VISUAL IMPACT ASSESSMENT FOR THE PROPOSED KARREEBOSCH 132KV POWERLINE AND SUBSTATION

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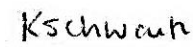

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EXECUTIVE SUMMARY

Karreebosch Wind Farm RF (Pty) Ltd, (hereafter referred to as “Karreebosch'') is proposing to construct a 132 kilovolt (kV) overhead powerline (OHPL) and 33/132kV substation near Matjiesfontein in the Western and Northern Cape Provinces (hereafter referred to as the “proposed development”). The overall objective of the proposed development is to feed the electricity generated by the proposed Karreebsoch Wind Energy Facility (WEF) (authorized under DFFE Ref No.: 14/12/16/3/3/2/807/AM3) into the national grid. The grid connection and substation (this application) require a separate Environmental Authorisation (EA), in order to allow the EA to be handed over to Eskom.

The proposed OHPL and substation project will be subject to a Basic Assessment (BA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) (as amended) and Appendix 1 of the Environmental Impact Assessment (EIA) Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. This visual impact assessment (VIA) is being undertaken as part of the BA process.

The study area has a largely natural, untransformed visual character with some elements of rural / pastoral infrastructure and as such, the proposed powerline and substation development could potentially 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 is however reduced by the presence of the Roggeveld Wind Energy Facility (WEF), associated grid connection infrastructure, Komsberg substation and existing high voltage powerlines located in the central and southern sectors of 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 visual sensitivity. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that would potentially be impacted by a proposed development.

The area is not typically valued for its tourism significance and no formal protected areas were identified within the study area. In addition, there is limited human habitation resulting in relatively few sensitive or potentially sensitive receptors across the entire extent of the study area. The area is however traversed by a recognised scenic route, namely the R354 main road, although visual impacts on travelers using this route will be considerably reduced by distance from the proposed powerline and the hilly terrain that screens views from much of this road.

The Visual Impact Assessment (VIA) identified 12 potentially sensitive receptors in the study area, i.e. within 5kms from the outer boundary of the combined powerline assessment corridor and substation sites. One of these receptors is considered to be a sensitive receptor as they are linked to leisure/nature-based tourism activities in the area. The remaining 11 receptors are all farmsteads that are regarded as potentially sensitive visual receptors as they are located within a mostly natural setting and the proposed development will likely alter natural vistas experienced from these dwellings. Five of these potentially sensitive receptor locations were however found to be outside the

viewshed of the proposed development and thus are not expected to experience any visual impacts as a result of the proposed development. These receptors were therefore removed from the assessment, leaving only 6 potentially sensitive receptors.

The VIA determined that the proposed development will have a low level of impact on the only sensitive receptor (Saaiplaas Guest Farm). Five (5) potentially sensitive receptors will be subjected to moderate levels of visual impact as a result of the proposed powerline development, while one (1) receptor will be subjected to low levels of visual impact. It was noted however, that most of these receptors are located on farms which are within the project areas for approved renewable energy projects. As such the owners / occupants are not expected to perceive the proposed powerline and substation in a negative light.

The overall impact rating revealed that the proposed development is expected to have a negative low visual impact rating during construction, operation and decommissioning phases with a number of mitigation measures available to prevent any additional visual impacts.

Although other renewable energy developments and infrastructure projects, either proposed or in operation, were identified within a 30km radius of the proposed development, it was determined that only 2 of these would have any significant impact on the landscape within the visual assessment zone. These facilities are the authorised Karreeboch WEF (14/12/16/3/3/2/807/AM3) and the operational Roggeveld WEF (12/12/20/1988/1). These facilities and the associated grid connection infrastructure will alter the inherent sense of place and 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.

It is important to note that the study area is located within the Renewable Energy Development Zone (REDZ) 2, namely the Komsberg REDZ , and also within the Central Strategic Transmission Corridor, and thus the relevant authorities support the concentration of renewable energy developments and associated grid connection infrastructure in this area. In addition, it is possible that the renewable energy facilities and associated grid connection elements located in close proximity to each other could be seen as one large facility rather than 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.

A comparative assessment of alternatives was undertaken in order to determine which of the substation sites and powerline corridor alternatives would be preferred from a visual perspective. No fatal flaws were identified for either of the substation site alternatives or any of the proposed powerline corridor alternatives and all alternatives were found to be favourable.

From a visual perspective therefore, the proposed Karreebosch 132kV powerline and associated substation project is deemed acceptable and the Environmental Authorization (EA) should be granted. SLR Consulting (South Africa) (Pty) Ltd (SLR) 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.

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

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	**Section of Report**
1. (1) A specialist report prepared in terms of these Regulations must contain- a) details of- i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	**Section 1.2** Specialist CV's are included in **Appendix A**
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** Error! Reference source not found.
(cA) an indication of the quality and age of base data used for the specialist report;	**Section 1.3**
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	**Section 6, 7 & 9**
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	**Section 1.3**
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	**Section 1.3**
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 6.3**
g) an identification of any areas to be avoided, including buffers;	**Section 6.3**
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** Error! Reference source not found.
k) any mitigation measures for inclusion in the EMPr;	**Section 9**
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 9**
n) a reasoned opinion- i. (as to) whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	**Section 11.1**
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	**N/A** - No feedback has yet been received from the public participation process regarding the visual environment
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	**N/A** - No feedback has yet been received from the public participation process regarding the visual environment
q) any other information requested by the competent authority.	N/A - 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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Glossary of Terms

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.

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

Study area / Visual assessment zone; The study area or visual assessment zone is assumed to encompass a zone of 5km from the outer boundary of the proposed Solar PV Facility application site.

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.

ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
BA	Basic Assessment
DBAR	Draft Basic Assessment Report
DEDECT	Department of Economic Development, Environment, Conservation and Tourism
DEFF	Department of Environment, Forestry and Fisheries
DM	District Municipality
DoE	Department of Mineral Resources and Energy
DTM	Digital Terrain Model
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EMP	Environmental Management Plan
FBAR	Final Basic Assessment Report
GIS	Geographic Information System
HA	Hectares
I&AP	Interested and/or Affected Party
IPP	Independent Power Producer
LM	Local Municipality
kV	Kilovolt
MW	Megawatt
NEMA	National Environmental Management Act
NGI	National Geo-Spatial Information
O&M	Operation and Maintenance
PPA	Power Purchase Agreement
PV	Photovoltaic
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SANBI	South African National Biodiversity Institute
SPEF	Solar Photovoltaic Energy Facility
VIA	Visual Impact Assessment
VR	Visual Receptor
WEF	Wind Energy Facility

Visual Impact Assessment for the Proposed Karreebosch 132kV Powerline

1. INTRODUCTION

Karreebosch Wind Farm RF (Pty) Ltd, (hereafter referred to as "Karreebosch'') is proposing to construct a 132 kilovolt (kV) OHPL and substations near Matjiesfontein in the Western and Northern Cape Provinces (hereafter referred to as the "proposed development"). The overall objective of the proposed development is to feed the electricity generated by the authorised Karreebosch Wind Energy Facility (WEF) (authorized under DFFE Ref No.: 14/12/16/3/3/2/807/AM3) into the national grid. The grid connection and substations (this application) require a separate Environmental Authorisation (EA) to allow the EA to be handed over to Eskom for operation and maintenance purposes.

The entire extent of the proposed 132kV OHPL is located within one of the Strategic Transmission Corridors as defined and in terms of the procedures laid out in Government Notice (GN) No. 113[1], namely the Central Corridor. The proposed overhead powerline and substation project will be subject to a Basic Assessment (BA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) (as amended) and Appendix 1 of the Environmental Impact Assessment (EIA) Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. The competent authority for this BA is the national Department of Forestry, Fisheries and the Environment (DFFE). Specialist studies have been commissioned to assess and verify the proposed OHPL and substations under the new Gazetted specialist protocols[2].

1.1 SCOPE AND OBJECTIVES

This visual impact assessment (VIA) is being undertaken as part of the BA process. The aim of the VIA is to identify potential visual issues associated with the proposed 132kV powerline and substations, 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 potential sensitive visual receptor locations and provides an assessment of the magnitude and significance of the visual impacts associated with the proposed development.

1.2 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. Kerry's GIS skills have been extensively utilised in projects throughout South Africa and in other Southern African countries. In recent years, Kerry has become increasingly involved in the compilation of VIA reports. Kerry's relevant VIA project experience is listed in the table below.

Table 1: Specialist Credentials and Project Experience

Environmental Practitioner	SLR Consulting (South Africa) (Pty) Ltd – Kerry Schwartz

[1] Formally gazetted on 16 February 2018 (GN No. 113)
[2] Formally gazetted on 20 March 2020 (GN No. 320)

Contact Details	**klschwartz@slrconsulting.com**
Qualifications	BA (Geography), University of Leeds 1982
Expertise to carry out the Visual Impact Assessment.	**Visual Impact Assessments:** • VIA (BA) for the proposed construction of the Oya 132kV powerline near Matjiesfontein, Northern and Western Cape Provinces; • VIA (BA) for the proposed construction of 132kV powerlines to serve the authorised Loeriesfontein 3 PV Solar Energy Facility near Loeriesfontein, Northern Cape Province; • 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) • Landscape Character Assessment for Mogale City Environmental Management Framework

A full CV is attached as **Appendix A** and a signed specialist declaration of independence is included in **Appendix B** of this specialist assessment**.**

1.3 ASSESSMENT METHODOLOGY

This VIA has been based on a desktop-level assessment supported by field-based observation drawn from a site visit undertaken between 30th August and 1st September 2021.

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 – 2020). The characteristics identified via desktop analysis were later verified during the site visit.

1.3.1 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 assessed in order to determine the impact of the proposed development on each of the identified receptor locations.

1.3.2 Fieldwork and photographic review

A three (3) day site visit was undertaken between the 30th August and 1st of September 2021 (late winter). The aim 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).

1.3.3 Visual Sensitivity

Areas of potential visual sensitivity along the powerline assessment corridors were demarcated, these being areas where the establishment of a powerline or other associated infrastructure would result in the greatest

probability of visual impacts on potentially sensitive visual receptors. GIS-based visibility analysis was used to determine which route alternatives would be visible to the highest numbers of receptors in the study area.

In addition, the National Environmental Screening Tool[3] was examined to determine any relative landscape sensitivity in respect of the proposed development.

1.3.4 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) to minimise the visual impact of the proposed development. The rating matrix made use of several 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.

1.3.5 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. Although I&APs have not yet provided any feedback in this regard, the report will be updated to include relevant information as and when it becomes available. If no relevant comments are received requiring the report to be updated, the report will automatically inform the final BA report.

1.4 SOURCES OF INFORMATION

The main sources of information utilized for this VIA included:

- Project description for the proposed powerline and substation development provided by Karreebosch;
- 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 2020 South African National Land-Cover Dataset provided by GEOTERRAIMAGE;

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

- 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 2 2021);
- The National Web-Based Environmental Screening Tool, DFFE;
- VIA for the proposed Karreebosch WEF, MetroGIS 2015; and
- VIA for the proposed Kudusberg WEF, SiVEST 2019;

2. ASSUMPTIONS AND LIMITATIONS

- Substations and powerlines are very large structures by nature and could impact on receptors that are located relatively far away, particularly in areas of very flat terrain. Given the nature of the receiving environment and the height of the various components of the proposed development, the study area or visual assessment zone is assumed to encompass a zone of 5 km from the outer boundary of the combined powerline assessment corridors and substation sites. This 5 km limit on the visual assessment zone relates to the importance of distance when assessing visual impacts. Although the proposed development may still be visible beyond 5 km, the degree of visual impact would diminish considerably and as such the need to assess the impact on potential receptor locations beyond this distance would not be warranted.

- 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 30th August and the 1st of September 2021.

- Due to the extent of the respective study area and the nature of the terrain, it was not possible to visit or verify every potentially sensitive visual receptor location. As such, several broad assumptions have been made in terms of the likely sensitivity of the receptors to the proposed development. It should be noted 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". Sensitive receptor locations typically include sites such as tourism facilities and scenic locations within natural settings which are likely to be adversely affected by the visual intrusion of the proposed development. 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.

- As stated above, 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 Karreebosch, all analysis undertaken for this VIA is based on a worst-case scenario where the maximum height of the powerline tower structures is assumed to be 40m. Substation facilities 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 the study area derived from the National Geo-Spatial Information (NGI)'s 25m DEM is fairly coarse and somewhat inconsistent and as such, localised topographic variations in the landscape may not be reflected on the Digital Elevation Model (DEM) used to generate the viewsheds and visibility analyses conducted in respect of the proposed development.

- In addition, the viewshed / visibility analysis 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 Basic Assessment Report (DBAR) 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 required for the proposed development and therefore the potential impact of lighting at night has not been assessed at a detailed level. It is however assumed that operational and security lighting will be required for the proposed substations and general measures to mitigate the impact of additional light sources on the ambient nightscape have been provided accordingly.

- 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.

- Information for the surrounding planned renewable energy developments, provided by the Environmental Assessment Practitioner (EAP), was factored into the cumulative impact assessment (**Section** Error! Reference source not found.).

- No visualisation modelling was undertaken for the proposed development as this is not normally required for linear infrastructure. This can however be provided should the Public Participation Process identify the need for this exercise.

- It should be noted that the site visits were undertaken during late winter (30th August to 1st September 2021). The study area is however typically characterised by low levels of rainfall all year round and therefore the season is not expected to affect the significance of the visual impact of the proposed development.

- Clear weather conditions tend to prevail throughout most of the year in this area, and in these clear conditions, powerlines and associated infrastructure would present a greater contrast with the surrounding landscape than they would on a cloudy overcast day. Both clear and cloudy weather conditions were experienced during the field investigation and these factors were taken into consideration when undertaking this VIA.

3. TECHNICAL DESCRIPTION

3.1 PROJECT LOCATION

The proposed OHPL and substation project area is located approximately 34 km north of Matjiesfontein, originating in the Karoo Hoogland Local Municipality in the Northern Cape, extending into the Laingsburg Local Municipality in the Western Cape Province before linking in to the Komsberg substation. (**Figure 1**).

The proposed overhead powerline corridors and substations will affect the following properties:

- Portion 2 (Nuwe Kraal) of Farm Ek Kraal No. 199
- Remainder of Farm Wilgebosch Rivier No. 188
- Remainder of Farm Klipbanks Fontein No. 198
- Portion 1 of Farm Klipbanks Fontein No. 198
- Remainder of Farm Karreebosch No. 200
- Portion 1 of Farm Ek Kraal No. 199
- Remainder of Farm Ek Kraal No.199
- Remainder of Farm Bon Espirange No. 73
- Farm Rietfontein No. 197
- Portion 1 of Farm Bon Espirange No. 73
- Farm Aprils Kraal No. 105
- Portion 2 of Farm Standvastigheid No. 210
- Remainder of Farm Standvastigheid No. 210

As previously stated, the entire extent of the proposed 132kV OHPL is located within a Strategic Transmission Corridor as defined and in terms of the procedures laid out in Government Notice (GN) No. 113, namely the Central Corridor.

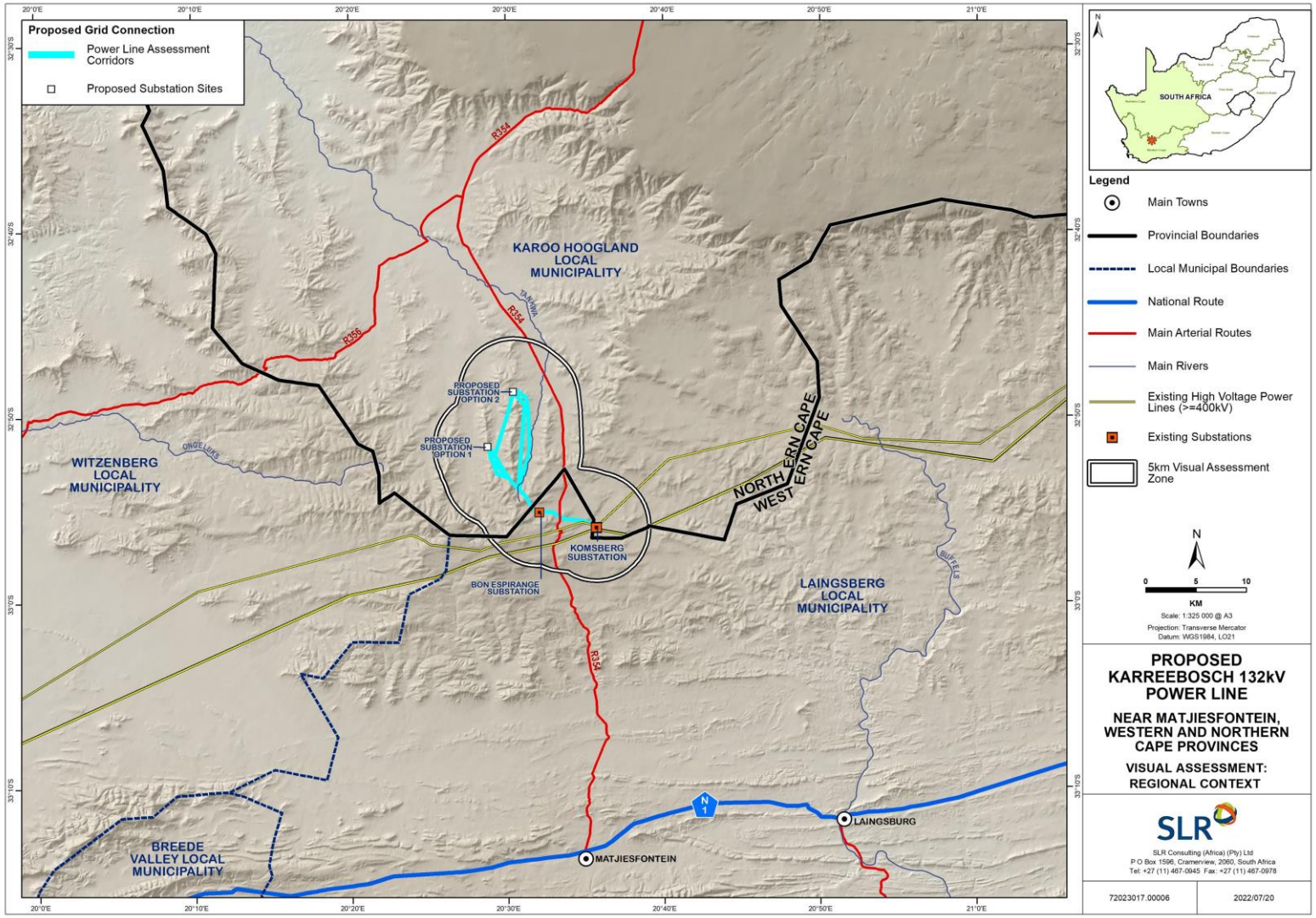

Figure 1: Proposed Powerline Route Alternatives and Substation in the Regional Context

3.2 PROJECT TECHNICAL DETAILS

At this stage, it is anticipated that the proposed development will include a 132kV OHPL and a 33/132kV substation (and associated internal access roads) to feed electricity generated by the Karreebosch WEF (EA Ref: 14/12/16/3/3/2/807/AM3, which is currently undergoing a Part 2 EA amendment, final layout and EMPr approval process), into the national grid at the existing Komsberg substation via the existing Bon Espirange substation.

The OHPL will be a 132kV twin tern double circuit overhead powerline. The powerline towers will either be steel lattice or monopole structures, which will be up to 40m in height. Towers are expected to be located on average 200m to 250m apart, although longer spans may be needed due to terrain and watercourse crossings. Pole positions will only be available once the powerline detail design has been completed by the Eskom Design Review Team (DRT). However, a 400m wide assessment corridor is being considered and has been walked down by the specialists for approval to allow for micro siting of tower positions once the detailed design has been completed.

3.2.1 Substation and Route Alternatives

Two substation alternatives with associated route alternatives are being assessed for the section of the OHPL connecting the proposed on-site Karreebosch substation to the authorised and existing Bon Espirange Substation (DFFE Ref. 14/12/16/3/3/1/1544). This grid infrastructure will specifically serve the Karreebosch WEF.

Only 1 OHPL route is technically feasible for the section of the proposed powerline directly preceding the existing Bon Espirange Substation (Route 3) and for the section connecting the Bon Espirange substation to the Komsberg substation (Bon Espirange to Komsberg Route), which is approximately 9.2 km in length. No alternatives can therefore be provided for these two sections of the OHPL (Route 3 and Bon Espirange to Komsberg Route).

Six (6) OHPL route alternatives (Options 1A, 1B, 1C, 2A, 2B and 2C) are proposed between the Karreebosch WEF onsite 33/132kV substation (substation alternatives: Option 1 and Option 2) and Route 3 preceding the existing Bon Espirange Substation. As noted above, all of the six OHPL route alternatives follow the same routing from their point of convergence on Remainder of farm Ek Kraal No.199, approximately 3.1 km before the Bon Espirange Substation, to the Komsberg Substation situated on Portion 2 of Farm Standvastigheid No. 210.

These alternatives are described below:

- **OHPL Route Option 1:** Three (3) OHPL route alternatives are being considered for the link between Substation Option 1 and the Bon Espirange Substation and Komsberg Substation, these being:
  - Option 1A (approximately 14.51 km in length in its entirety from Substation Option 1 to the Komsberg Substation);
  - Option 1B (approximately 17.28 km in length in its entirety from Substation Option 1 to the Komsberg Substation); and

  - Option 1C (approximately 13.91 km in length in its entirety from Substation Option 1 to the Komsberg Substation).
  - Option 1B (approximately 11.4 km in length); and
  - Option 1C (approximately 8.2 km in length).

- **OHPL Route Option 2:** Three (3) OHPL route alternatives are being considered for the link between Substation Option 2 and the Bon Espirange Substation and Komsberg Substation, these being:
  - Option 2A (approximately 20.47 km in length in its entirety from Substation Option 2 to the Komsberg Substation);
  - Option 2B (approximately 16.63 km in length in its entirety from Substation Option 2 to the Komsberg Substation); and
  - Option 2C (approximately 20.52 km in length in its entirety from Substation Option 2 to the Komsberg Substation).

Alternatives 1A-C feed out of Substation Option 1 proposed in the south-central portion of the Farm Klipbanks Fontein 198/1.

Alternatives 2A-C feed out of Substation Option 2 proposed in the south-eastern corner of Wilgebosch Rivier 188/RE.

The preferred alternative is depicted in **Figure 2**.

3.2.2 No-Go Alternative

The 'no-go' alternative is the option of not developing the proposed project, thus preventing the proposed Karreebosch WEF from feeding electricity into the national grid. This alternative would not result in any environmental impacts within the assessment corridors or in the surrounding local area and the status quo would remain. This scenario provides the baseline against which other alternatives are compared and will be considered throughout the report.

While the 'no-go' option is a feasible option, it would prevent the proposed development from contributing to the environmental, social and economic benefits associated with the development of the renewables sector.

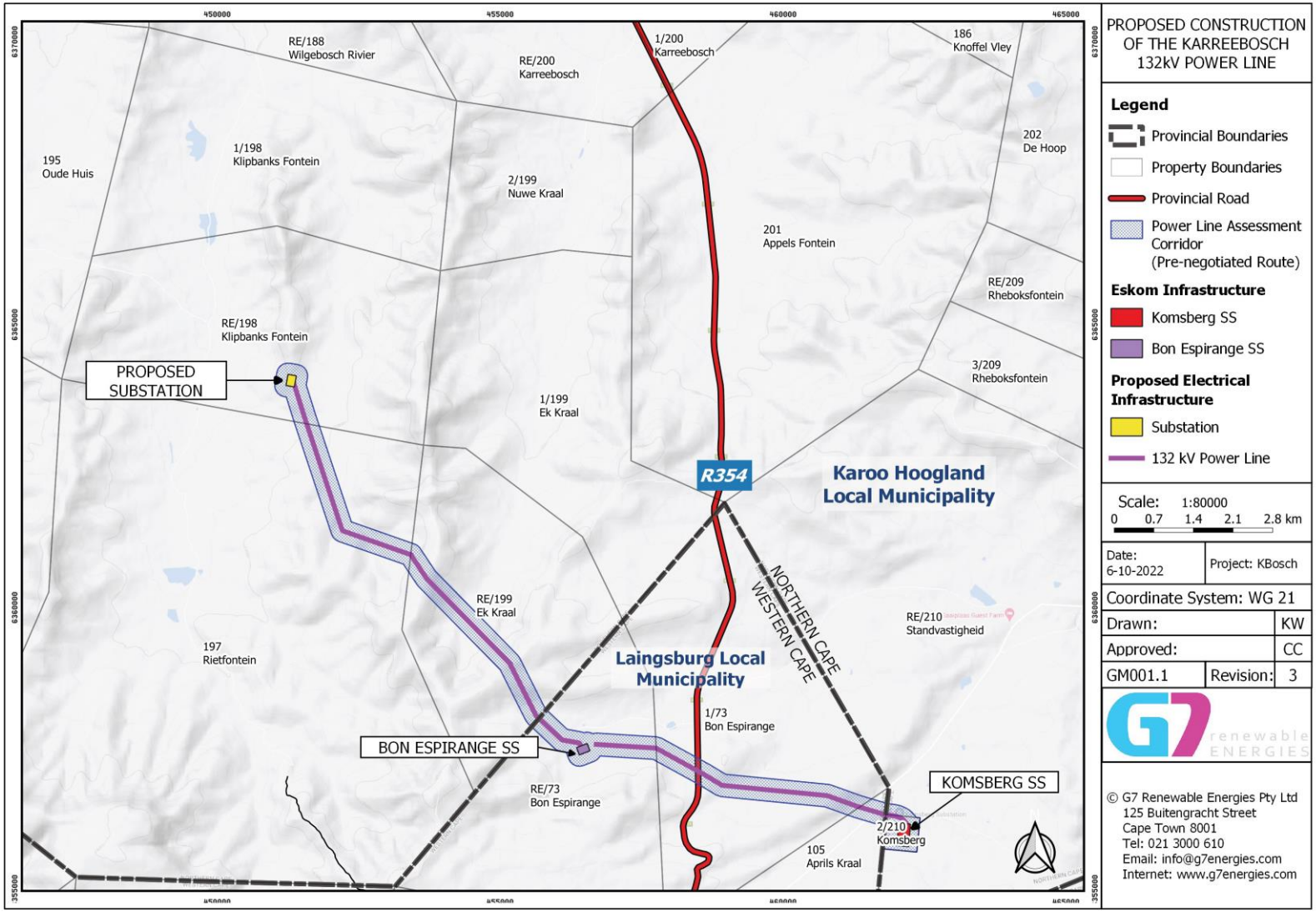

Figure 2: Overview of Preferred Route Alternatives

4. LEGAL REQUIREMENT AND GUIDELINES

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

In terms of the NEMA and the EIA Regulations 2014 (as amended), the proposed development includes listed activities which require a BA to be undertaken. As previously stated, the entire extent of the proposed 132kV overhead powerline is located within one of the Strategic Transmission Corridors as defined and in terms of the procedures laid out in Government Notice (GN) No. 113, namely the Central Corridor. The proposed overhead powerline and substation project irrespective would be subject to a BA process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) (as amended) and Appendix 1 of the EIA Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. The competent authority for this BA is the National Department of Environment, Forestry and Fisheries (DEFF).

As part of this BA process, the need for a VIA to be undertaken has been identified in order to assess the visual impact of the proposed grid connection infrastructure. The VIA must adhere to the requirements for specialist studies as stipulated in Appendix 6 of the NEMA EIA Regulations, 2014, as amended;

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

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

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. It should be noted however that these aspects have been considered in the Terrestrial Biodiversity and Heritage Impact Assessments undertaken in respect of the proposed development.

5. FACTORS INFLUENCING VISUAL IMPACT

5.1 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. It is largely based on the viewer's perception and 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 powerlines and associated infrastructure to be a negative visual impact as they are often associated with employment creation, social upliftment and the general growth and progression of an area, and thus the development could even have positive connotations.

5.2 VISUAL ENVIRONMENT

Powerlines and substations are not features of the natural environment but are rather a representation of human (anthropogenic) alteration. As such, this type of development is likely to be perceived as visually intrusive when placed in a largely undeveloped landscape that has a natural scenic quality and where tourism activities, based upon the enjoyment of (or exposure to) the scenic or aesthetic character of the area, are practiced. Residents and visitors to these areas could perceive the powerlines, substations and associated infrastructure to be highly incongruous in this context and may regard these features as an unwelcome intrusion which degrade the natural character and scenic beauty of the area, and which could potentially even compromise the practising of tourism activities in the area. The experience of the viewer is however highly subjective and there are those who may not perceive features such as powerlines and substations as a visual intrusion.

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 new powerline or substation into this setting may be considered to be less visually intrusive than if there was no existing built infrastructure visible.

5.3 TYPE OF VISUAL RECEPTOR

Visual impacts can be experienced by different types of receptors, including people living, 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 places 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** 3).

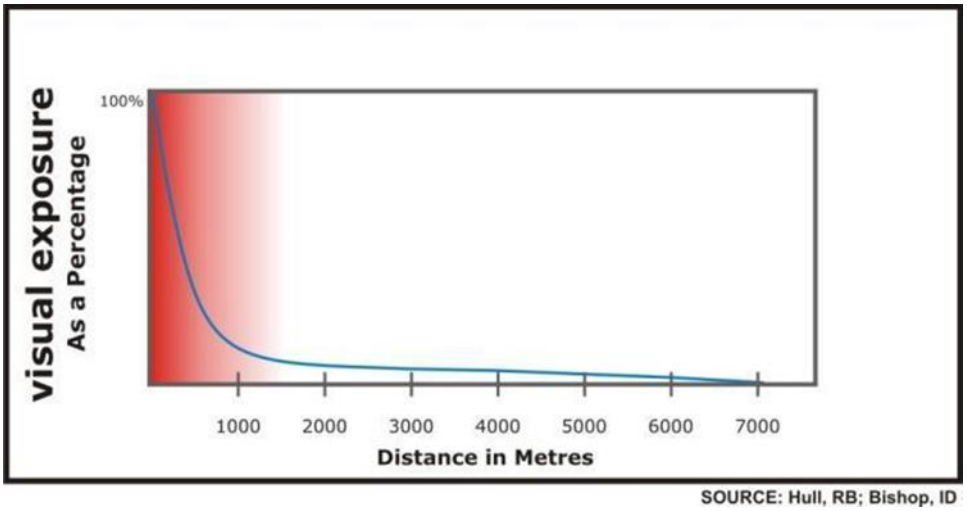

Figure 3: Conceptual representation of diminishing visual exposure over distance

6. VISUAL CHARACTER AND SENSITIVITY OF THE STUDY AREA

Defining the visual character of an area is an important factor in the assessment of 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 proposed powerline and substation are located in the scenic Karoo region of the Western / Northern Cape which is generally associated with wide vistas and mountainous landscapes. The topography in the broader study area is largely dominated by the mountains/hills at the southern end of the Klein Roggeveld range. Much of the study area is therefore dominated by the steep slopes and broad ridges of these mountains and escarpments (**Figure 4**, **Figure 5** and **Figure 6**).

Maps showing the topography and slopes within and in the immediate vicinity of the combined assessment area are provided in **Figure 7** and **Figure 8** below.

Figure 4: View (SE) from R354 main road (-32.818506; 20.553465E) showing mountainous terrain associated with the Klein Roggeveld range to the east.

Figure 5: View (SSE) from the farmstead on Portion 1 of Klipbanks Fontein No 198 (- 32.826638; 20.466372E), showing the relatively hilly terrain across the study area.

Figure 6: View (WNE) from R354 (-32.853703; 20.559532).

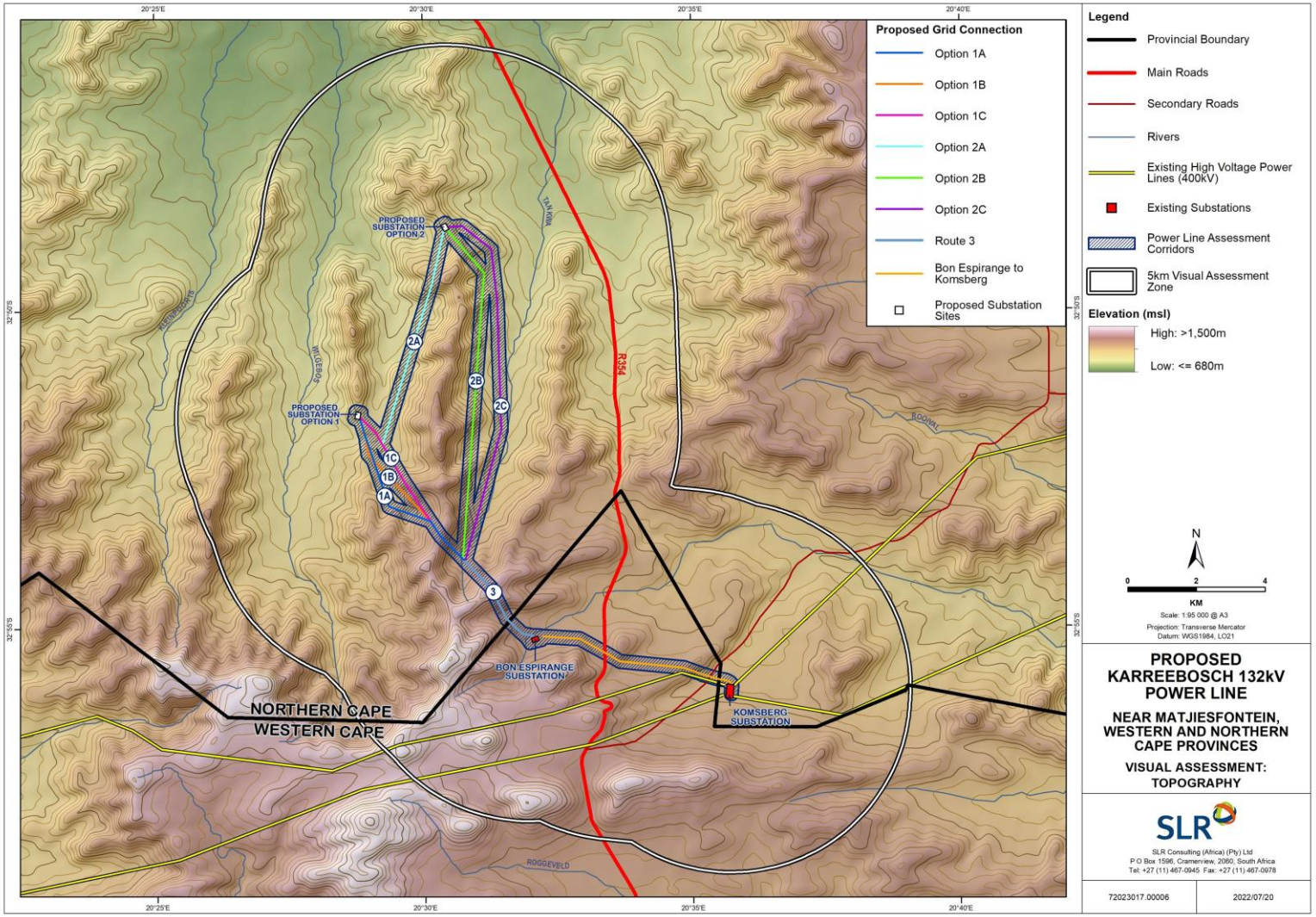

Figure 7: Topography of the study area

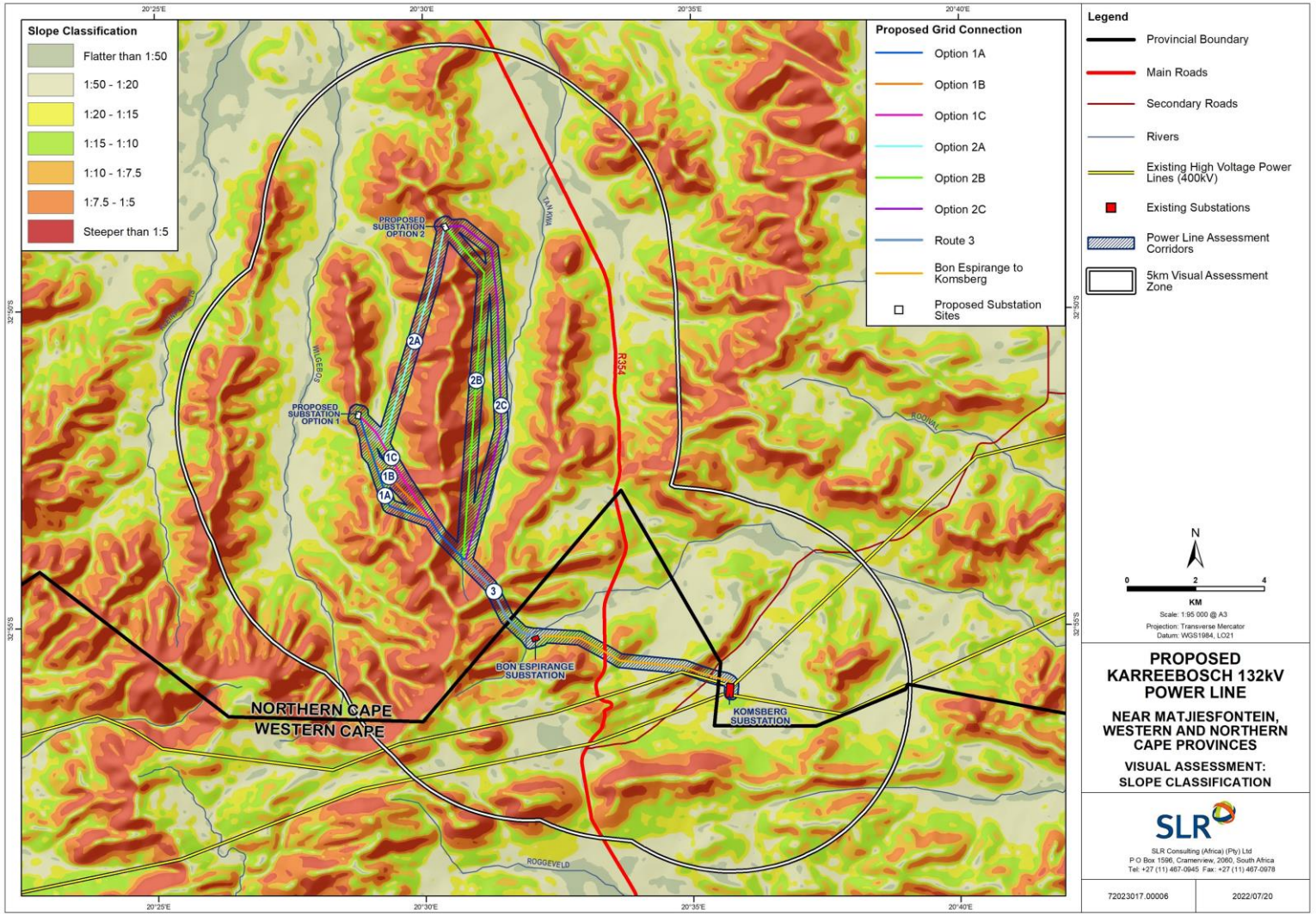

Figure 8: Slope classification of the study area

Visual Implications

Areas of flatter relief, including plains and higher-lying plateaus, are characterised by wide ranging vistas (**Figure 9**), although views from the east and south will be somewhat constrained by the hilly terrain in these sectors of the study area which enclose the visual envelope. 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 much wider vistas would be experienced from 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 on enclosed plateaus would be far less visible.

Bearing in mind that powerline towers and substations are large structures (towers could potentially be up to 20 m in height), these elements of the grid connection infrastructure could be visible from a relatively extensive area around the grid connection infrastructure. However, topographic shielding provided by the hills and prominent ridges across the study area would reduce the visibility of the powerlines and substations from many of the locally occurring receptor locations, and also from much of the R354 main road.

Figure 9: View (N) from the farm Rietfontein No 197 in south-western section of the study area (-32.939518S; 20.490003E) showing wide-ranging vistas experienced from higher elevations.

GIS technology was used to undertake a preliminary visibility analysis for the proposed powerline route alignments and substation sites. This analysis was based on points at 250 m intervals along the centre line of the corridor alternatives, and assumes a tower height of 40 m. The resulting viewshed indicates the geographical area from where the proposed powerlines and substation sites would theoretically be visible, i.e. the zone of visual influence or viewshed. This analysis is based entirely on topography (relative elevation and aspect) and does not take into account 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 viewshed 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.

The results of this analysis, as per **Figure 10** below, show that although elements of the proposed grid connection infrastructure would be visible from many parts of the study area, the prominent ridges on the site provide a degree of topographic screening, resulting in significant portions of the study area being outside the combined viewshed for the proposed powerline and substation sites.

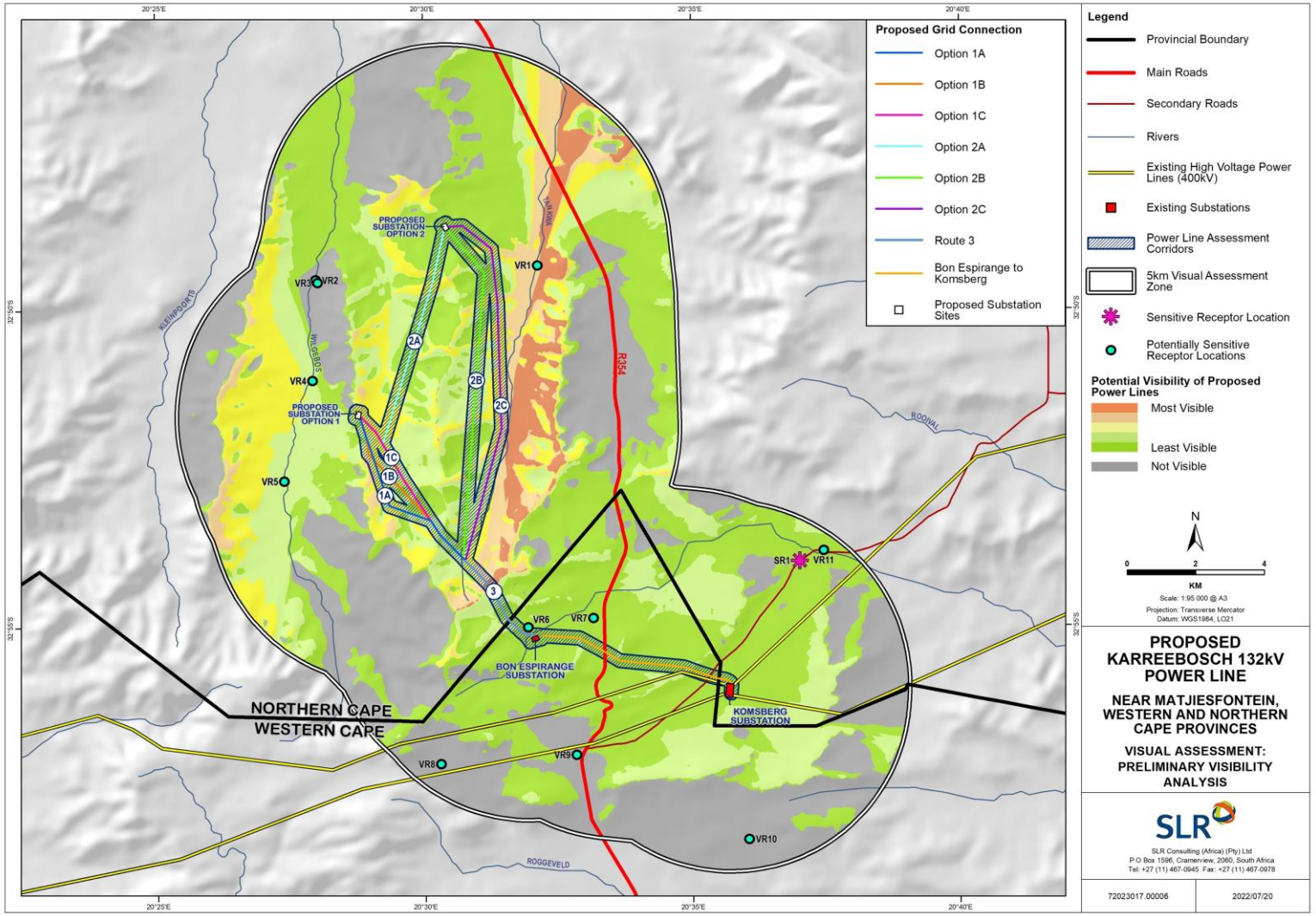

Figure 10: Preliminary visibility analysis of proposed development

6.1.2 Vegetation

According to Mucina and Rutherford (2018), much of the northern and eastern sectors of the study area are covered by the Koedoesberge – Moordenaars Karoo vegetation type, which tends to occur on slightly undulating to hilly landscapes. This vegetation type comprises low succulent scrubs, scattered tall shrubs and patches of "white" grass visible on plains (Figure 11). The dwarf shrubs include *Pteronia, Drosanthemum* and *Galenia*.

Figure 11: View from the R354 main road of typical vegetation cover prevalent across the northern sector of study area

The southern section of the study area which is dominated by high mountains / hills, is however associated with Central Mountain Shale Renosterveld. This vegetation type is typically found on slopes and broad ridges of low mountains and escarpments, with taller shrubland dominated by renosterbos and large areas of mainly non-succulent karoo shrubs and with a rich geophytic flora in the undergrowth or in more open, wetter or rocky habitats (**Figure 12**).

Figure 12: View from the R354 main road of typical vegetation cover found in the southern sector of the study area.

Small patches of the Tanqua Escarpment Shrubland type occur along the eastern boundary of the study area, on the slopes of the Klein-Roggeveldberge range. This vegetation type is typically characterised by succulent shrubland of medium height.

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

Vegetation classifications across the study area are shown in **Figure 14** below.

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, taller trees have been planted around farmhouses, possibly restricting views from these receptor locations to some degree (**Figure 13**).

Figure 13: Trees planted around Saaiplaas farmstead (Remainder of the Farm Standvastigheid No 210) in the south-eastern sector of the study area

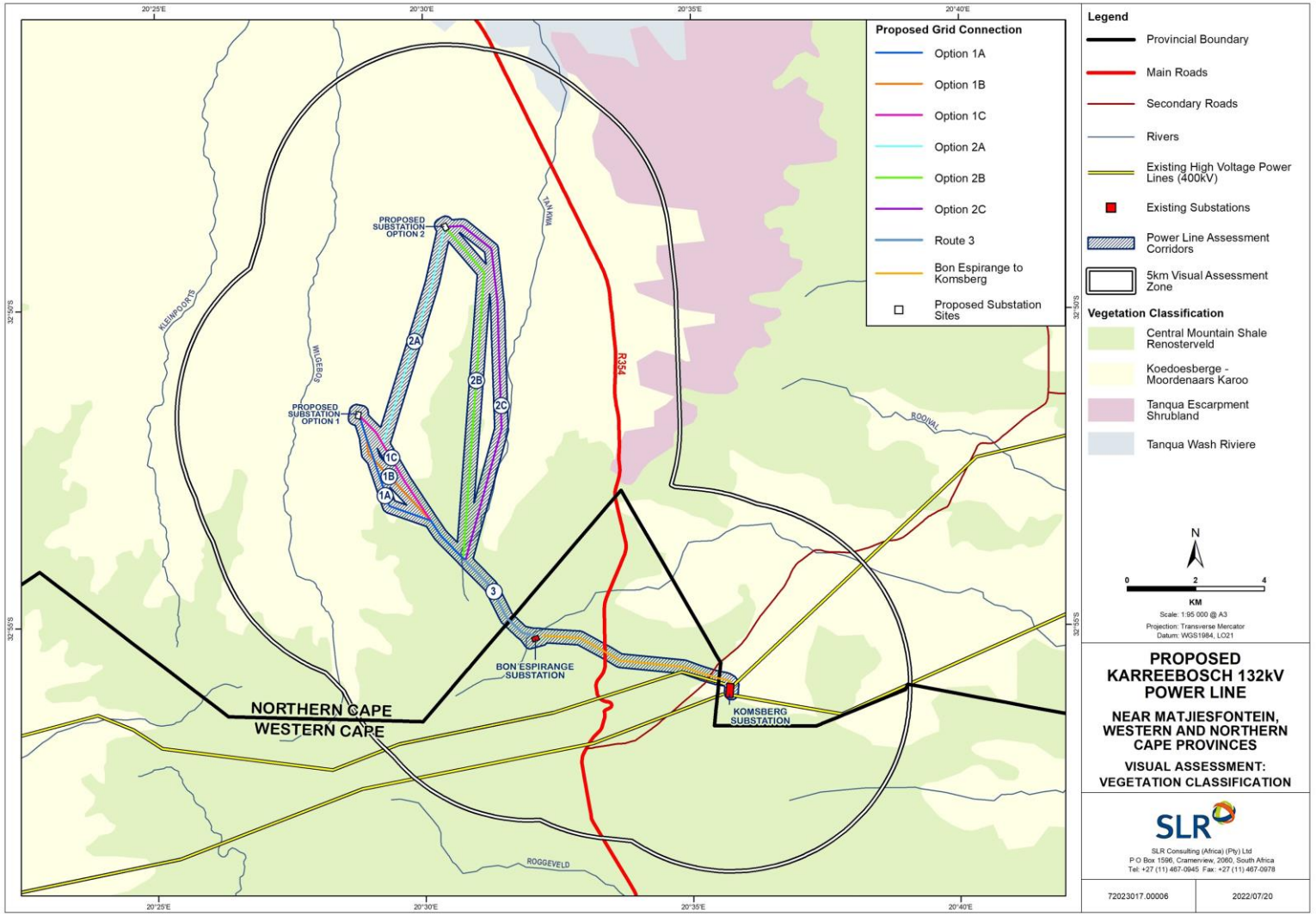

Figure 14: Vegetation Classification in the Study Area

6.1.3 Land Use

According to the South African National Land Cover dataset (GeoTerra Image 2020), much of the visual assessment area is characterised by natural vegetation which is dominated by Karoo and Fynbos shrubland interspersed with natural grassland (**Figure 15**).

Agricultural activity in the area is restricted by the arid nature of the local climate and areas of cultivation are largely confined to relatively small patches of land distributed along drainage lines. As such, the natural vegetation has been retained across much of the study area. Livestock farming (mostly sheep) 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 scattered farmsteads in evidence (**Figure 16**). 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 17**).

High voltage (400Kv and above) powerlines in the study area (**Figure 18**) however form significant man-made features in an otherwise undeveloped landscape. These powerlines bisect the southern sector of the study area in a south-west to north-east alignment, linking in to the Komsberg 400kV substation, situated at the southern end of the powerline assessment corridors. This substation is a substantial anthropogenic feature with a distinctly more industrial character, resulting in a significant degree of transformation in the landscape (**Figure 19**). Further human influence is visible in the area in the form of the R354 man road which traverses the study area in a north to south direction (**Figure 20**).

Much of the central portion of the study area lies within the project area for the Roggeveld WEF (**Figure 21**). This facility, including wind turbines located along ridge-tops, access roads, powerlines and the recently constructed Bon Espirange substation (**Figure 22**) has resulted in significant transformation of the landscape.

The closest built-up area is the small town, Matjiesfontein, which is situated approximately 34km south of Komsberg Substation while Laingsburg is some 37kms to the south-east. These small towns are well outside the visual assessment zone and thus not expected to have an impact on the visual character of the study area.

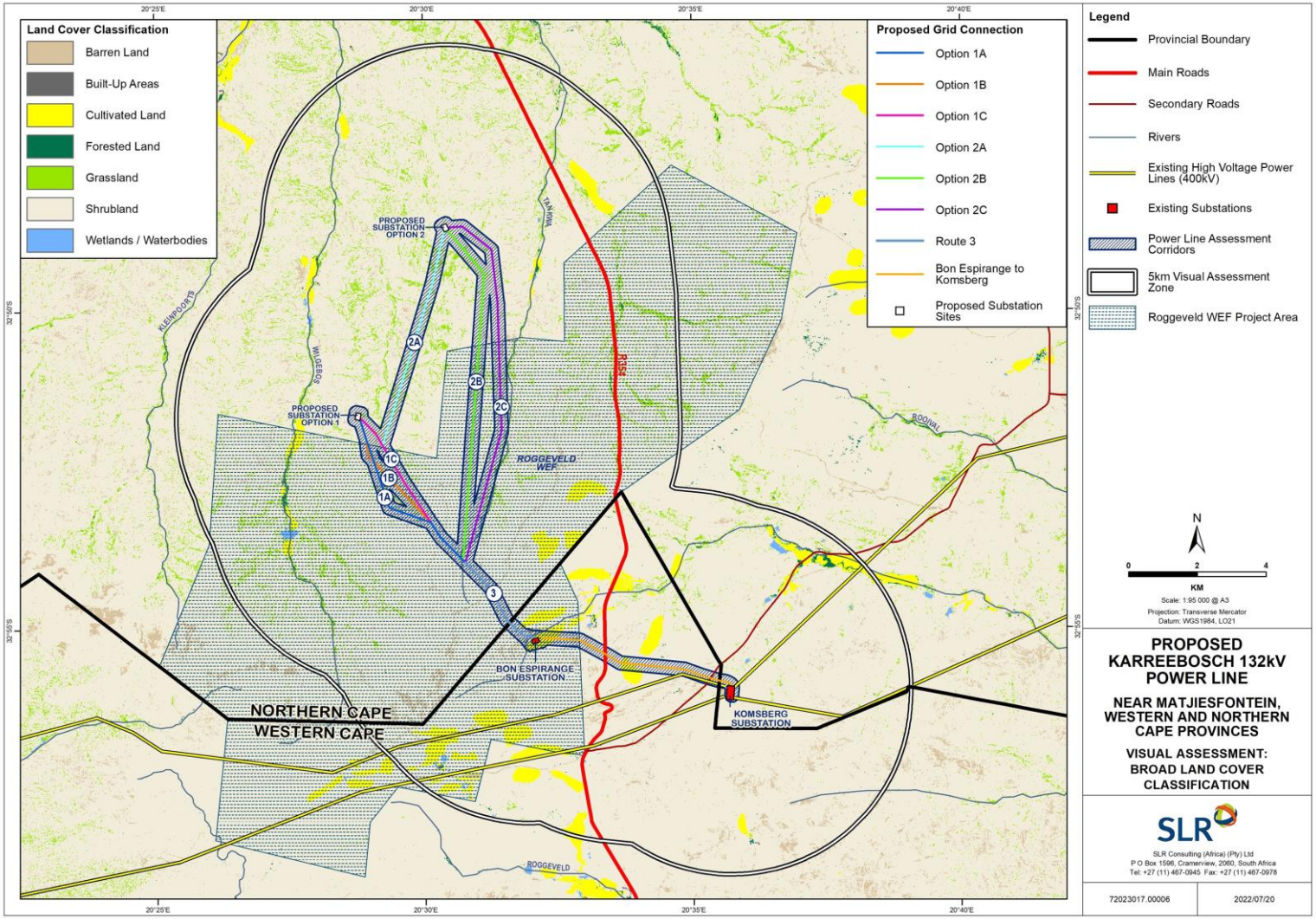

Figure 15: Land Cover Classification of the study area.

Figure 16: Isolated farmstead on Portion 1 of the Farm Klipbanks Fontein No 198

Figure 17: Typical view of built form in the study area, including farmhouses, telephone poles and a windmill.

Figure 18: View of high voltage powerlines in the study area.

Figure 19: Komsberg Substation

Figure 20: R354 main road is a prominent feature in the landscape.

Figure 21: Roggeveld WEF

Figure 22: Bon Espirange Substation.

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.

Significant elements of human transformation are however present in the central and southern sectors of the study area, including the Roggeveld WEF, high voltage powerlines and the Bon Espirange and Komsberg Substations. These elements are considered to have degraded the visual character of the study area to some degree.

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 above physical and land use-related characteristics of the study area 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 such as buildings, roads and other objects such as telephone or electricity 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.

Agricultural activities in the area have not transformed the natural landscape to any significant degree and there are no towns or built-up areas in the study area influencing the overall visual character. Hence the natural character has been retained across much of the study area.

Prominent anthropogenic elements in the study area however include a large electrical substation (Komsberg), associated high voltage powerlines and the Roggeveld WEF and associated infrastructure. The presence of this infrastructure is an important factor in this context, as the introduction of the proposed powerline and substation infrastructure would result in less visual contrast where other anthropogenic elements are already present.

The construction of the Roggeveld WEF and the associated 132kV powerline and substation is a significant factor in the visual character of the study area. WEFs and their associated infrastructure typically consist of very large structures which are highly visible. As such, this facility has already significantly altered the visual character and baseline across the central sector of the study area, resulting in a more industrial-type visual character.

It is important to note that several renewable energy facilities (solar and wind) are proposed within relatively close proximity to the proposed powerline. These facilities and their associated infrastructure, typically consist of very large structures which are highly visible. As such, if these facilities are constructed they will further alter the visual character and baseline in the study area towards a more industrial-type visual character. Although this will lessen the degree to which the proposed powerline would contrast with the elements and form in the surrounding environment, the cumulative impact on each sensitive receptor location would increase. This is discussed in more detail in Section 8.4 below.

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 hilly / mountainous terrain which occurs across much of the study area

is considered to be an important feature that increases the scenic appeal and visual interest in the area. The R354 Main Road is in fact considered to have high scenic and rural value.

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

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 an increasingly important concept in terms of the preservation and management of rural and urban settings across the world (Breedlove, 2002).

The 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 Matjiesfontein, 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 light of this, it is important to assess whether the introduction of a new powerline 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 very remote and there are few significant tourism enterprises attracting visitors into the study area. In addition, although a recognised scenic route (R354) traverses the study area, visual impacts on travelers using this route will be considerably reduced by distance from the proposed powerline and the hilly terrain across the study area. In addition, it could be argued that this type of development is not considered to be a significant degrading factor in the context of the natural Karoo character of the study area, due to the fact that electrical infrastructure is frequently part of the typical form present within the Karoo landscape

A detailed assessment of the potential impacts of the proposed powerline and substation development on the cultural landscape has been included in the Heritage Impact Assessment (HIA) undertaken in respect of the proposed project.

6.3 VISUAL SENSITIVITY

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 shaped by the perceived aesthetic appeal of an area and on the presence of economic activities (such as recreational tourism) which may be based on this aesthetic appeal.

In order to assess the visual sensitivity of the area, a matrix has been developed 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 (Error! Reference source not found.), 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 powerline and/or substation 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									
		LOW									*HIGH*
		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 potentially 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	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 grid connection 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 or under construction 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 matrix above, the total score for the study area is 41, which according to the scale above, would result in the area being rated as having a low 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. This 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 within the study area and relatively few sensitive or potentially sensitive receptors were found to be present.

As part of the visual sensitivity assessment, a screening exercise was undertaken with the aim of indicating any areas that should be precluded from the proposed development footprint. From a visual perspective, these are areas where the establishment of powerlines and/or substations would result in the greatest probability of visual impacts on sensitive or potentially sensitive visual receptors.

Using GIS-based visibility analysis, it was possible to determine which sectors of the application site would be visible to the highest numbers of receptors in the study area (Figure 23). This analysis considered all the sensitive and potentially sensitive receptor locations identified (Section 8.1). Due to hilly terrain and the fact that there are relatively few receptors, widely scattered across the area, sections of Corridor Options 1A, 1B, 1C and 2A are outside the viewshed and none of the remaining sections of the proposed route alignments were found to be significantly more visible than any others. It was however determined that one of the potentially sensitive receptors (VR6) is within 500 m of the combined powerline assessment corridor and could potentially be affected by the proposed development. It has been noted that this farmstead is located within the Roggeveld WEF project area, in close proximity to the Bon Espirange Substation, and as such it is assumed that the occupants have a vested interest in the WEF development. Thus, although a 500m potential visual sensitivity zone has been delineated around this receptor, this zone is not considered to be a “no go area”, but rather should be viewed as a zone where visual impacts could occur, depending on the sentiments of nearby residents.

It should be noted that the visibility analysis is based purely on topographic data available for the broader study area and does not take into account any localised topographic variations or any existing infrastructure and / or vegetation that may constrain views. In addition, the analysis does not consider differing perceptions of the viewer which would largely determine the degree of visual impact being experienced.

The visual sensitivity analysis should therefore be seen as a conceptual representation or a worst-case scenario which rates the visibility of the site in relation to potentially sensitive receptors. These areas of visual sensitivity are shown in **Figure 23** below.

In assessing visual sensitivity, the proposed development was examined in relation to the Landscape Theme of the National Environmental Screening Tool to determine the relative landscape sensitivity for the development of grid connection infrastructure. The tool does not however identify any landscape sensitivities in respect of the proposed powerline or substation.

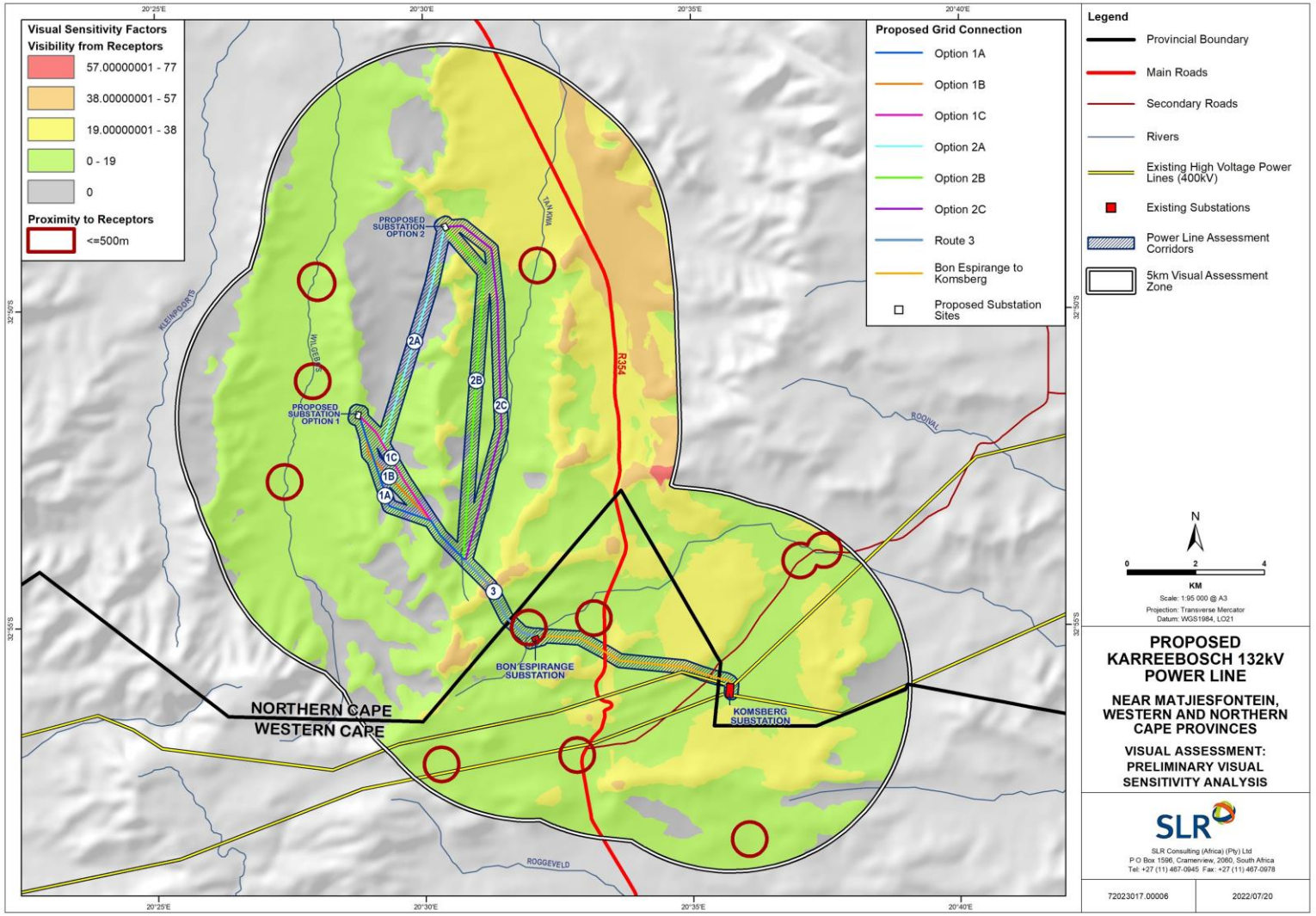

Figure 23: Preliminary visual sensitivity analysis of proposed development.

6.4 SITE SENSITIVITY VERIFICATION

Where a specialist assessment is required and no specific environmental theme protocol has been prescribed (as per Government Gazette 43110, 20 March 2020), 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.

In accordance with GN 320 and GN 1150 of the NEMA EIA Regulations of 2014, prior to commencing with a specialist assessment, a site sensitivity verification must be undertaken to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool).

No preliminary visual sensitivities or sensitivity rating was identified or provided based on the DFFE Screening Tools (i.e. a preliminary sensitivity rating was not provided that could then be confirmed or altered based on further assessment).

Nevertheless, this assessment report contains a detailed assessment of the visual impacts of the proposed project. As such, it provides all the necessary information and assessment data to provide an opinion on the sensitivity rating of the site. In particular, Section 6.3 of the report speaks to the site sensitivity of the site as confirmed by the site visit undertaken between the 30th August and 1st of September 2021.

6.5 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.

Although the hilly nature of the topography in the study area would increase the visual absorption capacity, this would be offset by the lack of screening provided by the dominant shrubland vegetation. A significant portion of the study area has however already undergone significant transformation as a result of the Komsberg substation and associated high voltage powerlines and further transformation has occurred with the construction of the Roggeveld WEF and the Bon Espirange Substation, thus increasing the visual absorption capacity of the landscape.

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

7. TYPICAL VISUAL IMPACTS ASSOCIATED WITH ON-SITE SUBSTATIONS AND POWERLINES

In this section, the typical visual issues related to the establishment of a 132kV powerline and substation are discussed.

Powerline towers and substations are very large objects and thus highly visible. According to information provided by Karreebosch, the maximum tower height being considered for the proposed powerline is 40m (approximately equivalent in height to a thirteen-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 powerline comprises a series of towers typically spaced approximately 200m to 250m apart in a linear alignment.

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. In the context of a powerline, the type of tower used as well as the degree to which the towers would impinge upon or obscure a view is also a factor that will influence the experience of the visual impacts.

As described above, a powerline or substation could be perceived to be highly incongruous in the context of a largely natural landscape. The height and linear nature of the powerline will exacerbate this incongruity, as the towers may impinge on views within the landscape. In addition, the practice of clearing any taller vegetation from areas within the powerline servitude can increase the visibility and incongruity of the powerline. In a largely natural, bushier setting, vegetation clearance will cause fragmentation of the natural vegetation cover, thus making the powerline more visible and drawing the viewer's attention to the powerline servitude.

Sensitivity to visual impacts is typically most pronounced in areas set aside for conservation of the natural environment (such as protected natural areas or conservancies), or in areas in where the natural character or scenic beauty of the area attracts visitors (tourists). In this instance however, the area is not typically valued for its tourism significance and no formal protected areas, leisure-based tourism activities were identified in the study area. Although a recognised tourism route (R354) traverses the study area, visual impacts affecting this route are expected to be reduced by the hilly nature of the terrain.

Conversely, the presence of other anthropogenic objects associated with the built environment may "degrade" the visual environment and thus the introduction of a new powerline and substation into this setting may be considered to be less of a visual impact than if there was no existing built infrastructure visible. In this context therefore, the presence of the Komsberg substation and the existing high voltage powerlines traversing the study area, in conjunction with the Roggeveld WEF and the associated Bon Espirange substation, is expected to lessen the visual contrast associated with the introduction of a new powerline and substation.

Other factors, as listed below, can also affect the nature and intensity of a potential visual impact associated with a powerline and substation:

- The location of the development in the landform setting – i.e. in a valley bottom or on a ridge top. In the latter example the development would be much more visible and would "break" the horizon;
- The presence of macro- or micro-topographical features, built form or vegetation that would screen views of the development from a receptor location;
- The presence of existing, similar features in the area and their alignment in relation to the proposed new development; and
- Temporary factors such as weather conditions (presence of haze, rainfall or heavy mist) which would affect visibility.

In this instance, the proposed powerline and substation are intended to serve the proposed Karreebosch WEF and as such, the powerline and substation will only be built if this WEF is developed. The proposed powerline and substation are therefore likely to be perceived to be part of the greater WEF development and the visual impact will be relatively minor when compared to the visual impact associated with the WEF as a whole.

8. SENSITIVE VISUAL RECEPTORS

A sensitive visual receptor location is defined as a location from 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 is however largely based on the viewer's perception and will often vary from one receptor to another.

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 BA study.

Viewing distance is also a critical factor in the experiencing of visual impacts. As the visibility of the development would diminish exponentially over distance (refer to section **5.4** above), receptor locations which are closer to the proposed development would experience greater adverse visual impacts than those located further away.

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 study area identified 12 potentially sensitive visual receptor locations within the study area, most of which appear to be existing farmsteads (**Figure 24**). These farmsteads 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, although the residents' sentiments toward the proposed development are unknown.

The findings of the desktop assessment were largely confirmed by field assessment conducted in late August / early September 2021, although it was not possible to confirm the presence of farmsteads at all the identified locations due to access restrictions. Notwithstanding this limitation, all the identified receptor locations were assessed as part of this VIA as they are still regarded as being potentially sensitive to the visual impacts associated with the proposed powerline and substation.

One of the identified receptor locations was confirmed to be a sensitive receptor, this being tourism / accommodation facilities at the Saaiplaas Guest Farm (SR1). Although this Guest Farm does not appear to be operating at present, for the purposes of this VIA, it has been assumed that this is a temporary state of affairs and this receptor has been included in the assessment as a "sensitive receptor".

Five identified receptors were found to be outside the viewshed for the combined grid infrastructure proposals and as such, no further assessment of these receptors was undertaken.

In many cases, roads along which people travel, are regarded as sensitive receptors. The primary thoroughfare in the broader region is the R354 main road which connects the N1 National Route at Matjiesfontein with Sutherland to the north. This road is considered to have high scenic and rural value and is recognised as an important tourist route to the Sutherland Observatory. As travellers using this route may experience adverse visual impacts as a result of the proposed powerline development, the road has been classified as a "receptor road".

The degree of impact experienced by travellers using this route will however depend on the relative visibility of the powerline from different sections of the road.

Other roads in the study area are primarily farm access roads and do not form part of any scenic tourist routes and are therefore not regarded as visually sensitive.

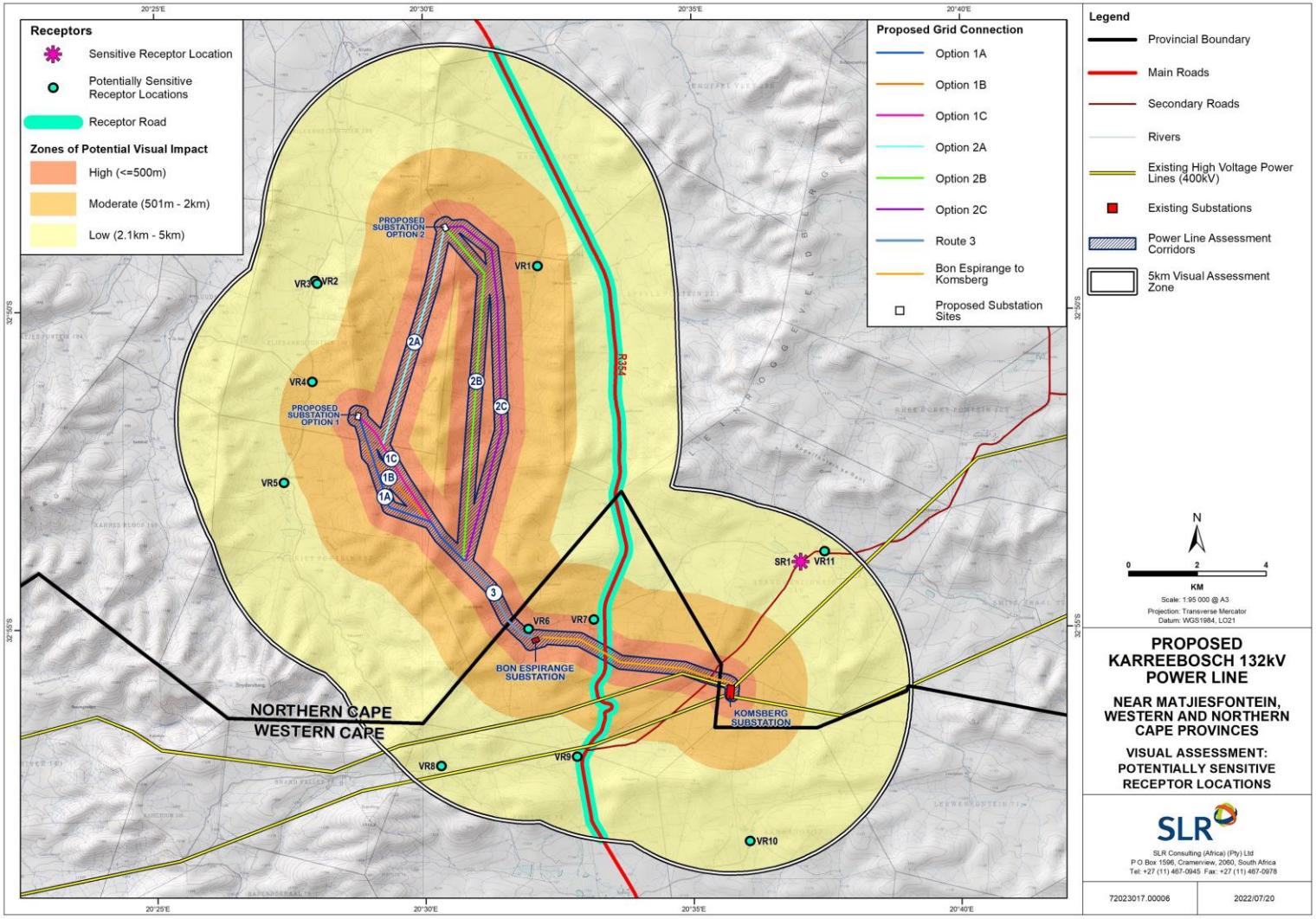

Figure 24: Potentially sensitive receptor locations within 5kms of the proposed Powerline Assessment Corridor.

8.2 RECEPTOR IMPACT RATING

In order to assess the impact of the proposed grid infrastructure development 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 a number of factors as 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 factors 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.

As described above, the 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 500m of the proposed development. Beyond 5km, the visual impact of a powerline and/or substation diminishes considerably, as the development would appear to merge with the elements on the horizon. Any visual receptor locations beyond this distance have therefore not been assessed as they fall outside the study area and would not be visually influenced by the proposed development.

Zones of visual impact for the proposed development were therefore delineated according to distance from the proposed powerline assessment corridors. Based on the height and scale of the project, the distance intervals chosen for the zones of visual impact are as follows:

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

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. As such, where views of the proposed development are completely screened, or where the receptor is outside the viewshed for the proposed development, the receptor has been assigned an overriding nil impact rating, as the development would not impose any impact on the receptor.

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 have a significant visual impact on sensitive receptors as it may change the visual character of the landscape.

In light of the fact that the study area is located within the Central Strategic Transmission Corridor, and also within Renewable Energy Development Zone 2 (Komsberg REDZ), the concentration of renewable energy developments and associated grid connection infrastructure is supported in this area. This could result in an incremental change in the visual character of the area and in the typical land use patterns towards a less rural environment within which powerlines and substations would be less incongruous.

The matrix returns a score which in turn determines the visual impact rating assigned to each receptor location (**Table 3**) 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 FACTOR	VISUAL IMPACT RATING			
	HIGH	**MODERATE**	**LOW**	**OVERRIDING FACTOR: NEGLIGIBLE**
Distance of receptor away from proposed development	<= 500m **Score 3**	500m < 2km **Score 2**	2km < 5km **Score 1**	>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 132kV OHPL and substation on each of the potentially sensitive visual receptor locations identified within 5kms of the proposed development.

Table 5: Summary Receptor Impact Rating

Receptor Location	Distance to nearest Corridor Alternative			Screening		Contrast		OVERALL IMPACT RATING	
	KMs	Rating		Rating		Rating		Rating	
SR1 - Saaiplaas Guest Farm	3.9	Low	1	Low	1	Mod	2	LOW	3
VR1 - Farmstead	1.1	Mod	2	Low	1	Mod	2	MODERATE	5
*VR2 - Farmstead**	*NIL*								
*VR3 - Farmstead**	*NIL*								
VR4 - Farmstead	1.3	Mod	2	Low	1	High	3	MODERATE	6
VR5 - Farmstead	2.4	Low	1	Mod	2	Mod	2	MODERATE	5
VR6 – Farmstead^	0.0	High	3	Mod	2	Mod	2	MODERATE	7
VR7 - Farmstead	0.6	Mod	2	Mod	2	Mod	2	MODERATE	6
*VR8 – Farmstead**	*NIL*								
*VR9 – Farmstead**	*NIL*								
*VR10 – Farmstead**	*NIL*								
VR11 - Farmstead	4.5	Low	1	Low	1	Mod	2	LOW	4

**Receptor is outside the preliminary viewshed and as such the overall impact rating is "NIL".*
^Receptor is inside the assessment corridor.

The table above shows that the only sensitive receptor within the study area would experience low levels of visual impact as a result of the proposed development, this being the Saaiplaas Guest Farm. Five (5) potentially sensitive receptors will be subjected to moderate levels of visual impact as a result of the proposed powerline development, while one (1) receptor will be subjected to low levels of visual impact. It should be noted however, that most of these receptors are located on farms which are within the project areas for other approved renewable energy projects. As such the owners / occupants are not expected to perceive the proposed powerline and substation in a negative light.

The remaining five (5) receptors are outside the viewshed of the proposed development and are therefore not expected to be subjected to any visual impacts as a result of the powerline development.

As stated above, the R345 main road could be considered as a potentially sensitive receptor road and sections of the proposed powerline are likely to be visible to motorists travelling along this route. The degree of visibility is restricted to some extent by the topography and the likely visual impacts of the powerline and substation would be reduced where sections of the road are some distance from the powerline or substation. The southern section of this road is traversed by the proposed powerline and is therefore likely to experience the most visual impact, although this would be reduced to some degree by the presence of existing high voltage powerlines. In light of this, visual impacts affecting the R354 are rated as **moderate**.

8.3 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 development 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 Matjiesfontein which is situated approximately 34km south of Komsberg Substation and is thus too far away to have significant impacts on the night scene in the study area. At night, the general study area is characterised by a picturesque dark starry sky and the visual character of the night environment is largely 'unpolluted' and pristine. Sources of light in the area are largely limited to lighting from isolated farmsteads and transient light from the passing cars travelling along the R354 main road and gravel access roads. Some light pollution is however likely to emanate from the operational and security lighting at Komsberg substation, Bon Espirange Substation and Roggeveld WEF and this would reduce the impacts of additional lighting in the area.

Powerlines and associated towers or pylons are not lit up at night and, thus light spill associated with the proposed electrical infrastructure project is only likely to emanate from the proposed substation. Although the lighting required at the substation site would normally be expected to intrude on the nightscape, night time impacts of this lighting will be reduced by the existing light spill emanating from the Komsberg and Bon Espirange substations and Roggeveld WEF. It should also be noted that the powerline and substation will only be constructed if the proposed Karreebosch WEF is also developed. Light sources for this facility will include operational and security lighting and thus the lighting impacts from the proposed substation would be subsumed by the glare and contrast of the lighting associated with the WEF. As such, the substation alone is not expected to result in significant lighting impacts.

8.4 CUMULATIVE IMPACTS

Although it is important to assess the potential visual impacts of the proposed powerline and substations specifically, it is equally important to assess the potential 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 powerlines 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.

Twenty three (23) renewable energy projects were identified within a 30 km radius of the proposed development as shown in **Figure 25** below. These projects, as listed in **Table 6** were identified using the DFFE's Renewable Energy EIA Application Database for SA in conjunction with information provided by the Environmental Assessment Practitioner (EAP) and Independent Power Producers (IPPs) operating in the broader region.

It is assumed that all of these renewable energy developments include grid connection infrastructure, although few details of this infrastructure were available at the time of writing this report. It should be noted that this list is based on information available at the time of writing this report and as such there may be several other renewable energy projects proposed within the study area.

The relatively large 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 6: Renewable energy developments proposed within a 30km radius of the Karreebosch WEF and Grid Connection Infrastructure

LABEL	DFFE REFERENCE	PROJECT TITLE	STATUS
1	12/12/20/1782/1/AM5	140MW Rietrug Wind Energy Facility near Sutherland, Northern Cape Province.	Preferred Bidder Round 5
2	12/12/20/1782/2/AM6	140MW Sutherland 1 Wind Energy Facility near Sutherland, Northern Cape and Western Cape Provinces	Preferred Bidder Round 5
3	12/12/20/1782/3/AM3	140 MW Sutherland 2 Wind Energy Facility near Sutherland, Northern Cape Provinces.	Preferred Bidder Round 5
4	12/12/20/1783/1/AM5	150MW Perdekraal Site 1 Wind Energy Facility, Western Cape Province.	Approved
5	12/12/20/1783/2/AM5	147MW Perdekraal Site 2 Wind Energy Facility, Western Cape Province.	Preferred Bidder Round 4, Operational
6	12/12/20/1988/1/AM6	140 MW Roggeveld Phase 1 Wind Farm, North of Matjiesfontein, Northern Cape and Western Cape Provinces.	Preferred Bidder Round 4, Operational
7	12/12/20/2370/1/AM6	140 MW Karusa Wind Energy Facility, Phase 1, Karoo Hoogland Municipality, Northern Cape Province.	Preferred Bidder Round 4, Operational
8	12/12/20/2370/2/AM6	140 MW Soetwater Wind Farm Phase 2, Karoo Hoogland Municipality, Northern Cape Province.	Preferred Bidder Round 4, Operational
9	12/12/20/2370/3/AM5	140 MW Great Karoo Wind Energy Facility Phase 3, Karoo Hoogland Municipality, Northern Cape Province.	Approved
10	14/1/1/16/3/3/1/2318	310MW Pienaarspoort Wind Energy Facility Phase 1, Witzenberg local Municipality, Western Cape Province	Approved
11	14/12/16/3/3/1/2441	360MW Pienaarspoort Wind Energy Facility Phase 1, Witzenberg local Municipality, Western Cape Province.	Approved

LABEL	DFFE REFERENCE	PROJECT TITLE	STATUS
12	14/12/16/3/3/1/1976/1/AM3	226 MW Kudusberg Wind Energy Facility between Matjiesfontein and Sutherland in Western and Northern Cape Provinces.	Approved
13	14/12/16/3/3/1115	325 WM Rondekop Wind Energy Facility between Matjiesfontein and Sutherland in Western and Northern Cape Provinces	Approved
14	14/12/16/3/3/1/1977/AM3	183 MW Rietkloof Wind Energy Facility near Matjiesfontein in the Western Cape Province.	Preferred Bidder Round 5
15	14/12/16/3/3/1/2542	200 MW Esizayo Wind Energy Facility Expansion near Laingsburg, Western Cape.	In Process
16	14/12/16/3/3/2/2009/AM1	Oya Energy Facility near Laingsburg, Western Cape.	Preferred Bidder Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP)
17	14/12/16/3/3/2/826	140 MW Gunsfontein Wind Energy Facility Karoo Hoogland Municipality, Northern Cape Province.	Approved
18	14/12/16/3/3/2/856 /AM4	275 MW Komsberg West near Laingsburg, Western Cape Provinces	Approved
20	14/12/16/3/3/2/900/AM2	140 MW Brandvalley Wind Energy Facility, WITHIN THE Laingsburg and Witzenberg Local Municipalities in the Western and Northern Cape Province.	Preferred Bidder Round 5
21	14/12/16/3/3/2/962/AM1	140 MW Maralla East Wind Energy Facility, Namakwa and Central Karoo District Municipalities, Western and Northern Cape Provinces.	Approved
22	14/12/16/3/3/2/963/AM1	140 MW Maralla West Wind Energy Facility, Karoo Hoogland local Municipality, Northern Cape Province.	Approved
23	14/12/16/3/3/2/967/AM3	140 MW Esizayo Wind Farm, Laingsburg Local Municipality Western Cape Province.	Approved

These renewable energy projects include 22 WEFs and one (1) Hybrid Facility. Although the different technologies are expected to have different impacts, all renewable energy developments and associated grid connection infrastructure are relevant as they contribute to the alteration of the visual character of the broader area.

Figure 25 below shows that many of the sites proposed for WEF development are located outside the 5 km visual assessment zone and also more than 30km from the proposed OHPL and substation. Given the distance from the study area and the hilly topography in the broader area, it is not anticipated that these developments will result in any significant cumulative impacts affecting the landscape or the visual receptors within the powerline visual assessment zone.

The study area is however directly affected by 2 renewable energy projects, namely the proposed Karreebosch WEF and the operational Roggeveld WEF. These projects and associated infrastructure will

inevitably introduce an increasingly industrial character into a largely natural, pastoral landscape in this sector of the study area, thus giving rise to significant cumulative impacts. Construction of the Roggeveld WEF and the associated grid connection infrastructure is now complete and the landscape has already undergone noticeable change, which will be exacerbated with further WEF development in the area. Impacts of this transformation will however be reduced by the fact the landscape in the vicinity of these proposed WEF developments has already been disturbed by Komsberg substation and the existing powerlines.

An examination of the literature available for the environmental assessments undertaken for many of these renewable energy applications 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 with associated grid connection infrastructure 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.

It is important to note however that the study area is located within the REDZ 2, known as Komsberg REDZ, and also within a Strategic Transmission Corridor and thus the relevant authorities support the concentration of renewable energy developments and associated powerline infrastructure in this area. In addition, it is possible that the renewable energy facilities located in close proximity to each other could be seen as one large facility rather than 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.

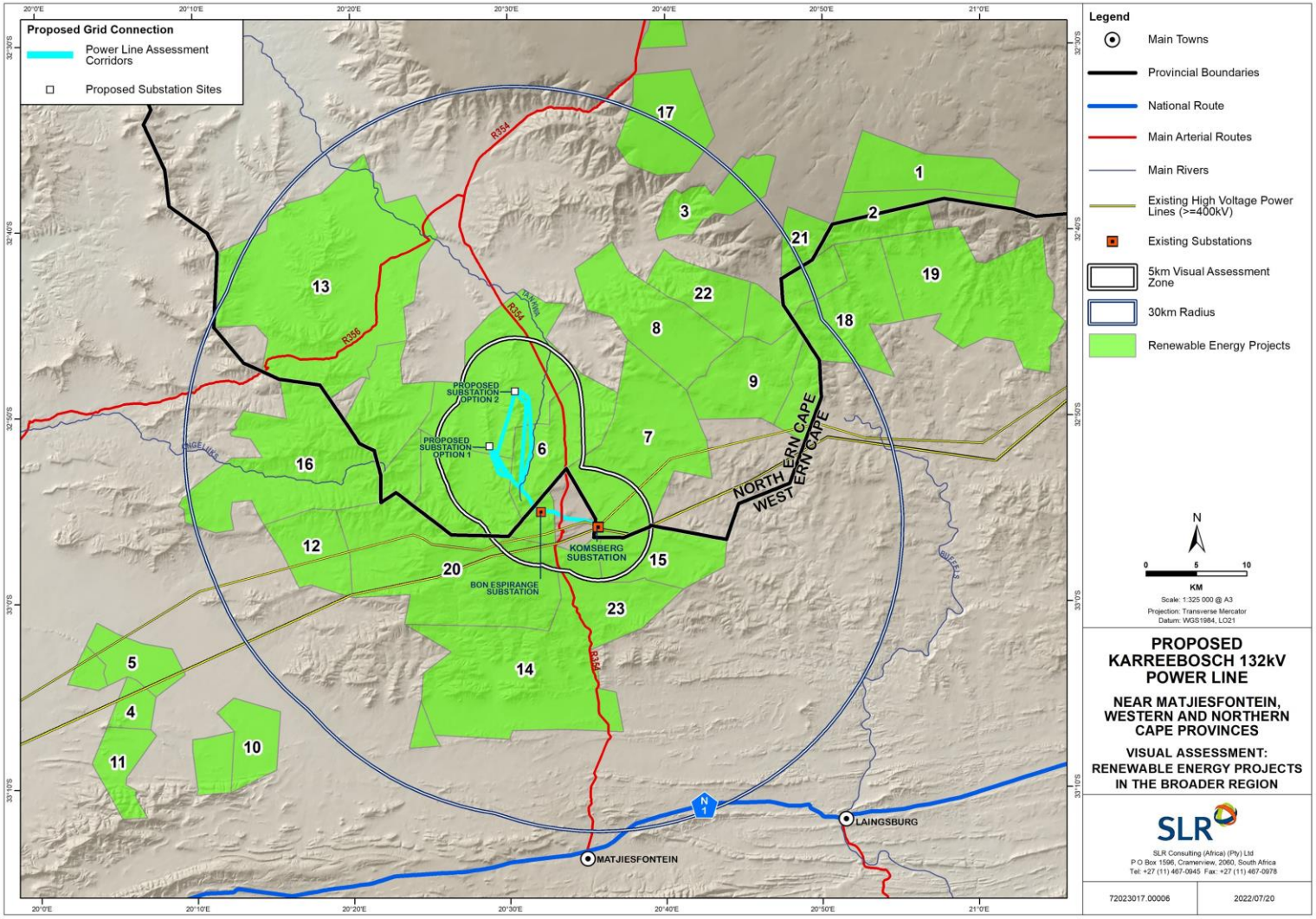

Figure 25: Renewable energy facilities proposed within a 30km radius of the 132kV Karreebosch Powerline

9. OVERALL 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 impact matrices for visual impacts associated with the proposed construction, operation and decommissioning of the proposed 132kV powerline and substation are presented below together with preliminary mitigation measures. The mitigation measures have been determined based on best practice and literature reviews.

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

9.1 CONSTUCTION PHASE

9.1.1 Impacts

Table 7: Impact Rating for 132kV Karreebosch Powerline and Substation during the construction phase

CONSTRUCTION PHASE: DIRECT IMPACTS																		
Impact number	**Aspect**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
Impact 1:	Visual impacts	▪ Large construction vehicles and equipment 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 (scarring) which could visually 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. ▪ Litter on the construction site may result in visual pollution.	Construction	Negative	Moderate	3	2	3	2	3	**30**	**N2**	2	2	3	2	2	**18**	**N2**
					Significance	**N2 - Low**							**N2 - Low**						

9.1.2 Mitigation Measures

- Carefully plan to mimimise the construction period and avoid construction delays as much as possible.
- Inform receptors within 500m of the proposed powerline and / or substation of the construction programme and schedules.
- Minimise vegetation clearing and rehabilitate temporary 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.
- 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 as needed:
    - on all access roads;
    - in all areas where vegetation clearing has taken place;
    - on all soil stockpiles.

9.2 OPERATIONAL PHASE

9.2.1 Impacts

Table 8: Impact Rating for 132kV Karreebosch Powerline and Substation during the operational phase

OPERATIONAL PHASE: DIRECT IMPACTS																			
Impact number	**Aspect**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
Impact 1:	Visual impacts	▪ The powerline and substation may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ The proposed powerline and substation 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 substation.	▪ Operational	▪ Negative	▪ Moderate	▪ 1	▪ 2	▪ 3	▪ 4	▪ 3	▪ **30**	▪ **N2**	▪ 2	▪ 2	▪ 3	▪ 4	▪ 2	▪ **22**	▪ **N2**
					Significance	**N2 - Low**							**N2 - Low**						

9.2.2 Mitigation Measures

- As far as possible, limit the number of maintenance vehicles using access roads.
- As far as possible, limit the amount of security and operational lighting at the proposed substation.
- 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.
- 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.

9.3 DECOMMISSIONING PHASE

9.3.1 Impacts

Table 9: Impact Rating for 132kV Karreebosch Powerline and Substation during the decommissioning phase

DECOMISSIONING PHASE: DIRECT IMPACTS																		
Impact number	**Aspect**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
Impact 1:	Visual impacts	▪ 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.	Decommissioning	Negative	Moderate	3	2	3	2	3	**30**	**Rating**	2	2	3	2	2	**18**	**N2**
					Significance	**N2 - Low**							**N2 - Low**						

9.3.2 Mitigation Measures

- All infrastructure that is not required for post-decommissioning use should be removed.
- Carefully plan to minimize the decommissioning period and avoid delays as much as possible.
- Maintain a neat decommissioning site by removing rubble and waste materials regularly.
- Make use of existing gravel access roads where possible.
- Limit the number of vehicles and trucks travelling to and from the decommissioning site, where possible.
- Ensure that dust suppression techniques are implemented as needed:
    - on all access roads;
    - in all areas where vegetation clearing has taken place;
    - on all soil stockpiles.
- All cleared areas should be rehabilitated as soon as possible.

9.4 CUMULATIVE IMPACTS

9.4.1 Impacts

Table 10: Cumulative Impacts

CUMULATIVE IMPACTS																		
Impact number	**Aspect**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
Impact 1:	Visual impacts	▪ 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.	Cumulative	Negative	Moderate	4	3	3	4	3	**42**	**N3**	3	3	3	4	3	**39**	**N3**
					Significance	**N3 - Moderate**							**N3 - Moderate**						

9.4.2 Mitigation Measures

- 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.

10. COMPARATIVE ASSESSMENT OF ALTERNATIVES

As previously mentioned, only one (1) route is technically feasible for the section of the proposed powerline connecting the existing Bon Espirange substation (authorised under 14/12/16/3/3/1/1544) to the Komsberg substation. Accordingly, no comparative assessment is required in respect of this route alignment.

However, two substation alternatives, each with three (3) associated route alternatives are being assessed for the section of the OHPL connecting the on-site substation to the Bon Espirange Substation. These alternatives, as described in Section 3.2.1 and depicted in Figure 2, have been comparatively assessed to determine which of the alternatives would be preferred from a visual perspective.

Preference ratings for each alternative are provided in Table 10 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 proposed substation or powerline corridor route alignment alternative in relation to areas of high elevation, especially ridges, koppies or hills;
- The location of each proposed substation or powerline corridor route alternative in relation to sensitive visual receptor locations; and
- The location of each proposed substation or powerline corridor route alternative in relation to areas of natural vegetation (clearing site for the development worsens the visibility).

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

Table 11: Comparative Assessment of Substation and Powerline Corridor Route Alternatives

Alternative	Preference	Reasons (incl. potential issues)
SUBSTATION ALTERNATIVES		
Substation Option 1	Favourable	▪ Substation Option 1 is located at the base of a prominent ridge, in a relatively hilly area. As such, development on this site would not be exposed on the skyline. ▪ This option is approximately 13.5km from the only sensitive receptor in the study area (SR1) and, considering the hilly nature of the terrain, substation development on this site is unlikely to be visible from this receptor location. ▪ The closest potentially sensitive receptor to this alternative is approximately 1.6kms away, this being VR4. The visual impacts from Option 1 affecting this receptor are therefore rated as moderate. Considering the nature of the terrain surrounding this site however, the substation is only expected to be partially visible from this site, thus reducing the degree of visual impact. The remaining

Alternative	Preference	Reasons (incl. potential issues)
		receptors are all more than 2.5kms away and, would only be subjected to low or negligible levels of impact. ▪ Option 1 is located some 7.7km from the nearest section of the R354 receptor road and as such travelers utilising this road would only experience negligible levels of visual impacts from the substation development. These impacts would be further reduced by the hilly terrain across the study area which effectively screens views from much of this road. ▪ 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 Option 2	Favourable	▪ Substation Option 2 is located on the lower slopes of a prominent ridge, in a relatively hilly area. As such, development on this site would be moderately exposed on the skyline. ▪ This option is approximately 14km from the only sensitive receptor in the study area (SR1) and considering the hilly nature of the terrain, substation development on this site is unlikely to be visible from this receptor location. ▪ The closest potentially sensitive receptor to this alternative is approximately 2.9kms away, this being VR1. The visual impacts from Option 2 affecting this receptor are therefore rated as low. Considering the nature of the terrain surrounding this site however, the substation is not expected to be visible from this site, thus reducing the degree of visual impact. The remaining receptors are all more than 4kms away and would only be subjected to low or negligible levels of impact. In addition, the nature of the terrain is such that this site is only likely to be visible from very few receptor locations. ▪ Option 2 is located some 3.5km from the nearest section of the R354 receptor road and as such travelers utilising this road would only experience low levels of visual impact resulting from the substation development. These impacts would be further reduced by the hilly terrain across the study area which effectively screens views from much of this road. ▪ In light of the above, there are no fatal flaws associated with Option 2 and this alternative is considered favourable from a visual perspective.
POWERLINE CORRIDOR ROUTE ALTERNATIVES		
Powerline Corridor Options 1A, 1B and 1C	Favourable	▪ From a visual impact perspective, there is little difference between Options 1A, 1B and 1C. ▪ For all three options, visibility varies as the route alignments follow valley lines and traverse ridges. Significant sections of each option would not be visible from the surrounding receptors, the least visible section being along Option 1A. Remaining sections of the alignments have been shown to have low to medium-low levels of visibility from the receptor locations. Even where the alignments traverse ridges, the visibility analysis does not indicate that these ridges are highly visible from the surrounding landscape. As such the powerlines would only be moderately exposed on the skyline. ▪ This option is approximately 7.9km from the only sensitive receptor in the study area (SR1) and considering the hilly nature of the terrain, only some sections of the powerlines are expected to be visible from this location. As such, visual impacts of the powerline are expected to be negligible and these would be further reduced by the presence of existing high voltage powerlines and Komsberg substation.

Alternative	Preference	Reasons (incl. potential issues)
		▪ Eight (8) potentially sensitive receptors are located within 5kms of Options 1A, 1B and 1C, although the sections of the proposed powerlines are only expected to be visible from four (4) of these locations. The closest potentially sensitive receptor to this alternative is VR6 which is located inside the assessment corridor. The visual impacts from Options 1A, 1B and 1C affecting this receptor are therefore rated as high. However, this farmstead is located within the Roggeveld WEF project area and in close proximity to the existing Bon Espirange Substation, and the land owner has consented to the proposed development on their property and does not perceive the proposed powerline in a negative light. The remaining receptors are all more than 1.5kms away and, would only be subjected to moderate or low levels of impact. ▪ All three Options are located some 2km from the nearest section of the R354 receptor road and as such travelers utilising this road would only experience moderate to low levels of visual impact resulting from the powerlines. These impacts would be further reduced by the hilly terrain across the study area which effectively screens views from sections of this road. ▪ The major portion of all of these route alignments is located in the project area for the Roggeveld WEF, and as such these sections of the route alignment have undergone some transformation from the natural state. This would lessen the impacts of a new powerline in this area. ▪ In light of the above, there are no fatal flaws associated with Option 1A, Option 1B and Option 1C and all of these alternatives are considered favourable from a visual perspective.
Powerline Corridor Options 2A, 2B and 2C	Favourable	▪ The southern sections of Options 2A, 2B and 2C all follow very similar route alignments to Options 1A, 1B and 1C. The northern sections of these alternatives however run in between ridges which provide a degree of topographic screening. ▪ For all three options, visibility varies as the route alignments follow valley lines and traverse ridges. It should however be noted that much of the northern section of Option 2A is outside the viewshed of the identified receptors. Remaining sections of all three alignments have been shown to have low to medium-low levels of visibility from the receptor locations. Even where the alignments traverse ridges, the visibility analysis does not indicate that these ridges are highly visible from the surrounding landscape. As such the powerlines would only be moderately exposed on the skyline. ▪ This option is approximately 7.9km from the only sensitive receptor in the study area (SR1) and considering the hilly nature of the terrain, only some sections of the powerlines are expected to be visible from this location. As such, visual impacts of the powerline are expected to be negligible and these would be further reduced by the presence of existing high voltage powerlines and Komsberg substation. ▪ Eleven (11) potentially sensitive receptors are located within 5kms of Options 2A, 2B and 2C, although the sections of the proposed powerlines are only expected to be visible from six (6) of these locations. The closest potentially sensitive receptor to this alternative is approximately 30m away, this being VR6. The visual impacts from Options 2A, 2B and 2C affecting this receptor are therefore rated as high. However, this farmstead is located within the Roggeveld WEF project area and in close proximity to the existing Bon Espirange Substation, and the land owner has consented to the proposed development

Alternative	Preference	Reasons (incl. potential issues)
		on their property and does not perceive the proposed powerline in a negative light. The remaining receptors are all more than 1.5kms away and, would only be subjected to moderate or low levels of impact. ▪ All three Options are located some 2km from the nearest section of the R354 receptor road and as such travelers utilising this road would only experience moderate to low levels of visual impact resulting from the powerlines. Although the northern sections of Options 2B and 2C are closer to the road than Option 2A, visibility westwards is reduced by the hilly terrain across the study area which effectively screens views from sections of this road. ▪ The major portion of all of these route alignments is located in the project area for the Roggeveld WEF, and as such these sections of the route alignment have already undergone some transformation from the natural state. This would lessen the impacts of a new powerline in this area. ▪ In light of the above, there are no fatal flaws associated with Option 2A, Option 2B and Option 2C and all of these alternatives are considered favourable from a visual perspective.

10.1 NO-GO ALTERNATIVE

The 'No Go' alternative is essentially the option of not developing powerlines or substations in this area. The area would thus retain its visual character and sense of place and no visual impacts would be experienced by any locally occurring receptors.

11. CONCLUSION

A VIA has been conducted to assess the magnitude and significance of the potential visual impacts associated with the construction of a proposed 132 kV OHPL, 33/132kV substation and associated infrastructure to support the proposed Karreebosch WEF located near Matjiesfontein 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, the proposed powerline and substation development could potentially 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 is however reduced by the presence of the Roggeveld WEF, Komsberg substation and existing high voltage powerlines located in the central and southern sectors of the study area.

The area is not however typically valued for its tourism significance and there is limited human habitation resulting in relatively few potentially sensitive receptors in the area. A total of 12 potentially sensitive receptors were identified in the study area, one (1) of which is considered to be a sensitive receptor as it is linked to leisure/nature-based tourism activities in the area.

According to the receptor impact rating undertaken for this VIA, the only sensitive receptor identified within the study area would experience low levels of visual impact as a result of the proposed development, this being the Saaiplaas Guest Farm. Five potentially sensitive receptors will be subjected to moderate levels of visual impact as a result of the proposed powerline and substation development, while one receptor will be subjected to low levels of visual impact. It should be noted however, that most of these receptors are located on farms which are within the project areas for approved renewable energy projects. As such the owners / occupants are not expected to perceive the proposed powerline and substation in a negative light.

The remaining five (5) receptors are outside the viewshed of the proposed development and are therefore not expected to be subjected to any visual impacts as a result of the powerline development.

An overall impact rating was also conducted in order to allow the visual impact to be assessed alongside other environmental parameters. The assessment revealed that impacts associated with the proposed 132kV powerline and substation will be of low significance during construction, operation and decommissioning phases with a number of mitigation measures available.

Although other renewable energy developments and infrastructure projects, either proposed or in operation, were identified within a 30km radius of the proposed development, it was determined that only two (2) of these would have any significant impact on the landscape within the visual assessment zone. These facilities are the authorised Karreebosch WEF (14/12/16/3/3/2/807/AM3) and the operational Roggeveld WEF (12/12/20/1988/1). These facilities and the associated grid connection infrastructure will alter the inherent sense of place and 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.

It is important to note that the study area is located within the Komsberg REDZ, and also within the Central Strategic Transmission Corridor, and thus the relevant authorities support the concentration of renewable energy developments and associated grid connection infrastructure in this area. In addition, it is possible that the renewable energy facilities located in close proximity to each other could be seen as one large facility rather than 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.

A comparative assessment of alternatives was undertaken in order to determine which of the substation options and powerline corridor alternatives would be preferred from a visual perspective. No fatal flaws were identified for either of the substation site alternatives or any of the proposed powerline corridor alternatives and all alternatives were found to be favourable.

11.1 IMPACT STATEMENT

It is SLR's opinion that, overall, the visual impacts associated with the proposed Karreebosch 132kV OHPL and associated 33/132kV substation are of moderate significance. Given the low level of human habitation and the relative absence of sensitive receptors, the project is deemed acceptable from a visual impact perspective and the EA should be granted for the EA application. SLR 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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Appendix A

SEPCIALIST EXPERTISE

CURRICULUM VITAE

KERRY LIANNE SCHWARTZ

SENIOR GIS CONSULTANT

EMPA, South Africa

QUALIFICATIONS

BA	1982	Geography, Leeds Trinity University, UK

EXPERTISE

- GIS, spatial modelling and 3D analysis
- Visual Impact Assessment
- Fatal Flaw Assessments
- Glint and Glare Assessments

Kerry is a highly focused and dedicated Spatial Professional with strong technical skills and some 27 years' experience in the application and use of geographic analysis and geospatial technologies in support of a range of environmental and development planning projects. While Kerry's expertise is largely centred on the management and presentation of geospatial data for environmental impact assessments, her GIS skills are frequently utilised in support of a range of other projects, including:

- Strategic environmental assessments and management plans;
- Visual and landscape assessments;
- Glint and glare assessments;
- Wetland / surface water assessments;
- Catchment delineation for floodline analysis;
- Urban and Rural Development Planning;
- Transport Assessments; and
- Infrastructure Development Planning.

Kerry has extended her skills base to include the undertaking of specialist Visual Impact Assessments (VIAs) for a range of projects, including renewable energy, power line and residential / mixed-use developments.

PROJECTS

A selection of Kerry's key project's are presented below.

	Built Infrastructure
EIA and EMP for a 9km railway line and water pipeline for manganese mine – Kalagadi Manganese	Kerry was responsible for GIS analysis and mapping in support of the EIA project in the Northern Cape, South Africa.
EIA and EMP for 5x 440kV Transmission Lines between Thyspunt (proposed nuclear power station site) and several substations	Kerry was responsible for GIS analysis and mapping in support of the EIA project in the Port Elizabeth area in the Eastern Cape, South Africa.

EIA for multi petroleum products pipeline from Kendall Waltloo, and from Jameson Park to Langlaagte Tanks farms Pipelines	Kerry was responsible for GIS analysis and mapping in support of the EIA project.
Environmental Management Plan for copper and cobalt mine	Kerry was responsible for GIS analysis and mapping in support of the EMP project in the Democratic Republic of Congo.
EIA and Agricultural Feasibility study for Miwani Sugar Mill	Kerry was responsible for GIS analysis and mapping in support of the EIA project in Kenya.
EIAs for several Solar Photovoltaic Energy Facilities and associated infrastructure	Kerry was responsible for GIS analysis and mapping in support of several EIAs for Solar PV facilities, the most recent projects being: • Oya Energy Facility (Western Cape Province); • Mooi Plaats, Wonderheuvel and Paarde Valley Solar PV Facilities (Northern Cape Province); and • Sendawo 1, 2 and 3 Solar Energy Facilities (North West Province).
EIAs / BAs for several WEFs and associated infrastructure	Kerry was responsible for GIS analysis and mapping in support of several EIAs for Wind Energy Farms, the most recent projects being: • Tooverberg WEF (Western Cape Province); • Rondekop WEF (Western Cape Province); and • Graskoppies, Hartebeest Leegte, Ithuba and !Xha Boom (Leeuwberg Cluster) WEFs (Northern Cape Province).
Basic Assessments for various 400kV and 132kV Distribution Lines for the Transnet Coal Link Upgrade Project	Kerry was responsible for GIS analysis and mapping in support of the powerline BA project in KwaZulu-Natal and Mpumalanga, South Africa.
Environmental Assessment for the proposed Moloto Development Corridor	Kerry was responsible for GIS analysis and mapping in support of the EIA project in the Limpopo Province.
Environmental Advisory Services for the Gauteng Rapid Rail Extensions Feasibility Project	Kerry was responsible for GIS analysis and mapping in support of a feasibility study for a rail extension in Gauteng, South Africa.
Environmental Screening for the Strategic Logistics and Industrial Corridor Plan for Strategic Infrastructure Project 2	Kerry was responsible for GIS analysis and mapping in support of the environmental screening for strategic infrastructure in KwaZulu-Natal, the Free State and Gauteng.

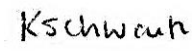
Fatal Flaw Assessments for various proposed Renewable Energy Facilities	Kerry was responsible for GIS analysis and mapping in support of fatal flaw assessment for renewable energy projects in the Northern Cape and Western Cape Provinces.
	Strategic Planning
Lesotho Highlands Development Association – Lesotho	GIS database development for socio-economic and health indicators arising from Social Impact Assessments
Development Plans for the adjacent towns of Kasane and Kazungula and for the rural village of Hukuntsi	Kerry was responsible for GIS database management, spatial data analysis and mapping for the development plans for towns in Botswana.
Integrated Development Plans for various District and Local Municipalities	Kerry was responsible for GIS database management, spatial data analysis and mapping for various IDPs for District Municipalities in KwaZulu-Natal.
Rural Development Initiative and Rural Roads Identification for uMhlathuze Local Municipality	Kerry was responsible for GIS database management, spatial data analysis and mapping for rural road identification in the uMhlathuze Local Municipality in KwaZulu-Natal.
Tourism Initiatives and Master Plans for areas such as the Mapungubwe Cultural Landscape	Kerry was responsible for GIS database management, spatial data analysis and mapping for various Master Plans in the Limpopo and Northern Cape Provinces.
Spatial Development Frameworks for various Local and District Municipalities	Kerry was responsible for GIS database management, spatial data analysis and mapping for Spatial Development Frameworks for various Municipalities in KwaZulu-Natal, Mpumalanga and the Free State.
Land Use Management Plans/Systems (LUMS) for various Local Municipalities	Kerry was responsible for GIS database management, spatial data analysis and mapping for the development of Land Use Management Systems for various Local Municipalities in KwaZulu-Natal.
Land use study for the Johannesburg Inner City Summit and Charter	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Johannesburg Inner City land use study.
Due Diligence Investigation for the Port of Richards Bay	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Port of Richards Bay Due Diligence Investigation.
	State of the Environment Reporting
2008 State of the Environment Report for City of Johannesburg	Kerry was responsible for GIS database management, spatial data analysis and mapping for the 2008 Johannesburg State of the Environment Report.

	Strategic Environmental Assessments and Environmental Management Frameworks
SEA for Greater Clarens	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Greater Clarens SEA in the Free State Province.
SEA for the Marula Region of the Kruger National Park	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Marula Region SEA on behalf of SANParks.
SEA for Thanda Private Game Reserve	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Thanda Private Game Reserve SEA in KwaZulu-Natal.
SEA for KwaDukuza Local Municipality	Kerry was responsible for GIS database management, spatial data analysis and mapping for the KwaDukuza Local Municipality SEA in KwaZulu-Natal.
SEA for Molemole Local Municipality, Capricorn District Municipality	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Molemole Local Municipality SEA in Limpopo Province.
SEA for Blouberg Local Municipality, Capricorn District Municipality	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Blouberg Local Municipality in Limpopo Province.
SEA for the Bishopstowe study area in the Msunduzi Local Municipality	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Bishopstowee SEA in KwaZulu-Natal.
EMF for proposed Renishaw Estate	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Reinshaw Estate EMF in KwaZulu-Natal.
EMF for Mogale City Local Municipality, Mogale City Local Municipality	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Mogale City Local Municipality EMF in Gauteng.
	Visual Impact Assessments
VIAs for various Solar Power Plants and associated grid connection infrastructure	Kerry was responsible for the GIS mapping and visual impact assessments for various Solar Power Plants and associated grid connection infrastructure (Northern Cape, Free State, Limpopo and North West Province) the most recent projects being: • Oya Energy Facility (Western Cape Province); • Mooi Plaats, Wonderheuvel and Paarde Valley Solar PV facilities (Northern Cape Province); and • Nokukhanya Solar PV Facility (Limpopo Province.

VIAs for various WEFs and associated grid connection infrastructure	Kerry was responsible for the GIS mapping and visual impact assessments for various Wind Energy Farms and associated grid connection infrastructure (Northern Cape and Western Cape), the most recent projects including: • Gromis and Komas WEFs (Northerrn Cape Province). • Paulputs WEF (Northern Cape Province); • Kudusberg WEF (Western Cape Province); • Tooverberg WEF (Western Cape Province); • Rondekop WEF (Northern Cape Province); and • San Kraal and Phezukomya WEFs (Northern Cape Province).
VIAs for various 400kV and 132kV Distribution Lines for the Transnet Coal Link Upgrade Project	Kerry was responsible for the GIS mapping and visual impact assessments for various powerlines in KwaZulu-Natal and Mpumalanga Provinces.
VIAs for the proposed Assagay Valley and Kassier Road North Mixed Use Development	Kerry was responsible for the GIS mapping and a visual impact assessment for the Assagay Valley and Kassier Road North Mixed Use Development in KwaZulu-Natal.
VIA for the proposed Tinley Manor South Banks Development	Kerry was responsible for the GIS mapping and a visual impact assessment for the Tinley Manor Southbanks Coastal Development in KwaZulu-Natal.
VIA for the proposed Tinley Manor South Banks Beach Enhancement Solution	Kerry was responsible for the GIS mapping and a visual impact assessment for the Tinley Beach Enhancement EIA in KwaZulu-Natal.
VIA for the proposed Mlonzi Hotel and Golf Estate Development	Kerry was responsible for the GIS mapping and a visual impact assessment for the Mlonzi Hotel and Golf Estate in the Eastern Cape.
Landscape Assessment for the Mogale City Local Municipality	Kerry was responsible for the GIS mapping and a visual impact assessment for the Mogale City Local Municipality landscape assessment.

MEMBERSHIPS

GISSA	Member of Geo-Information Society of South Africa
SAGC	Registered as GISc Technician with the South African Geomatics Council, Membership No. GTc GISc 1187



04 February 2022

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 CONSTRUCTION OF THE KARREEBOSCH WIND ENERGY FACILITY AND ASSOCIATED 132KV POWER LINE AND SUBSTATION NEAR MATJIESFONTEIN, WESTERN AND NORTHERN CAPE PROVINCES

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:	SLR Consulting (South Africa) (Pty) Ltd			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	30.88
Specialist name:	Kerry Lianne Schwartz			
Specialist Qualifications:	BA			
Professional affiliation/registration:	SAGC (GISc Technician)			
Physical address:	Suite1 Building D, Monte Circle, 178 Montecasino Boulevard, Fourways			
Postal address:	As above			
Postal code:	2191	Cell:	082 469 5850	
Telephone:	011 467 0945	Fax:		
E-mail:	klschwartz@slrconsulting.com			

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

SLR Consulting (South Africa) (Pty) Ltd

Name of Company:

01 August 2022

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

SLR Consulting (South Africa) (Pty) Ltd

Name of Company

01 August 2022

Date

Signature of the Commissioner of Oaths

1 August 2022

Date

I certify that the DEPONENT has acknowledged that he/she knows and understands the contents of this affidavit, that he/she does not have any objection to taking the oath, and that he/she considers it to be binding on his/her conscience, and which was sworn to and signed before me

at Fourways on this the 1 day of Aug 20 22

and that the administering oath complied with the regulations contained in Government Gazette No. R1258 of 21 July 1972, as amended.

COMMISSIONER OF OATHS
Oren Jan Van Vrede
Ex Officio – Professional Accountant (S.A.)
Member No.: 33335
Building D Monte Circle, 178 Montecasino Boulevard,
Fourways, Johannesburg, 2191
(011) 467-0945

Appendix C

Impact Rating Methodology

BASIC ASSESSMENT PROCESS

OBJECTIVES OF THE BASIC ASSESSMENT PROCESS AS PER THE PROCEDURAL FRAMEWORK

As defined in Appendix 1 of the EIA Regulations, 2014 (as amended), the objective of the impact assessment process is to, through a consultative process:

- Determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- Identify the alternatives considered, including the activity, location, and technology alternatives;
- Describe the need and desirability of the proposed alternatives;
- Through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine—
    - The nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
    - The degree to which these impacts—
        - Can be reversed;
        - May cause irreplaceable loss of resources; and
        - Can be avoided, managed, or mitigated.
- Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to–
    - Identify and motivate a preferred site, activity and technology alternative;
    - Identify suitable measures to avoid, manage or mitigate identified impacts; and
    - Identify residual risks that need to be managed and monitored.

BASELINE ENVIRONMENTAL ASSESSMENT

The description of the environmental attributes of the project area was compiled through a combination of desktop reviews and site investigations. Desktop reviews made use of available information including existing reports, aerial imagery, and mapping.

IMPACT ASSESSMENT METHODOLOGY

ASSESSMENT OF IMPACTS AND MITIGATION

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and

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resources and receptors to provide a detailed discussion of impacts. The assessment considers direct[1], indirect[2], secondary[3] as well as cumulative[4] impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e. residual impact). The significance of environmental aspects is determined and ranked by considering the criteria[5] presented in **Table 1**.

Table 1: Impact Assessment Criteria and Scoring System

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
IMPACT SIGNIFICANCE RATING					
Total Score	0 – 30	31 to 60	61 – 100		
Environmental Significance Rating (Negative (-))	**Low (-)**	**Moderate (-)**	**High (-)**		
Environmental Significance Rating (Positive (+))	**Low (+)**	**Moderate (+)**	**High (+)**		

IMPACT MITIGATION

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact and are included to

[1] Impacts that arise directly from activities that form an integral part of the Project.
[2] Impacts that arise indirectly from activities not explicitly forming part of the Project.
[3] Secondary or induced impacts caused by a change in the Project environment.
[4] Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects.
[5] The definitions given are for guidance only, and not all the definitions will apply to all the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during Project implementation to verify that actual impacts are the same as those predicted in this report.

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

The mitigation sequence/hierarchy is shown in **Figure 0-1** below.

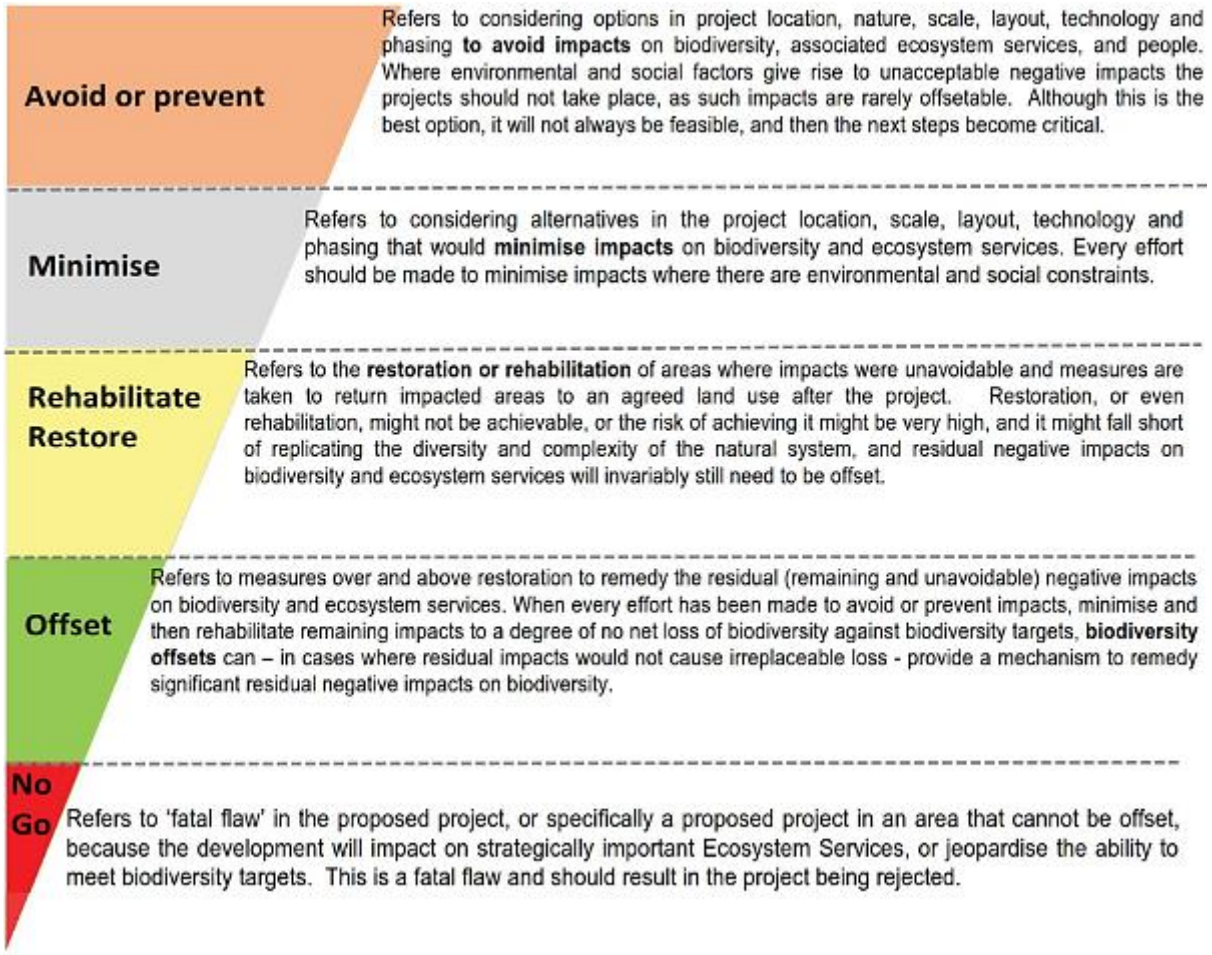


Figure 0-1: Mitigation Sequence/Hierarchy

1 ENVIRONMENTAL IMPACT ASSESSMENT

This Chapter identifies the perceived environmental and social effects associated with the proposed Project. The assessment methodology is outlined above. The issues identified stem from those aspects presented in the baseline assessment as well as project description provided. The impact assessment will be based on the preferred alternative at all project phases. This section only assesses the preferred option along with the no-go section. The mitigation hierarchy criteria for each mitigation measure are indicated in brackets after each measure indicated.

Furthermore, the decommissioning assessment will be considered as part of the decommissioning process that will be subject to a separate authorisation and impact assessment process. The impact assessment in this section encompasses the geographical, physical, biological, social, economic, heritage and cultural aspects in accordance with Appendix 1 of GNR 326.

An example of how the impact assessment methodology is applied is provided below:

1.1 AIR QUALITY

1.1.1 CONSTRUCTION PHASE

DUST AND PARTICULATE MATTER

The National Dust Control Regulations (GNR 827) prescribe general measures for the control of dust in both residential and non-residential areas and will be applicable during construction of the OHPL. **Table 2** provides the acceptable dust fall rates as prescribed by GNR 827.

Table 2: Acceptable dust fall rates (GNR 827)

RESTRICTION AREAS	DUST FALL RATE (D) (mg/m^2/day – 30 DAYS AVERAGE)	PERMITTED FREQUENCY OF EXCEEDING DUST FALL RATE
Residential area	D < 600	Two within a year, not sequential months
Non-residential area	600 < D < 1200	Two within a year, not sequential months

During the construction phase, dust and vehicular emissions (carbon monoxide (CO), hydrocarbons, particulate matter (PM) and nitrogen oxides (NO_x) will be released as a result of vegetation clearing activities, transportation of equipment and materials to site, and the installation thereof, all of which involves the movement of large plant and trucks along unpaved roads and exposing of soils. The emissions will, however, have short-term impacts on the immediate surrounding areas that can be easily mitigated and thus the authorisation of such emissions will not be required. All construction phase air quality impacts will be minimised with the implementation of dust control measures contained within the EMPr.

The impact of the construction phase on the generation of dust and particulate matter (PM) is shown in **Table 3** below.

Table 3: Construction Impact on Generation of Dust and PM

Potential Impact	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
GENERATION OF DUST AND PM									
Without Mitigation	2	2	3	1	4	**32**	**Moderate**	(-)	High
With Mitigation	1	1	3	1	3	**18**	**Low**	(-)	High

Potential Impact	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
GENERATION OF DUST AND PM								
Mitigation and Management Measures	— Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and soil/material stockpiles especially. This includes wetting of exposed soft soil surfaces and not conducting activities during high wind periods which will increase the likelihood of dust being generated; — All stockpiles (if any) must be restricted to designated areas and may not exceed a height of two (2) metres; — Ensure that all vehicles, machines and equipment are adequately maintained to minimise emissions; — It is recommended that the clearing of vegetation from the site should be selective, be kept to the minimum feasible area, and be undertaken just before construction so as to minimise erosion and dust potential; — All materials transported to, or from, site must be transported in such a manner that they do not fly or fall off the vehicle. This may necessitate covering or wetting friable materials. — Enforcing of speed limits. Reducing the dust generated by the listed activities above, putting up signs to enforce speed limit in access roads. — No burning of waste, such as plastic bags, cement bags and litter is permitted; and — All issues/complaints must be recorded in the complaints register.							

1.1.2 OPERATIONAL PHASE

There are no anticipated air quality impacts during the operational phase as maintenance activities will occur as and when required and will be extremely short term.

CUMULATIVE IMPACT ASSESSMENT

Although the BA process is essential to assessing and managing the environmental and social impacts of individual projects, it often may be insufficient for identifying and managing incremental impacts on areas or resources used or directly affected by a given development from other existing, planned, or reasonably defined developments at the time the risks and impacts are identified.

IFC PS 1 recognizes that, in some instances, cumulative effects need to be considered in the identification and management of environmental and social impacts and risks. For private sector management of cumulative impacts, IFC considers good practice to be two pronged:

- effective application of and adherence to the mitigation hierarchy in environmental and social management of the specific contributions by the project to the expected cumulative impacts; and
- best efforts to engage in, enhance, and/or contribute to a multi-stakeholder, collaborative approach to implementing management actions that are beyond the capacity of an individual project proponent.

Even though Performance Standard 1 does not expressly require, or put the sole onus on, private sector clients to undertake a cumulative impact assessment (CIA), in paragraph 11 it states that the impact and risk identification process "*will take into account the findings and conclusions of related and applicable plans, studies, or assessments prepared by relevant government authorities or other parties that are directly related to the project and its area of influence*" including "*master economic development plans, country or regional plans, feasibility studies, alternatives analyses, and cumulative, regional, sectoral, or strategic environmental assessments where relevant*."

Cumulative impacts are those that result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones. For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognized as important on the basis of scientific concerns and/or concerns of affected communities (IFC).

Evaluation of potential cumulative impacts is an integral element of an impact assessment. In reference to the scope for an impact assessment, IFC's Performance Standards specify that "*Risks and impacts will be analysed in the context of the project's area of influence. This area of influence encompasses…areas potentially impacted by cumulative impacts from further planned development of the project, any existing project or condition, and other project-related developments that are realistically defined at the time the Social and Environmental Assessment is undertaken; and (iv) areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location."*

A cumulative impact assessment is the process of (a) analysing the potential impacts and risks of proposed developments in the context of the potential effects of other human activities and natural environmental and social external drivers on the chosen Valued Environmental and Social Components (VECs) over time, and (b) proposing concrete measures to avoid, reduce, or mitigate such cumulative impacts and risk to the extent possible (IFC).

Cumulative impacts with existing and planned facilities may occur during construction and operation of the proposed project. While one project may not have a significant negative impact on sensitive resources or receptors, the collective impact of the projects may increase the severity of the potential impacts.

SURROUNDING AREA

The project area and surrounding areas have been earmarked for renewable energy development. The South African government gazetted[6] eight (8) areas earmarked for renewable energy development in South Africa. These areas are known as Renewable Energy Development Zones (REDZ) and this project falls within the Komsberg REDZ. The purpose of the REDZ is to cluster development of renewable energy facilities in order to streamline the grid expansion for South Africa i.e. connect zones to one another as opposed to a wide scatter of projects. It is therefore not surprising that there are a number of environmental authorisations (EA) issued for wind energy facilities (either issued or in process) in the area surrounding the proposed project site. It is important to note that the existence of an approved EA does not directly equate to actual 'development'.

The surrounding projects, except for the Preferred Bidders, are still subject to the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) bidding process or subject to securing an off taker of electricity through an alternative

[6] Government Notice 114 of 16 February 2018

process. Some of the surrounding proposed WEFs secured EAs several years ago but have not obtained Preferred Bidder status and as such have not been developed.

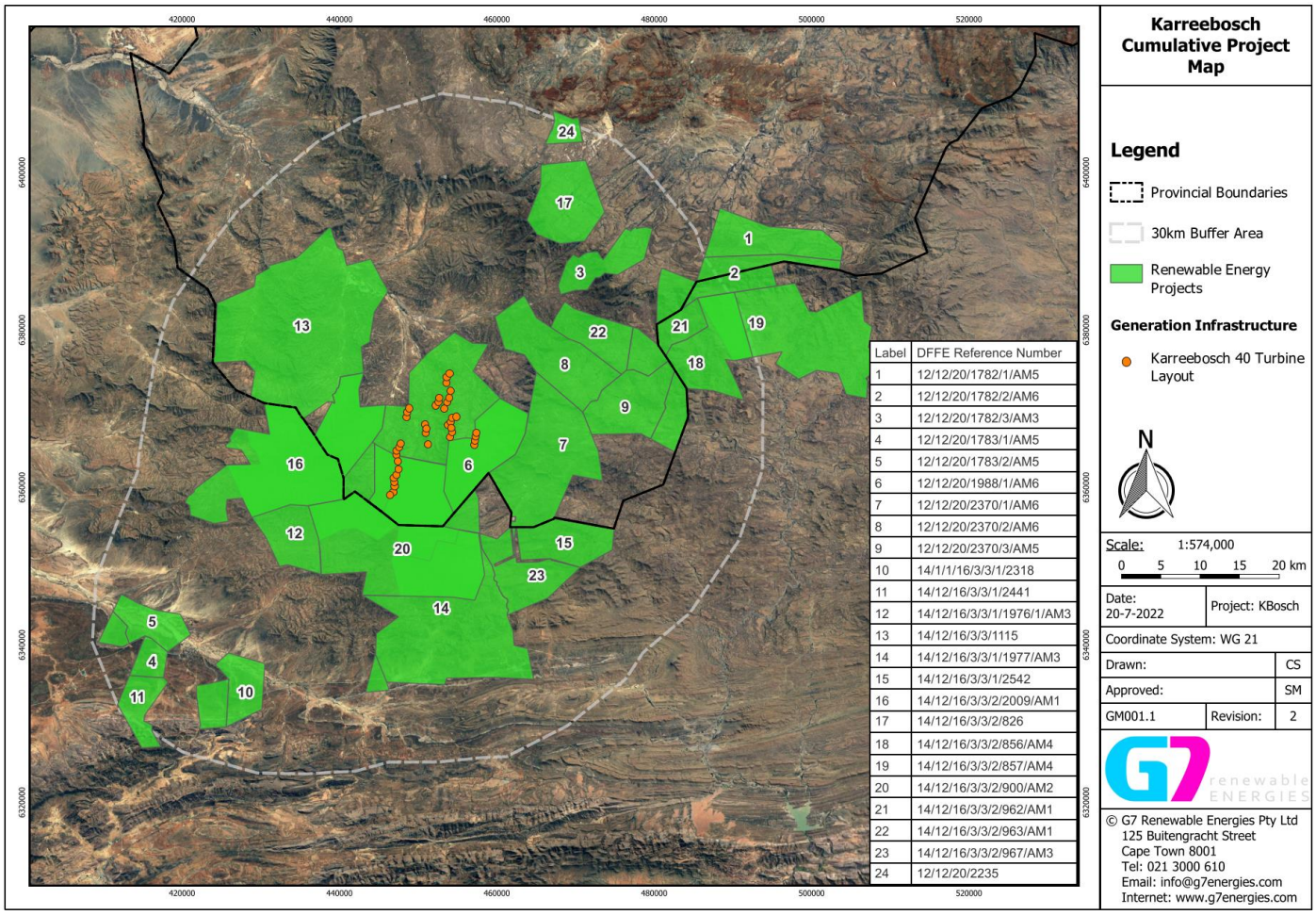
These existing surrounding projects of varying approval status have been detailed in the table and figure below. Given the site's location within the Komsberg REDZ, it is considered to be located within the renewable energy hub that is developing in this focus area.

All specialists must consider the cumulative impact of these projects in their statements / assessments prepared to inform this assessment.

Table 4: Renewable energy applications within 30km of the Karreebosch WEF and Powerline

LABEL	DFFE REFERENCE	PROJECT TITLE	STATUS
1	12/12/20/1782/1/AM5	140MW Rietrug Wind Energy Facility near Sutherland, Northern Cape Province.	Preferred Bidder Round 5
2	12/12/20/1782/2/AM6	140MW Sutherland 1 Wind Energy Facility near Sutherland, Northern Cape and Western Cape Provinces.	Preferred Bidder Round 5
3	12/12/20/1782/3/AM3	140 MW Sutherland 2 Wind Energy Facility near Sutherland, Northern Cape Provinces.	Preferred Bidder Round 5
4	12/12/20/1783/1/AM5	150MW Perdekraal Site 1 Wind Energy Facility, Western Cape Province.	Approved
5	12/12/20/1783/2/AM5	147MW Perdekraal Site 2 Wind Energy Facility, Western Cape Province.	Preferred Bidder Round 4, Operational
6	12/12/20/1988/1/AM6	140MW Roggeveld Phase 1 Wind Farm, North of Matjiesfontein, Northern Cape and Western Cape Provinces.	Preferred Bidder Round 4, Operational
7	12/12/20/2370/1/AM6	140 MW Karusa Wind Energy Facility,Phase 1, Karoo Hoogland Municipality, Northern Cape Province.	Preferred Bidder Round 4, Operational
8	12/12/20/2370/2/AM6	140MW Soetwater Wind Farm Phase 2, Karoo Hoogland Municipality, Northern Cape Province.	Preferred Bidder Round 4, Operational
9	12/12/20/2370/3/AM5	140MW Great Karoo Wind Energy Facility Phase 3, Karoo Hoogland Municipality, Northern Cape Province.	Approved
10	14/1/1/16/3/3/1/2318	310MW Pienaarspoort Wind Energy Facility Phase 1, Witzenberg local Municipality, Western Cape Province.	Approved
11	14/12/16/3/3/1/2441	360MW Pienaarspoort Wind Energy Facility Phase 1, Witzenberg local Municipality, Western Cape Province.	Approved
12	14/12/16/3/3/1/1976/1/AM3	226MW Kudusberg Wind Energy Facility between Matjiesfontein and Sutherland in Western and Northern Cape Provinces.	Approved
13	14/12/16/3/3/1115	325WM Rondekop Wind Energy Facility between Matjiesfontein and Sutherland in Western and Northern Cape Provinces	Approved
14	14/12/16/3/3/1/1977/AM3	183MW Rietkloof Wind Energy Facility near Matjiesfontein in the Western Cape Province.	Preferred Bidder Round 5
15	14/12/16/3/3/1/2542	200 MW Esizayo Wind Energy Facility Expansion near Laingsburg, Western Cape.	In Process

16	14/12/16/3/3/2/2009/AM1	Oya Energy Facility	Preferred Bidder Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP)
17	14/12/16/3/3/2/826	140MW Gunsfontein Wind Energy Facility Karoo Hoogland Municipality, Northern Cape Province.	Approved
18	14/12/16/3/3/2/856 /AM4	275MW Komsberg West near Laingsburg, Western Cape Provinces	Approved
19	14/12/16/3/3/2/857/AM4	275 Komsberg East near Laingsburg, Western Cape Provinces.	Approved
20	14/12/16/3/3/2/900/AM2	140MW Brandvalley Wind Energy Facility, WITHIN THE Laingsburg and Witzenberg Local Municipalities in the Western and Northern Cape Province.	Preferred Bidder Round 5
21	14/12/16/3/3/2/962/AM1	140MW Maralla East Wind Energy Facility, Namakwa and Central Karoo District Municipalities, Western and Northern Cape Provinces.	Approved
22	14/12/16/3/3/2/963/AM1	140Maralla West Wind Energy Facility, Karoo Hoogland local Municipality, Northern Cape Province.	Approved
23	14/12/16/3/3/2/967/AM3	140MW Esizayo Wind Farm, Laingsburg Local Municipality Western Cape Province.	Approved
24	12/12/20/2235	10MW Inca Photovoltaic Facility near Sutherland, Northern Cape Province.	Approved



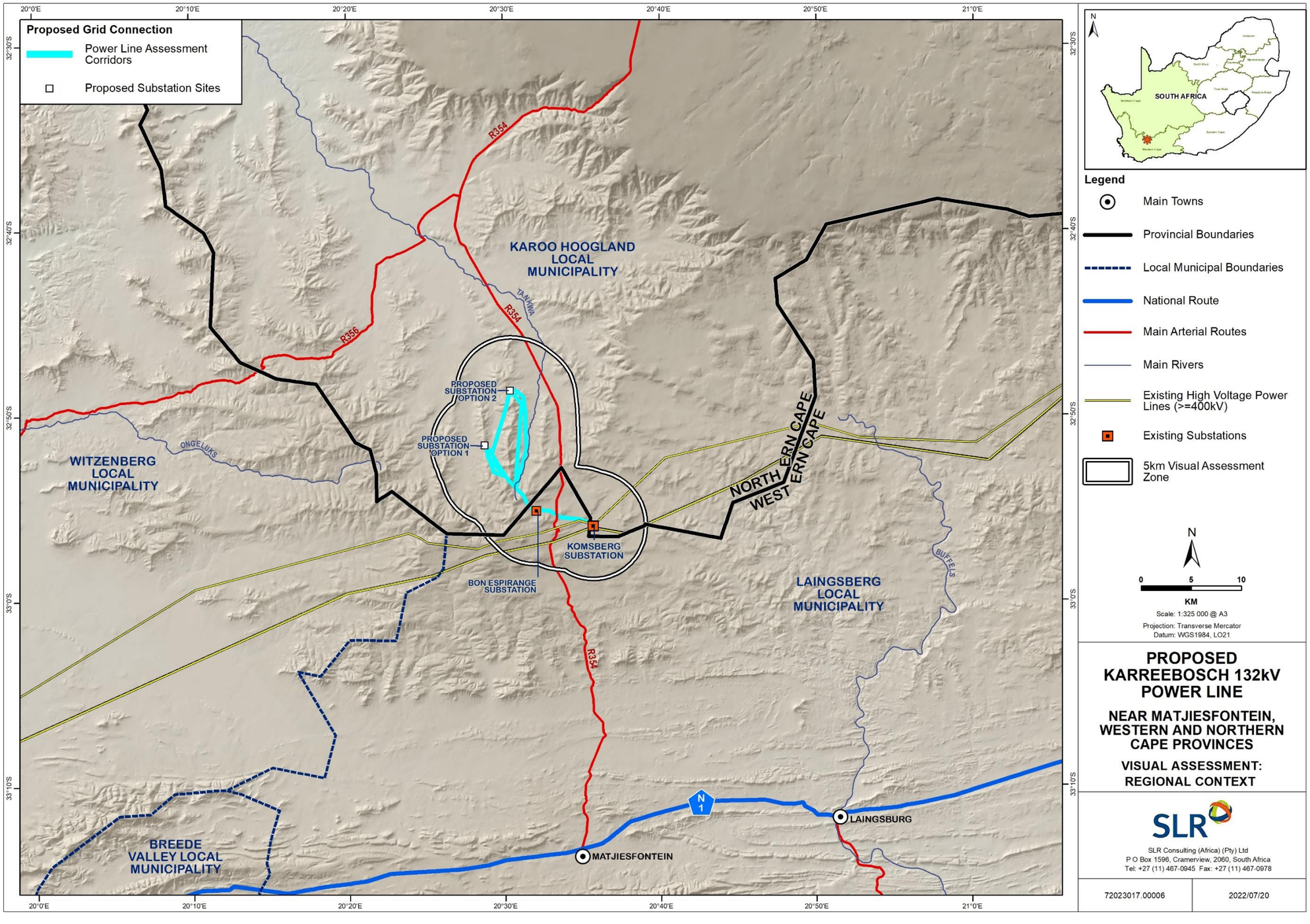
Label	DFFE Reference Number
1	12/12/20/1782/1/AM5
2	12/12/20/1782/2/AM6
3	12/12/20/1782/3/AM3
4	12/12/20/1783/1/AM5
5	12/12/20/1783/2/AM5
6	12/12/20/1988/1/AM6
7	12/12/20/2370/1/AM6
8	12/12/20/2370/2/AM6
9	12/12/20/2370/3/AM5
10	14/1/1/16/3/3/1/2318
11	14/12/16/3/3/1/2441
12	14/12/16/3/3/1/1976/1/AM3
13	14/12/16/3/3/1115
14	14/12/16/3/3/1/1977/AM3
15	14/12/16/3/3/1/2542
16	14/12/16/3/3/2/2009/AM1
17	14/12/16/3/3/2/826
18	14/12/16/3/3/2/856/AM4
19	14/12/16/3/3/2/857/AM4
20	14/12/16/3/3/2/900/AM2
21	14/12/16/3/3/2/962/AM1
22	14/12/16/3/3/2/963/AM1
23	14/12/16/3/3/2/967/AM3
24	12/12/20/2235

Figure 0-1: Renewable energy projects within a 30km radius of the Karreebosch WEF

Appendix D

Maps

MAP 1: Regional Context



PROPOSED KARREEBOSCH 132kV POWER LINE

NEAR MATJIESFONTEIN, WESTERN AND NORTHERN CAPE PROVINCES

VISUAL ASSESSMENT: REGIONAL CONTEXT

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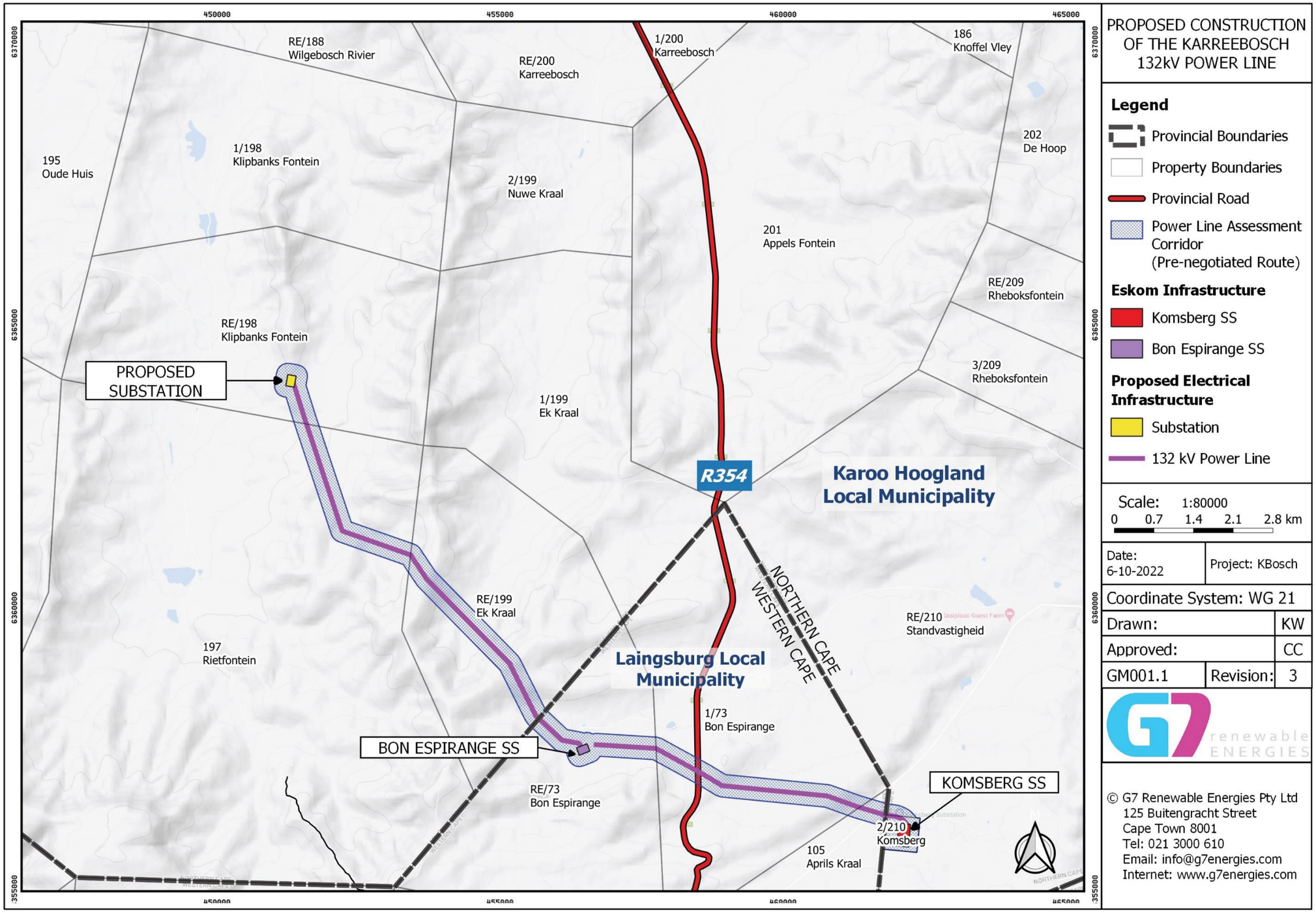
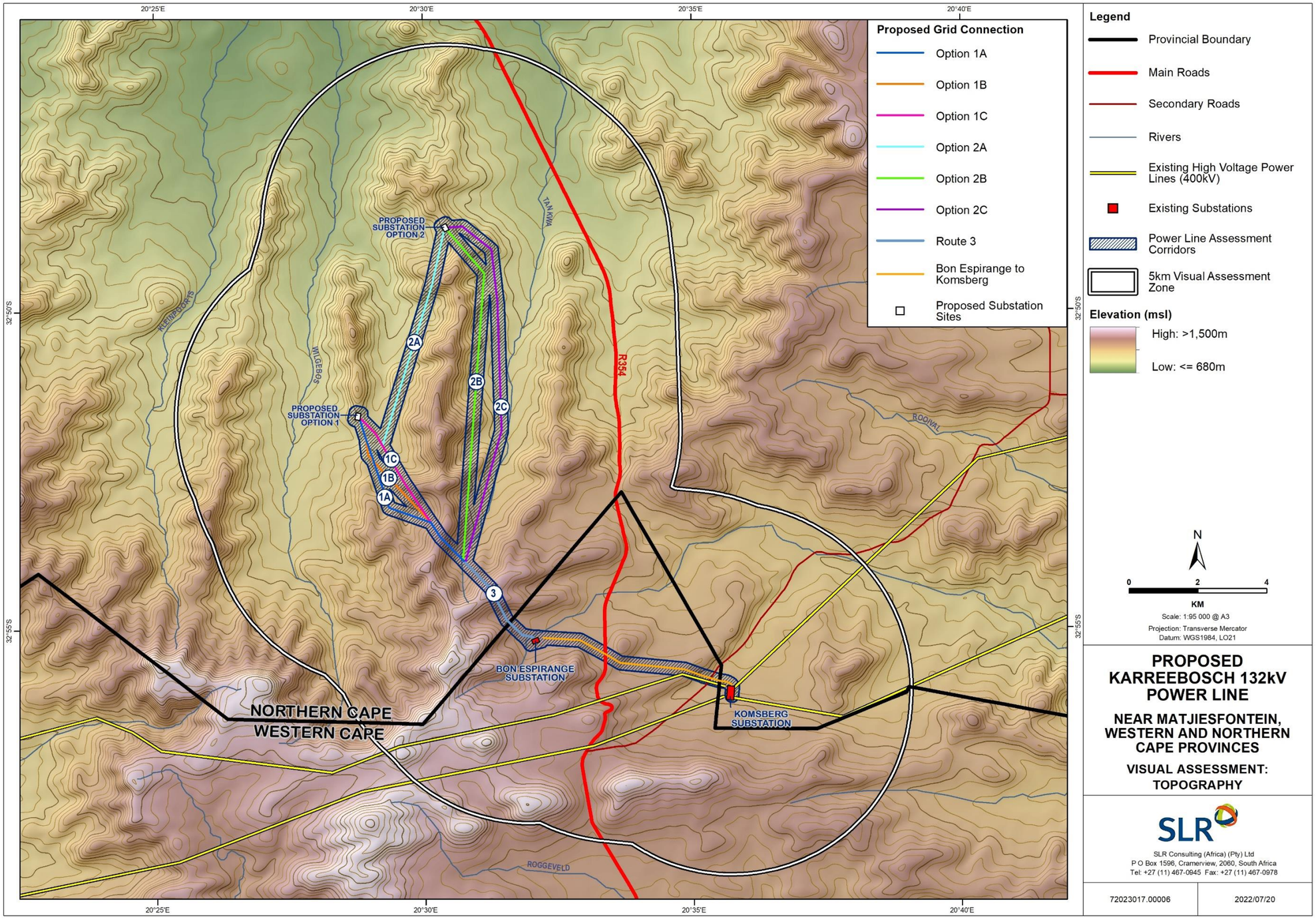
MAP 2: Preferred Route Overview



MAP 3: Topography



PROPOSED KARREEBOSCH 132kV POWER LINE

NEAR MATJIESFONTEIN, WESTERN AND NORTHERN CAPE PROVINCES

VISUAL ASSESSMENT: TOPOGRAPHY

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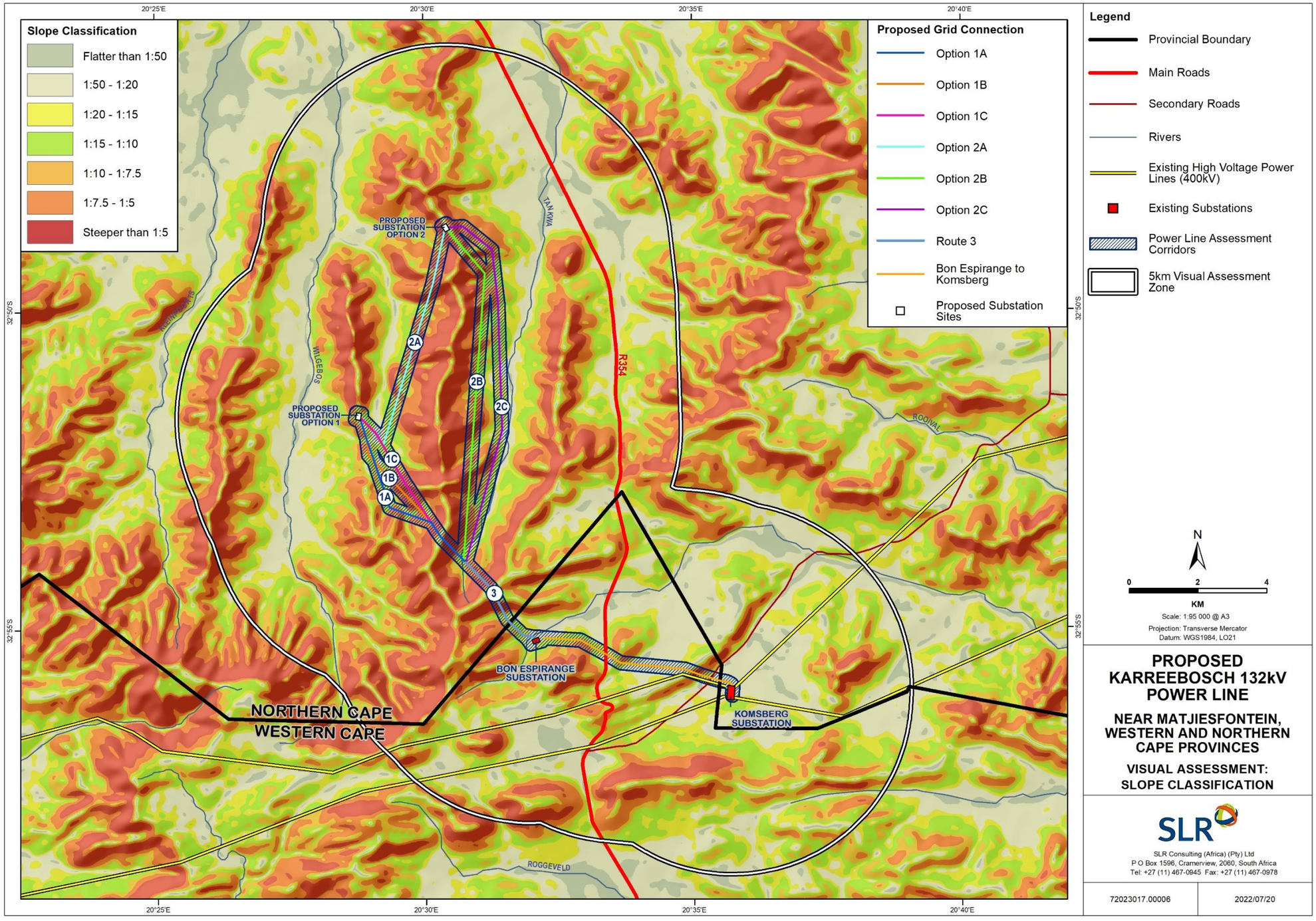
MAP 4: Slope Classification



PROPOSED KARREEBOSCH 132kV POWER LINE

NEAR MATJIESFONTEIN, WESTERN AND NORTHERN CAPE PROVINCES

VISUAL ASSESSMENT: SLOPE CLASSIFICATION

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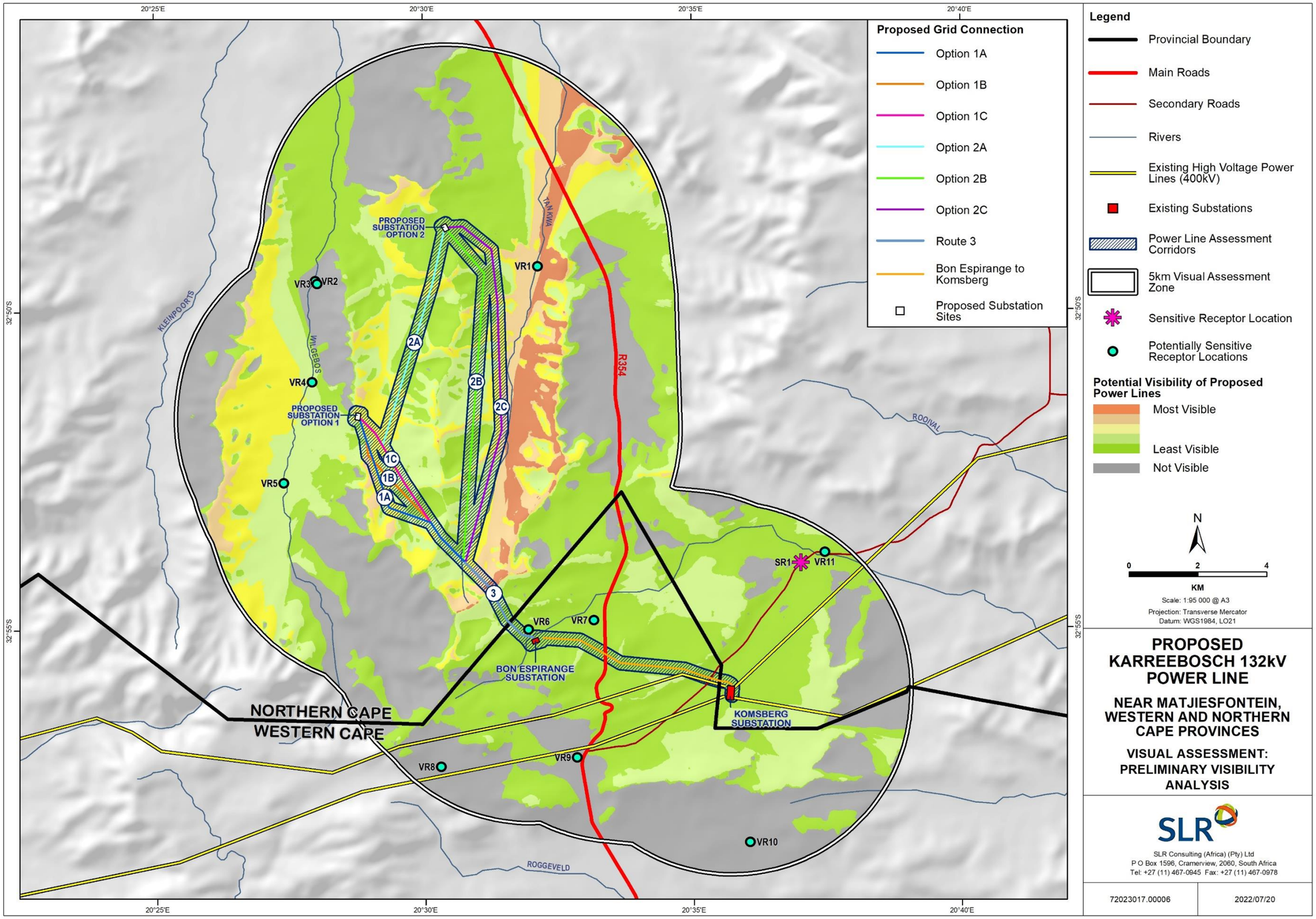
MAP 5: Preliminary Visibility Analysis



PROPOSED KARREEBOSCH 132kV POWER LINE

NEAR MATJIESFONTEIN, WESTERN AND NORTHERN CAPE PROVINCES

VISUAL ASSESSMENT: PRELIMINARY VISIBILITY ANALYSIS

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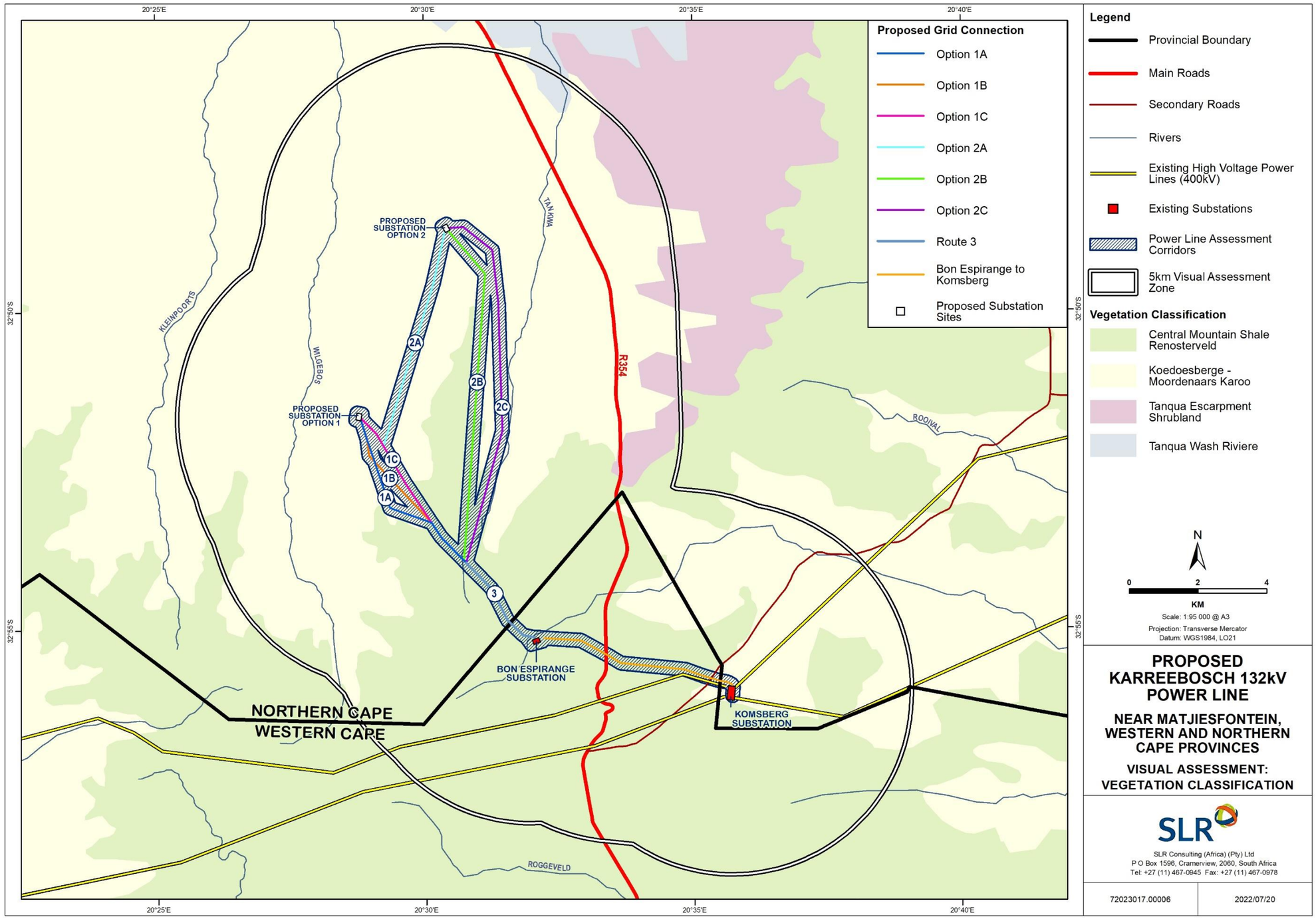
MAP 6: Vegetation Classification



PROPOSED KARREEBOSCH 132kV POWER LINE

NEAR MATJIESFONTEIN, WESTERN AND NORTHERN CAPE PROVINCES

VISUAL ASSESSMENT: VEGETATION CLASSIFICATION

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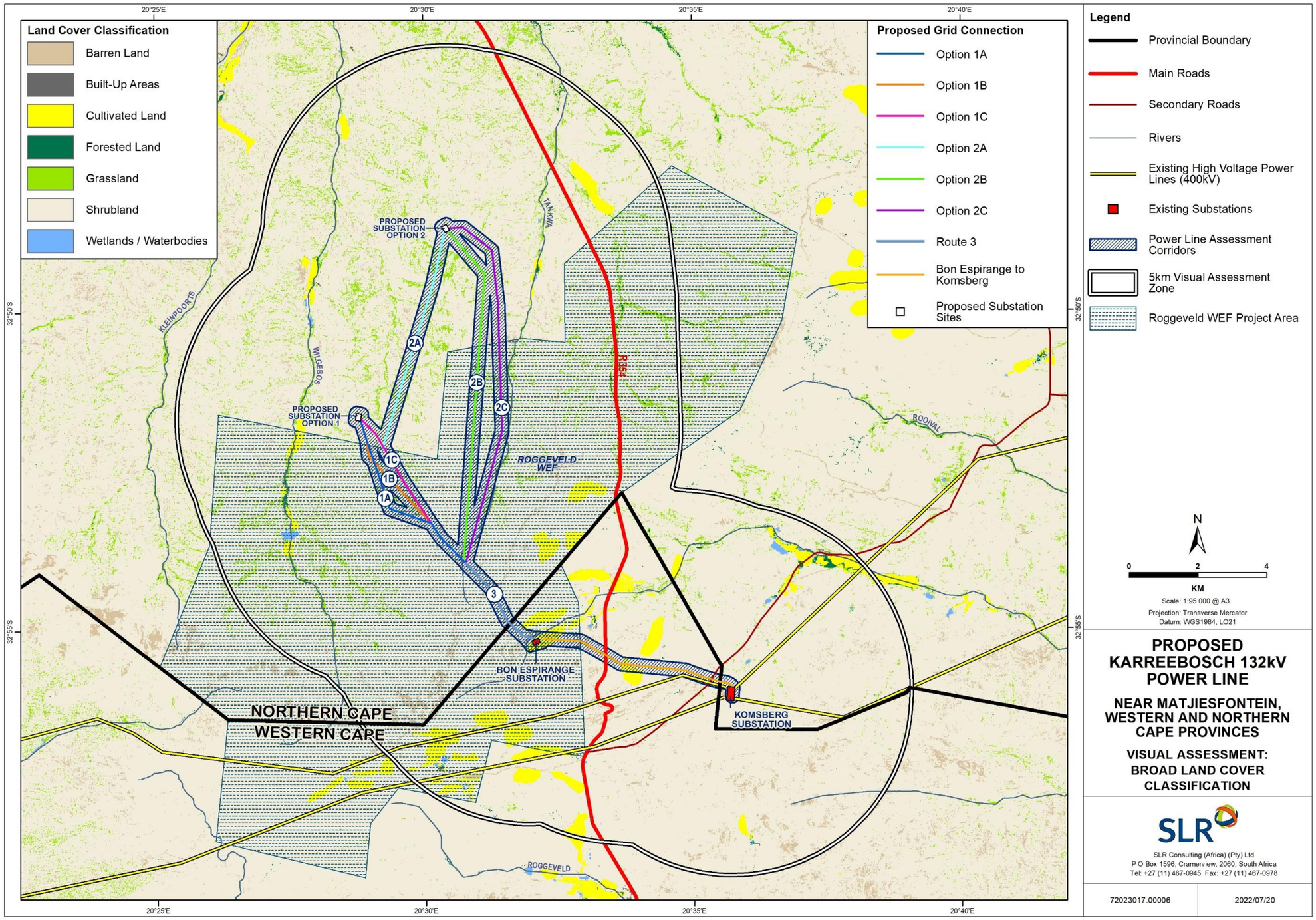
MAP 7: Broad Land Cover Classification



PROPOSED KARREEBOSCH 132kV POWER LINE

NEAR MATJIESFONTEIN, WESTERN AND NORTHERN CAPE PROVINCES

VISUAL ASSESSMENT: BROAD LAND COVER CLASSIFICATION

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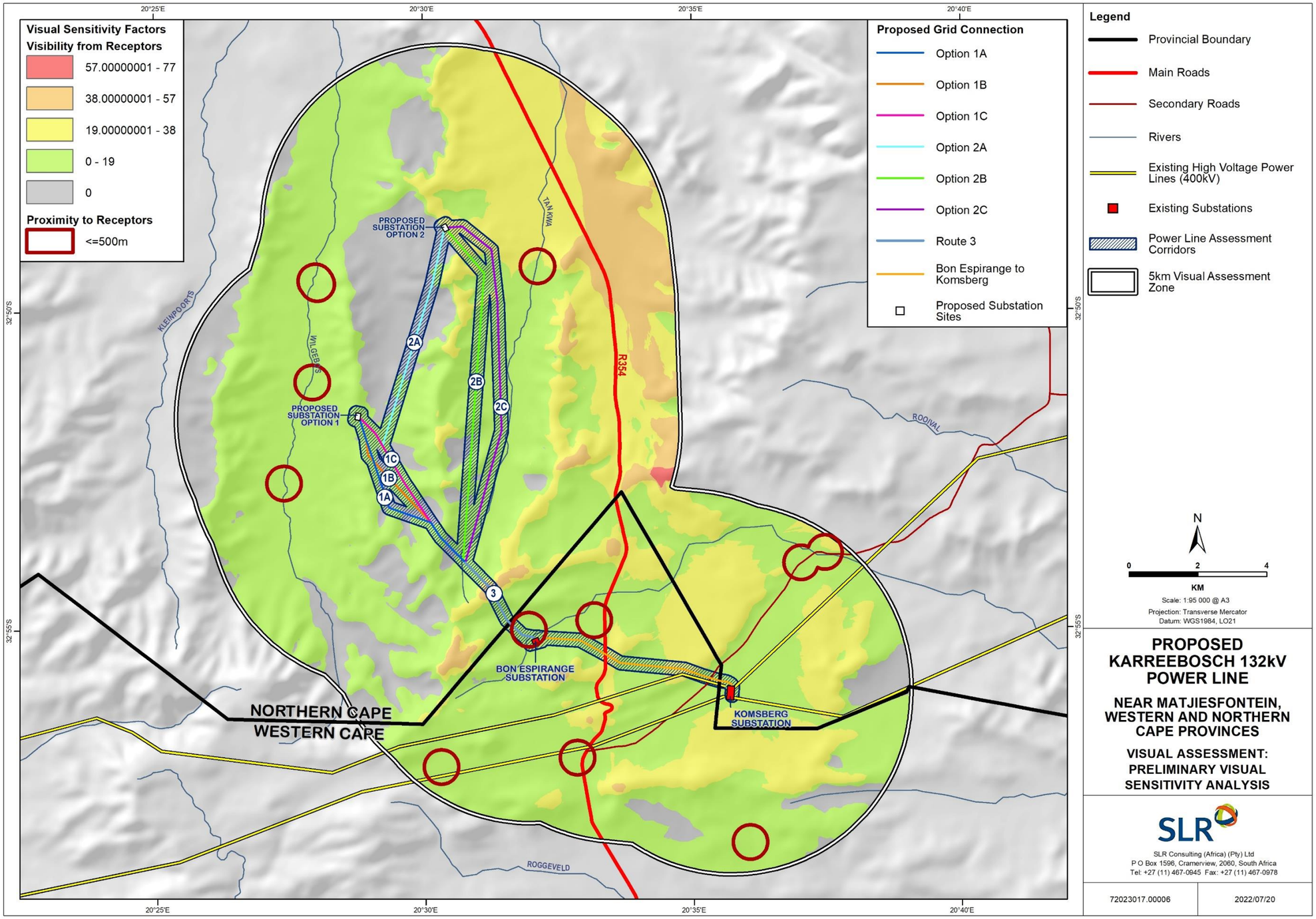
MAP 8: Preliminary Visual Sensitivity Analysis



PROPOSED KARREEBOSCH 132kV POWER LINE

NEAR MATJIESFONTEIN, WESTERN AND NORTHERN CAPE PROVINCES

VISUAL ASSESSMENT: PRELIMINARY VISUAL SENSITIVITY ANALYSIS

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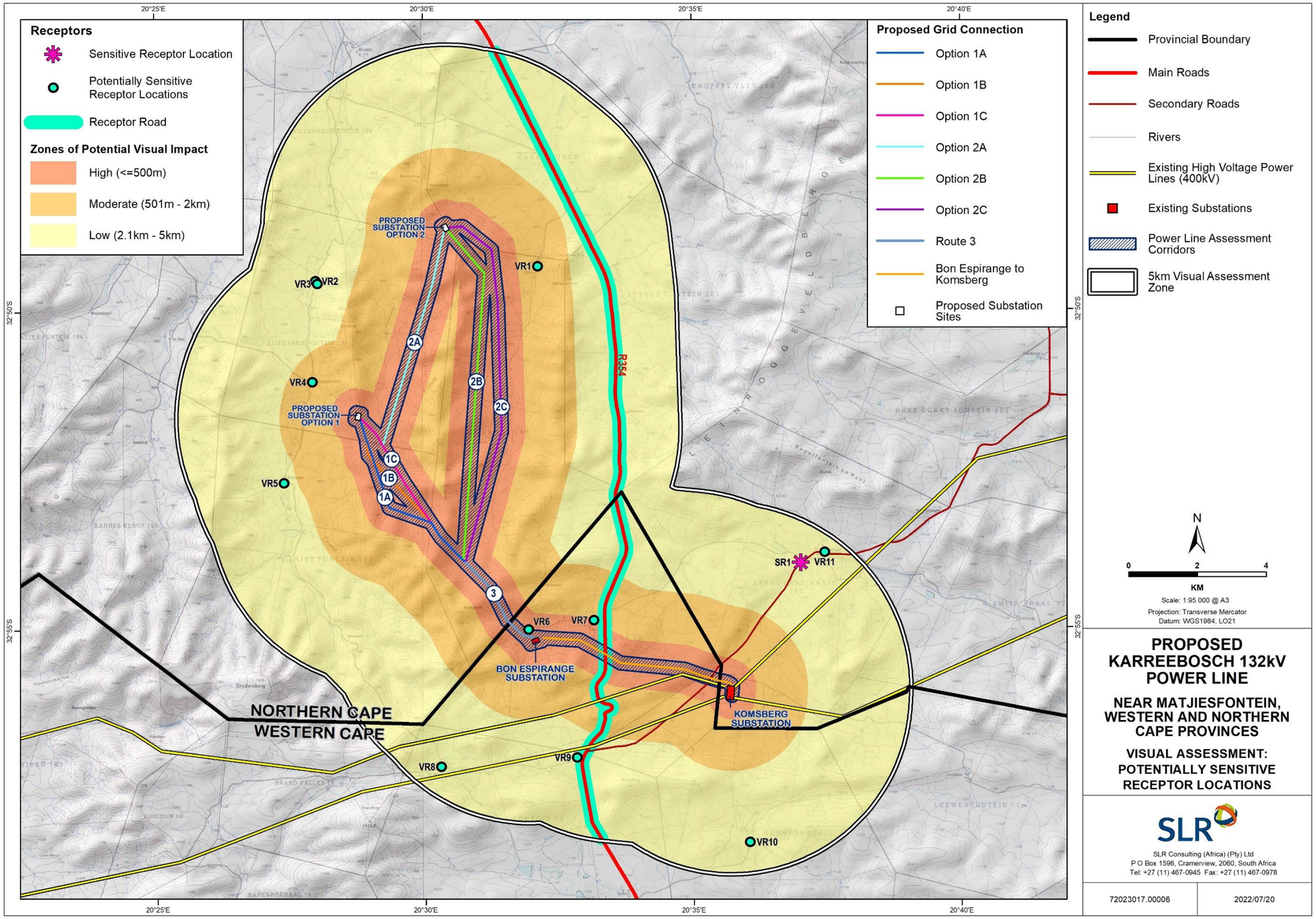
MAP 9: Potentially Sensitive Receptor Locations



PROPOSED KARREEBOSCH 132kV POWER LINE

NEAR MATJIESFONTEIN, WESTERN AND NORTHERN CAPE PROVINCES

VISUAL ASSESSMENT: POTENTIALLY SENSITIVE RECEPTOR LOCATIONS

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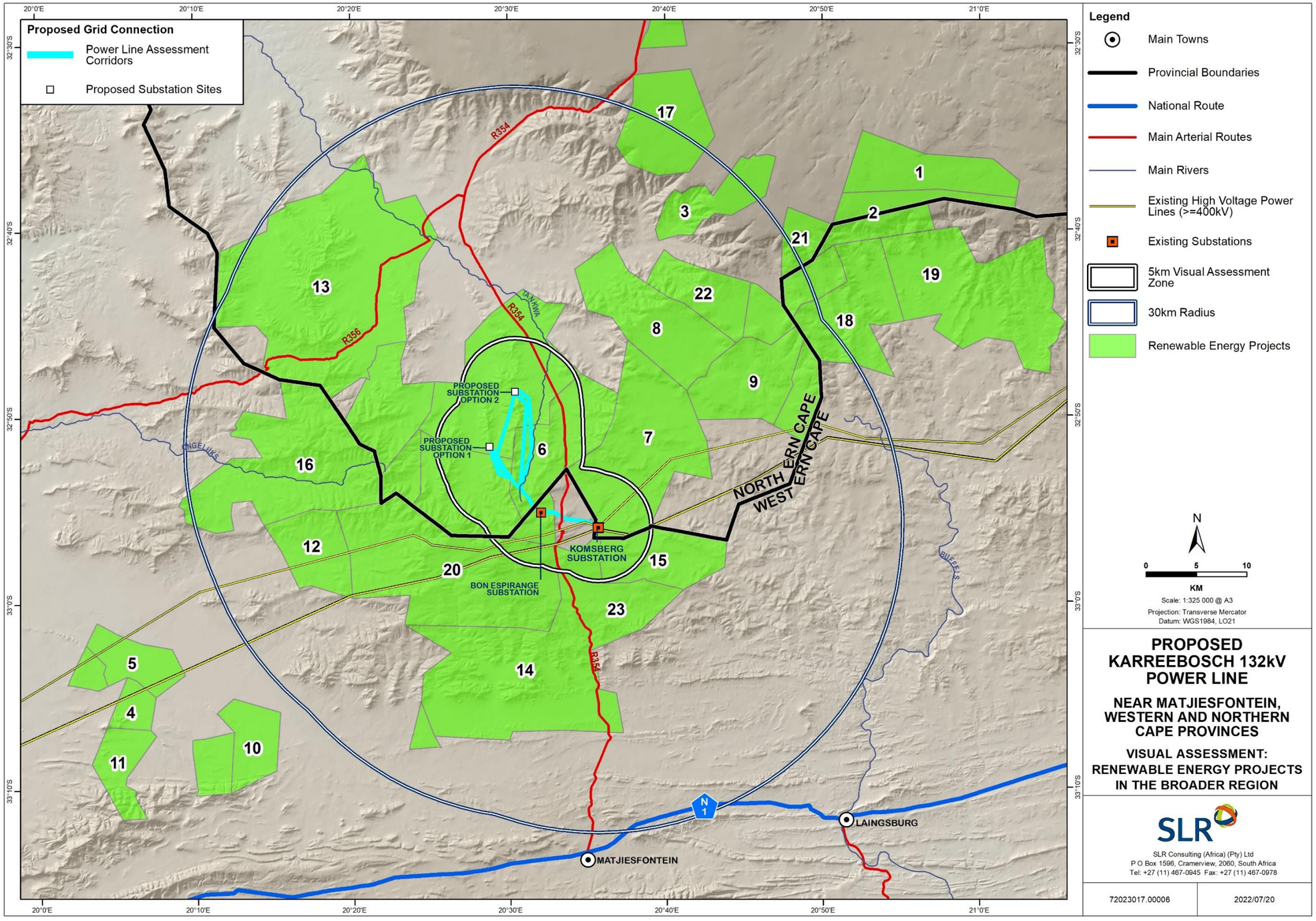
MAP 10: Renewable Energy Projects within 30km of the Proposed Powerline



Legend

- Main Towns
- Provincial Boundaries
- National Route
- Main Arterial Routes
- Main Rivers
- Existing High Voltage Power Lines (>=400kV)
- Existing Substations
- 5km Visual Assessment Zone
- 30km Radius
- Renewable Energy Projects

N

0 5 10

KM

Scale: 1:325 000 @ A3
Projection: Transverse Mercator
Datum: WGS1984, LO21

PROPOSED KARREEBOSCH 132kV POWER LINE

NEAR MATJIESFONTEIN, WESTERN AND NORTHERN CAPE PROVINCES

VISUAL ASSESSMENT: RENEWABLE ENERGY PROJECTS IN THE BROADER REGION

SLR Consulting (Africa) (Pty) Ltd
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