ENERTRAG SOUTH AFRICA (PTY) LTD

Proposed Construction of the Camden Collector Substation, Main Transmission Substation and associated 400kV Power Lines near Ermelo, Mpumalanga Province

Visual Impact Assessment Report – Scoping Phase

DEA Reference: (To be announced)
Issue Date: 29 November 2021
Version No.: 1
Project No.: 15875

Date:	29 11 2021
Document Title:	Proposed construction of the Camden Collector Substation, Main Transmission Substation and associated 400kv power lines near Ermelo, Mpumalanga Cape Province
Version Number:	1
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Client:	Enertrag South Africa (Pty) Ltd

Confidentiality Statement

National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) - Requirements for Specialist Reports (Appendix 6)

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	**Section of Report**
(a) details of the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a *curriculum vitae*;	**Section 1.2.** **Appendix B**
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	**Appendix B**
(c) an indication of the scope of, and the purpose for which, the report was prepared;	**Section** Error! Reference source not found. **Appendix A**
(cA) an indication of the quality and age of base data used for the specialist report;	**Section** Error! Reference source not found.. **Section** Error! Reference source not found..
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	**Section 6.** **Section 8.**
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	**Section 1.4** **Section** Error! Reference source not found..
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	**Section** Error! Reference source not found.. **Appendix C**
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	**Section 6.**
(g) an identification of any areas to be avoided, including buffers;	**Section** Error! Reference source not found.. **Section** Error! Reference source not found..
(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** Error! Reference source not found..
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	**Section** Error! Reference source not found..
(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. **Section** Error! Reference source not found.

(k) any mitigation measures for inclusion in the EMPr;	**Section** Error! Reference source not found.**.**
(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** Error! Reference source not found.
(n) a reasoned opinion— i. whether the proposed activity, activities or portions thereof should be authorised; iA. Regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr or Environmental Authorization, and where applicable, the closure plan;	**Section 10.1**
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	No feedback has yet been received from the public participation process regarding the visual environment
(p) any other information requested by the competent authority	No information regarding the visual study has been requested from the competent authority to date.
(2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	**N/A**

ENERTRAG SOUTH AFRICA (PTY) LTD

PROPOSED CONSTRUCTION OF THE CAMDEN COLLECTOR SUBSTATION, MAIN TRANSMISSION SUBSTATION AND ASSOCIATED 400KV POWER LINES NEAR ERMELO, MPUMALANGA PROVINCE

VISUAL IMPACT ASSESSMENT REPORT – SCOPING PHASE

Executive Summary

Enertrag South Africa (Pty) Ltd (hereafter referred to as "Enertrag") is proposing to construct the Camden Collector Substation, a Main Transmission Substation and associated 400kV power lines. The proposed power line and substation project is one of eight projects comprising the proposed Camden Renewable Energy Complex, located approximately 13kms south-east of Ermelo in Mpumalanga Province and is within the Msukaligwa Local Municipality, in the Gert Sibande District Municipality.

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

The VIA has determined that the study area has a somewhat mixed visual character, transitioning from the heavily transformed urban / peri-urban landscape associated with Camden Power Station, Camden residential area and Mooiplaats Colliery in the north-east to a more rural / pastoral character across the remainder of the study area. Hence, although a power line / substation development would alter the visual character and contrast with this rural / pastoral character, the location of the proposed development in close proximity to Camden Power Station and the associated power lines, mining activity and rail infrastructure will significantly reduce the level of contrast.

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

One formal protected area (Langcarel Private Nature Reserve) was identified within the study area, although there is some doubt as to the present status of this nature reserve and any visual

/ landscape value has been reduced by the apparent lack of ongoing management of the site. The area is not typically valued for its tourism significance and relatively few leisure-based tourism facilities (lodges/accommodation facilities) were identified inside the study area. This factor in conjunction with the high levels of transformation in the north-east have reduced the overall visual sensitivity of the broader area.

A total of twenty-five (25) sensitive receptors were identified in the study area, only one of which (SR2) is considered to be a sensitive receptor as it is linked to leisure/nature-based tourism activities in the area. The remaining receptor locations, are all believed to be farmsteads that are regarded as *potentially* sensitive visual receptors as the proposed development will likely alter natural or semi-natural vistas experienced from these locations. Six (6) of these farmsteads are not expected to experience any visual impacts as a result of the proposed development as they are outside the viewshed for the proposed power line and substation.

One of the remaining receptors (VR16) would experience high levels of visual impact, largely as a result of its location within the assessment corridor. As this receptor is located in close proximity to an existing 400kV power line servitude, and also within the Camden 1 WEF project area, the level of visual impact would be reduced. The remaining receptor locations, including the only sensitive receptor (SR2) are expected to experience moderate or low levels of impact as a result of the proposed power line / substation development. Considering that eight of these receptors are located within the Camden 1 WEF project area, it has been assumed that the relevant land owners are involved in the overall Camden Renewable Energy Complex project. As such, they are not expected to perceive the proposed development in a negative light and this would reduce the level of visual impact experienced at these locations.

Although the N2 receptor road traverses the study area, motorists travelling along this route are only expected to experience low impacts from the proposed development.

A preliminary assessment of overall impacts revealed that visual impacts associated with the proposed power line and substations are of low significance during construction, operation and decommissioning phases, with a number of mitigation measures available.

Considering the presence of existing and proposed mining activity and electrical generation and distribution infrastructure, the introduction of new electrical grid infrastructure in the area will result in further change in the visual character of the area and alteration of the inherent sense of place, extending 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 recommended mitigation measures. In light of this, cumulative impacts have been rated as moderate.

From a visual perspective therefore, the proposed construction of the Camden Collector Substation, Main Transmission Substation and associated 400kV power lines is deemed acceptable and the Environmental Authorization (EA) should be granted. SiVEST is of the opinion that the visual impacts associated with the construction, operation and

decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

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GLOSSARY OF TERMS

ABBREVIATIONS

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

DEFINITIONS

Anthropogenic feature: An unnatural feature resulting from human activity.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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VISUAL IMPACT ASSESSMENT REPORT – SCOPING PHASE

1 INTRODUCTION

Enertrag South Africa (Pty) Ltd (hereafter referred to as ”Enertrag”) is proposing to construct the Camden Collector Substation, a Main Transmission Substation and associated 400kV power lines near Ermelo in Mpumalanga Province. The proposed substations and power line project is one of eight projects comprising the proposed Camden Renewable Energy Complex. The proposed substation and power line development will be subject to a full Environmental Impact Assessment (EIA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended and EIA Regulations, 2014 (as amended). Accordingly, an EIA process as contemplated in terms of the EIA Regulations (2014, as amended) is being undertaken in respect of the proposed power line project. The competent authority for this EIA is the national Department of Forestry, Fisheries and Environment (DFFE).

The associated Camden 1 Wind Energy Facility (WEF) and Camden 1 Solar Energy Facility (SEF) projects will be subject to separate EIA Processes, which are currently being undertaken in parallel to this EIA process.

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

1.1 Scope and Objectives

This Visual Impact Assessment (VIA) is being undertaken as part of the EIA process. The aim of the VIA is to identify potential visual issues associated with the development of the proposed 400kV power line, as well as to determine the potential extent of visual impacts. This will be achieved by determining the character of the visual environment and identifying areas of potential visual sensitivity that may be subject to visual impacts. The visual assessment focuses on the potentially sensitive visual receptor locations, and provides an assessment of the magnitude and significance of the visual impacts associated with the proposed development.

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

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 undertaken by SiVEST. Kerry's GIS and spatial analysis skills have been extensively utilised in projects throughout South Africa and in other Southern African countries. Kerry has also undertaken many VIAs in recent years and the relevant VIA project experience is listed in the table below.

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

Table 1: Relevant Project Experience

Environmental Practitioner	SiVEST (Pty) Ltd – Kerry Schwartz
Contact Details	kerrys@sivest.co.za
Qualifications	BA (Geography), University of Leeds 1982
Expertise to carry out the Visual Impact Assessment.	**Visual Impact Assessments:** ▪ VIA (EIA) for the proposed Oya Energy Facility near Matjiesfontein, Western Cape Province; ▪ VIA (BA) for the proposed construction of 132kV power lines to serve the authorised Loeriesfontein 3 PV Solar Energy Facility near Loeriesfontein, Northern Cape Province; ▪ VIA (BA) for the proposed construction of the Oya 132kV power line near Matjiesfontein, Northern and Western Cape Provinces; ▪ VIAs (BA) for the proposed Gromis WEF and associated Grid Connection Infrastructure, near Komaggas, Northern Cape Province. ▪ VIAs (BA) for the proposed Komas WEF and associated Grid Connection Infrastructure, near Komaggas, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Mooi Plaats, Wonderheuvel and Paarde Valley solar PV plants near Noupoort in the Northern and Eastern Cape Provinces. ▪ VIAs (Scoping and Impact Phase) for the proposed Sendawo 1, 2 and 3 solar PV energy facilities near Vryburg, North West Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Tlisitseng 1 and 2 solar PV energy facilities near Lichtenburg, North West Province. ▪ VIA for the proposed Nokukhanya 75MW Solar PV Power Plant near Dennilton, Limpopo Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Helena 1, 2 and 3 75MW Solar PV Energy Facilities near Copperton, Northern Cape Province.

	▪ VIA (EIA) for the proposed Paulputs WEF near Pofadder in the Northern Cape Province. ▪ VIA (EIA) for the proposed development of the Rondekop WEF near Sutherland in the Northern Cape Province. ▪ VIA (BA) for the proposed development of the Tooverberg WEF near Touws Rivier in the Western Cape Province. ▪ VIA (BA) for the proposed development of the Kudusberg WEF near Sutherland, Northern and Western Cape Provinces. ▪ VIA (Scoping and Impact Phase) for the proposed development of the Kuruman Wind Energy Facility near Kuruman, Northern Cape Province. ▪ VIA (Scoping and Impact Phase) for the proposed development of the Phezukomoya Wind Energy Facility near Noupoort, Northern Cape Province. ▪ VIA (Scoping and Impact Phase) for the proposed development of the San Kraal Wind Energy Facility near Noupoort, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Graskoppies Wind Farm near Loeriesfontein, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Hartebeest Leegte Wind Farm near Loeriesfontein, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Ithemba Wind Farm near Loeriesfontein, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Xha! Boom Wind Farm near Loeriesfontein, Northern Cape Province ▪ Visual Impact Assessments for 5 Solar Power Plants in the Northern Cape ▪ Visual Impact Assessments for 2 Wind Farms in the Northern Cape ▪ Visual Impact Assessment for Mookodi Integration Project (132kV distribution lines)

1.3 Assessment Methodology

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

1.3.1 Physical landscape characteristics

Physical landscape characteristics such as topography, vegetation and land use are important factors influencing the visual character and visual sensitivity of the study area. Baseline information about the physical characteristics of the study area was initially sourced from spatial databases provided by NGI, the South African National Biodiversity Institute (SANBI) and the

South African National Land Cover Dataset (Geoterraimage – 2018). The characteristics identified via desktop means were later verified during the site visit.

1.3.2 Identification of sensitive receptors

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

1.3.3 Fieldwork and photographic review

A two (2) day site visit was undertaken between the 17th and the 18th of September 2019 (late winter). The purpose of the site visit was to:

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

1.3.4 Visual / Landscape Sensitivity

GIS technology was used to identify any specific areas of potential visual sensitivity within the Camden 1 WEF development site. These would be areas where the establishment of a power line or other associated infrastructure would result in the greatest probability of visual impacts on potentially sensitive visual receptors.

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

1.3.5 Impact Assessment

A 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

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

proposed development, the presence of screening factors and the degree to which the proposed development would contrast with the surrounding environment.

Potential visual impacts associated with the overall development were identified and preliminary mitigation measures were recommended (where possible) in an attempt to minimise the visual impact of the proposed development. These impacts will be rated during the EIA phase of the project in line with the impact rating matrix provided by the Environmental Assessment Practitioner (EAP).

1.3.6 Consultation with I&APs

Continuous consultation with Interested and Affected Parties (I&APs) undertaken during the public participation process will be used (where available) to help establish how the proposed development will be perceived by the various receptor locations and the degree to which the impact will be regarded as negative. Although I&APs have not yet provided any feedback in this regard, the EIA phase report will be updated to include relevant information as and when it becomes available.

1.4 Sources of Information

The main sources of information utilised for this VIA included:

- Project description for the proposed development provided by Enertrag;
- 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;
- 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 DFFE (incremental release Quarter 2 2021);
- South African Protected Areas Database from DFFE (incremental release Quarter 2 2021);
- The National Web-Based Environmental Screening Tool, Department of Forestry, Fisheries and Environment (DFFE);

2 ASSUMPUMPTIONS AND LIMITATIONS

- Power lines and associated substations are relatively large structures that could impact on visual receptors located relatively far away, particularly in areas where the terrain is

very flat. Given the nature of the receiving environment and the height of the proposed power line towers, the study area or visual assessment zone is assumed to encompass an area of 5km from the outer boundary of the combined power line 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 in mid-September 2019. Due to the extent of the study area however and the number of receptors that could potentially be sensitive to the proposed development, it was not possible to visit or verify every potentially sensitive visual receptor location. As such, a number of broad assumptions have been made in terms of the likely sensitivity of the receptors to the proposed development.
- 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 improved electricity supply. 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 sensitive 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 an 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, 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. Where details of the levels of leisure / tourism activities on different sectors of the relevant farms are not known, the impact rating matrix for these receptors is based on the assumed location of the main accommodation complex on each property.
- Where receptors have been identified within the Camden Renewable Energy Complex project area, it has been assumed that the land owners or residents at these locations support the proposed renewable energy development and would not view the project in a negative light.

- Based on the project description provided by Enertrag, all analysis for this VIA is based on a worst-case scenario where power line tower heights are assumed to be 40 m.
- Due to the varying scales and sources of information; maps may have minor inaccuracies. Terrain data for this area, derived from the National Geo-Spatial Information (NGI)'s 25m Digital Elevation Model (DEM), is fairly coarse and somewhat inconsistent and as such, localised topographic variations in the landscape may not be reflected on the DEM used to generate the viewshed(s) and visibility analysis conducted in respect of the proposed development.
- In addition, the viewshed / visibility 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 Scoping Report (DSR) for the WEF 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 and infrastructural / mining 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.
- It should be noted that the fieldwork for this study was undertaken in mid-September 2019, during late winter which is characterised by low levels of rainfall and reduced vegetation cover. In these conditions, increased levels of visual impact will be experienced from receptor locations in the surrounding area.
- The overall weather conditions in the study area have certain visual implications and are expected to affect the visual impact of the proposed development to some degree. In clear weather conditions, the power lines and associated infrastructure would present a greater contrast with the surrounding environment than they would on an overcast day. Although the field investigation was conducted during clear weather conditions however, localised pollution in the study area results in relatively hazy skies which would reduce the visibility of the power lines.

3 TECHNICAL DESCRIPTION

3.1 Project Location

The study area for the proposed power line and substations is located approximately 10km south-east of Ermelo in Mpumalanga Province (**Figure 1**) and is within the Msukaligwa Local Municipality, in the Gert Sibande District Municipality.

Based on the current proposed alignment, the proposed power line corridors and substations will affect the following properties (**Figure 2**):

- Portion 14 of Mooiplaats Farm No. 290;
- Portion 1 of Welgelegen Farm No. 322; and
- Portion 2 of Welgelegen Farm No. 322.
- Portion 20 of Farm Mooiplaats No. 290.
- Portion 12 of Farm Uitkomst No. 292.
- Portion 0 of Farm 329 (Camden Power Station).

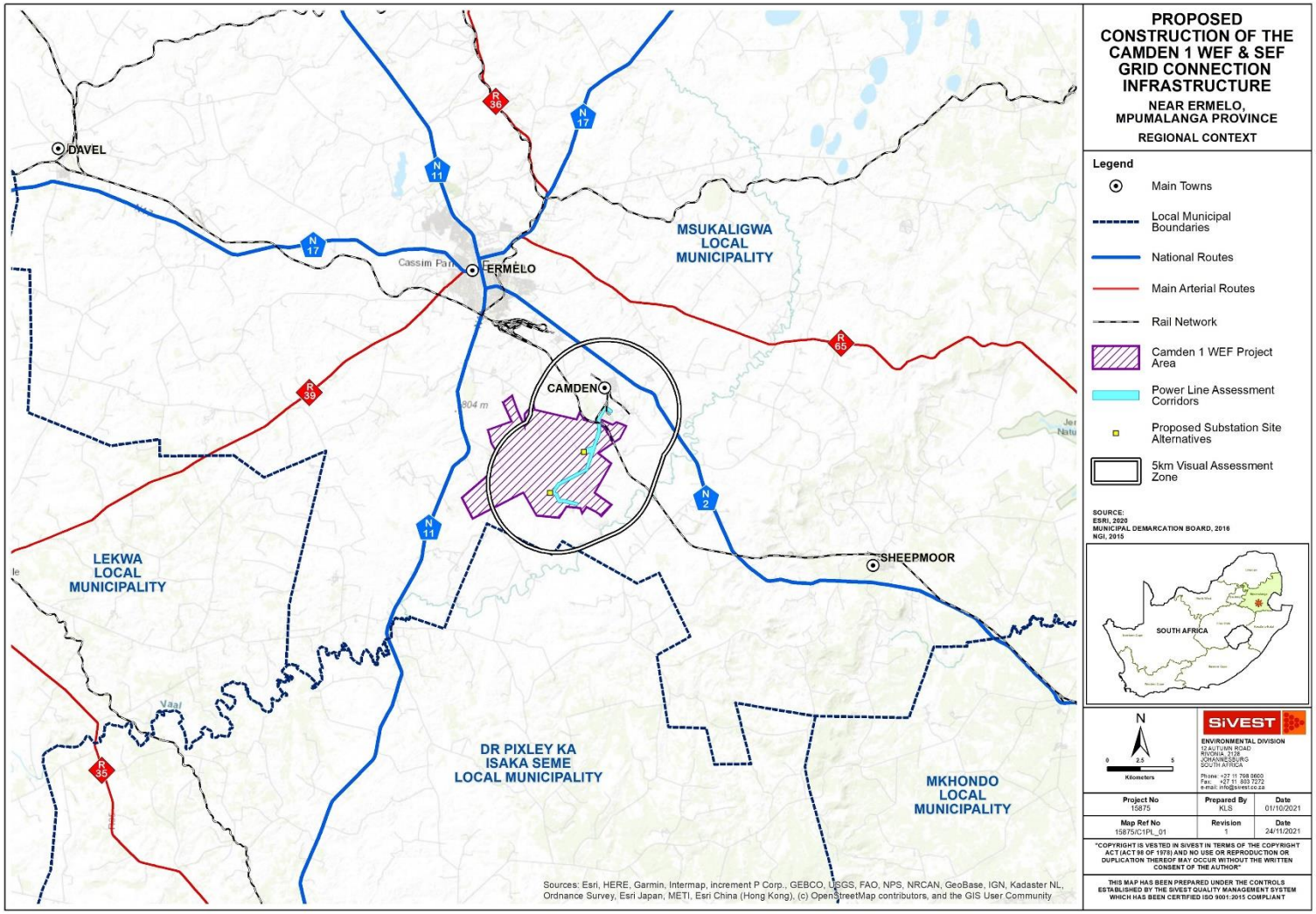


Figure 1: Proposed grid connection in the Regional Context

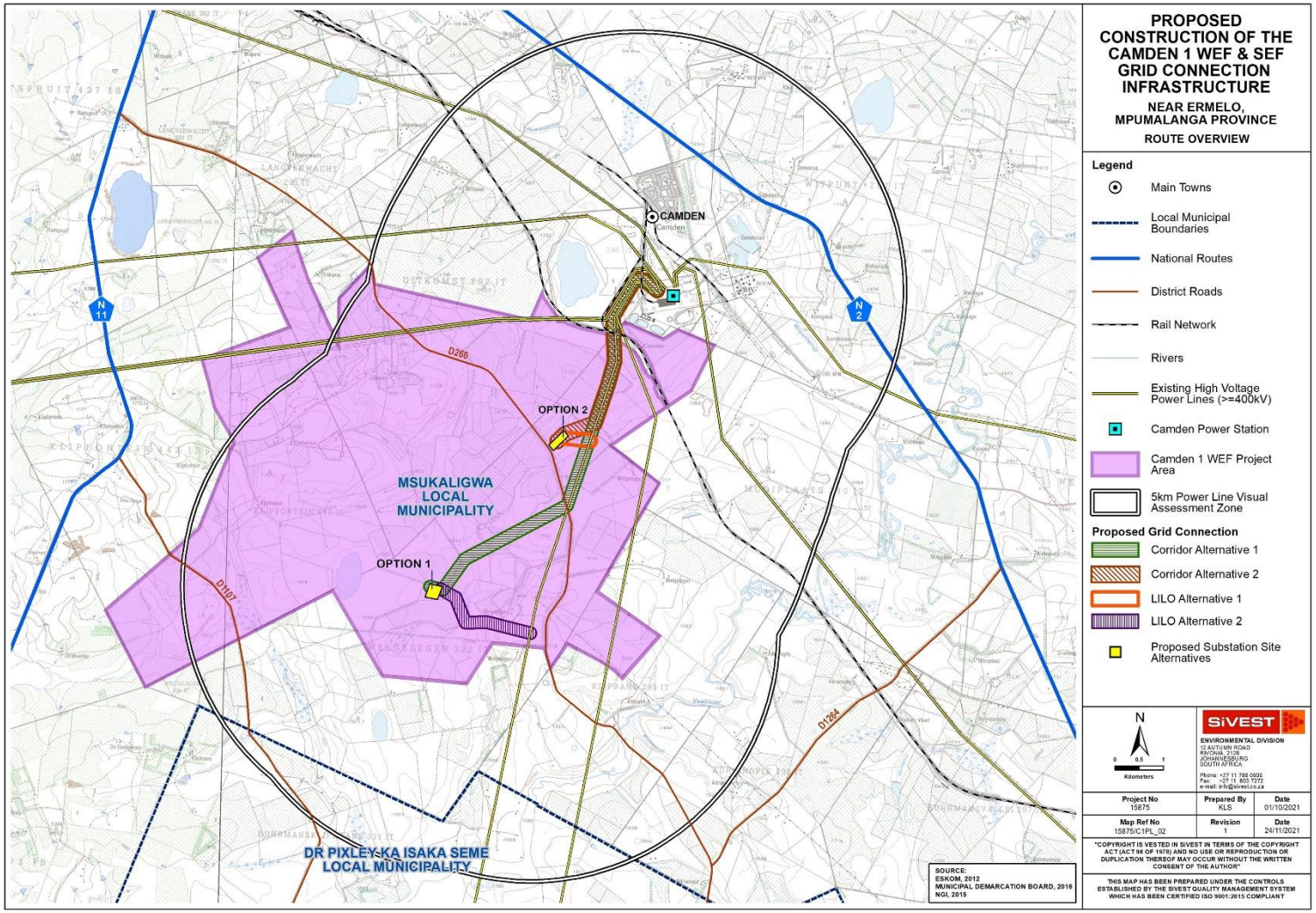


Figure 2: Power line route alternatives

3.2 Project Technical Details

At this stage, it is anticipated that the proposed development will include:

- Camden Collector Substation (up to 132kV);
- Main Transmission Substation (132/400kV) – immediately adjacent to the collector substation;
- 400kV LILO or direct overhead power line (OHL); and
- Camden Power Station substation upgrade works (as required).

The OHL towers will be up to 40m in height and it is assumed that these towers will be located approximately 200m to 250m apart.

Power line corridors of 250 m are being assessed to allow flexibility when determining the final route alignment. The required servitude width is however much less than 250m and would be positioned within the assessed corridor.

The proposed substation will have a footprint of up to 5 hectares (ha), including a control and workshop area.

3.2.1 Substation and Route Alternatives

Two substation alternatives with associated route alternatives are being assessed for the proposed grid connection:

- Power Line Corridor Option 1 is approximately 9 km in length, linking substation Option 1 to Camden Power Station;
- Power Line Corridor Option 2 is approximately 4 km in length, linking substation Option 2 to Camden Power Station. Most of this route follows the same alignment as the northern-most section of Corridor Option 1;
- LILO Corridor Option 1 is approximately 1 km in length, linking substation Option 1 to the 400kV power lines; and
- LILO Corridor Option 2 is approximately 2 km in length, linking substation Option 2 to the 400kV power lines.

4 LEGAL REQUIREMENTS AND GUIDELINES

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

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

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

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

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

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

5 FACTORS INFLUENCING VISUAL IMPACT

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

5.1 Visual environment

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

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

5.2 Subjective experience of the viewer

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

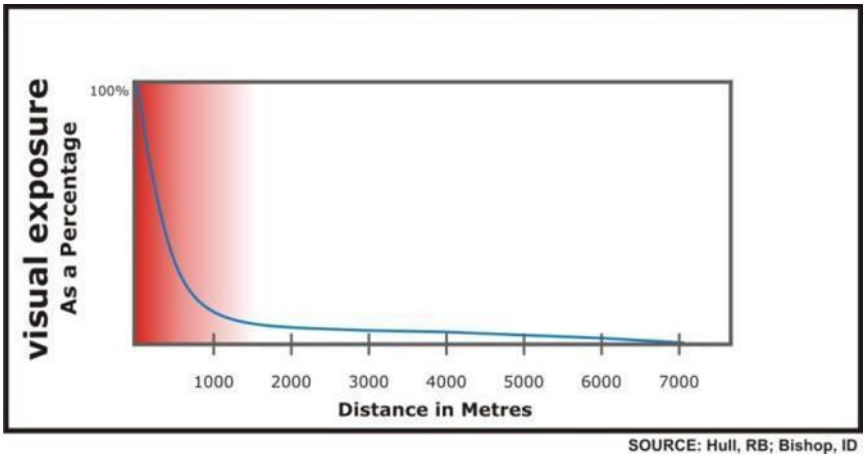
5.3 Type of visual receptor

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

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

5.4 Viewing distance

Viewing distance is a critical factor in the experiencing of visual impacts, as beyond a certain distance, even large developments tend to be much less visible, and difficult to differentiate from the surrounding landscape. The visibility of an object is likely to decrease exponentially as one moves away from the source of impact, with the impact at 1 000m being considerably less than the impact at a distance of 500m **(**Error! Reference source not found.**)**.



SOURCE: Hull, RB; Bishop, ID

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 part of assessing visual impacts as this 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 power line and substation are located in an area largely characterised by a mix of undulating plains (**Figure 4**) and greater relief in the form of higher lying plateaus intersected by river valleys (**Figure 5**). Slopes across the study area are relatively gentle to moderate, with steeper slopes being largely associated with the more incised river valleys. The main water course in the study area is the Vaal River on the southern boundary of the study area.

Maps showing the topography and slopes within and in the immediate vicinity of the combined assessment area are provided in **Figure 6** and **Figure 7.**

Figure 4: View south-east from the D260 District Road in the north-western of the study area showing undulating terrain

Figure 5: Areas of greater relief to the south of the study area.

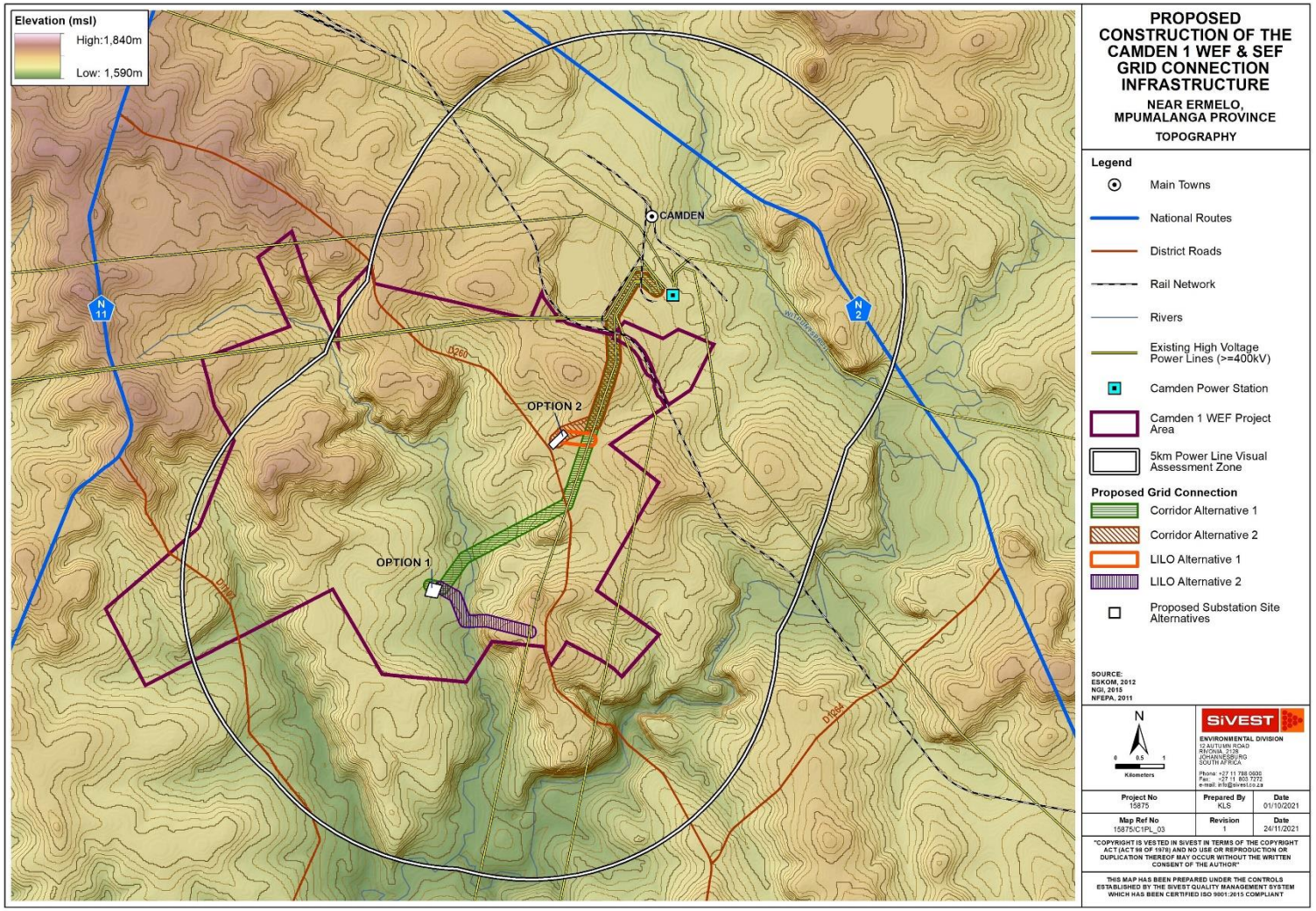


Figure 6: Topography of the study area

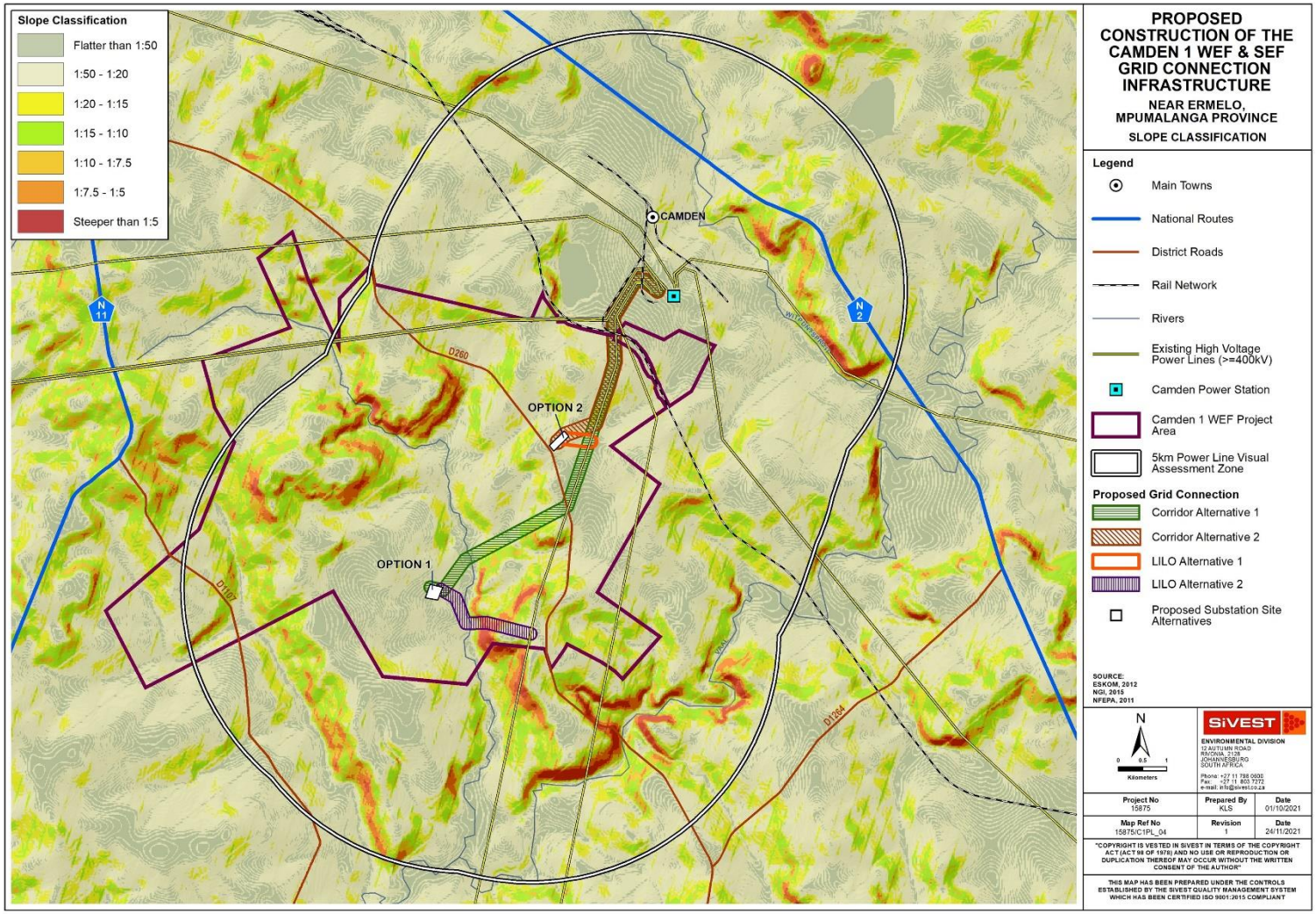


Figure 7: Slope classification

Visual Implications

The nature of the topography and the position of the viewer within the landscape are strong factors influencing the types of vistas typically present. Wider vistas will typically be experienced from higher-lying areas or hilltops and as such the viewshed will be directly dependent on whether the viewer is within a valley bottom or in an area of higher elevation. Importantly in the context of this study, the same is true of objects placed at different elevations and within different landscape settings. Objects placed on high-elevation slopes or ridge tops would be highly visible, while those placed in valleys or enclosed plateaus would be far less visible.

Bearing in mind that power lines and substations are very large structures (potentially up to 40m in height), these structures could be visible from a considerable area around the site. Localised topographic variations may limit views of power lines or substations from some parts of the study area, but across the remainder of the study area there would be very little topographic shielding to lessen the visibility of the steel structures of the proposed on-site substation from many of the locally occurring receptor locations.

GIS technology was used to undertake a preliminary visibility analysis for the proposed power line project based on the project information provided by Enertrag. This analysis was based on points placed 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 power lines 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 8** below, show that although elements of the proposed grid connection infrastructure would be visible from many parts of the study area, significant portions of the study area are outside the combined viewshed for the proposed power line and substation sites.

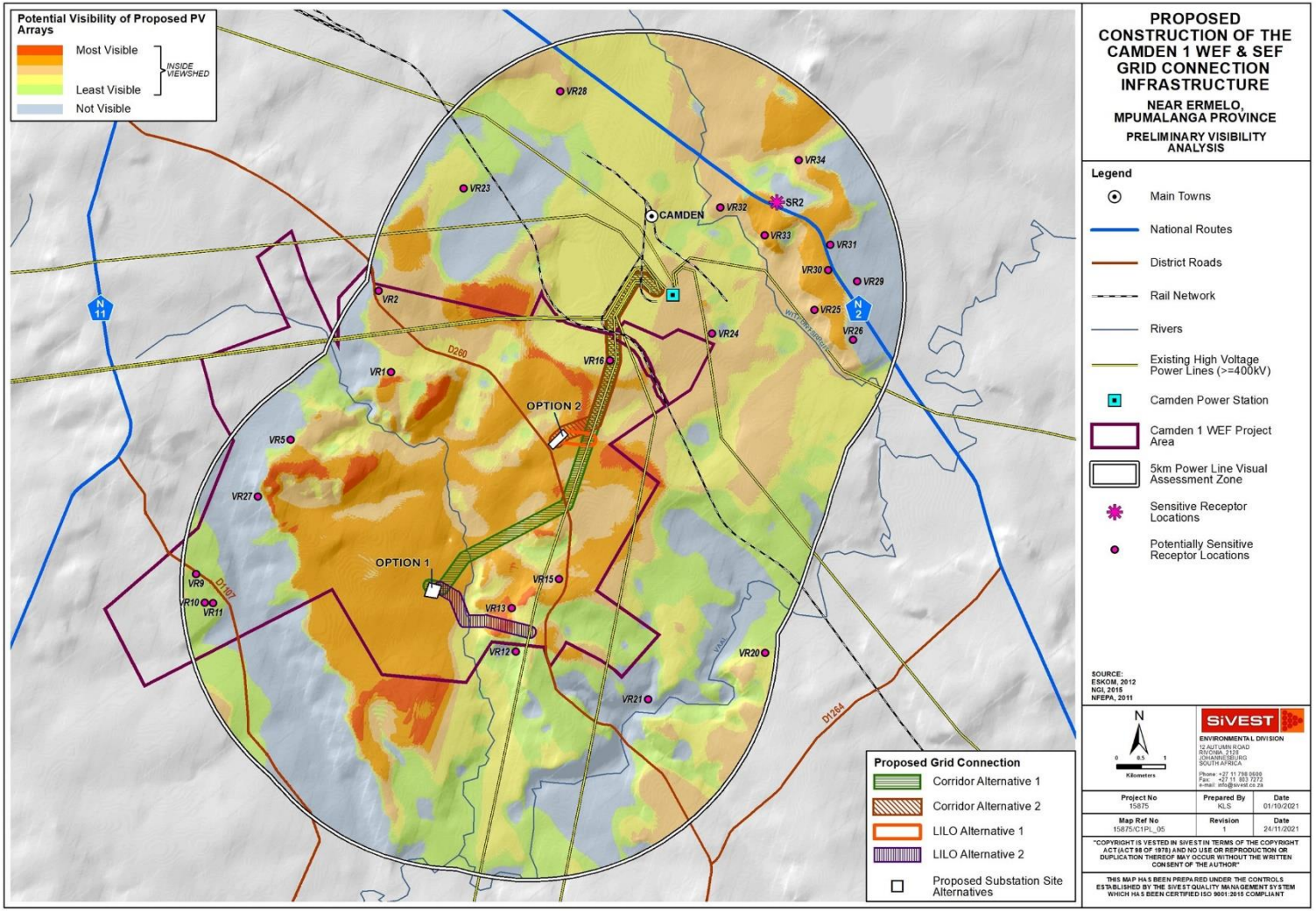


Figure 8: Potential visibility of substation and 400kV power line

6.1.2 Vegetation

According to Mucina and Rutherford (2006), the study area is largely dominated by two vegetation types, namely the Amersfoort Highveld Clay Grassland and the Eastern Highveld Grassland vegetation types (**Figure 9**). Amersfoort Highveld Clay Grassland in the north-western section of the study area (**Figure 10)** is associated with undulating grassland plains, largely dominated by a dense *Themeda triandra* sward, often forming a short lawn as a result of grazing. The Eastern Highveld Grassland, in much of the remainder of the study area is characterised by a short dense grassland with scattered rocky outcrops where some woody species occur.

Much of the natural vegetation cover has however been partly removed or transformed by cultivation as well as the presence of tall exotic trees scattered in clusters across the study area and around farmsteads **(Figure 11**).

Visual Implications

Although the proposed development will contrast significantly with the predominant vegetative cover in the area, scattered trees and shrubs will provide some degree of screening thus potentially reducing impacts experienced by the potentially sensitive receptors in the area. In addition, tall trees planted around farmhouses in the area may restrict views from these receptor locations.

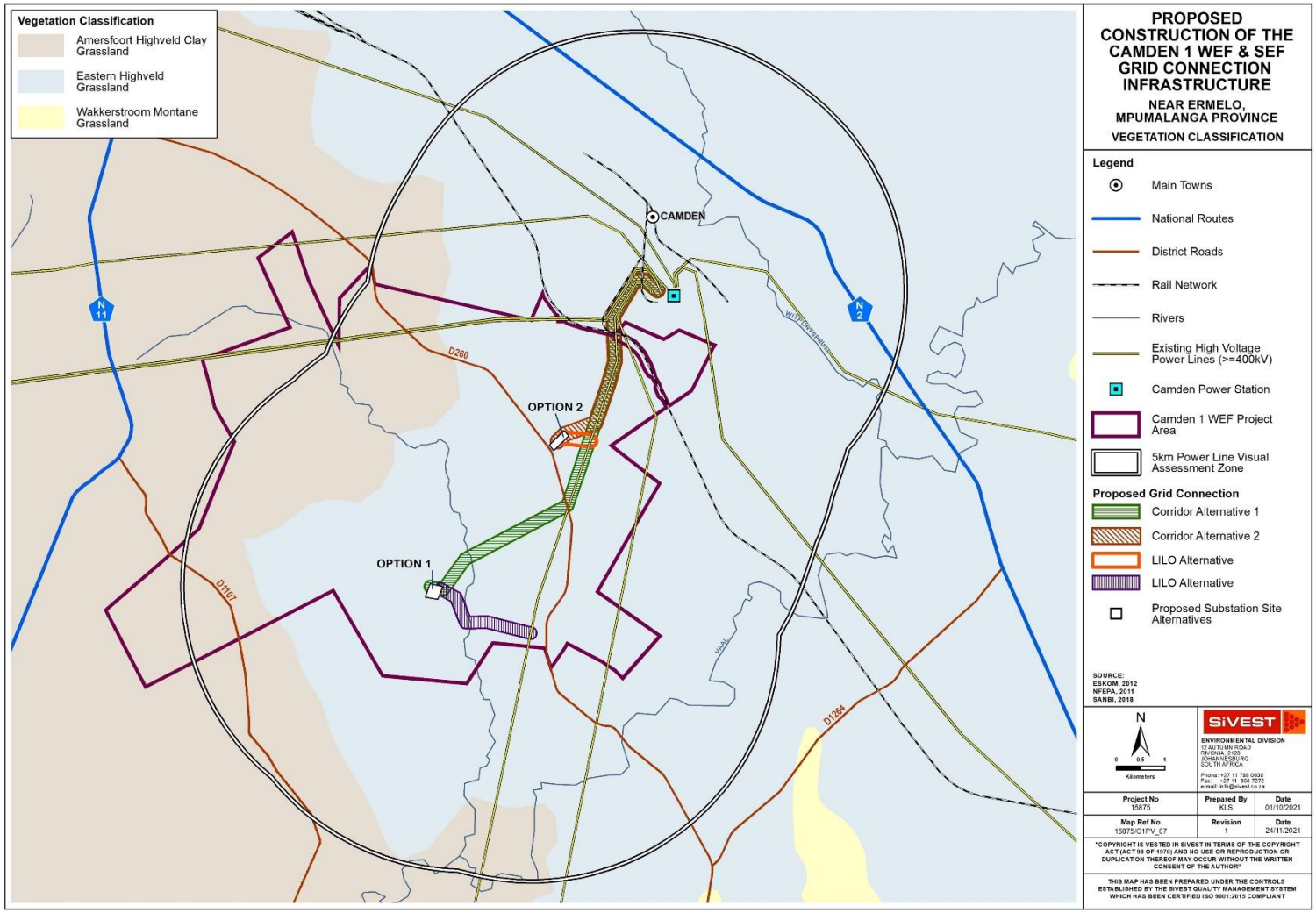


Figure 9: Vegetation Classification in the Study Area

Figure 10: Grasslands in the western sector of the study area.

Figure 11: Clusters of tress scattered across the study area.

6.1.3 Land Use

According to the South African National Land Cover dataset (Geoterraimage 2020), much of the visual assessment area is classified as “Grassland” interspersed with significant areas of “Cultivation”. Small tracts of forested land and numerous water bodies are scattered throughout the study area (**Figure 12**).

Commercial agriculture is the dominant activity in the study area, with the main focus being maize cultivation (**Figure 13**) and livestock grazing (**Figure 14**). Although there are several farm portions in the study area, the density of rural settlement is relatively low, and farmsteads are scattered across the study area. Built form in much of the study area comprises farmsteads, ancillary farm buildings and workers’ dwellings (**Figure 15**), gravel access roads, telephone lines, fences and windmills.

High levels of human influence are however visible in the northern sector of the study area caused by the presence of Camden Power Station (**Figure 16**) and the adjacent Camden residential area and associated high voltage power lines (**Figure 17**). Mooiplaats Colliery, located south of Camden Power Station also forms a distinctive anthropogenic feature in the otherwise pastoral landscape.

Other evidence of significant human influence includes road, rail, telecommunications and high voltage electricity infrastructure (**Figure 18**).

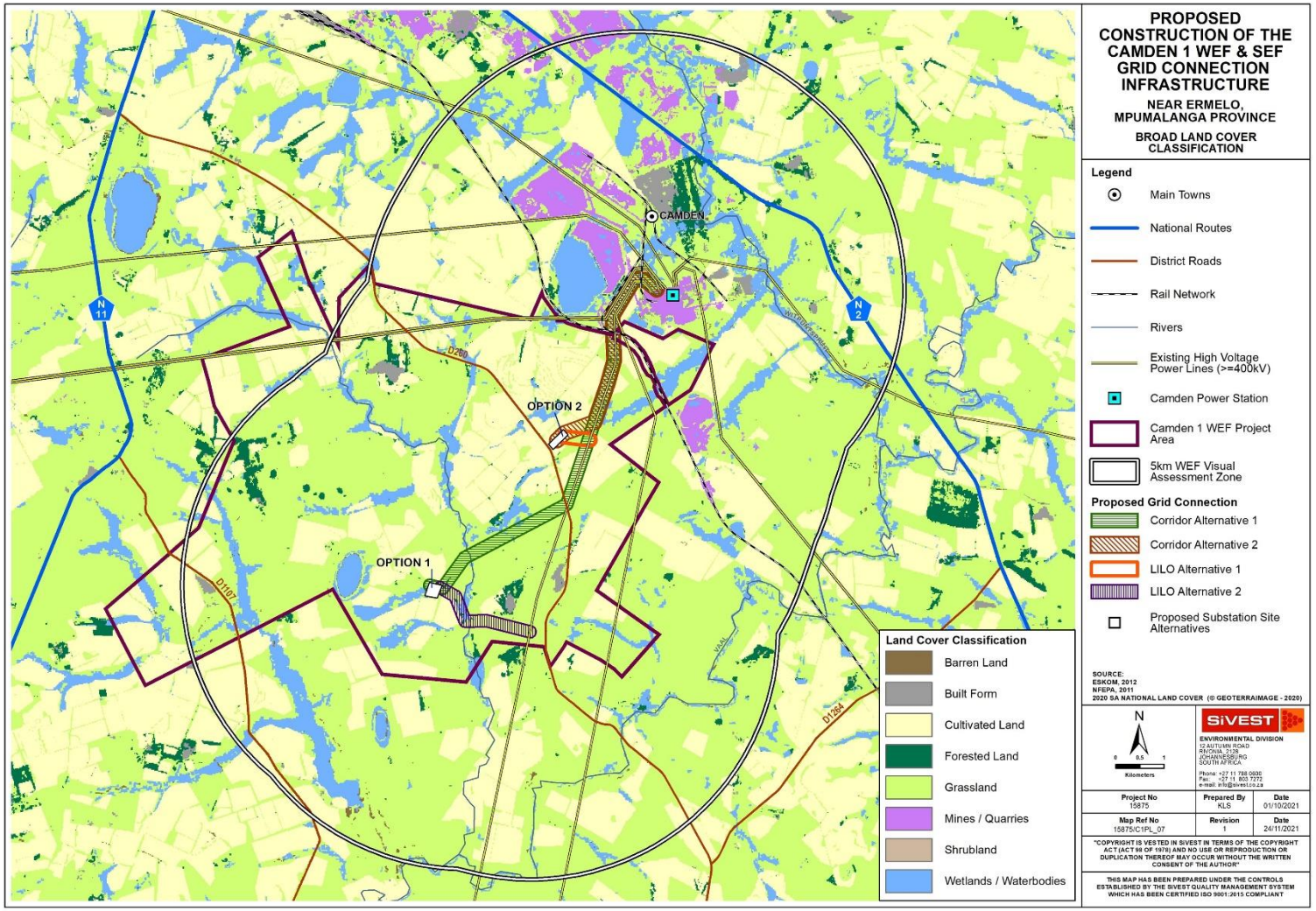


Figure 12: Land Cover Classification

Figure 13: Maize cultivation to the north-west of the power line project.

Figure 14: Livestock grazing is common in the study area.

Figure 15: Farm workers dwellings and associated farm infrastructure in the study area.

Figure 16: View of Camden Power Station to the west of the N2 national route.

Figure 17: High voltage power lines feeding into Camden Power Station.

Figure 18: Rail infrastructure and power lines to the south-east of the proposed project.

Visual Implications

The predominance of cultivated land in conjunction with the remaining natural grassland cover across much of the study area would give the viewer the general impression of a largely rural / pastoral setting. Thus, the proposed power line and substation development would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the development site and across much of the study area.

High levels of human transformation and visual degradation are however evident in the north-east where Camden Power Station and associated residential and infrastructural development

as well as mining activity dominate the landscape. In addition, roads, railways and existing power line infrastructure have further degraded the visual character of the study area to some degree. This transformation has already altered the visual character across much of the north-eastern sector of the study area, thus reducing the level of contrast of the proposed development.

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

6.2 Visual Character and Cultural Value

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

The predominant land use in the area (maize cultivation) has significantly transformed the natural landscape across much of the study area. In addition, the landscape becomes progressively more transformed towards the north-eastern boundary of the study area where Camden Power Station with its associated power lines in conjunction with mining activities have resulted in a high degree of visual degradation. The more industrial character of the landscape is an important factor in this context, as the introduction of the proposed power line and substations would result in less visual contrast where other anthropogenic elements are already present, especially where the scale of those elements is similar to that of the proposed development.

The scenic quality of the landscape is also an important factor that contributes to the visual character or inherent sense of place. Visual appeal is often associated with unique natural features or distinct variations in form. As such, the pastoral landscape and rolling hills in parts of the study area are important features that could increase the visual appeal and visual interest in the area.

Cultural landscapes are becoming increasingly important concepts in terms of the preservation and management of rural and urban settings across the world. The concept of ‘cultural landscape’ is a way of looking at a place that focuses on the relationship between human activity and the biophysical environment (Breedlove, 2002). In this instance, the rural / pastoral landscape represents how the environment 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 Ermelo, engulfed by an otherwise rural / pastoral environment, form an integral part of the wider landscape.

In light of this, it is important to assess whether the introduction of a new power line and substations into the study area would be a degrading factor in the context of the prevailing character of the cultural landscape. Broadly speaking, visual impacts on the cultural landscape in the area around the proposed development would be reduced by the fact that there are several existing high voltage power lines in the area. In addition, the visual character in much of the area has been significantly transformed and degraded as a result of mining and infrastructural development.

6.3 Visual Sensitivity Analysis and Verification

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

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

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

i) **High** - The introduction of a new development such as a power line 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									
		1	2	3	4	5	6	7	8	9	10
Pristine / natural / scenic character of the environment	Study area is largely natural with areas of scenic value and some pastoral elements.										
Presence of sensitive visual receptors	Relatively few sensitive receptors have been identified in the study area.										
Aesthetic sense of place / visual character	Visual character is a typical rural / pastoral 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 a typical rural / pastoral landscape.										
Protected / conservation areas in the study area	No protected or conservation areas were identified in the study area.										
Sites of special interest present in the study area	No sites of special interest were identified in the study area.										
Economic dependency on scenic quality	Relatively few tourism/leisure based facilities in the area										
International / regional / local status of the environment	Study area is typical of rural / pastoral landscapes										
**Scenic quality under threat / at risk of change	Introduction of a new power line and / or substation will alter the visual character and sense of place. In addition, the development of other renewable energy facilities in the broader area as planned will introduce an increasingly industrial character, giving rise to significant cumulative impacts										

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

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

Based on the above factors, the total score for the study area is 39, 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, and is based on the physical characteristics of the study area, economic activities and land use that predominates. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs and this has been factored into the sensitivity rating above. The presence of visual receptors is examined in more detail in **Section 8** of this report.

The rating has also taken into account the Langcarel Private Nature Reserve identified in the South African Protected Areas Database (incremental release Quarter 2 2021), although, there is some doubt as to the present status of this nature reserve. Field investigation found no outward indication of the presence of a nature reserve in this area and much of the land within the demarcated reserve appears to be utilised for commercial cultivation. The reserve includes farm properties that form part of the Camden 1 WEF project area and as such, it is assumed that the land owners support the proposed WEF development and the associated grid connection infrastructure. Accordingly, visual sensitivities normally associated with protected areas will be reduced in this instance.

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 power lines 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 assessment corridors would be visible to the highest numbers of receptors in the study area. However, this analysis found that no areas are *significantly* more visible than any other. As such, in terms of visibility, no areas were found to be particularly sensitive.

In determining visual sensitivity, consideration must also be given to the direct visual impact of the power line or substation on any nearby farmsteads or receptors. The investigation determined that there is only one receptor that would be affected, this being the farmstead located on Portion 14 of Mooiplaats Farm No. 290. This receptor is inside the assessment corridors for both route alternatives. There is however some doubt as to the sensitivity of this receptor as it is located in close proximity to an existing 400kV power line servitude. In addition, the farm property forms part of the Camden 1 WEF project area and as such it is assumed that the land owners support the Camden Renewable Energy Complex project. Accordingly, no areas of visual sensitivity were identified in relation to any of the corridor alternatives.

6.3.1 Sensitivities identified by the National Screening Tool

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 power line or substation.

6.4 Visual Absorption Capacity

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

Although the undulating topography in the study area and the areas of cultivation and grassland would reduce the visual absorption capacity, this would be offset to some degree by the presence of Camden Power Station, high voltage power lines, mining and infrastructural development in the vicinity of the proposed development.

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

7 TYPICAL VISUAL IMPACTS ASSOCIATED WITH ON-SITE SUBSTATIONS AND POWER LINES

In this section, the typical visual issues related to the establishment of a 400kV power line and substations are discussed

Power line towers and substations are very large objects and thus highly visible. According to the project description provided by Enertrag, the maximum tower height envisaged for the proposed power line is 40m (approximately equivalent in height to a ten storey building). Although a tower structure would be less visible than a building, the height of the structure means that the tower would still typically be visible from a considerable distance. Visibility would be increased by the fact that the power line comprises a series of towers typically spaced approximately 200m to 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 power line, 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 power line or substation could be perceived to be highly incongruous in the context of a largely natural or pastoral landscape. The height and linear nature of the power line will exacerbate this incongruity, as the towers may impinge on views within the landscape. In addition, the practice of clearing any taller vegetation from areas within the power line servitude can increase the visibility and incongruity of the power line. In a largely natural, bushier setting, vegetation clearance will cause fragmentation of the natural vegetation cover, thus making the power line more visible and drawing the viewer's attention to the power line 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 recognised tourism routes traverse the study area.

Conversely, the presence of other anthropogenic objects associated with the built environment may "degrade" the visual environment and thus the introduction of a new power line 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 Camden Power Station and its associated power line infrastructure as well as mining activity in the area is

expected to lessen the visual contrast associated with the introduction of a new power line and substation.

Other factors, as listed below, can also affect the nature and intensity of a potential visual impact associated with a power line 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 power line and substation are intended to serve the proposed Camden 1 WEF and Camden 1 SEF and as such, the power line and substations will only be built if these facilities are developed. The proposed power line and substations are therefore likely to be perceived to be part of the greater renewable energy complex 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 where receptors would potentially be impacted by a proposed development. Adverse impacts often arise where a new development is seen as an intrusion which alters the visual character of the area and affects the 'sense of place'. The degree of visual impact experienced will however vary from one receptor to another, as it is largely based on the viewer's perception.

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

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

- the visual character of the area, especially taking into account visually scenic areas and areas of visual sensitivity;

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

As the visibility of the development would diminish exponentially over distance (refer to **section 5.4** above), receptor locations which are closer to the 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 landscape character of the surrounding area.

8.1 Receptor Identification

Preliminary desktop assessment of the study area identified twenty-five (25) potentially sensitive visual receptor locations within a five km radius of the power line / substation assessment corridors, most of which appear to be existing farmsteads. Although the findings of the desktop assessment were largely confirmed during the field investigation, it was not possible to confirm the presence of receptors at all the identified locations due to access restrictions. Notwithstanding this limitation, all the identified receptor locations were assessed as part of the VIA as they are still regarded as being potentially sensitive to the visual impacts associated with the proposed development.

Only one (1) of the identified receptor locations, namely Indawo Game Ranch and Hotel (SR2) was found to be linked to leisure / tourism facilities and is thus considered to be a sensitive. Receptor.

The remaining receptor locations, are all believed to be farmsteads that are regarded as *potentially* sensitive visual receptors as the proposed development will likely alter natural or semi-natural vistas experienced from these locations. At this stage however, local sentiments towards the proposed development are not known. Six (6) of these farmsteads were found to be outside the preliminary viewshed for the proposed power line and substations.

In addition, ten (10) of these receptors are located within the Camden 1 WEF project area, and as such it has been assumed that the relevant land owners are involved in the overall Camden Renewable Energy Complex project. These land owners therefore are not expected to perceive the proposed development in a negative light and this would reduce the level of visual impact experienced at these locations.

It was noted that the residential area of Camden is partially located within the grid infrastructure study area. Many of the residences appear to be derelict and disused and although the remaining residences could be seen as receptors, they are not considered to be sensitive due to their location within built-up, heavily transformed areas.

In many cases, roads along which people travel, are regarded as sensitive receptors. The primary thoroughfare in the study is the N2 national route which links Piet Retief in the east with Ermelo to the north and Gauteng Province to the north-west. Another important route is the D260 district road which traverses the study area in a north-south direction.

The section of the N2 traversing the study area is not considered part of designated scenic route, although this route is an important link and is likely to be utilised, to some extent, by tourists exploring this part of Mpumalanga Province. As a result, the N2 is considered to be potentially sensitive receptor road – i.e. a road that is used by motorists who may object to the potential visual intrusion of the proposed power line / substation development.

The D260 District Road and other thoroughfares in the study area are primarily used as local access roads and do not form part of any scenic tourist routes. These roads are not specifically valued or utilised for their scenic or tourism potential and are therefore not regarded as visually sensitive.

As previously stated, the South African Protected Areas Database identifies the Langcarel Private Nature Reserve within the study area. There is however some doubt as to the present status of this nature reserve and any visual appeal has been reduced by the apparent lack of ongoing management of the site. Accordingly, the reserve is not considered to be a sensitive receptor.. Furthermore, the reserve includes farm properties that form part of the Camden 1 WEF project area and as such, it is assumed that the land owners support the proposed WEF development and the associated grid connection infrastructure.

The identified potentially sensitive visual receptor locations for the proposed power line and substation are indicated in **Figure 19**.

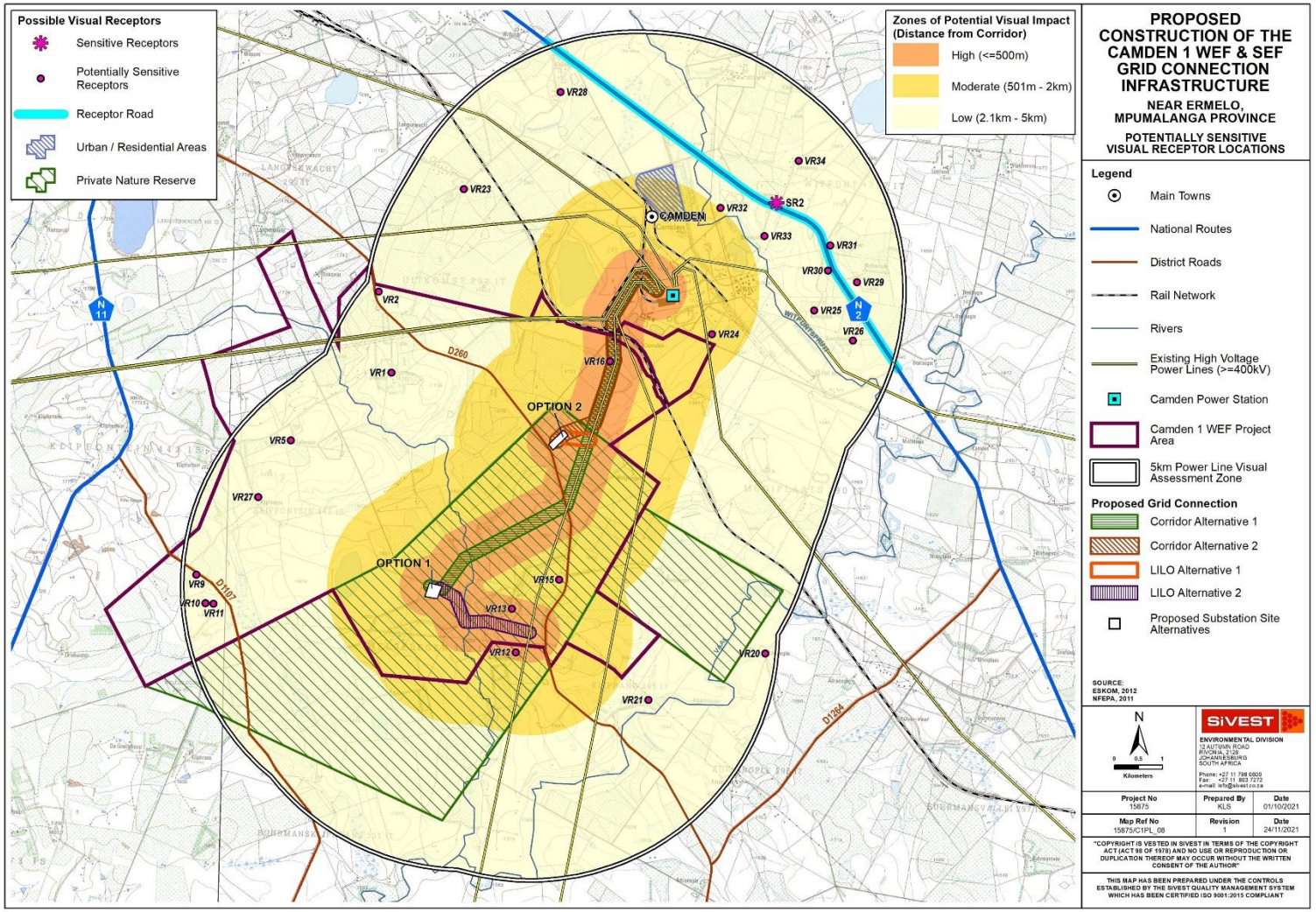


Figure 19: Potentially sensitive receptor locations within the study area

8.2 Receptor Impact Rating

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

The matrix is based on the factors listed below:

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

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

8.2.1 Distance

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

At this stage of the process, zones of visual impact for the proposed development have been delineated according to distance from the proposed power line / substation assessment corridors. Based on the height and scale of the project, the distance intervals chosen for the zones of visual impact, as shown in **Figure 19**, are as follows:

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

8.2.2 Screening Elements

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

8.2.3 Visual Contrast

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

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

- **High –** undeveloped / natural / rural areas.
- **Moderate –**
    - areas within 500m of existing power lines (>=88kV);
    - areas within 500m of N2 national route;
    - areas within 500m of railway infrastructure;
    - cultivated areas and smallholdings.
- **Low –**
    - areas within 500m of urban / built-up areas;
    - areas within 500m of quarries / mines etc;
    - areas within 500m of Camden Power Station;

These zones are depicted in **Figure 20** below.

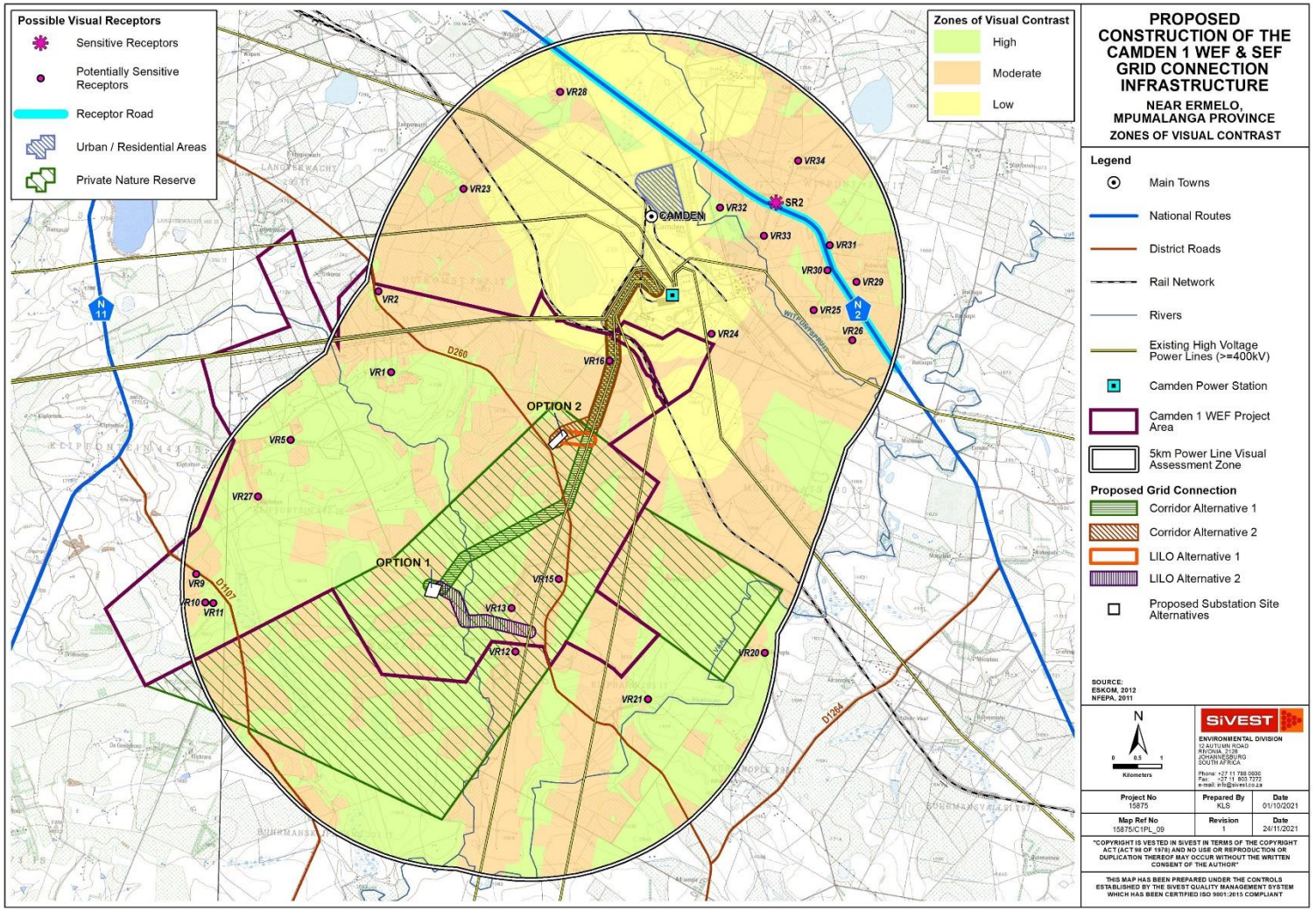


Figure 20: Zones of Visual Contrast

8.2.4 Impact Rating Matrix

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

Table 3: Rating scores

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

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

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

	VISUAL IMPACT RATING			
VISUAL FACTOR	**HIGH**	**MODERATE**	**LOW**	**OVERRIDING FACTOR: NEGLIGIBLE**
Distance of receptor away from proposed development	<= 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**	

Error! Reference source not found. below presents a summary of the overall visual impact of the proposed power line and substations 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	
SR2 - Indawo Game Ranch	2.8	Low	1	Mod	2	Mod	2	MODERATE	5
VR1 - Farmstead	3.6	Low	1	Mod	2	Mod	2	MODERATE	5
VR2 - Farmstead	4.7	Low	1	Mod	2	Mod	2	MODERATE	5
VR5 - Farmstead *	*NIL*								
VR9 - Farmstead *	4.7	Low	1	High	3	High	3	MODERATE	7
VR10 - Farmstead *	4.5	Low	1	Mod	2	High	3	MODERATE	6
VR11 - Farmstead *	4.4	Low	1	High	3	Mod	2	MODERATE	6
VR12 - Farmstead *	0.3	High	3	Low	1	Mod	2	MODERATE	6
VR13 - Farmstead	0.3	High	3	Low	1	Mod	2	MODERATE	6
VR15 - Farmstead	1.1	Mod	2	High	3	Mod	2	MODERATE	7
VR16 - Farmstead	0.0	High	3	High	3	Mod	2	HIGH	8
VR20 - Farmstead	4.8	Low	1	Low	1	High	3	MODERATE	5
VR21 - Farmstead *	*NIL*								
VR23 - Farmstead	3.9	Low	1	Mod	2	High	3	MODERATE	6
VR24 - Farmstead	1.3	Mod	2	Mod	2	Low	1	MODERATE	5
VR25 - Farmstead	3.2	Low	1	Mod	2	Mod	2	MODERATE	5
*VR26 - Farmstead**	*NIL*								
*VR27 - Farmstead**	*NIL*								
VR28 - Farmstead	4.0	Low	1	High	3	Mod	2	MODERATE	6
*VR29 - Farmstead**	*NIL*								
VR30 - Farmstead	3.4	Low	1	Low	1	Mod	2	LOW	4
*VR31 - Farmstead**	*NIL*								
VR32 - Farmstead	2.1	Low	1	Low	1	High	3	MODERATE	5
VR33 - Farmstead	2.4	Low	1	Mod	2	Mod	2	MODERATE	5
VR34 - Farmstead	3.8	Low	1	Low	1	Mod	2	LOW	4

** Receptor is outside the preliminary viewshed and as such the overall impact rating is **"NIL"***

The table above shows that the only sensitive receptor (SR2) within the study area is expected to experience moderate levels of impact as a result of the proposed development.

One of the potentially sensitive receptors (VR16) would experience high levels of visual impact, largely as a result of its location within the assessment corridor. As mentioned however, this receptor is located in close proximity to an existing 400kV power line servitude. In addition, the farm property forms part of the Camden 1 WEF project area and as such it is assumed that the land owners support the Camden Renewable Energy Complex project. They are therefore not expected to perceive the proposed development in a negative light and this would reduce the level of visual impact.

Fifteen of the remaining receptor locations are expected to experience moderate levels of impact as a result of the proposed development, while two receptors will only experience low levels of visual impact. The remaining six receptors are outside the viewshed for the combined assessment corridors and are not expected to experience any visual impacts as a result of the proposed development.

Although the Langcarel Private Nature Reserve is within the study area, it has not been included in the impact rating matrix due to the fact that there is some doubt as to the present status of this nature reserve and there is no evidence of any ongoing management of the site or public access to this reserve. As such, this site is not considered visually sensitive..

As stated above, the N2 national route could be considered as a potentially sensitive receptor road. Elements of the power line / substation development are expected to be visible to motorists travelling along the N2, but the likely visual impacts of the proposed development on motorists utilising this road would be reduced by the presence of existing power lines and the level of transformation and landscape degradation in the vicinity of Camden Power Station. In light of this, visual impacts affecting the N2 are rated as low.

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 wind farm at night.

Camden Power Station and the adjacent Camden residential area, as well as Mooiplaats Colliery to the north-east of the proposed project are the main sources of light within the study area. These elements are expected to have a significant impact on the night scene in the northern sector of the study area. Other light sources in the broader area would largely emanate from the many farmsteads dotted across the study area, and also from vehicles travelling along the national routes. Overall, the visual character of the night environment within the study area

is considered to be moderately 'polluted' and will therefore not be regarded as pristine. However, farmsteads located in areas characterised by lower levels of disturbance / transformation would be moderately sensitive to the impact of additional lighting.

Power lines 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 Camden Power Station and the adjacent Camden residential area. It should also be noted that the power line and substation will only be constructed if the proposed Camden 1 WEF and Camden 1 SEF are 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 a whole. 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 visual impacts of the proposed power line and substations specifically, it is equally important to assess the cumulative visual impact that could materialise as a result of this development. 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:

- existing and proposed mining / quarrying activities,
- electrical infrastructure including Camden Power Station and associated power lines; and
- proposed renewable energy facilities comprising the Camden Renewable Energy Complex (Wind, Solar, Hydrogen and associated grid connection infrastructure).

Existing mining / quarrying and electrical infrastructure have already resulted in large scale visual impacts, mostly along the N2 national route, extending south-eastwards from Ermelo to Camden Power Station. These developments have significantly altered the sense of place and visual character in the broader region.

Renewable energy facilities have the potential to cause large-scale visual impacts, and although the level of transformation already present in the landscape will reduce the contrast and overall visual impact of the new power line / substation development, the incremental change in the landscape will be increased and the visual impacts on surrounding visual receptors would be exacerbated. Although the South African Renewable Energy EIA Application Database from DFFE does not record any existing or proposed renewable projects within 35kms of the proposed development, a cumulative assessment must include all elements of the proposed Camden Renewable Energy Complex. This complex, including wind, solar and green hydrogen energy facilities as well as associated grid connection infrastructure, will affect a large portion of the study area.

From a visual perspective, the concentration of renewable energy facilities as proposed will further change the visual character of the area and alter the inherent sense of place, extending 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 recommended mitigation measures. In addition, it is possible that these developments in close proximity to each other could be seen as one large Renewable Energy Facility (REF) rather than several separate developments. Although this will not necessarily reduce impacts on the visual character of the area, it could potentially reduce the cumulative impacts on the landscape.

8.5 Identification of Potential Impacts

Potential visual issues / impacts resulting from the proposed power line and substation, together with possible mitigation measures are outlined below.

8.5.1 Construction Phase

Nature of the impact

- Potential visual intrusion resulting from large construction vehicles and equipment;
- Potential visual effect of construction activities;
- Potential visual effect of material stockpiles;
- Potential impacts of increased dust emissions from construction activities and related traffic;
- Potential visual scarring of the landscape as a result of surface disturbance during construction; and
- Potential visual pollution resulting from littering on the construction site

Significance of impact

The significance of visual impacts during construction are expected to be **Low**, but will be further reduced with the implementation of mitigation measures.

Proposed mitigation measures

- Carefully plan to minimise the construction period and avoid construction delays.
- Inform receptors within 500m of the proposed power line and / or substation of the construction programme and schedules;
- Vegetation clearing should take place in a phased manner.
- Make use of existing gravel access roads where possible.
- Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible.
- Ensure that dust suppression techniques are implemented:
    - on all access roads;
    - in all areas where vegetation clearing has taken place;
    - on all soil stockpiles.
- Maintain a neat construction site by removing litter, rubble and waste materials regularly.

8.5.2 Operational Phase

Nature of the impact

- Potential alteration of the visual character of the area;
- Potential visual intrusion resulting from grid connection infrastructure dominating the skyline in a largely natural / rural area;
- Potential impacts of increased dust emissions from maintenance activities and related traffic;
- Potential visual effect on surrounding farmsteads; and
- Potential alteration of the night time visual environment as a result of operational and security lighting at the proposed substations.

Significance of impact

The significance of visual impacts during operation are expected to be **Low**, but will be further reduced with the implementation of mitigation measures.

Proposed mitigation measures

- As far as possible, limit the number of maintenance vehicles which are allowed to access the site.
- As far as possible, limit the amount of security and operational lighting at the proposed substations.
- 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, whilst adhering to relevant safety standards.
- Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used, whilst adhering to relevant safety standards.
- If possible, make use of motion detectors on security lighting.
- Buildings on the substation sites should be painted in natural tones that fit with the surrounding environment.
- Non-reflective surfaces should be utilised where possible.

8.5.3 Decommissioning Phase

Nature of the impact

- Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process;
- Potential impacts of increased dust emissions from decommissioning activities and related traffic; and
- Potential visual intrusion of any remaining infrastructure on the site.

Significance of impact

The significance of visual impacts during decommissioning are expected to be **Low**, but will be further reduced with the implementation of mitigation measures.

Proposed 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.
- Maintain a neat decommissioning site by removing rubble and waste materials regularly.
- Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase.
- All cleared areas should be rehabilitated as soon as possible.
- Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.

8.5.4 Cumulative Impacts

Nature of the impact

- Combined visual impacts from mining, industrial, infrastructural and renewable energy development in the broader area could potentially alter the sense of place and visual character of the area; and
- Combined visual impacts from mining, industrial, infrastructural and renewable energy development in the broader area could potentially exacerbate visual impacts on visual receptors.

Significance of impact

The significance of cumulative visual impacts are potentially **High**, but could be reduced to **Moderate** with the implementation of mitigation measures.

Proposed mitigation measures

- Implementation of the mitigation measures as recommended above.

8.6 Overall Visual Impact Rating

The EIA Regulations, 2014 (as amended) require that an overall rating for visual impact be provided to allow the visual impact to be assessed alongside other environmental parameters. A full impact rating matrix for the proposed development will be presented in the EIA phase VIA.

9 COMPARATIVE ASSESSMENT OF ALTERNATIVES

At this stage, no fatal flaws have been identified in respect of any of the power line corridor or substation site alternatives being proposed. A full comparative assessment will however be provided in the EIA phase VIA report.

10 CONCLUSION

A scoping level visual study was conducted to assess the magnitude and significance of the potential visual impacts associated with the development the Camden Collector Substation, a Main Transmission Substation and associated 400kV power lines near Ermelo in Mpumalanga Province.

The VIA has demonstrated that the study area has a somewhat mixed visual character, transitioning from the heavily transformed urban / peri-urban landscape associated with Camden Power Station, Camden residential area and Mooiplaats Colliery in the north-east to a more rural / pastoral character across the remainder of the study area. Hence, although a power line / substation development would alter the visual character and contrast with this rural / pastoral character, the location of the proposed development in close proximity to Camden Power Station and the associated power lines, mining activity and rail infrastructure will significantly reduce the level of contrast.

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

One formal protected area (Langcarel Private Nature Reserve) was identified within the study area, although there is some doubt as to the present status of this nature reserve and any visual / landscape value has been reduced by the apparent lack of ongoing management of the site. The area is not typically valued for its tourism significance and relatively few leisure-based tourism facilities (lodges/accommodation facilities) were identified inside the study area. This factor in conjunction with the high levels of transformation in the north-east have reduced the overall visual sensitivity of the broader area.

A total of twenty-five (25) sensitive receptors were identified in the study area, only one of which (SR2) is considered to be a sensitive receptor as it is linked to leisure/nature-based tourism activities in the area. The remaining receptor locations, are all believed to be farmsteads that are regarded as *potentially* sensitive visual receptors as the proposed development will likely alter natural or semi-natural vistas experienced from these locations. Six (6) of these farmsteads are not expected to experience any visual impacts as a result of the proposed development as they are outside the viewshed for the proposed power line and substation.

One of the remaining receptors (VR16) would experience high levels of visual impact, largely as a result of its location within the assessment corridor. As this receptor is located in close proximity to an existing 400kV power line servitude, and also within the Camden 1 WEF project area, the level of visual impact would be reduced. The remaining receptor locations, including the only sensitive receptor (SR2) are expected to experience moderate or low levels of impact as a result of the proposed power line / substation development. Considering that eight of these receptors are located within the Camden 1 WEF project area, it has been assumed that the relevant land owners are involved in the overall Camden Renewable Energy Complex project.

As such, they are not expected to perceive the proposed development in a negative light and this would reduce the level of visual impact experienced at these locations.

Although the N2 receptor road traverses the study area, motorists travelling along this route are only expected to experience low impacts from the proposed development.

A preliminary assessment of overall impacts revealed that visual impacts associated with the proposed power line and substations are of low significance during construction, operation and decommissioning phases, with a number of mitigation measures available.

Considering the presence of existing and proposed mining activity and electrical generation and distribution infrastructure, the introduction of new electrical grid infrastructure in the area will result in further change in the visual character of the area and alteration of the inherent sense of place, extending 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 recommended mitigation measures. In light of this, cumulative impacts have been rated as moderate.

10.1 Visual Impact Statement

It is SiVEST's opinion that the potential visual impacts associated with the proposed Camden Collector Substation, Main Transmission Substation and associated 400kV power lines are negative and of moderate significance. Given the relatively low number of sensitive receptors and the significant level of human transformation and landscape degradation in areas near the proposed development, the project is deemed acceptable from a visual perspective and the EA should be granted. SiVEST is of the opinion that the impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

10.2 EIA Phase Plan of Study

The scoping phase VIA report has adequately assessed the visual impacts of the proposed 400kV power line and associated substations and no further field investigation will be required. The focus of the EIA phase assessment will be to update the scoping phase VIA report. This will entail:

- a review of the findings of the VIA in accordance with amended route alignments;
- a comparative assessment of the corridor and substation site alternatives provided;
- addressing any comments or concerns arising from the public participation process.

11 REFERENCES

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Appendix A

SPECIALIST CV AND DECLARATION

CURRICULUM VITAE

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

Professional Qualifications

BA (Geography), University of Leeds 1982

Membership to Professional Societies

South African Geomatics Council – GTc GISc 1187

Employment Record

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

Language Proficiency

LANGUAGE	SPEAK	READ	WRITE
English	Fluent	Fluent	Fluent

Key Experience

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

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

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

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

Projects Experience

STRATEGIC PLANNING PROJECTS

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

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

BUILT INFRASTRUCTURE

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

STATE OF THE ENVIRONMENT REPORTING

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

STRATEGIC ENVIRONMENTAL ASSESSMENTS AND ENVIRONMENTAL MANAGEMENT FRAMEWORKS

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

VISUAL IMPACT ASSESSMENTS

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

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

Camden Renewable Energy Complex, which consists of eight subprojects as follows:

- Camden I Wind Energy Facility (up to 210MW)
- Camden I Wind Grid Connection (up to 132kV);
- Camden Grid Connection and Collector substation (up to 400kV);
- Camden I Solar (up to 100MW)
- Camden I Solar Grid Connection (up to 132kV);
- Camden II Wind Energy Facility (up to 210MW)
- Camden II Wind Energy Facility up to 132kV Grid Connection; and
- Camden Green Hydrogen and Ammonia Facility, including grid connection infrastructure

Kindly note the following:

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

Departmental Details

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

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

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

1. SPECIALIST INFORMATION

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

2. DECLARATION BY THE SPECIALIST

I, **Kerry Schwartz**, declare that –

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

K Schwartz

Signature of the Specialist

SiVEST SA (Pty) Ltd

Name of Company:

25 November 2021

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

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

KSchwartz

Signature of the Specialist

SiVEST SA (Pty) Ltd

Name of Company

25 November 2021

Date

Hlengiwe Innocentia Ntuli
COMMISSIONER OF OATHS

Signature:

Signature of the Commissioner of Oaths

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

Date 25/11/2021 **Place** Rivonia

Business Address: 12 Autumn Street, Rivonia 2128

25 NOVEMBER 2021

Date

10.4 The Specialist

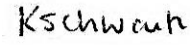
Note: Duplicate this section where there is more than one specialist.

I **Kerry Schwartz**, as the appointed specialist hereby declare/affirm the correctness of the information provided as part of the application, and that I:

- in terms of the general requirement to be independent (tick which is applicable):

X	other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
	am not independent, but another EAP that is independent and meets the general requirements set out in Regulation 13 has been appointed to review my work (Note: a declaration by the review specialist must be submitted);

- have expertise in conducting specialist work as required, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- will ensure compliance with the EIA Regulations 2014;
- 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 application;
- will take into account, to the extent possible, the matters listed in regulation **18** of the regulations when preparing the application and any report, plan or document relating to the application;
- will disclose to the proponent or applicant, registered interested and affected parties 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 or the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority (unless access to that information is protected by law, in which case I will indicate that such protected information exists and is only provided to the competent authority);
- declare that all the particulars furnished by me in this form are true and correct;
- am aware that it is an offence in terms of Regulation 48 to provide incorrect or misleading information and that a person convicted of such an offence is liable to the penalties as contemplated in section 49B(2) of the National Environmental Management Act, 1998 (Act 107 of 1998).



Signature of the specialist

SiVEST SA (Pty) Ltd
Name of company

25 November 2021
Date

Appendix B

Impact Rating Methodology

1 ENVIRONMENTAL IMPACT ASSESSMENT (EIA) METHODOLOGY

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

1.1 Determination of Significance of Impacts

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

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

1.2 Impact Rating System

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

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

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

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

1.2.1 Rating System Used to Classify Impacts

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

Table 1: Rating of impacts criteria

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

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

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

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

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

Table 2: Rating of impacts template and example

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Construction Phase																				
Vegetation and protected plant species	Vegetation clearing for access roads, turbines and their service areas and other infrastructure will impact on vegetation and protected plant species.	2	4	2	2	3	3	39	-	Medium	**Outline/explain the mitigation measures to be undertaken to ameliorate the impacts that are likely to arise from the proposed activity. These measures will be detailed in the EMPr.**	2	4	2	1	3	2	24	-	Low

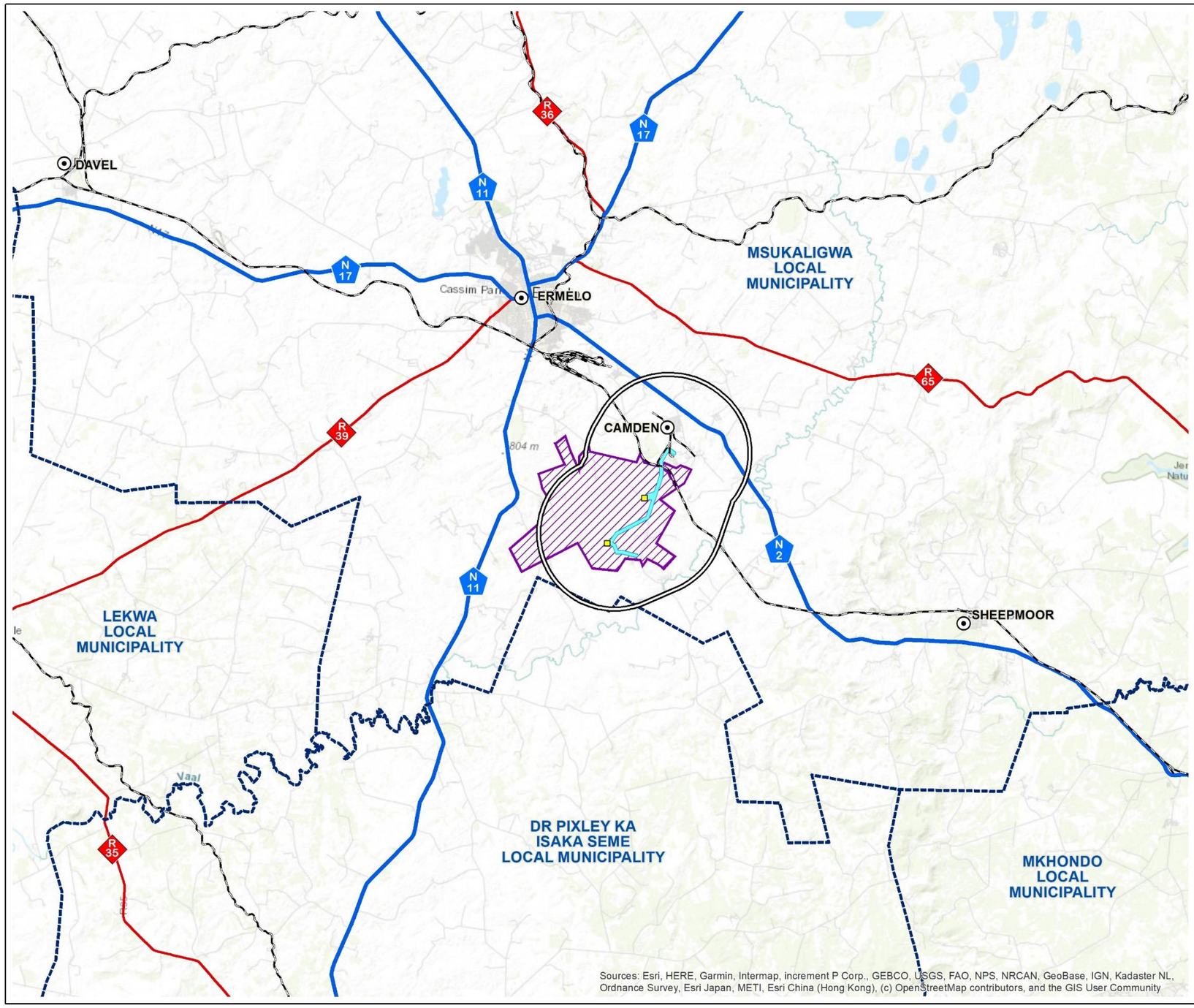
Operational Phase																				
Fauna	Fauna will be negatively affected by the operation of the wind farm due to the human disturbance, the presence of vehicles on the site and possibly by noise generated by the wind turbines as well.	2	3	2	1	4	3	36	-	Medium	**Outline/explain the mitigation measures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

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

Appendix C

Maps

MAP 1: Regional Context



PROPOSED CONSTRUCTION OF THE CAMDEN 1 WEF & SEF GRID CONNECTION INFRASTRUCTURE

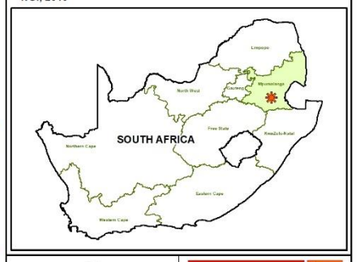
NEAR ERMELO, MPUMALANGA PROVINCE

REGIONAL CONTEXT

Legend

- Main Towns
- Local Municipal Boundaries
- National Routes
- Main Arterial Routes
- Rail Network
- Camden 1 WEF Project Area
- Power Line Assessment Corridors
- Proposed Substation Site Alternatives
- 5km Visual Assessment Zone

SOURCE:
ESRI, 2020
MUNICIPAL DEMARCATION BOARD, 2016
NGI, 2015



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Kilometers

SiVEST
ENVIRONMENTAL DIVISION
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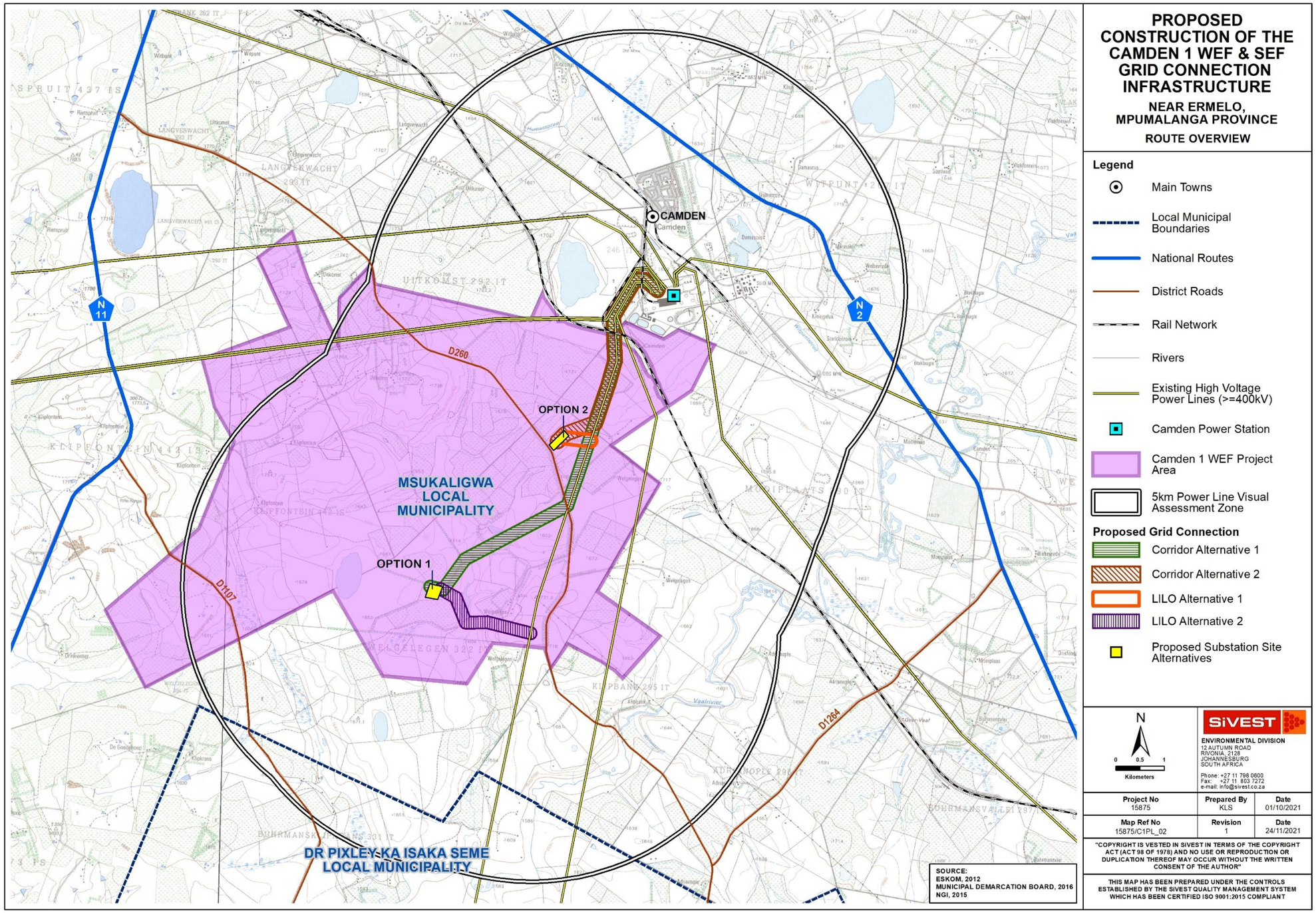
SOUTH AFRICA
Phone: +27 11 798 0600
Fax: +27 11 803 7272
e-mail: info@sivest.co.za

Project No	Prepared By	Date
15875	KLS	01/10/2021
Map Ref No	**Revision**	**Date**
15875/C1PL_01	1	24/11/2021

MAP 2: Route Overview



PROPOSED CONSTRUCTION OF THE CAMDEN 1 WEF & SEF GRID CONNECTION INFRASTRUCTURE

NEAR ERMELO, MPUMALANGA PROVINCE

ROUTE OVERVIEW

Legend

- Main Towns
- Local Municipal Boundaries
- National Routes
- District Roads
- Rail Network
- Rivers
- Existing High Voltage Power Lines (>=400kV)
- Camden Power Station
- Camden 1 WEF Project Area
- 5km Power Line Visual Assessment Zone

Proposed Grid Connection

- Corridor Alternative 1
- Corridor Alternative 2
- LILO Alternative 1
- LILO Alternative 2
- Proposed Substation Site Alternatives

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Kilometers

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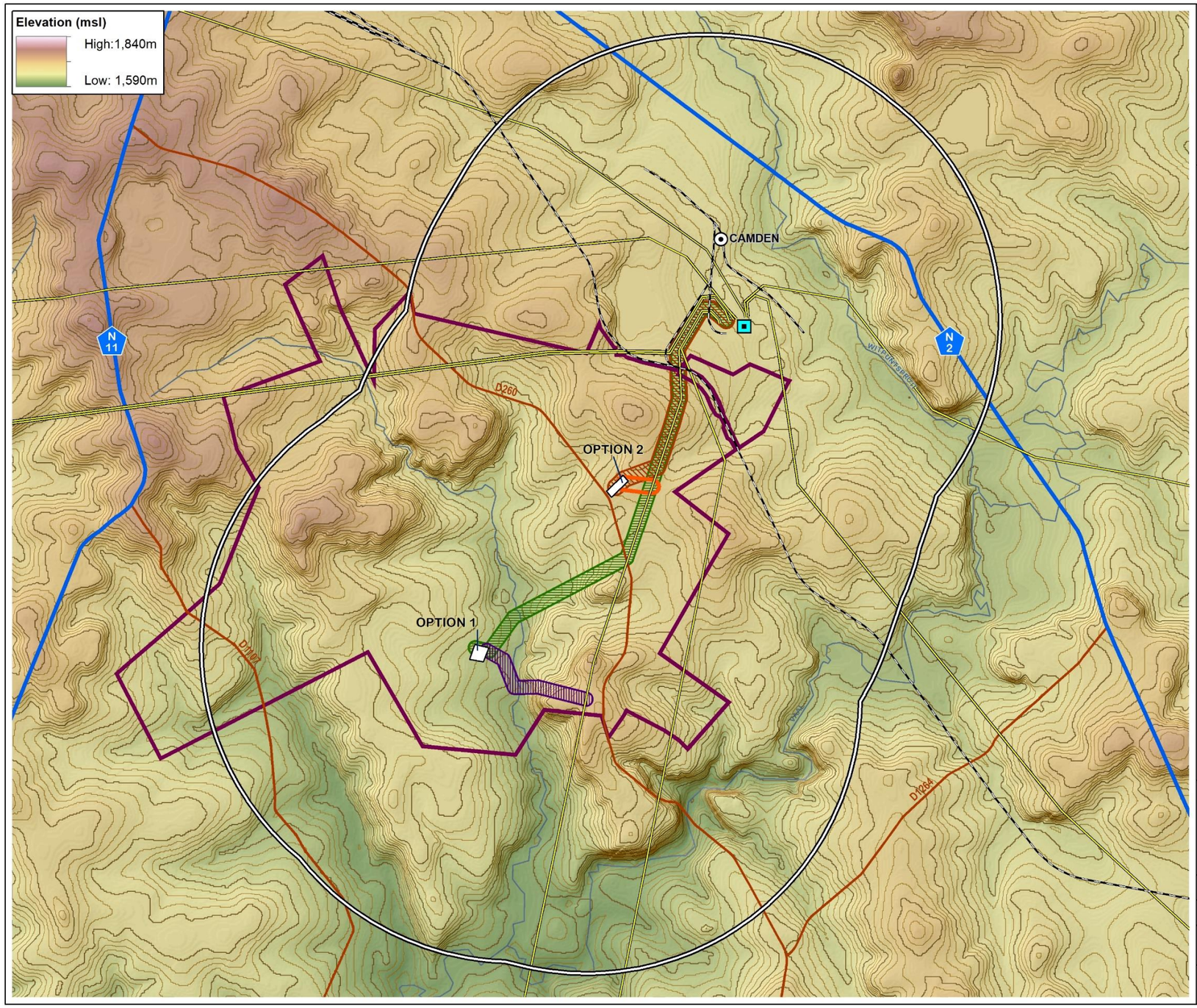
Project No	Prepared By	Date
15875	KLS	01/10/2021
Map Ref No	**Revision**	**Date**
15875/C1PL_02	1	24/11/2021

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

MAP 3: Topography



PROPOSED CONSTRUCTION OF THE CAMDEN 1 WEF & SEF GRID CONNECTION INFRASTRUCTURE

NEAR ERMELO, MPUMALANGA PROVINCE

TOPOGRAPHY

Legend

- Main Towns
- National Routes
- District Roads
- Rail Network
- Rivers
- Existing High Voltage Power Lines (>=400kV)
- Camden Power Station
- Camden 1 WEF Project Area
- 5km Power Line Visual Assessment Zone

Proposed Grid Connection

- Corridor Alternative 1
- Corridor Alternative 2
- LILO Alternative 1
- LILO Alternative 2
- Proposed Substation Site Alternatives

SOURCE:
ESKOM, 2012
NGI, 2015
NFEPA, 2011

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Kilometers

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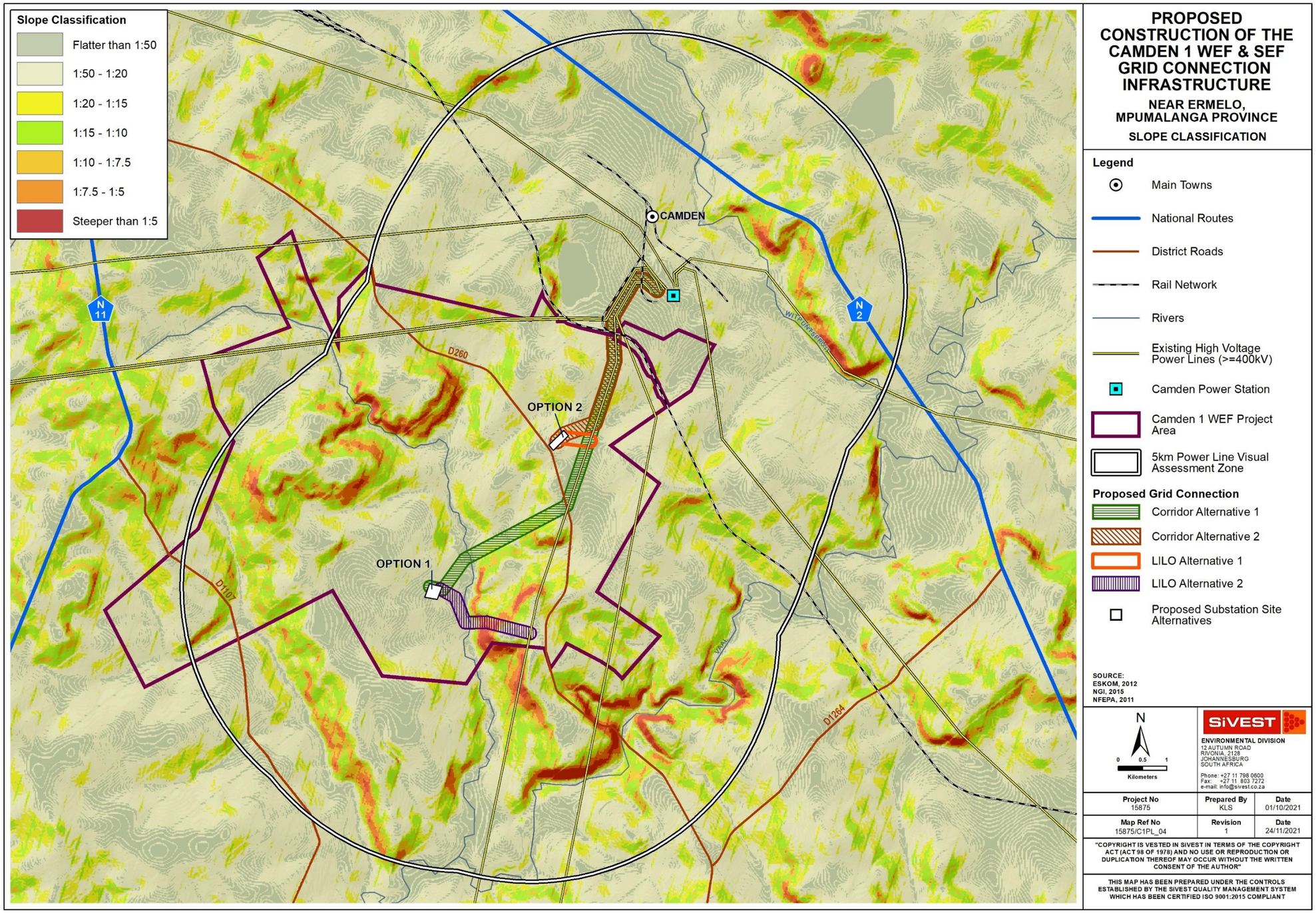
Project No	Prepared By	Date
15875	KLS	01/10/2021
Map Ref No	**Revision**	**Date**
15875/C1PL_03	1	24/11/2021

MAP 4: Slope Classification



PROPOSED CONSTRUCTION OF THE CAMDEN 1 WEF & SEF GRID CONNECTION INFRASTRUCTURE

NEAR ERMELO, MPUMALANGA PROVINCE

SLOPE CLASSIFICATION

Legend

- Main Towns
- National Routes
- District Roads
- Rail Network
- Rivers
- Existing High Voltage Power Lines (>=400kV)
- Camden Power Station
- Camden 1 WEF Project Area
- 5km Power Line Visual Assessment Zone

Proposed Grid Connection

- Corridor Alternative 1
- Corridor Alternative 2
- LILO Alternative 1
- LILO Alternative 2
- Proposed Substation Site Alternatives

SOURCE:
ESKOM, 2012
NGI, 2015
NFEPA, 2011

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Kilometers

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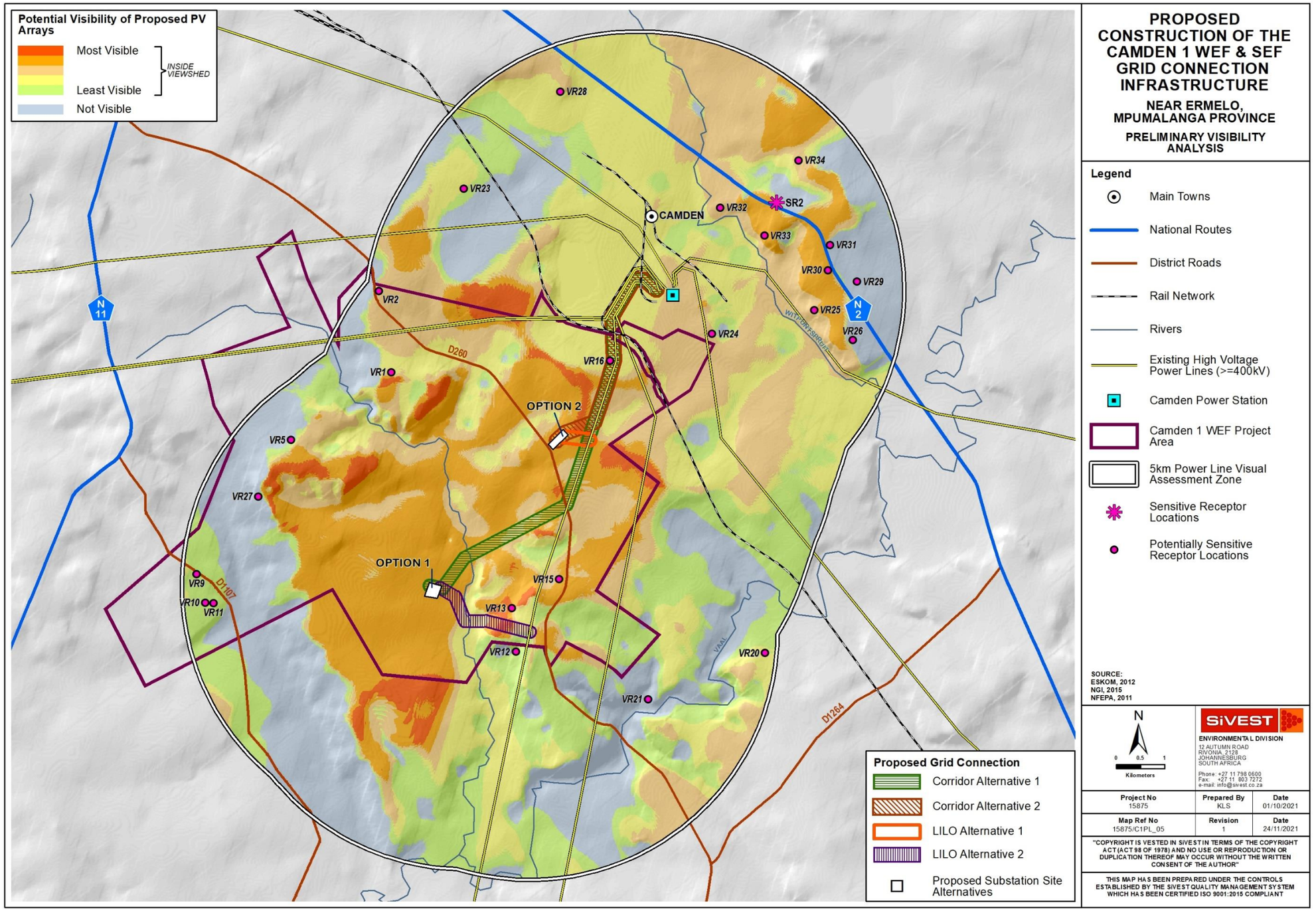
Project No	Prepared By	Date
15875	KLS	01/10/2021
Map Ref No	**Revision**	**Date**
15875/C1PL_04	1	24/11/2021

MAP 5: Potential Visibility of Facility



PROPOSED CONSTRUCTION OF THE CAMDEN 1 WEF & SEF GRID CONNECTION INFRASTRUCTURE

NEAR ERMELO, MPUMALANGA PROVINCE

PRELIMINARY VISIBILITY ANALYSIS

Legend

- Main Towns
- National Routes
- District Roads
- Rail Network
- Rivers
- Existing High Voltage Power Lines (>=400kV)
- Camden Power Station
- Camden 1 WEF Project Area
- 5km Power Line Visual Assessment Zone
- Sensitive Receptor Locations
- Potentially Sensitive Receptor Locations

SOURCE:
ESKOM, 2012
NGI, 2015
NFEPA, 2011

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Kilometers

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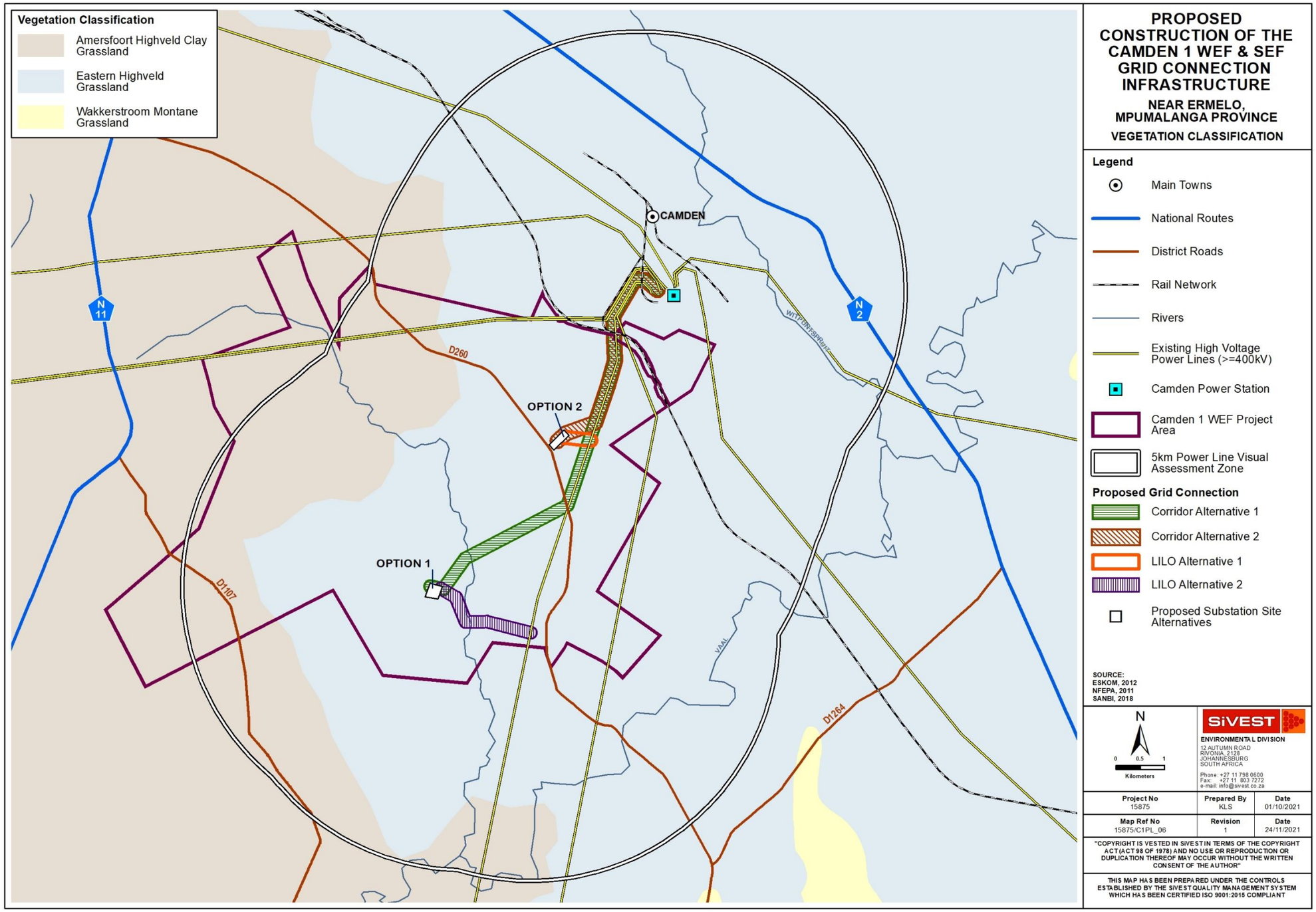
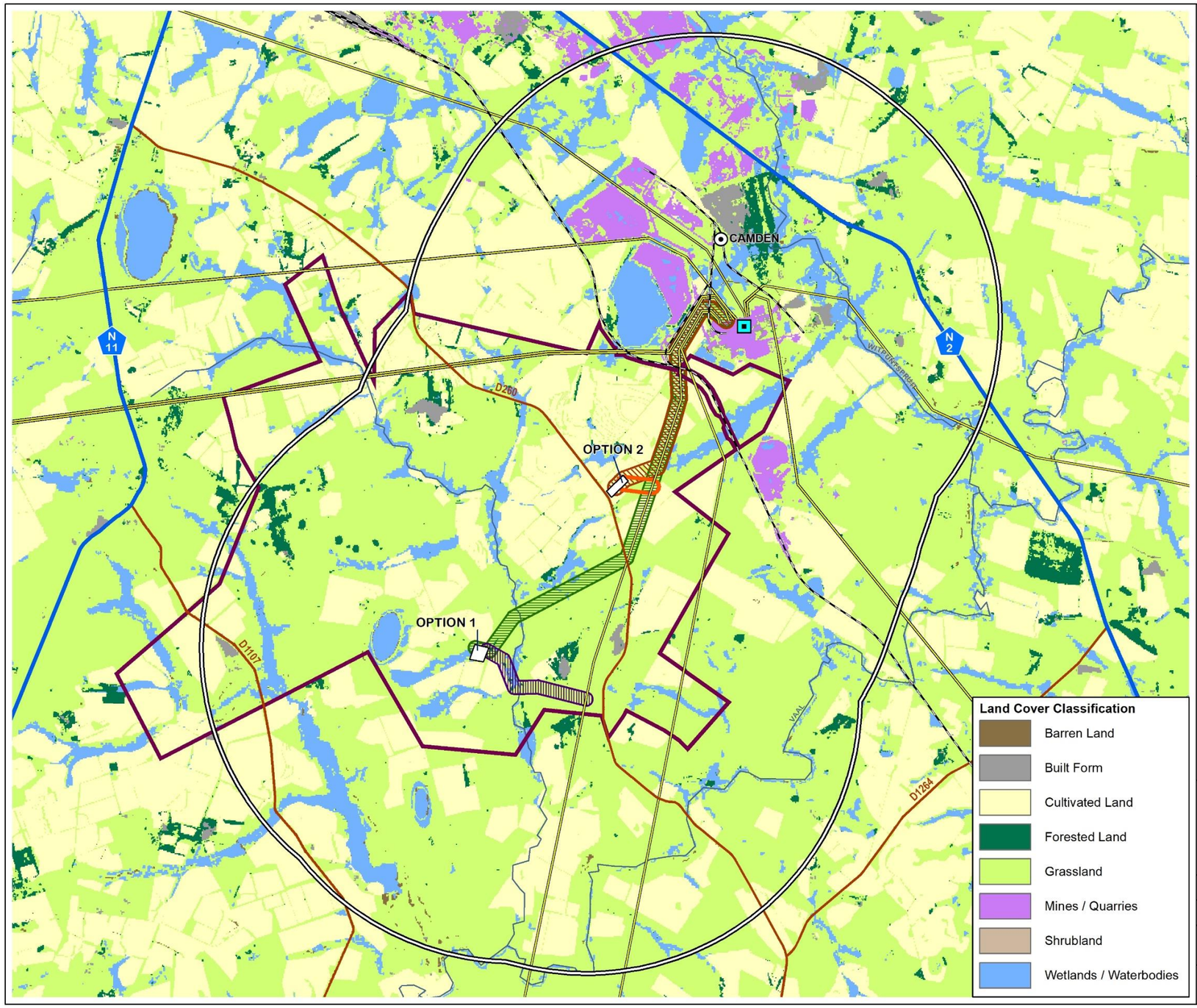
Project No	Prepared By	Date
15875	KLS	01/10/2021
Map Ref No	**Revision**	**Date**
15875/C1PL_05	1	24/11/2021

MAP 6: Vegetation Classification



MAP 7: Land Cover Classification



PROPOSED CONSTRUCTION OF THE CAMDEN 1 WEF & SEF GRID CONNECTION INFRASTRUCTURE

NEAR ERMELO, MPUMALANGA PROVINCE

BROAD LAND COVER CLASSIFICATION

Legend

- Main Towns
- National Routes
- District Roads
- Rail Network
- Rivers
- Existing High Voltage Power Lines (>=400kV)
- Camden Power Station
- Camden 1 WEF Project Area
- 5km WEF Visual Assessment Zone

Proposed Grid Connection

- Corridor Alternative 1
- Corridor Alternative 2
- LILO Alternative 1
- LILO Alternative 2
- Proposed Substation Site Alternatives

Land Cover Classification

- Barren Land
- Built Form
- Cultivated Land
- Forested Land
- Grassland
- Mines / Quarries
- Shrubland
- Wetlands / Waterbodies

SOURCE:
ESKOM, 2012
NFEPA, 2011
2020 SA NATIONAL LAND COVER (® GEOTERRAIMAGE - 2020)

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0 0.5 1
Kilometers

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ENVIRONMENTAL DIVISION
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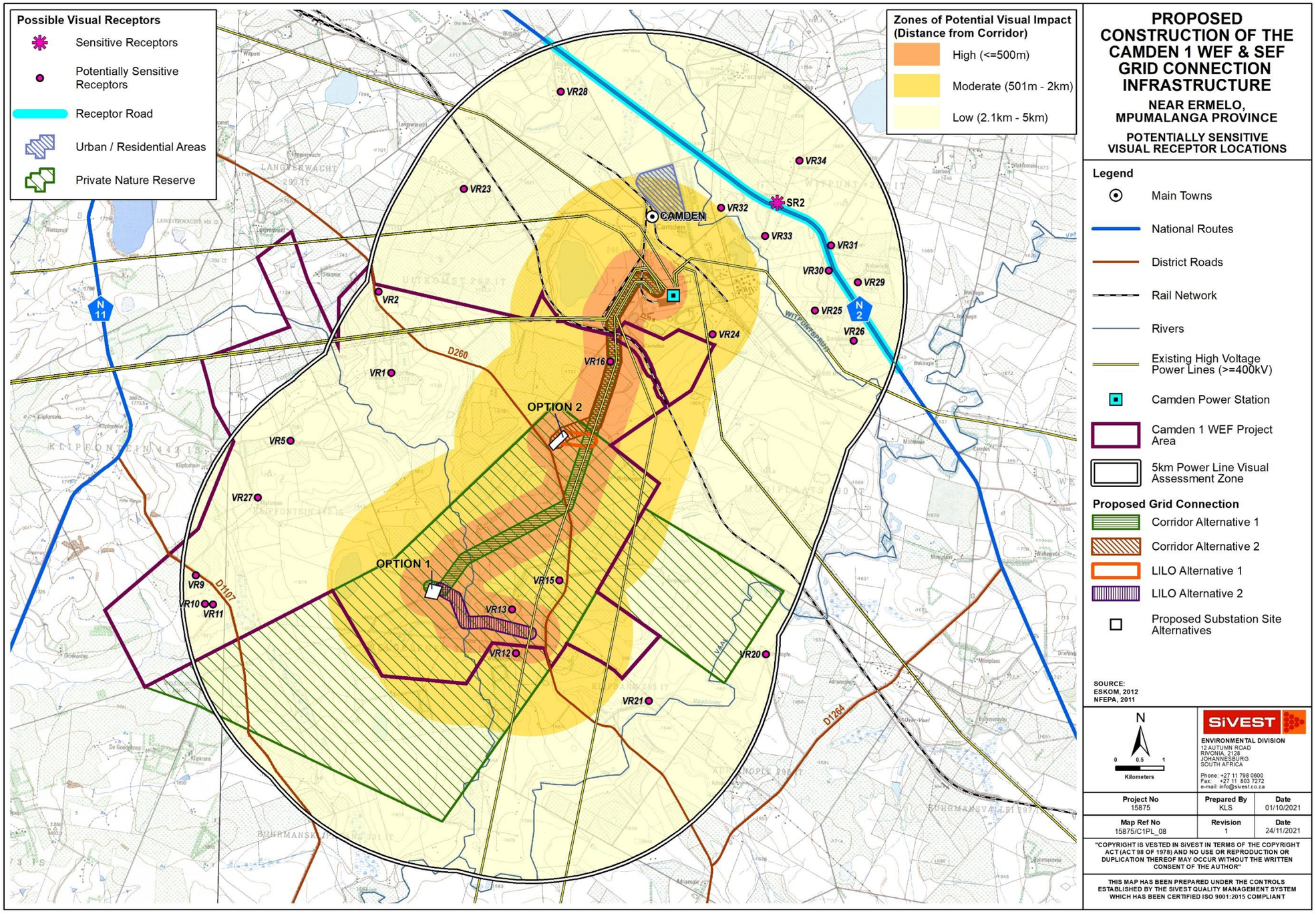
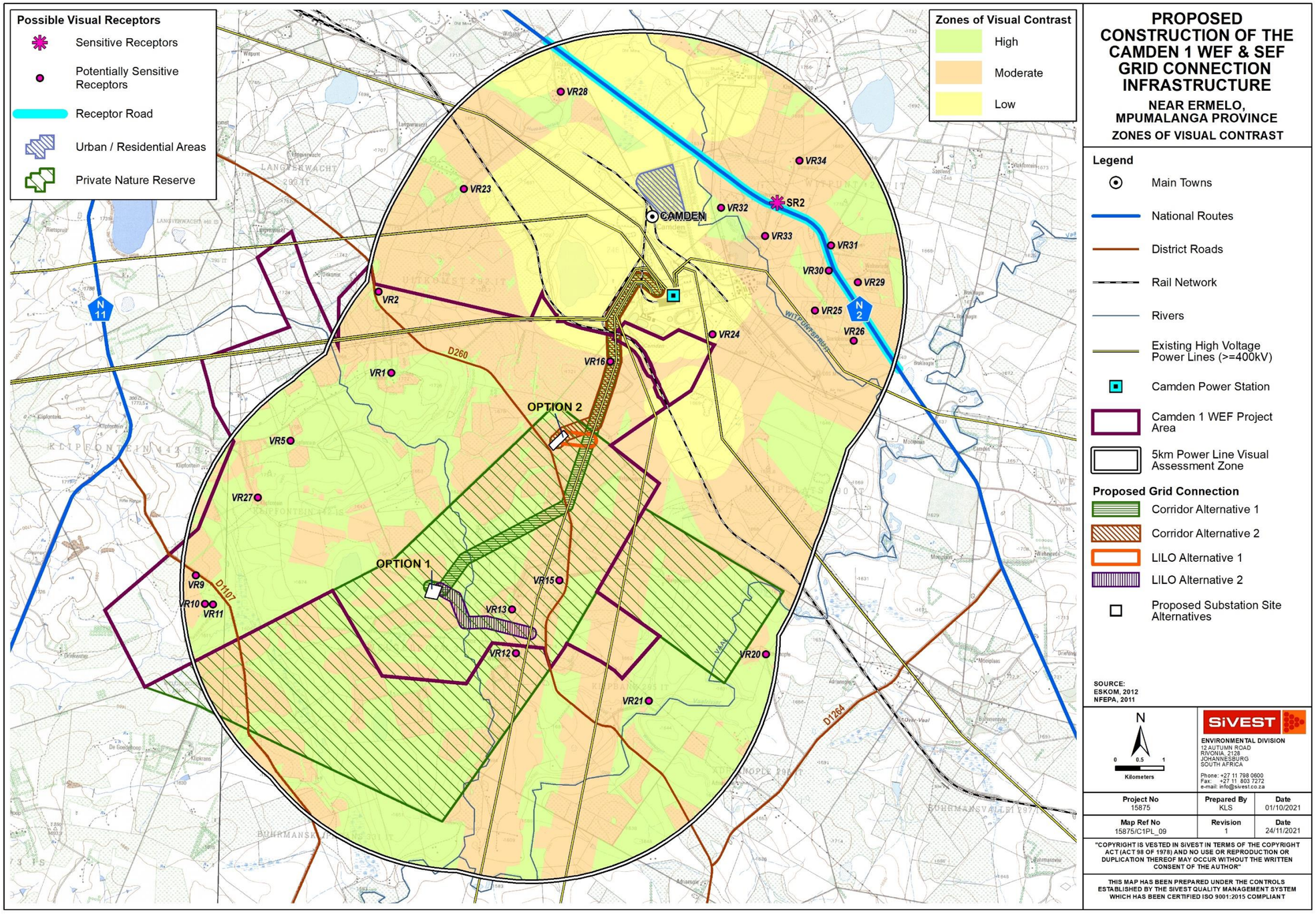
Project No	Prepared By	Date
15875	KLS	01/10/2021
Map Ref No	**Revision**	**Date**
15875/C1PL_07	1	24/11/2021

MAP 8: Potentially Sensitive Receptor Locations



MAP 9: Zones of Visual Contrast



PROPOSED CONSTRUCTION OF THE CAMDEN 1 WEF & SEF GRID CONNECTION INFRASTRUCTURE

NEAR ERMELO, MPUMALANGA PROVINCE

ZONES OF VISUAL CONTRAST

Legend

- Main Towns
- National Routes
- District Roads
- Rail Network
- Rivers
- Existing High Voltage Power Lines (>=400kV)
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Proposed Grid Connection

- Corridor Alternative 1
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- LILO Alternative 2
- Proposed Substation Site Alternatives

SOURCE:
ESKOM, 2012
NFEPA, 2011

N

0 0.5 1

Kilometers

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Project No	Prepared By	Date
15875	KLS	01/10/2021
Map Ref No	**Revision**	**Date**
15875/C1PL_09	1	24/11/2021