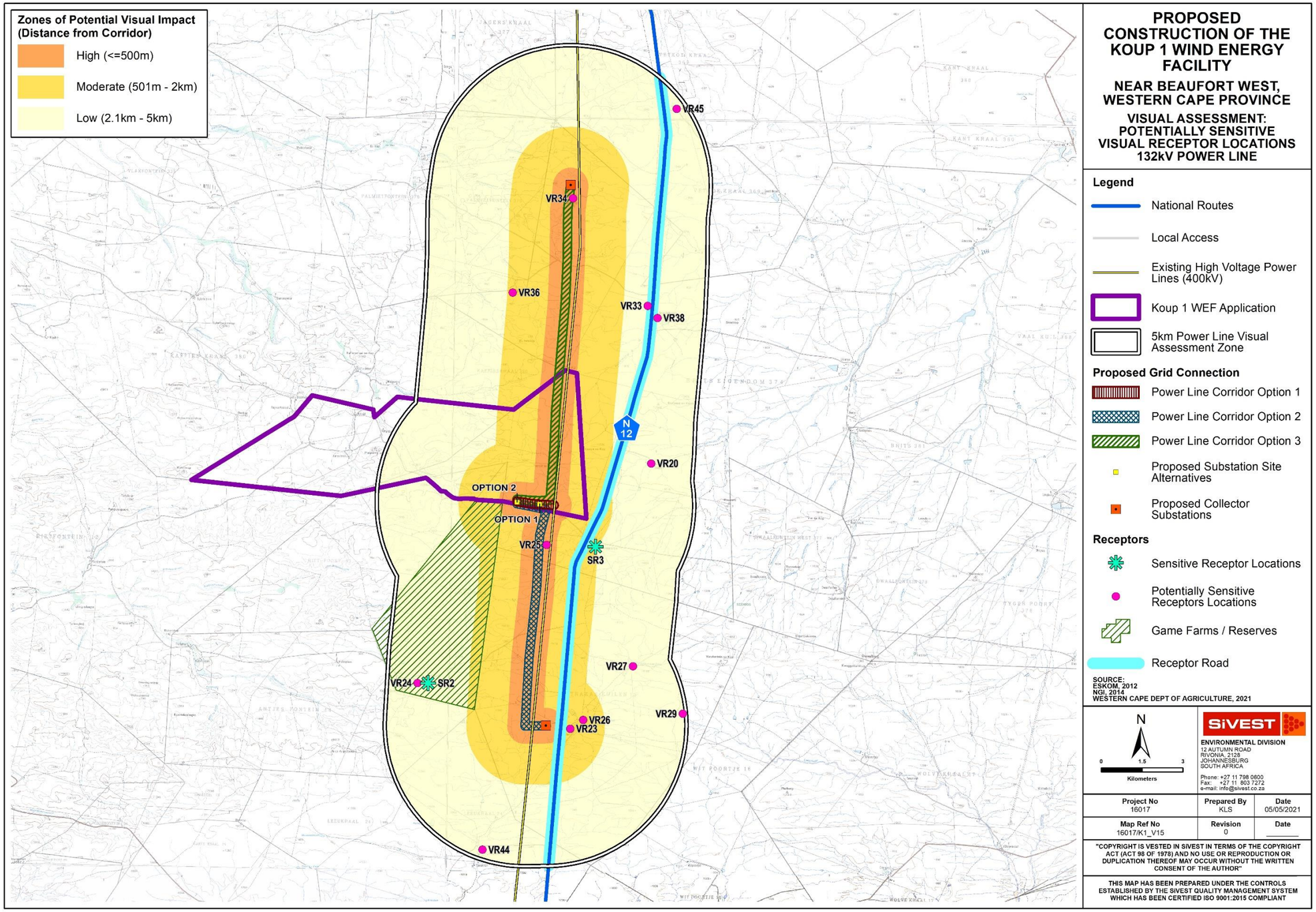
Map Ref No	**Revision**	**Date**
16017/K1_V14	0	

MAP 15: Potentially Sensitive Receptor Locations within 5kms of the Koup 1 132kV Power Line



PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY

NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: POTENTIALLY SENSITIVE VISUAL RECEPTOR LOCATIONS 132kV POWER LINE

Legend

- National Routes
- Local Access
- Existing High Voltage Power Lines (400kV)
- Koup 1 WEF Application
- 5km Power Line Visual Assessment Zone

Proposed Grid Connection

- Power Line Corridor Option 1
- Power Line Corridor Option 2
- Power Line Corridor Option 3
- Proposed Substation Site Alternatives
- Proposed Collector Substations

Receptors

- Sensitive Receptor Locations
- Potentially Sensitive Receptors Locations
- Game Farms / Reserves
- Receptor Road

SOURCE:
ESKOM, 2012
NGI, 2014
WESTERN CAPE DEPT OF AGRICULTURE, 2021

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Kilometers

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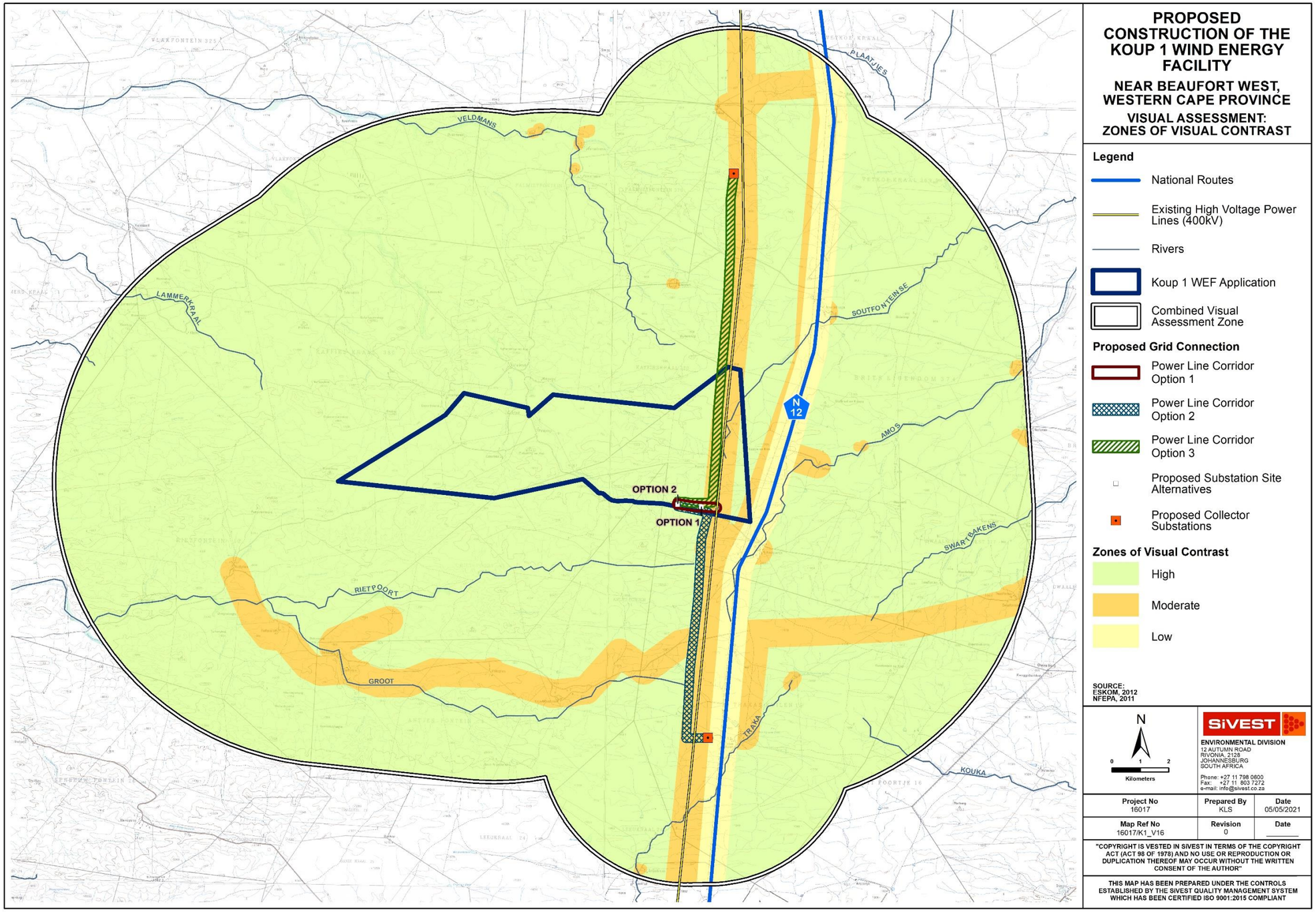
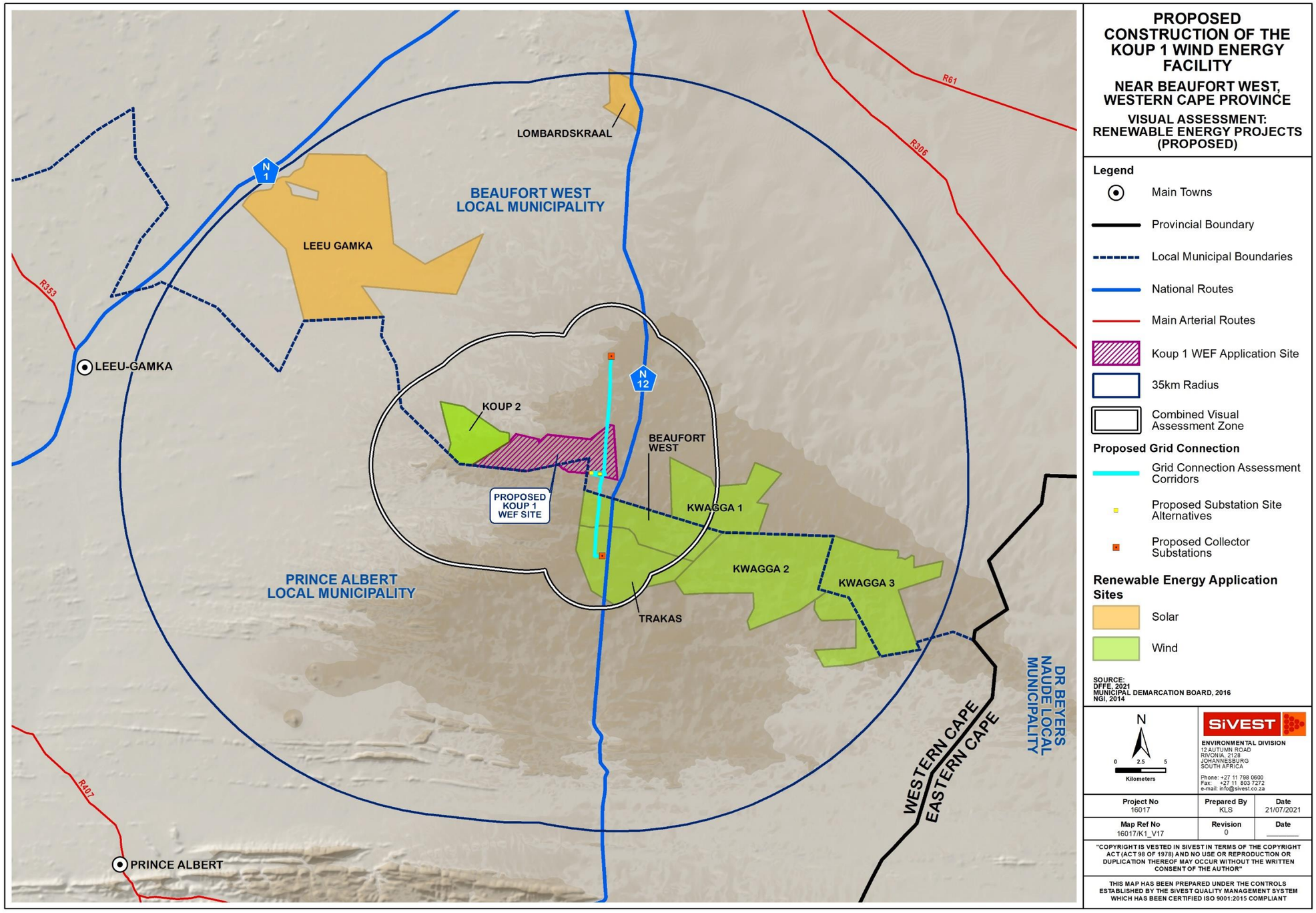
Map Ref No	**Revision**	**Date**
16017/K1_V15	0	_____

MAP 16: Zones of Visual Contrast in the Combined Area



MAP 17: Renewable Energy Facilities Proposed within 35km Radius of Koup 1 WEF Application Site



PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY

NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: RENEWABLE ENERGY PROJECTS (PROPOSED)

Legend

- Main Towns
- Provincial Boundary
- Local Municipal Boundaries
- National Routes
- Main Arterial Routes
- Koup 1 WEF Application Site
- 35km Radius
- Combined Visual Assessment Zone

Proposed Grid Connection

- Grid Connection Assessment Corridors
- Proposed Substation Site Alternatives
- Proposed Collector Substations

Renewable Energy Application Sites

- Solar
- Wind

SOURCE:
DFFE, 2021
MUNICIPAL DEMARCATION BOARD, 2016
NGI, 2014

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Kilometers

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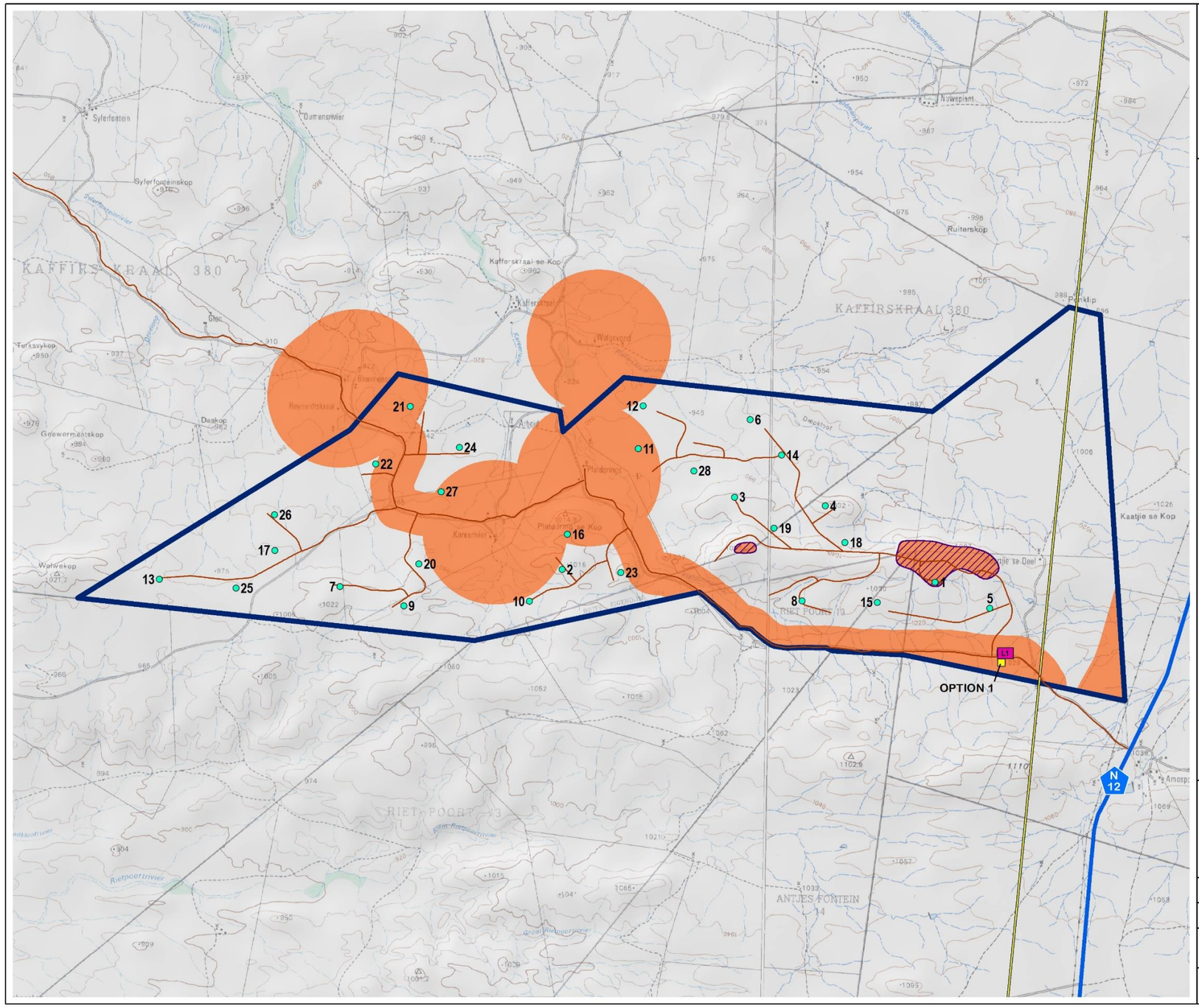
16017	KLS	21/07/2021
Map Ref No	**Revision**	**Date**
16017/K1_V17	0	

MAP 18: Proposed WEF Layout



PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY

NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: PROPOSED LAYOUT

Legend

- National Routes
- Existing High Voltage Power Lines (400kV)
- Koup 1 WEF Application Site
- Visual Sensitivity Zones

Proposed WEF Components

- Turbine Positions
- Preferred Substation Site Alternative
- Preferred Construction Laydown Area
- Internal Road Network

SOURCE:
ESKOM, 2012
NGI, 2014

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Kilometers

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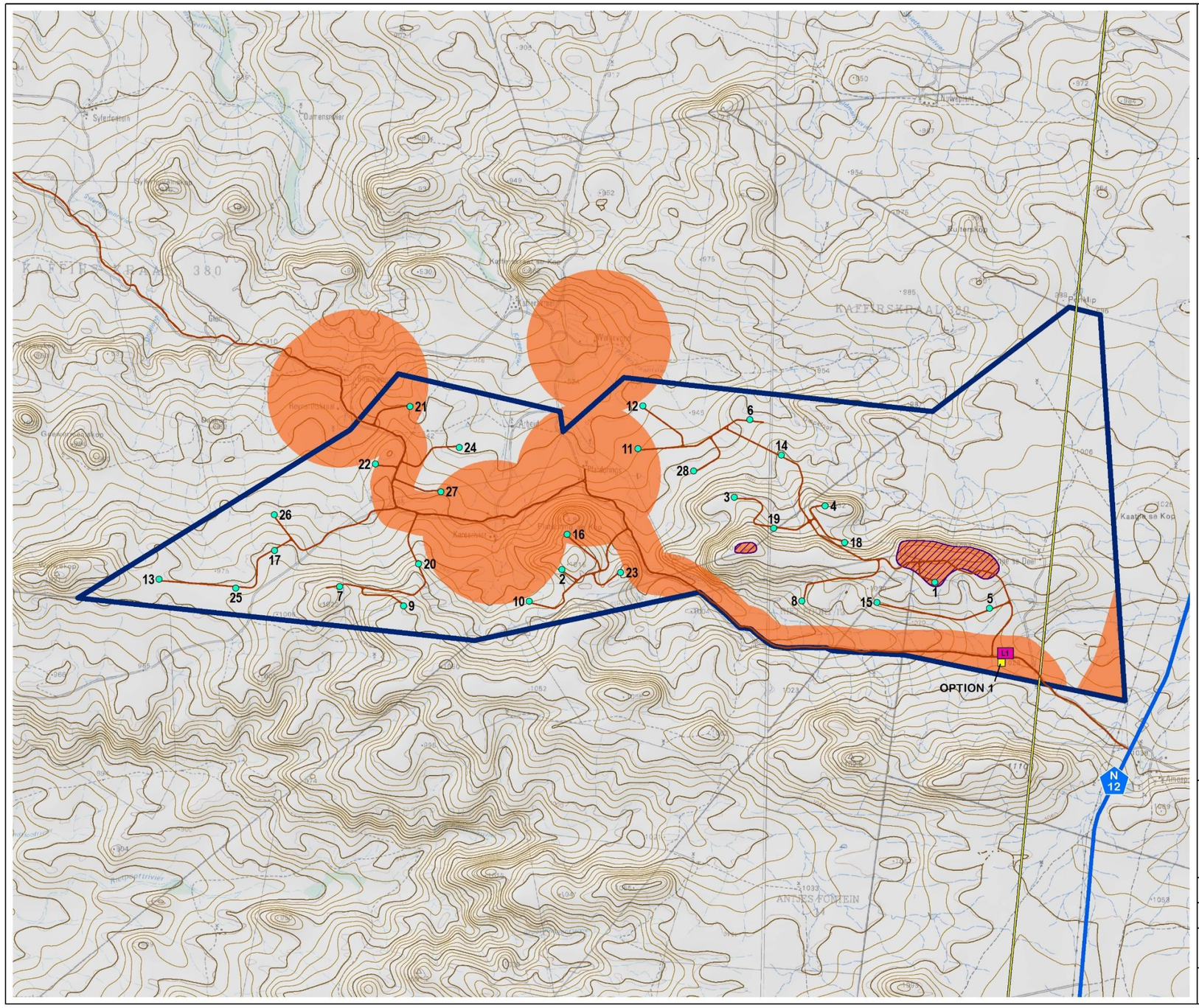
Map Ref No	**Revision**	**Date**
16017/K1_WS10	0	

THIS MAP HAS BEEN PREPARED UNDER THE CONTROLS ESTABLISHED BY THE SIVEST QUALITY MANAGEMENT SYSTEM WHICH HAS BEEN CERTIFIED ISO 9001:2015 COMPLIANT

MAP 19: Refined Koup 1 WEF Layout



PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY

NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: REFINED LAYOUT

Legend

- National Routes
- Existing High Voltage Power Lines (400kV)
- Contours (20m Interval)
- Contours (5m Interval)
- Koup 1 WEF Application Site
- Visual Sensitivity Zones
- High Ridges (>=1 050msl)

Proposed WEF Components

- Turbine Positions
- Preferred Substation Site Alternative
- Preferred Construction Laydown Area
- Internal Road Network

SOURCE:
ESKOM, 2012
NGI, 2014

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Kilometers

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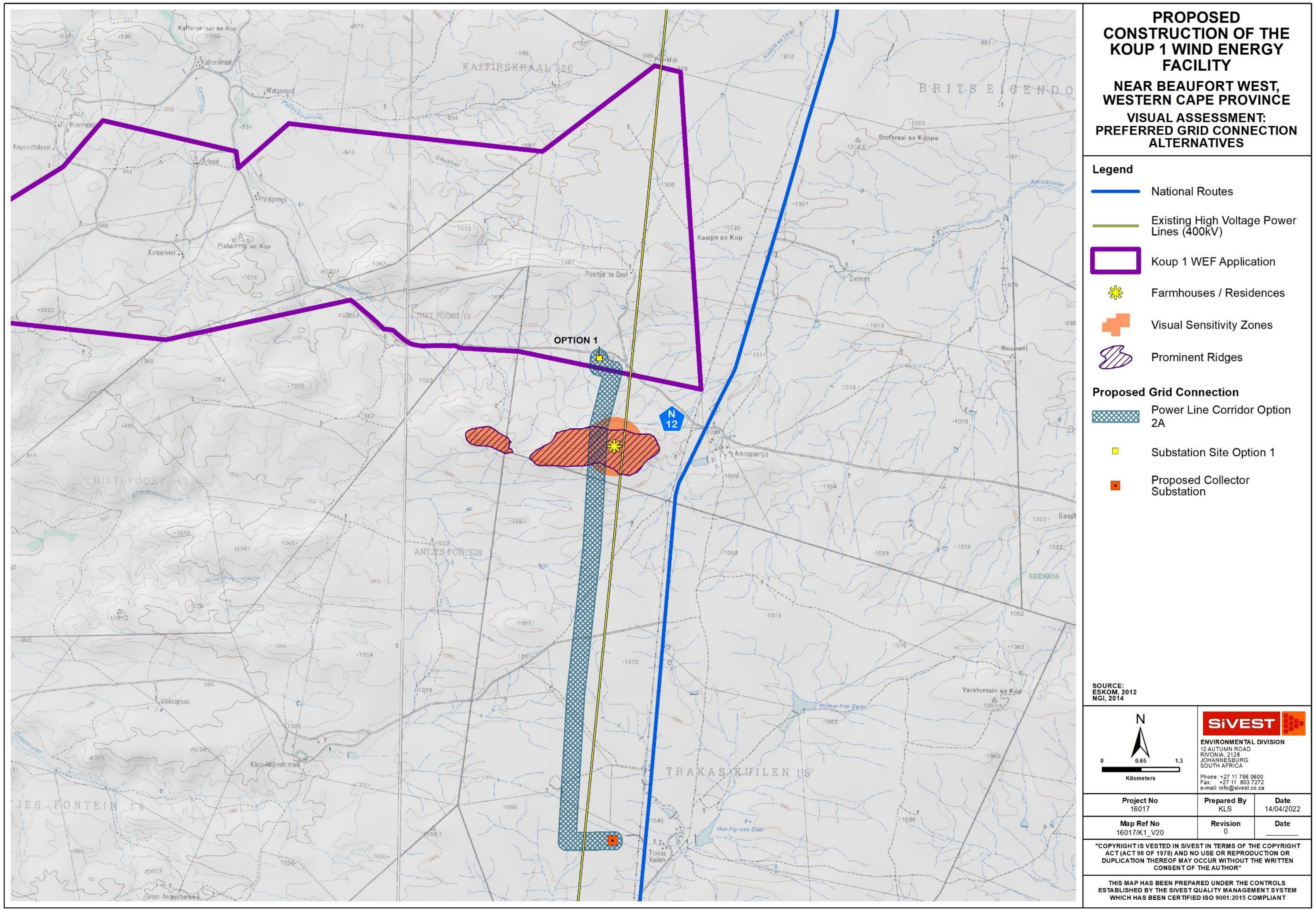
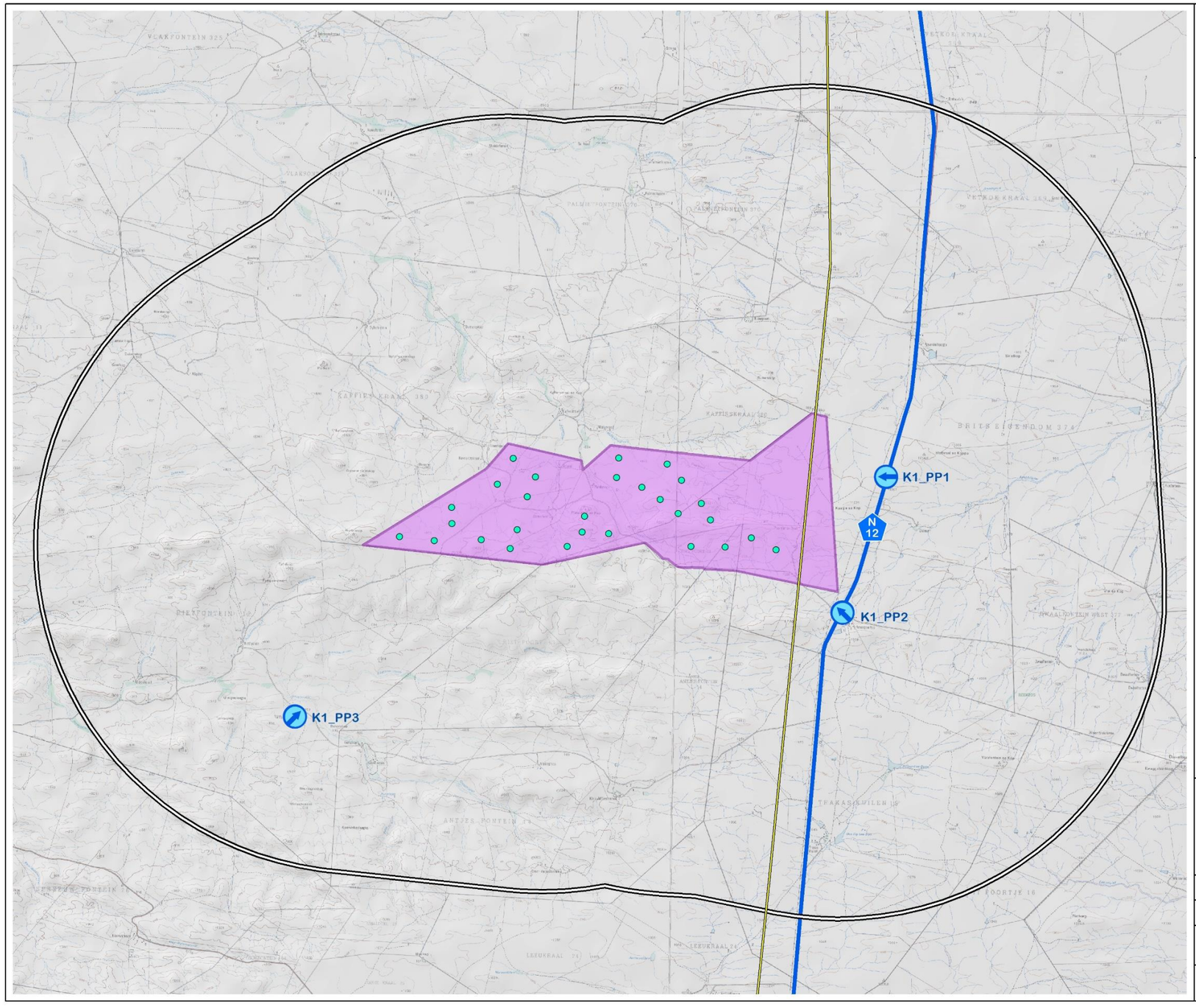
Project No	Prepared By	Date
16017	KLS	14/04/2022
Map Ref No	**Revision**	**Date**
16017/K1_WS19	0	

MAP 20: Preferred Grid Connection Alternatives for Koup 1 WEF



MAP 21: Photomontage View Points for Koup 1 WEF



PROPOSED CONSTRUCTION OF THE KOUP 1 WIND ENERGY FACILITY

NEAR BEAUFORT WEST, WESTERN CAPE PROVINCE

VISUAL ASSESSMENT: PHOTOMONTAGE VIEW POINTS

Legend

- National Routes
- Local Access Roads
- Existing High Voltage Power Lines (400kV)
- Koup 1 WEF Application Site
- 10km WEF Visual Assessment Zone
- Proposed Turbine Positions
- View Points

SOURCE:
ESKOM, 2012
MUNICIPAL DEMARCATION BOARD, 2016
NGI, 2014

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Kilometers

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Project No	Prepared By	Date
16017	KLS	22/04/2022
Map Ref No	**Revision**	**Date**
16017/K1_V21	0	____

Appendix E

Site Sensitivity Verification (in terms of Part A of the Assessment Protocols published in GN 320 on 20 March 2020)

GENESIS ENERTRAG KOUP 1 WIND (PTY) LTD

Proposed Construction of the Koup 1 Wind Energy Facility and Associated Grid Connection Infrastructure near Beaufort West, Western Cape Province

Site Sensitivity Verification Report

DEFF Reference: *(***To be provided***)*
Report Prepared by: SiVEST
Issue Date: 19 July 2021
Version No.: 1

SITE SENSITIVITY VERIFICATION
(IN TERMS OF PART A OF THE ASSESSMENT PROTOCOLS PUBLISHED IN GN 320 ON 20 MARCH 2020

Contents

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SITE SENSITIVITY VERIFICATION
(IN TERMS OF PART A OF THE ASSESSMENT PROTOCOLS PUBLISHED IN GN 320 ON 20 MARCH 2020

1 INTRODUCTION

Genesis Enertrag Koup 1 Wind (Pty) Ltd (hereafter referred to as Genesis) is proposing to construct the 140MW Koup 1 Wind Energy Facility (WEF) and associated grid connection infrastructure near Beaufort West in the Western Cape Province. The proposed WEF development will be subject to a full Environmental Impact Assessment (EIA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended and EIA Regulations, 2014 (as amended). Accordingly, an EIA process as contemplated in terms of the EIA Regulations (2014, as amended) is being undertaken in respect of the proposed WEF project. The competent authority for this EIA is the national Department of Forestry, Fisheries and Environment (DFFE).

Grid connection infrastructure for the WEF will be subject to a separate Basic Assessment (BA) Process as contemplated in terms of regulation 19 and 20 of the Environmental Impact Assessment Regulations, 2014, which is currently being undertaken in parallel to the EIA process.

Specialist studies have been commissioned to assess and verify the proposed development under the new Gazetted specialist protocols[1].

A combined visual impact assessment (VIA) is being undertaken by SiVEST SA (PTY) Ltd as part of the required EIA and BA processes. The aim of the VIA is to identify potential visual issues associated with the proposed WEF and associated infrastructure, as well as to determine the potential extent of visual impacts. This is done by characterising the visual environment of the area and identifying areas of potential visual sensitivity that may be subject to visual impacts. This visual assessment focuses on the potentially sensitive visual receptor locations and provides an assessment of the magnitude and significance of the visual impacts associated with the proposed WEF and the associated grid connection infrastructure.

In accordance with Appendix 6 of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014, a site sensitivity verification has been undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area and to assess the sensitivities against the outputs of the National Web-Based Environmental Screening Tool (Screening Tool).

2 SITE SENSITIVITY VERIFICATION

A site sensitivity verification has been conducted in support of the Visual Impact Assessment (VIA) for the proposed Koup 1 WEF and associated grid connection infrastructure. The verification exercise is based on a desktop-level assessment supported by field-based observation and involved an assessment of factors as outlined below.

[1] Formally gazetted on 20 March 2020 (GN No. 320)

2.1 Physical landscape characteristics

Physical landscape characteristics such as topography, vegetation and land use are important factors influencing the visual character and visual sensitivity of the study area. Baseline information about the physical characteristics of the study area was sourced from spatial databases provided by NGI, the South African National Biodiversity Institute (SANBI) and the South African National Land Cover Dataset (Geoterraimage – 2018). The characteristics identified via desktop analysis were then verified during the site visit.

1.1 Identification of sensitive receptors

Visual receptor locations and routes that are sensitive and / or potentially sensitive to the visual intrusion of the proposed development were identified by way of a desktop assessment as well as field-based investigation. Initially Google Earth imagery (2021) was used to identify potential receptors within the study area and where possible, these receptor locations were verified and assessed during the field investigation.

2.2 Fieldwork and photographic review

A four (4) day site visit was undertaken between the 21st and the 24th of June 2021 (mid winter). The purpose of the site visit was to:

- verify the landscape characteristics identified via desktop means;
- conduct a photographic survey of the study area;
- verify, where possible, the sensitivity of visual receptor locations identified via desktop means;
- eliminate receptor locations that are unlikely to be influenced by the proposed development;
- identify any additional visually sensitive receptor locations within the study area; and
- inform the impact rating assessment of visually sensitive receptor locations (where possible).

2.3 Source of Information

The main sources of information utilised for this site sensitivity verification exercise included:

- Elevation data from 25m Digital Elevation model (DEM) from the National Geo-Spatial Information (NGI);
- 1:50 000 topographical maps of South Africa from the NGI;
- Land cover and land use data extracted from the 2018 South African National Land-Cover Dataset provided by GEOTERRAIMAGE;
- Vegetation classification data extracted from the South African National Biodiversity Institute's (SANBI's) VEGMAP 2018 dataset;
- Google Earth Satellite imagery 2021;

- South African Renewable Energy EIA Application Database from Department of Environmental Affairs (incremental release Quarter 3 2020);
- The National Web-Based Environmental Screening Tool, Department of Forestry, Fisheries and Environment (DFFE);
- VIA for the proposed Beaufort West Renewable Energy Facilities, Bernard Oberholzer, 2010.

3 OUTCOME OF SITE SENSITIVITY VERIFICATION

Overall, sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. As such, a WEF development with associated grid connection infrastructure would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the broader study area. The level of contrast will however be reduced by the presence of the N12 national route and existing high voltage power lines traversing the study area.

A broad-scale assessment of landscape sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a low to moderate visual sensitivity.

A site sensitivity assessment was undertaken to inform the site layout for the WEF and the power line route alignment. The aim of this exercise was to indicate any areas of the application site or grid assessment corridors which should be precluded from the development footprint. From a visual perspective, sensitive areas would be areas where the establishment of wind turbines, power lines or substations would result in the greatest probability of visual impacts on sensitive or potentially sensitive visual receptors.

3.1 WEF Site Sensitivity

Using GIS-based visibility analysis, it was possible to determine that the tip of at least one turbine blade (ie at a maximum height of 300m) would be visible from most identified potentially sensitive receptors in the study area and as such, no areas on the site are *significantly* more visible than the remainder of the site. Consideration was however given to the fact that the visual prominence of a very tall structure such as a wind turbine would be exacerbated if located on a ridge top or a relatively high lying plateau. As such, it is recommended that wind turbines should preferably not be located on the highest ridges (= 1050msl) within the WEF development area. While these ridges could be seen as areas of potentially high visual sensitivity, the study area as a whole is rated as having a low to moderate visual sensitivity, and as such, the sensitivity rating would be reduced to “Medium-High”. Hence the ridges are not considered to be “no go areas”, but rather should be viewed as zones where turbine placement would be least preferred.

From a visual perspective, another concern is the direct visual impact of the turbines on any farmsteads or receptors located on the application site. Accordingly, a 1km visual sensitivity zone has been delineated around the existing residences on the application site and also around the two receptors located within 1km of the site boundary. This 1km buffer is in accordance with the flicker-sensitive buffers applied in the DFFE

Screening Tool. In addition, it is recommended that the following visual sensitivity zones are applied to main roads on or near the application site:

- N12 national route: 1km
- Main access roads on the site: 300m

The preclusion of turbine development from these zones would reduce the direct impact of the turbines on the occupants of the farmsteads and on passing motorists, especially those impacts related to shadow flicker. At this stage however, the visual sensitivity zones are ***not*** considered "no go" areas, but rather should be viewed as zones where development should be limited. It should be stressed that these zones on the WEF development site apply to turbine development only. The visual impacts resulting from the associated on-site infrastructure are considered to have far less significance when viewed in the context of multiple wind turbines and as such the associated on-site infrastructure has been excluded from the sensitivity analysis.

The areas identified as visually sensitive to WEF development are shown in **Figure 1Error! Reference source not found.** below

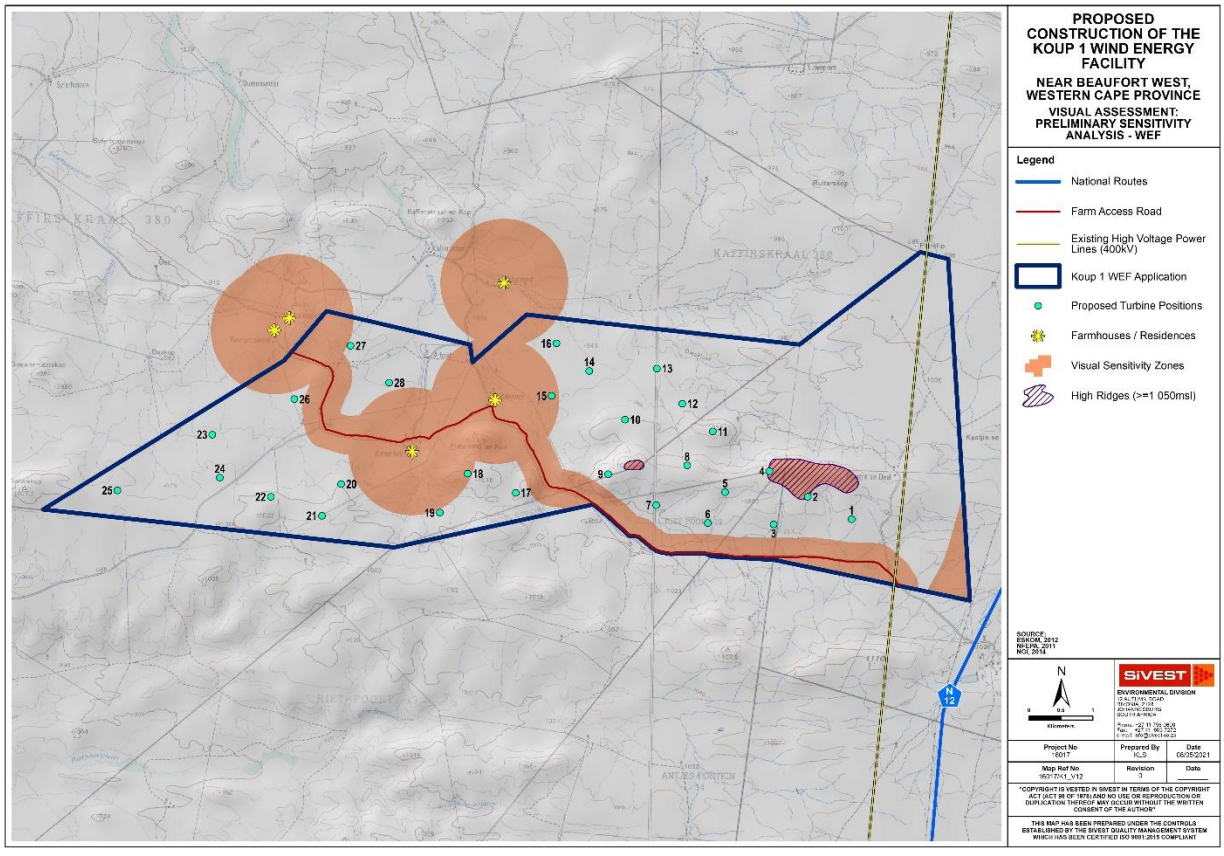

Figure 1: Areas of Potential Visual Sensitivity on the Koup 1 WEF Application Site

3.2 Power Line Route Sensitivity

GIS-based visibility analysis was again used to determine which sectors of the grid assessment corridors would be visible to the highest numbers of receptors in the study area. Although sections of the assessment corridors are expected to be visible from most of the identified receptor locations, one section of Corridor Option 2 is expected to be significantly more visible than all other sections. This section is located immediately south of the Koup 1 WEF application site where the proposed power line route alignment traverses a prominent ridge. While this could be seen as an area of potentially high visual sensitivity, given the low to moderate visual sensitivity rating of the study area as a whole, the sensitivity of the ridge would be reduced to “Medium-High”. Hence this is not considered to be a “no go area”, but rather should be viewed as a zone where power line development would be least preferred.

Additional areas of potential visual sensitivity have been delineated around the identified receptors located within 500m of the grid assessment corridor, these being VR 25 and VR45 which are farmsteads located on Portions 19 and 24 of the Farm Brits Eigendom No 374 respectively. Receptor VR25 is inside power line corridor Option 2, while VR45 is inside power line corridor Option 3. As such, these receptors would be subject to high levels of visual impact from the proposed power lines. The level of visual impact experienced would however be reduced as a result of the proximity of both of these farmsteads to the existing 400kV power lines. The level of impact would also largely depend on the sentiments of the owners/occupants of the farmsteads towards the proposed development and this is not known at this stage. As such, 500 m buffers around the sites were delineated as areas of potential visual sensitivity

The areas of visual sensitivity affecting the grid connection infrastructure are shown in **Figure 2Error! Reference source not found.** below.

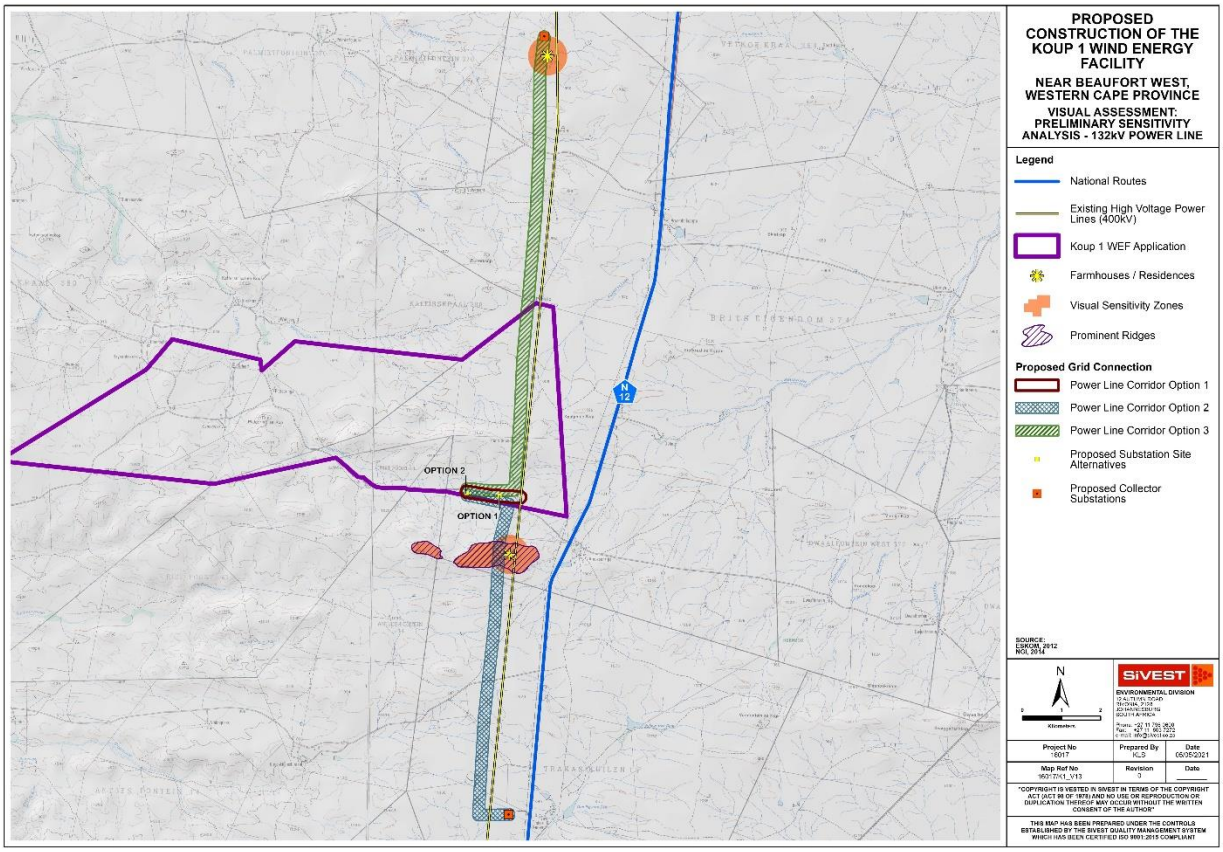

Figure 2: Areas of Potential Visual Sensitivity along the power line assessment corridors

4 NATIONAL ENVIRONMENTAL SCREENING TOOL

4.1 WEF Site Sensitivity

In assessing the potential visual sensitivity of the area to WEF development, consideration was given to the Landscape and Flicker Themes of the National Environmental Screening Tool. Under the Landscape Theme, as shown in **Figure 3** below, the tool identifies areas of Very High sensitivity in respect of WEF development on the Koup 1 WEF site. According to the Screening Tool, the high sensitivity rating applied to the Koup 1 WEF site is associated with the presence of natural features such as mountain tops, high ridges and steep slopes. Based on these criteria, a significant portion of the site would be ruled out for WEF development.

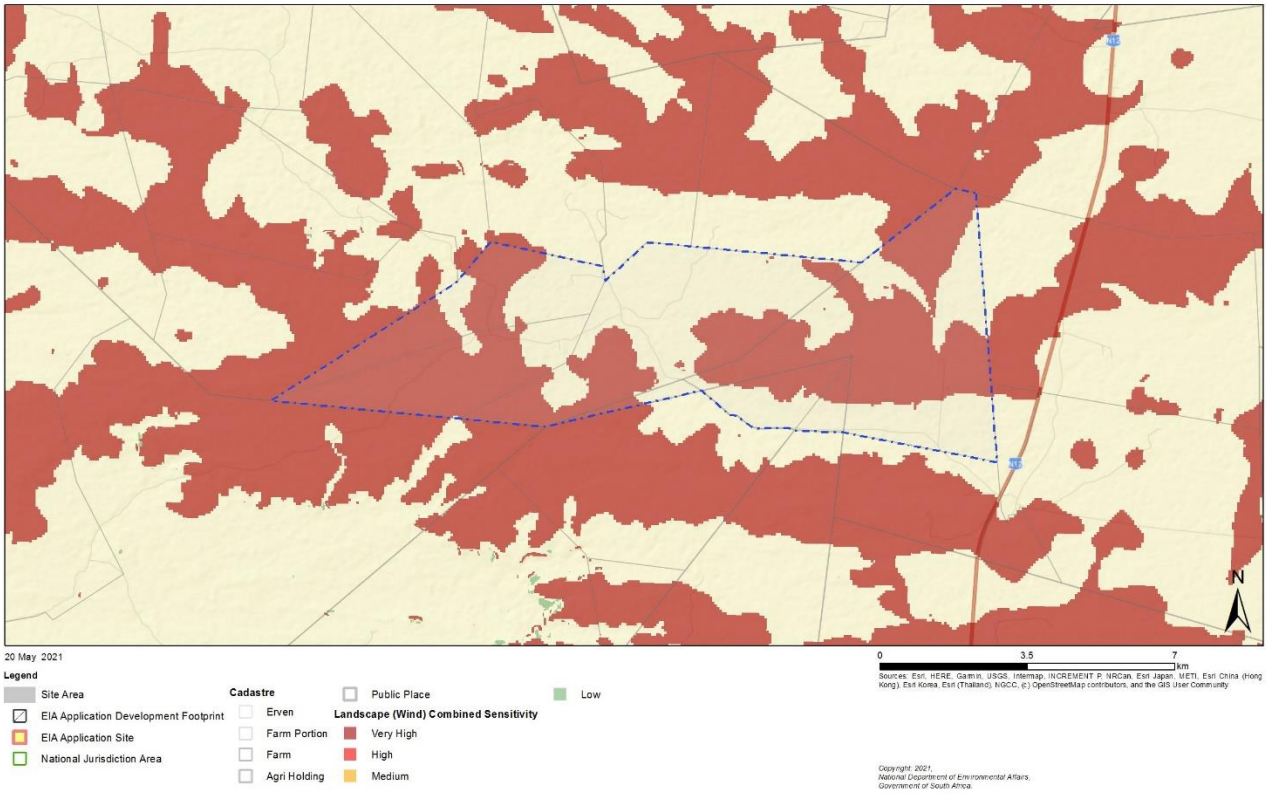

Figure 3: Relative Landscape Sensitivity (May 2021)

The flicker theme demarcates areas (1 km buffers) of sensitivity around identified receptors in the area (**Figure 4**). Under this theme, several “receptors” have been identified on the site, the majority of which are concentrated in the western portion of the site. As a result of the buffers demarcated around these receptors, a significant portion of the site has been assigned a “very high” sensitivity rating.

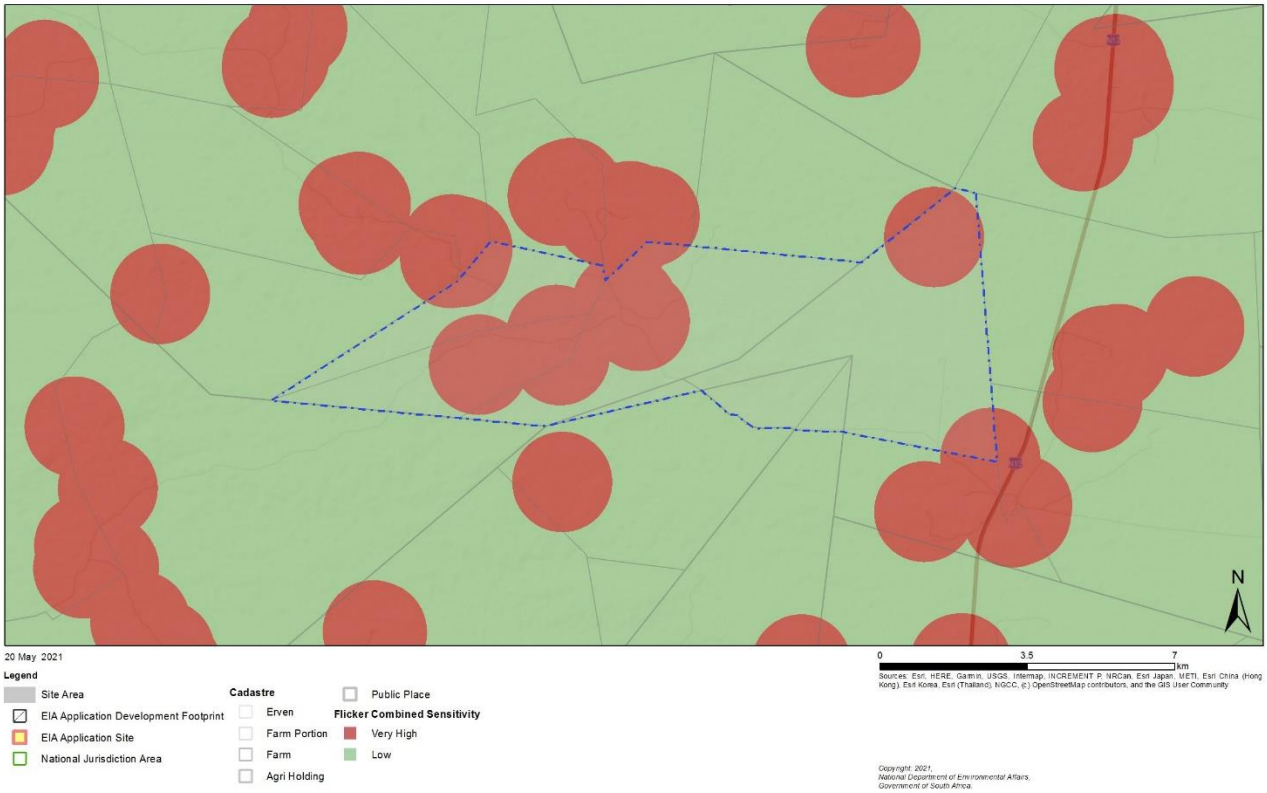

Figure 4: Flicker Sensitivity (May 2021)

The Screening Tool provides a very high level, desktop assessment and as such the results of the study must be viewed against the findings of the field investigation as well as factors affecting visual impact, such as:

- the presence of visual receptors;
- the distance of those receptors from the proposed development; and
- the likely visibility of the development from the receptor locations.

4.2 Sensitivity Analysis Summary for WEF Development

Although the Screening Tool identifies significant areas of very high landscape and flicker sensitivity, the site sensitivity verification exercise conducted in respect of the VIA found little evidence to support this sensitivity rating. The desktop topographic assessment of the area did not indicate the presence of mountaintops, high ridges or any significantly steep slopes. This assessment, confirmed by the field investigation, showed the presence of a few ridges in a largely flat to gently undulating landscape. The sensitivity analysis above has recognised these ridges and identified the higher ridges as zones where development would be least preferred.

The presence of receptors, either on the Koup 1 WEF application, or within 1km of the site boundary, was confirmed by the site sensitivity verification exercise. However, an assessment of receptor locations using

Google Earth showed that there were no receptors present at some of the locations identified by the National Screening Tool. The remaining (confirmed) receptors were factored into the sensitivity analysis, together with a 1km buffer.

4.3 Sensitivities identified by the National Screening Tool: Power Line Route Alternatives

The National Environmental Screening Tool does not identify any landscape sensitivities in respect of the proposed grid connection.

5 CONCLUSION

A site sensitivity verification has been conducted in respect of the Visual Impact Assessment (VIA) for the proposed 140MW Koup 1 WEF and associated grid connection infrastructure near Beaufort West in the Western Cape Province. This verification has been based on a desktop-level assessment supported by field-based observation.

As outlined above, the sensitivities identified have been further assessed in relation to the sensitivities identified in terms of the Landscape and Flicker Themes of the National Environmental Screening Tool and the areas identified as visually sensitive during the course of the specialist Visual Impact Assessment and associated field work have been verified.

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