CAMDEN I WIND (RF) PTY LTD

Proposed Construction of the Camden 1 Wind Energy Facility and Associated Grid Connection Infrastructure near Ermelo, Mpumalanga Province

Visual Impact Assessment Report – EIA Phase

DEA Reference: (To be announced)
Issue Date: 18 May 2022
Version No.: **1**
Project No.: 15875

Date:	18 05 2022
Document Title:	Proposed Construction of the Camden 1 Wind Energy Facility and Associated Grid Connection Infrastructure near Ermelo, Mpumalanga Cape Province
Version Number:	1
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Confidentiality Statement

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

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	**Section of Report**
(a) details of the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a *curriculum vitae*;	**Section 1.2.** **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 12.1**
(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**

CAMDEN I WIND (RF) PTY LTD
PROPOSED CONSTRUCTION OF THE CAMDEN I WIND ENERGY FACILITY NEAR ERMELO, MPUMALANGA PROVINCE

VISUAL IMPACT ASSESSMENT REPORT – EIA PHASE

Executive Summary

Camden I Wind (RF) Pty Ltd (hereafter referred to as "CD I Wind") is proposing to construct the up to 200MW Camden I Wind Energy Facility (WEF) and associated grid connection infrastructure near Ermelo in Mpumalanga Province. The proposed WEF and grid connection projects are two of the eight projects comprising the proposed Camden Renewable Energy Complex.. , located approximately 13km south-east of Ermelo in Mpumalanga Province (**Figure 1**). The projects are located within the Msukaligwa Local Municipality, in the Gert Sibande District Municipality.

The proposed WEF development will be subject to a full Environmental Impact Assessment (EIA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended and EIA Regulations, 2014 (as amended). Accordingly, an EIA process as contemplated in terms of the EIA Regulations (2014, as amended) is being undertaken in respect of the proposed WEF project. The competent authority for this EIA is the national Department of Forestry, Fisheries and Environment (DFFE). Grid connection infrastructure for the WEF will be subject to a separate EIA Process, which is currently being undertaken in parallel to the EIA process. This Visual Impact Assessment (VIA) is being undertaken as part of the EIA process.

This combined VIA has determined that the study area has a somewhat mixed visual character, transitioning from the heavily transformed urban / peri-urban landscape associated with the town of Ermelo in the north and north-east to a more rural / pastoral character across the remainder of the study area. Hence, although a WEF and power line development would alter the visual character and contrast with this rural / pastoral character, the location of the proposed WEF and grid connection infrastructure 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 to moderate** visual sensitivity. However, an important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs.

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 and north-east have reduced the overall visual sensitivity of the broader area.

A total of six (6) sensitive receptors were identified in the study area, four (4) of which are considered to be sensitive receptors as they are linked to leisure/nature-based tourism facilities in the area. None of these receptors are however expected to experience high levels of visual impact from the proposed WEF facility. An additional fourteen (14) receptors were identified within 2km of the proposed WEF development, all of which appear to be farmsteads that could be regarded as potentially sensitive visual receptors as the proposed development will likely alter vistas experienced from these locations. Twelve (12) of these farmsteads are located within the Camden I WEF project area and as such the owners / occupants are assumed to be involved in the project and in these circumstances are not expected to view the proposed WEF in a negative light. The remaining two potentially sensitive receptors are expected to experience moderate levels of visual impact as a result of the proposed development.

A total of fourteen (14) receptors were identified within 5 km of the nearest corridor alternative, none of which are considered sensitive. All of the receptors identified are assumed to be farmsteads which could be considered to be receptors. However, given the degree of transformation in the landscape, and the fact that much of the proposed route alignment is relatively close to existing high voltage power lines, it is not anticipated that all of these receptors would be sensitive to the proposed development.

Seven of the identified receptors were found to be outside the viewshed for the proposed power lines and were excluded from the assessment. Ten (10) *potentially* sensitive receptor locations are located within the Camden I WEF project area and as the relevant land owners are known to support the proposed development, they are not expected to perceive the proposed development in a negative light.

Five receptor locations are expected to experience moderate levels of impact as a result of the Camden I grid connection infrastructure, while the remaining two (2) would only experience low levels of visual impact.

Although the N2 and N11 receptor roads traverse the study area, motorists travelling along these routes are only expected to experience moderate impacts from the proposed Camden 1 WEF. As there are no national routes or main roads within 5 kms of the grid assessment corridors, it is not anticipated that these roads will be subjected to any visual impacts as a result of the grid connection infrastructure.

A preliminary assessment of overall impacts revealed that impacts associated with all the proposed Camden I WEF and associated grid connection infrastructure (post mitigation) are of

low significance during both construction and decommissioning phases. During operation however, visual impacts (post mitigation) from the Camden I WEF would be of moderate significance with relatively few mitigation measures available to reduce the visual impact. Visual impacts associated with the Camden I Grid Connection project during operation would be of low significance.

Considering the presence of existing and proposed mining activity and electrical generation and distribution infrastructure, the introduction of new renewable energy facilities 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.

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

No fatal flaws were identified for either of the substation alternatives or any of the grid connection infrastructure alternatives. No preference was determined for either of the substation site alternatives and both alternatives were found to be favourable. Power Line Corridor Option 4 was identified as the Preferred Alternative, while Power Line Corridor Options 1, 2 and 3 were found to be favourable.

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

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VISUAL IMPACT ASSESSMENT REPORT – SCOPING PHASE

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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
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

CAMDEN I Wind (RF) Pty Ltd (hereafter referred to as ”CD I Wind”) is proposing to construct the up to 200MW Camden 1 Wind Energy Facility (WEF) and associated grid connection infrastructure near Ermelo in Mpumalanga Province. The proposed WEF and grid connection projects are two of the eight projects comprising the proposed Camden Renewable Energy Complex. The proposed WEF development will be subject to a full Environmental Impact Assessment (EIA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended and EIA Regulations, 2014 (as amended). Accordingly, an EIA process as contemplated in terms of the EIA Regulations (2014, as amended) is being undertaken in respect of the proposed WEF project. The competent authority for this EIA is the national Department of Forestry, Fisheries and Environment (DFFE).

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

[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. 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	Kerry Schwartz (for and on behalf of SiVEST SA)
Contact Details	klschwartz@slrconsulting.com
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 (EIA) for the proposed Koup 1 and Koup 2 WEFs, near Beaufort West, Western Cape Province; ▪ VIAs (BA) for the proposed Gromis WEF and associated Grid Connection Infrastructure, near Komaggas, Northern Cape Province. ▪ VIAs (BA) for the proposed Komas WEF and associated Grid Connection Infrastructure, near Komaggas, Northern Cape Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Mooi Plaats, Wonderheuvel and Paarde Valley solar PV plants near Noupoort in the Northern and Eastern Cape Provinces. ▪ VIAs (Scoping and Impact Phase) for the proposed Sendawo 1, 2 and 3 solar PV energy facilities near Vryburg, North West Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Tlisitseng 1 and 2 solar PV energy facilities near Lichtenburg, North West Province. ▪ VIA for the proposed Nokukhanya 75MW Solar PV Power Plant near Dennilton, Limpopo Province. ▪ VIAs (Scoping and Impact Phase) for the proposed Helena 1, 2 and 3 75MW Solar PV Energy Facilities near Copperton, Northern Cape Province.

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

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 – 2020). 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 and also within the power line assessment corridors. These would be areas where the placement of wind turbines or the establishment of a new power line will 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 provide an objective evaluation of the significance of the visual impacts associated with the proposed development, both before and after implementing mitigation measures. Mitigation measures were identified (where possible) in an attempt to minimise the visual impact of the proposed development. The rating matrix considers a number of different factors including geographical extent, probability, reversibility, irreplaceable loss of

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

resources, duration and intensity, in order to assign a level of significance to the visual impact of the project.

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

1.3.6 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, feedback received during the EIA phase will be addressed in later updates of this report.

1.4 Sources of Information

The main sources of information utilised for this VIA included:

- Project description for the proposed development provided by the Proponent;
- 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 3 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 ASSUMPTIONS AND LIMITATIONS

- Wind turbines are very large structures and could impact on visual receptors that are located relatively far away, particularly in areas where the terrain is very flat. Given the nature of the receiving environment and the height of the proposed wind turbines, the

study area or visual assessment zone is assumed to encompass an area of 10km from the proposed WEF – i.e. an area of 10km from the boundary of the WEF application site. The application of the 10km limit on the visual assessment zone relates to the fact that visual impacts decrease exponentially over distance. Thus although the WEF may still be visible beyond 10km, the degree of visual impact would diminish considerably. As such, the need to assess the impact on potential receptors beyond this distance would not be warranted.

- In assessing the potential visual impacts of the proposed 132kV power line, the visual assessment zone is assumed to encompass a zone of 5km from the outer boundary of the power line assessment corridors.
- The identification of visual receptors involved a combination of desktop assessment as well as field-based observation. Initially Google Earth imagery was used to identify potential receptors within the study area. Where possible, these receptor locations were verified and assessed during a site visit which was undertaken 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 assumptions have been made in terms of the likely sensitivity of the receptors to the proposed development.
- It should be noted that not all receptor locations would necessarily perceive the proposed development in a negative way. This is usually dependent on the use of the facility, the economic dependency of the occupants on the scenic quality of views from the facility and on people's perceptions of the value of "Green Energy". Sensitive receptor locations typically include sites such as tourism facilities and scenic locations within natural settings which are likely to be adversely affected by the visual intrusion of the proposed development. Thus, the presence of a receptor in an area potentially affected by the proposed development does not necessarily mean that any visual impact will be experienced.
- The potential visual impact at each 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 WEF project area, it has been assumed that the land owners or residents at these locations support the proposed WEF development and would not view the project in a negative light.
- Based on the project description provided by the Proponent, all analysis for this VIA is based on a worst-case scenario where turbine heights are assumed to be 300 m at the blade tip. On-site substations, Battery Energy Storage (BESS) facilities and office building heights are assumed to be less than 25m in height.
- Visual analysis in respect of the power lines is based on a worst-case scenario where power line tower heights are assumed to be 35 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 EIA Report (DEIR) or Draft Basic Assessment Report (DBAR) will however be incorporated into further drafts of this report, if relevant.
- At the time of undertaking the visual study no information was available regarding the type and intensity of lighting that will be required for the proposed WEF and therefore the potential impact of lighting at night has not been assessed at a detailed level. However, lighting requirements are relatively similar for all WEFs and as such, general measures to mitigate the impact of additional light sources on the ambiance of the nightscape have been provided.
- At the time of undertaking the visual study no *detailed* information was available regarding the design and layout of services and infrastructure associated with the proposed development. The potential visual impact of the *typical* infrastructure associated with a wind farm has therefore been assessed.
- In the light of the fact that the renewable energy industry is still relatively new in South Africa, this report draws on international literature and web material to describe the generic impacts associated with WEFs.
- Photomontages *have not* been compiled for all sensitive and potentially sensitive receptor locations. Instead, a range of locations was selected for modelling purposes to provide an indication of the possible impacts from different locations within the study area. It should be noted that these photomontages are specific to the location, and that even sites in close proximity to one another may be affected in different ways by the

proposed WEF development. The visual models represent a visual environment that assumes that all vegetation cleared during construction will be restored to its current state after the construction phase. This is however an improbable scenario as some vegetation cover may be permanently removed which may reduce the accuracy of the models generated.

- At the request of the Proponent, photomontages were compiled for this WEF in October 2019 at which time, the proposed project was still in the planning phase. As such, the photomontages are based on a turbine layout which has since changed. Accordingly, the photomontages presented in this report should be seen merely as indicative illustrations and not as an accurate representation of the proposed Camden 1 WEF turbine layouts.
- Although the grid connection and on-site infrastructure associated with the WEF has not been included in the models, this is not considered to be a major limitation as the visual impact of associated infrastructure would be minor when considering the scale of these infrastructural elements in relation to wind turbines.
- 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 wind turbines and power lines 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 turbines.

3 TECHNICAL DESCRIPTION

3.1 Project Location

3.1.1 WEF

The proposed WEF is located approximately 13km 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 conceptual layout, the WEF project area as shown on the locality map below (**Figure 2**) is approximately 6 000 hectares (ha) in extent and incorporates the following farm portions:

- Remainder of the Farm Klipfontein 442;
- Portion 1 of Klipfontein Farm No. 442;
- Portion 3 of Klipfontein Farm No. 442;
- Portion 1 of Welgelegen Farm No. 322;
- Portion 2 of Welgelegen Farm No. 322;
- Portion 2 of Uitkomst Farm No. 292;
- Portion 10 of Uitkomst Farm No. 292
- Portion 3 of Langverwatch Farm No. 293;
- Portion 3 of Klipbank Farm No. 295; and
- Portion 14 of Mooiplaats Farm No. 290

A smaller buildable area (approximately 200 ha) subject to finalisation based on technical and environmental requirements, has however been identified as a result of a preliminary suitability assessment undertaken by the Proponent and this area is likely to be further refined with the exclusion of sensitive areas determined through various specialist studies being conducted as part of the EIA process.

3.1.2 Grid Connection

It is proposed that a 132kV overhead power line will connect the Camden I WEF on-site substation to Camden Power Station via the proposed Camden Collector substation (which in turn will connect to the Camden Power Station.

Based on the current proposed power line route alignment, the grid assessment corridors will traverse the following farm portions:

- Remainder of Klipbank No 295;
- Portion 3 of Klipbank Farm No. 295;
- Remainder of Adrianople No 296;
- Portion 1 of Adrianople No 296;
- Portion 3 of Adrianople No 296;
- Portion 1 of Welgelegen Farm No. 322; and
- Portion 2 of Welgelegen Farm No. 322;

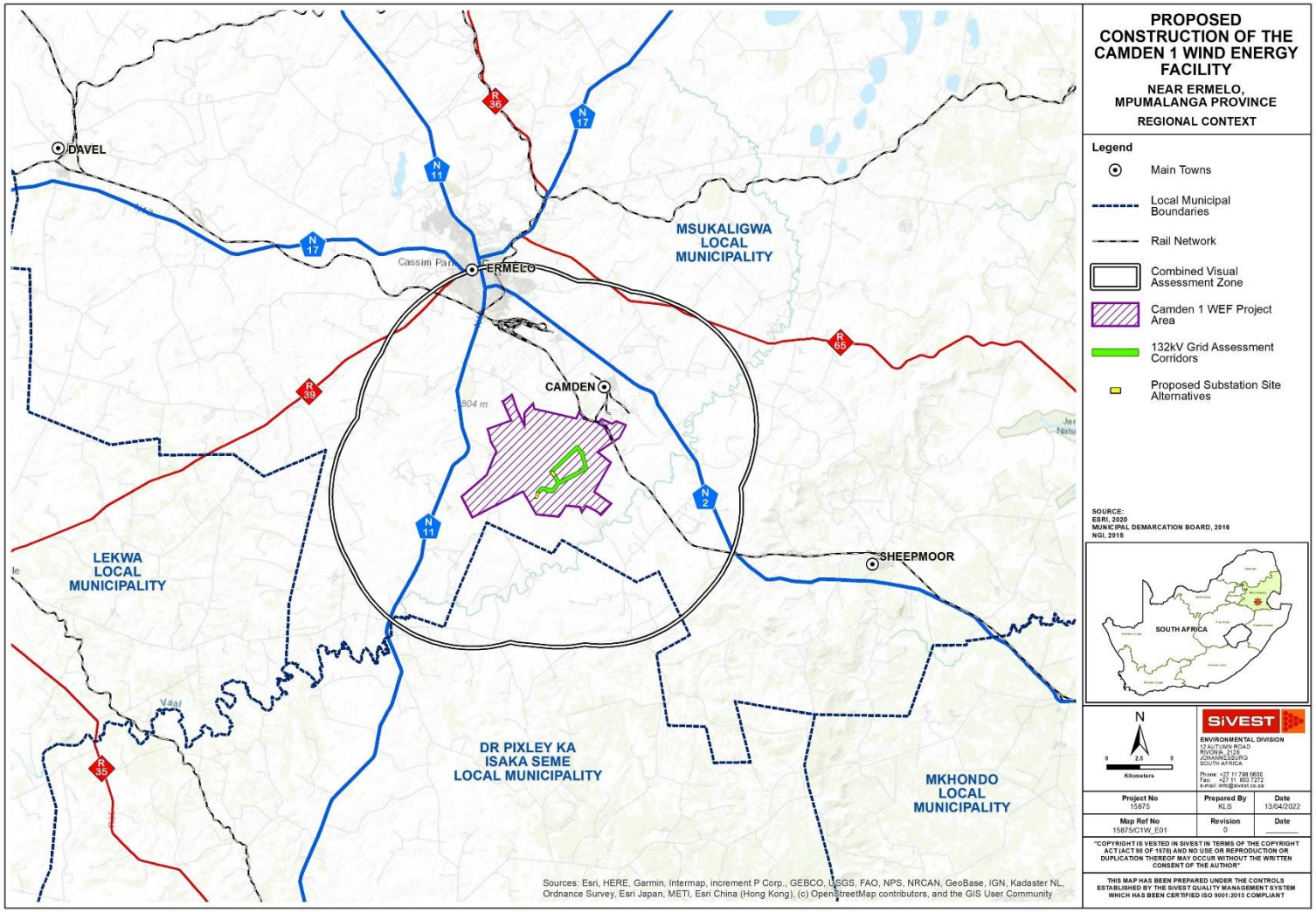

Figure 1: Camden I WEF and Grid Connection Infrastructure in the Regional Context

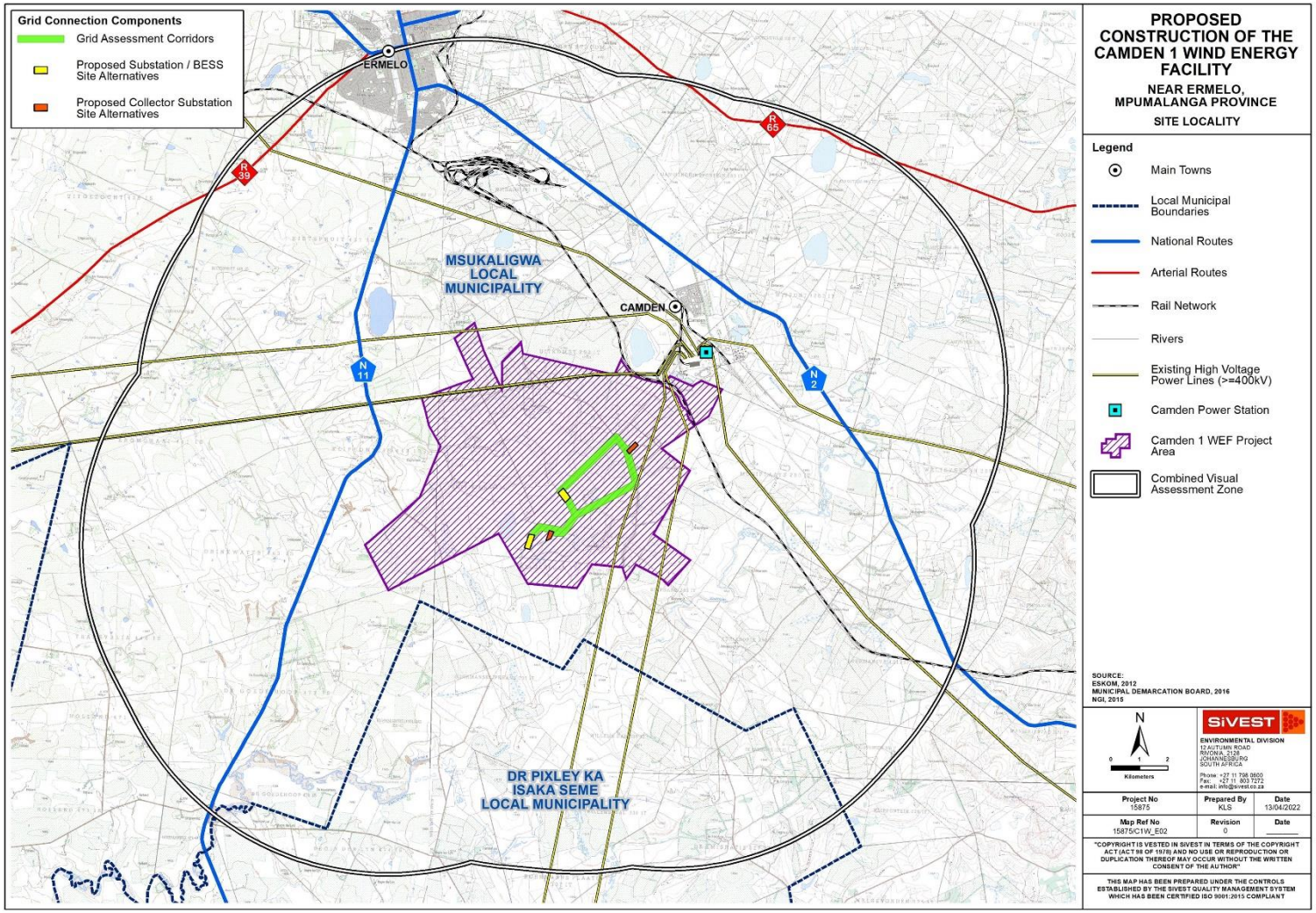

Figure 2: Camden 1 WEF and Grid connection Infrastructure Site Locality

3.2 Project Technical Details

3.2.1 Wind Farm Components

It is anticipated that the proposed Camden I WEF will comprise up to forty-seven (47) wind turbines with a maximum total energy generation capacity of up to 200MW. The electricity generated by the proposed WEF development will be fed into the national grid by way of 132kV and 400kV overhead power line s(OHP) connecting to the nearby Camden Power Station, via a collector substation which in turn is connected to the Camden I Wind Farm IPP on-site substation (of up to 132kV). In summary, the proposed Camden I WEF will include the following components:

- Up to 47 wind turbines, with a total maximum capacity of up to 200MW. The final number of turbines and layout of the WEF will, however, be dependent on the outcome of the Specialist Studies conducted during the EIA process;
- Each wind turbine will have a hub height and rotor diameter of up to approximately 200m (**Figure 3**);
- Permanent compacted hard-standing areas / platforms (also known as crane pads) of approximately 25m^2 per turbine during construction and for on-going maintenance purposes for the lifetime of the proposed development;
- Each wind turbine will require concrete foundations with a diameter ofapproximately25m and will be up to approximately 4.5m in depth depending on the geotechnical conditions.
- One (1) new Independent Power Producer (IPP) on-site substation, occupying an area of approximately 6.5 ha. The proposed substation will consist of a high voltage substation yard to allow for multiple (up to) 132kV feeder bays and transformers, control building, telecommunication infrastructure, access roads, etc.
- A Battery Energy Storage System (BESS) will be located next to the onsite substation. The BESS storage capacity will be up to 200MW/800MWh with up to four hours of storage. It is proposed that Lithium Battery Technologies, such as Lithium Iron Phosphate, Lithium Nickel Manganese Cobalt oxides or Vanadium Redox flow technologies will be considered as the preferred battery technology. The main components of the BESS include the batteries, power conversion system and transformer which will all be stored in various rows of containers;
- The wind turbines will be connected to the proposed substation via medium voltage (up to and including 33kV) cables. Cables will be installed underground, except where a technical assessment suggests that overhead lines are required.
- Internal roads with a width of between 5m and 6m will provide access to each wind turbine. Where required for turning circle/bypass areas, access or internal roads may be up to 20m to allow for larger component transport. The total length of internal road envisaged is 60km.
- One (1) temporary laydown / staging area of between 22 000m^2 and 30 000m^2.
- Operation and Maintenance (O&M) buildings, with a combined footprint of approximately 500m^2 to be located in close proximity to the substation site.
- A temporary cement batching plant occupying a footprint of approximately 0.5 ha. The site will also accommodate a cement silo of up to 20m in height.

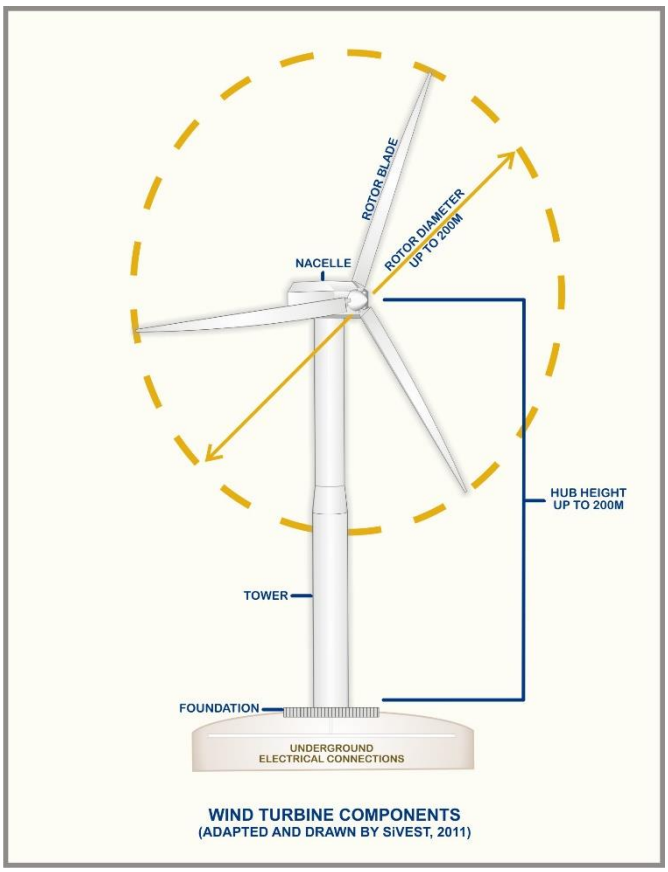

Figure 3: Typical components of a wind turbine

3.2.2 Grid Connection Infrastructure

The electricity generated by the proposed Camden I WEF will be fed into the national grid by way of (up to 132kV) overhead power lines (OHPs), connecting to the nearby Camden Power Station. The OHL towers will be up to 35 m 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 will be positioned within the assessed corridor.

The proposed grid connection infrastructure to serve the Camden I WEF will include the following components:

- One (1) new 33/132kV on-site substation, occupying an area of up to approximately 1.5 ha in extent. The onsite grid connection substation will consist of a high voltage substation yard to allow for multiple (up to) 132kV feeder bays and transformers, control building, telecommunication infrastructure, access roads, etc. The proposed substation will be a step-up substation and will include an Eskom portion and an IPP portion, hence the substation has been included in both the EIA for the WEF and in the BA for the grid infrastructure to allow for handover to Eskom. The applicant will remain in control of the low voltage components (i.e. 33kV components) of the substation, while the high voltage

components (i.e. 132kV components) of this substation will likely be ceded to Eskom shortly after the completion of construction; and

- New 132kV overhead power lines, either single or double circuit, connecting the on-site substation to the nearby proposed Camden Collector substation, which in turn will connect to the Camden Power Station.

3.2.3 EIA Layout Alternatives

Design and layout alternatives for the proposed WEF are being considered and assessed as part of the EIA. These include two site alternatives each for the Substation / BESS, construction camp / batching plant and temporary laydown area (**Figure 4**).

3.2.4 BA Alternatives

Two substation alternatives with four associated route alternatives are being assessed for the proposed Camden I 132kV WEF grid connection (**Figure 5**).

- Power Line Corridor Option 1 is approximately 3.6 km in length (depending on the exact route options), linking substation Option 2 to Camden Collector Substation Option 2.
- Power Line Corridor Option 2 is approximately 5.7 km in length (depending on the exact route options), linking substation Option 1 to Camden Collector Substation Option 2.
- Power Line Corridor Option 3 is approximately 1.9 km in length (depending on the exact route options), linking substation Option 2 to Camden Collector Substation Option 1.
- Power Line Corridor Option 4 is approximately 1 km in length (depending on the exact route options), linking substation Option 1 to Camden Collector Substation Option 1.

All four route alternatives are within the Camden I WEF project area.

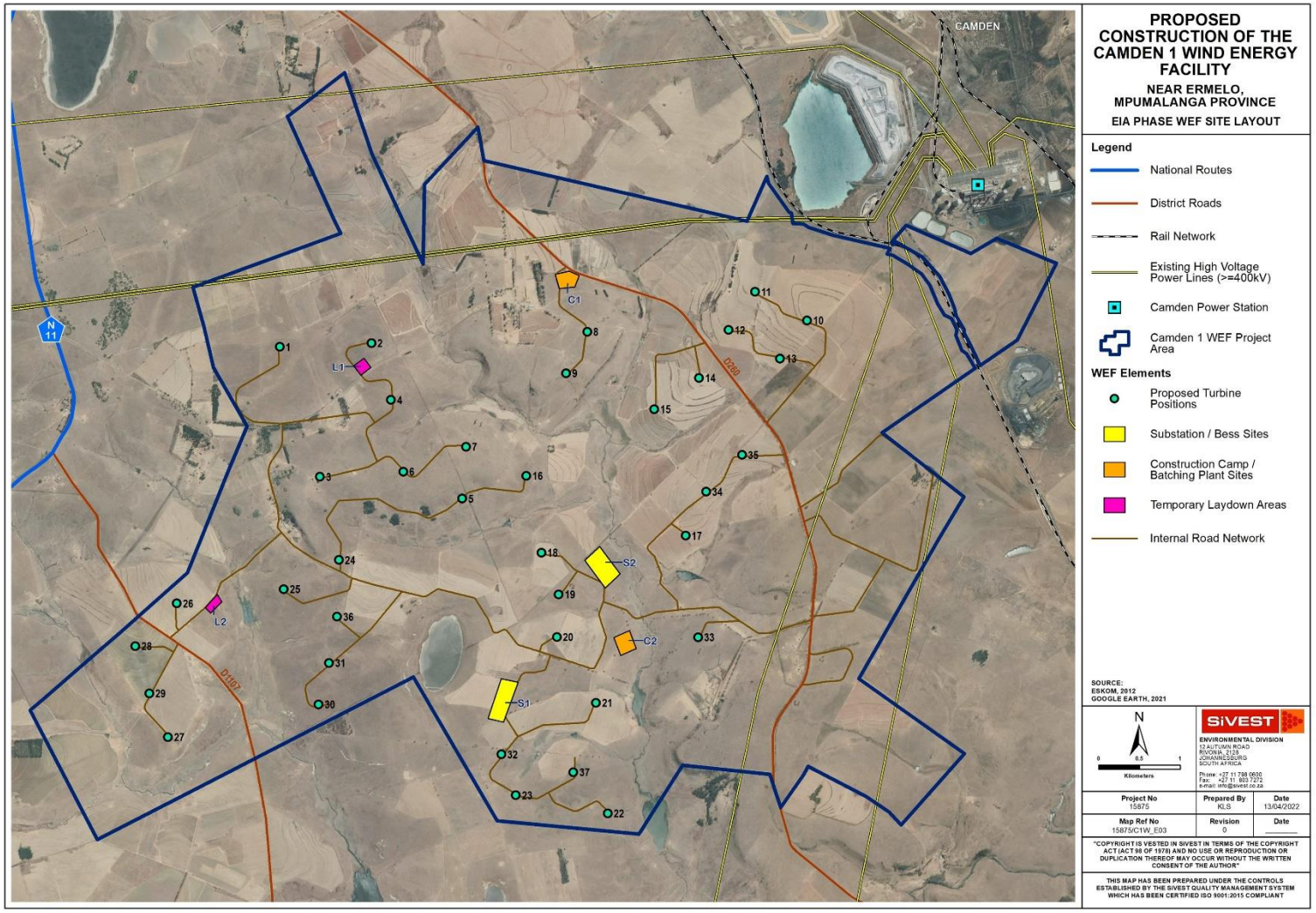

Figure 4: Preliminary Camden 1 WEF layout (turbine number is for reference purposes only)

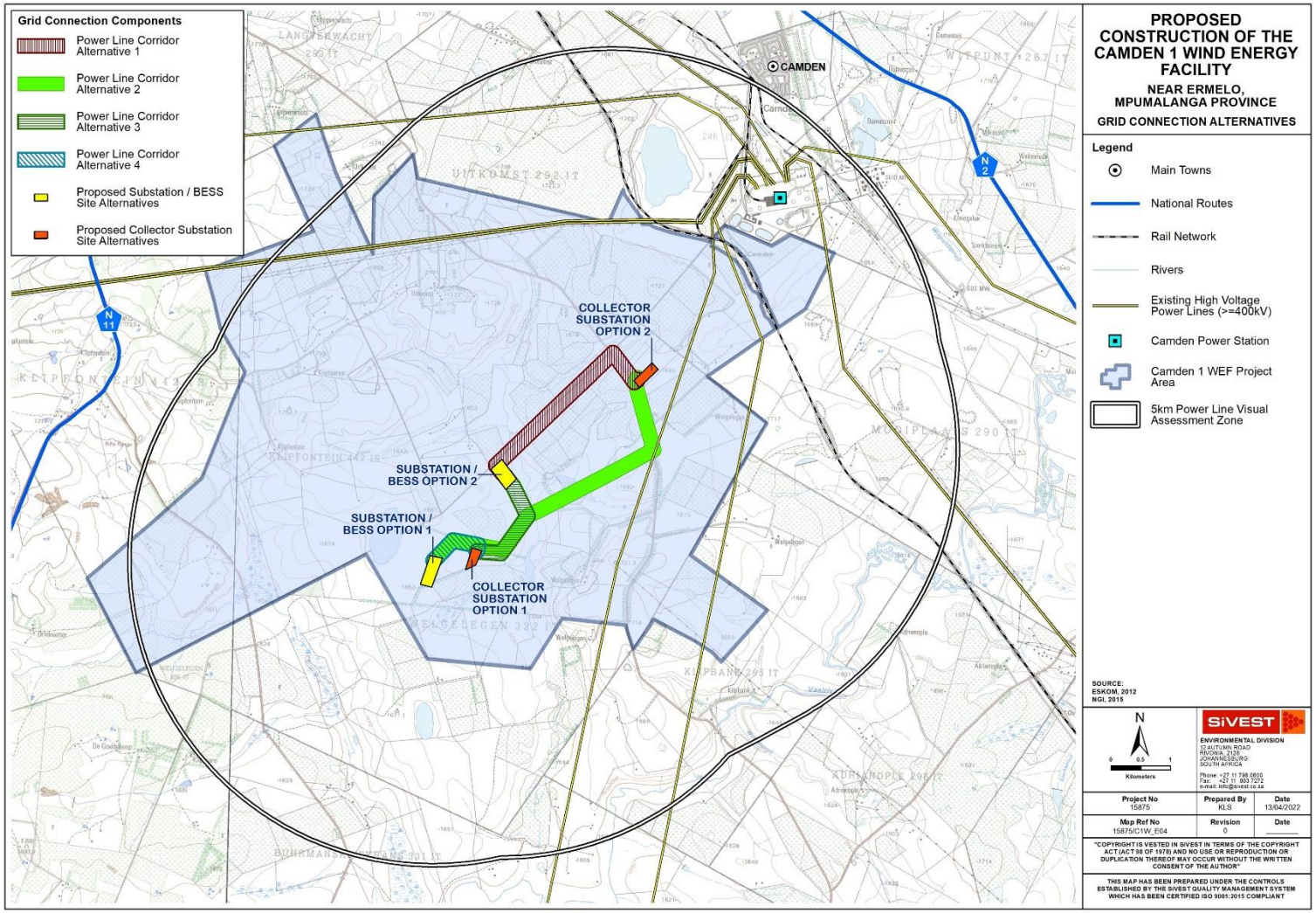

Figure 5: Grid Connection Alternatives

4 LEGAL REQUIREMENTS AND GUIDELINES

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

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

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

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

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

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

5 FACTORS INFLUENCING VISUAL IMPACT

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

5.1 Visual environment

WEF faciities and electrical infrastructure 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 a WEF and associated grid connection infrastructure into this setting may be considered to be less visually intrusive than if there was no existing built infrastructure visible.

5.2 Subjective experience of the viewer

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

5.3 Type of visual receptor

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

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

5.4 Viewing distance

Viewing distance is a critical factor in the experiencing of visual impacts, as beyond a certain distance, even large developments tend to be much less visible, and difficult to differentiate from the surrounding landscape. The visibility of an object is likely to decrease exponentially as one moves away from the source of impact, with the impact at 1 000m being considerably less than the impact at a distance of 500m **(Figure 6)**.

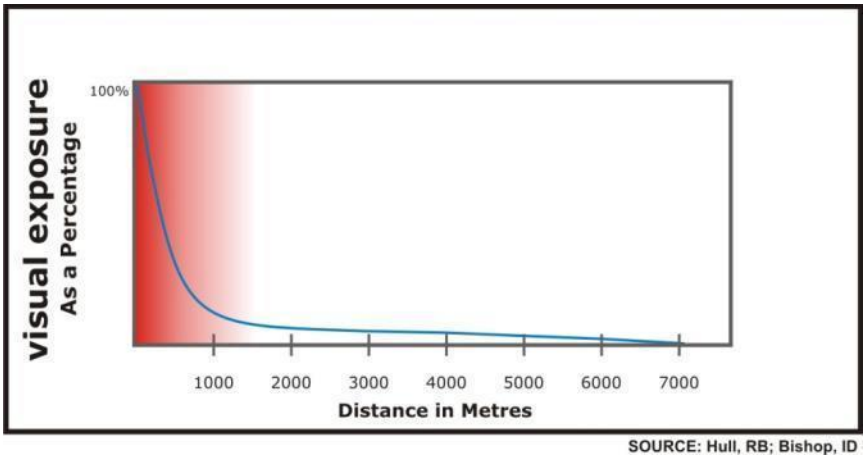

Figure 6: Conceptual representation of diminishing visual exposure over distance

Visual impacts resulting from wind turbines would be greatest within a 1km to 2km radius, and although turbines may still be visible beyond 10km, the degree of visual impact would diminish considerably at this distance (**Figure 7**).

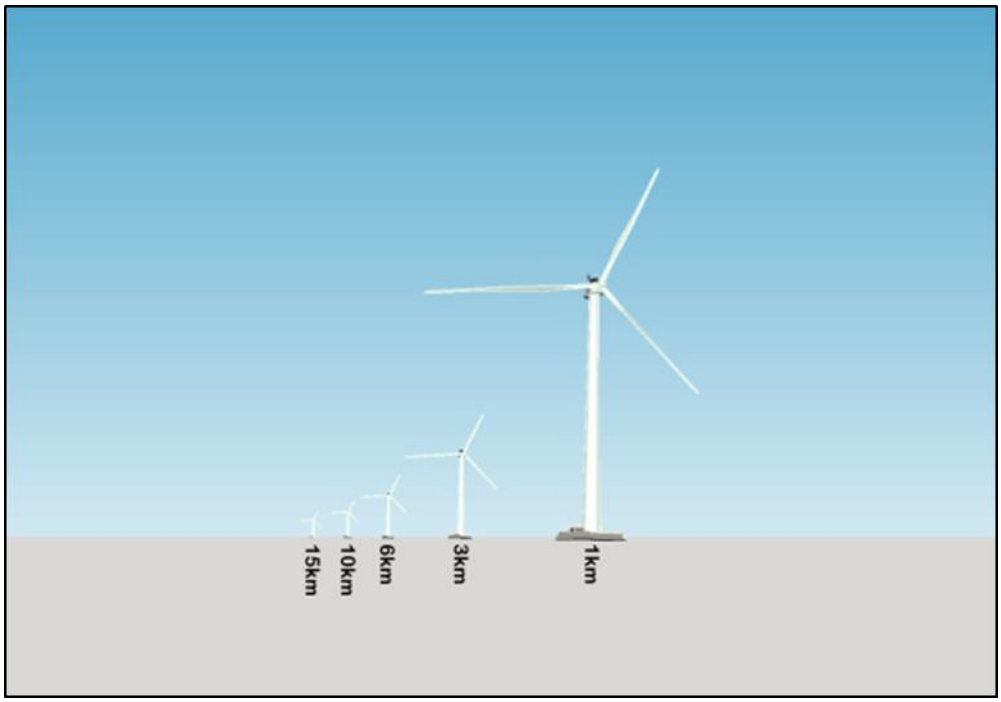

Figure 7: Conceptual representation of the diminishing visibility of a wind turbine over distance.

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 site proposed for the Camden 1 WEF development and associated grid connection infrastructure is located in an area largely characterised by a mix of undulating plains (**Figure 8**) and greater relief in the form of higher lying plateaus intersected by river valleys ((**Figure 9**). 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 broader study area (not within the proposed facility footprint) is the Vaal River in the south-eastern portion of the study area.

Gently undulating terrain prevails across much of the WEF development site (**Figure 10**).

Maps showing the topography and slopes within and in the immediate vicinity of the combined assessment area are provided in **Figure 11** and **Figure 12.**

Figure 8: View from the western edge of the study area showing undulating terrain.

Figure 9: Areas of greater relief to the south of the Camden 1 WEF project area.

Figure 10: View of undulating terrain within the Camden 1 WEF project area.

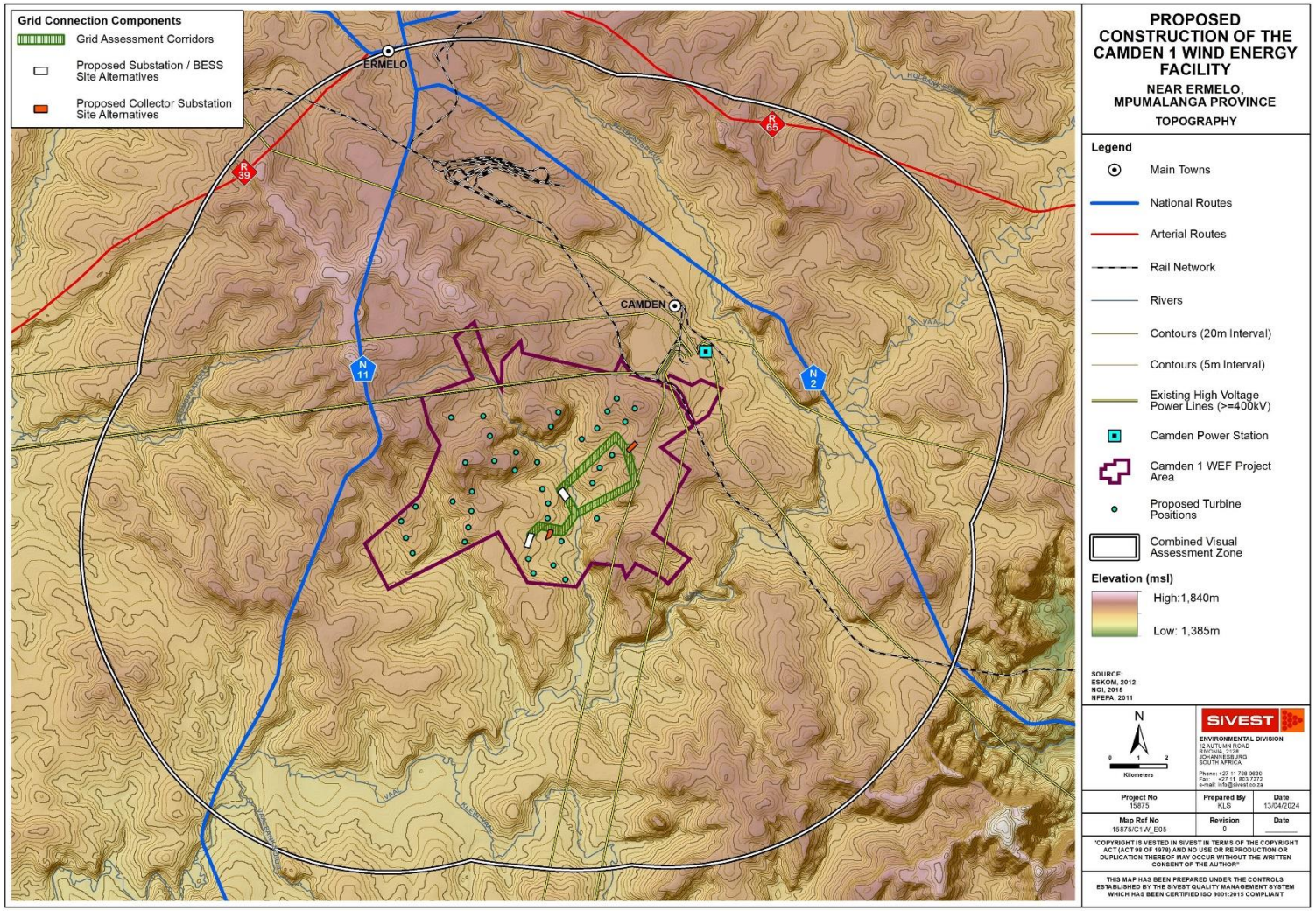

Figure 11: Topography of the combined study area

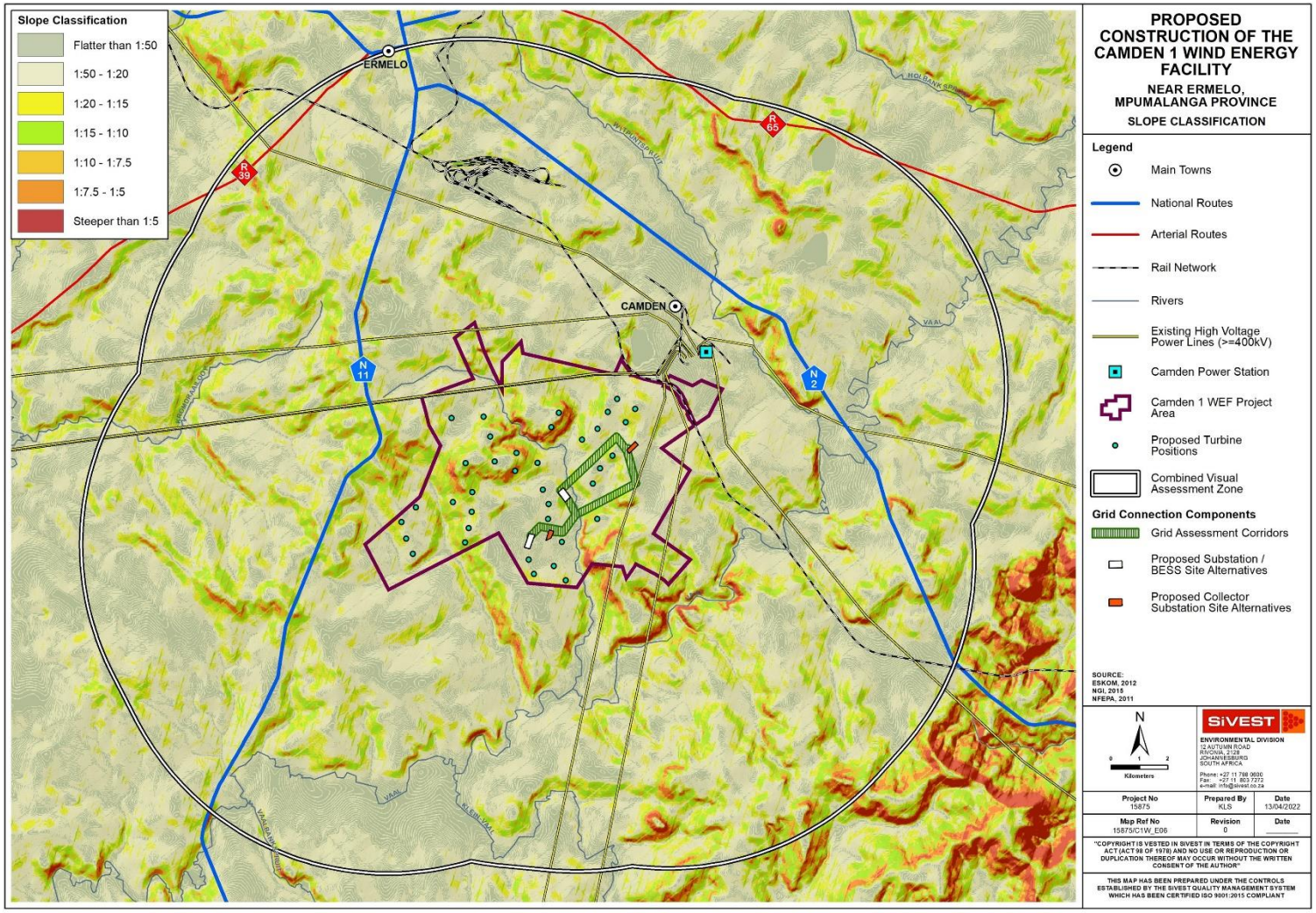

Figure 12: Slope classification

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

The high degree of visibility was confirmed by way of a preliminary visibility analysis for the proposed turbine positions as provided by the proponent. A worst-case scenario was assumed when undertaking this analysis, in which the proposed turbines were assigned a maximum height of 300 m (**maximum height at blade tip**). The resulting viewshed, as shown in **Figure 13**. indicates that the blade tips of wind turbines positioned on the application site would be visible from most parts of the study area. It should be noted however, that in some instances, *only* the blade tips or the upper-most sections of the turbines may be visible from certain areas because views of the lower portions of the turbine could possibly be screened by topographic elements and / or vegetation cover. Visual impacts in these instances would thus be significantly reduced.

Although the power line towers and the steel structures of the proposed substation are much smaller than wind turbines, at a maximum height of 35m, they are still likely to be visible from many of the locally-occurring receptor locations. In addition, sections of the proposed power line could impact on the skyline, particularly where they traverse ridges or areas of relatively higher elevation. A preliminary visibility analysis was undertaken for the proposed power line routes and substation sites, based on points at 250 m intervals along the centre line of the corridor alternatives, and assuming a tower height of 35 m. The resulting viewshed as per **Figure 14** below indicates that elements of the proposed grid connection infrastructure would be highly visible from areas within 1.5 km of the assessment corridors. Beyond this distance however, much of the study area is outside the viewshed for the power lines.

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

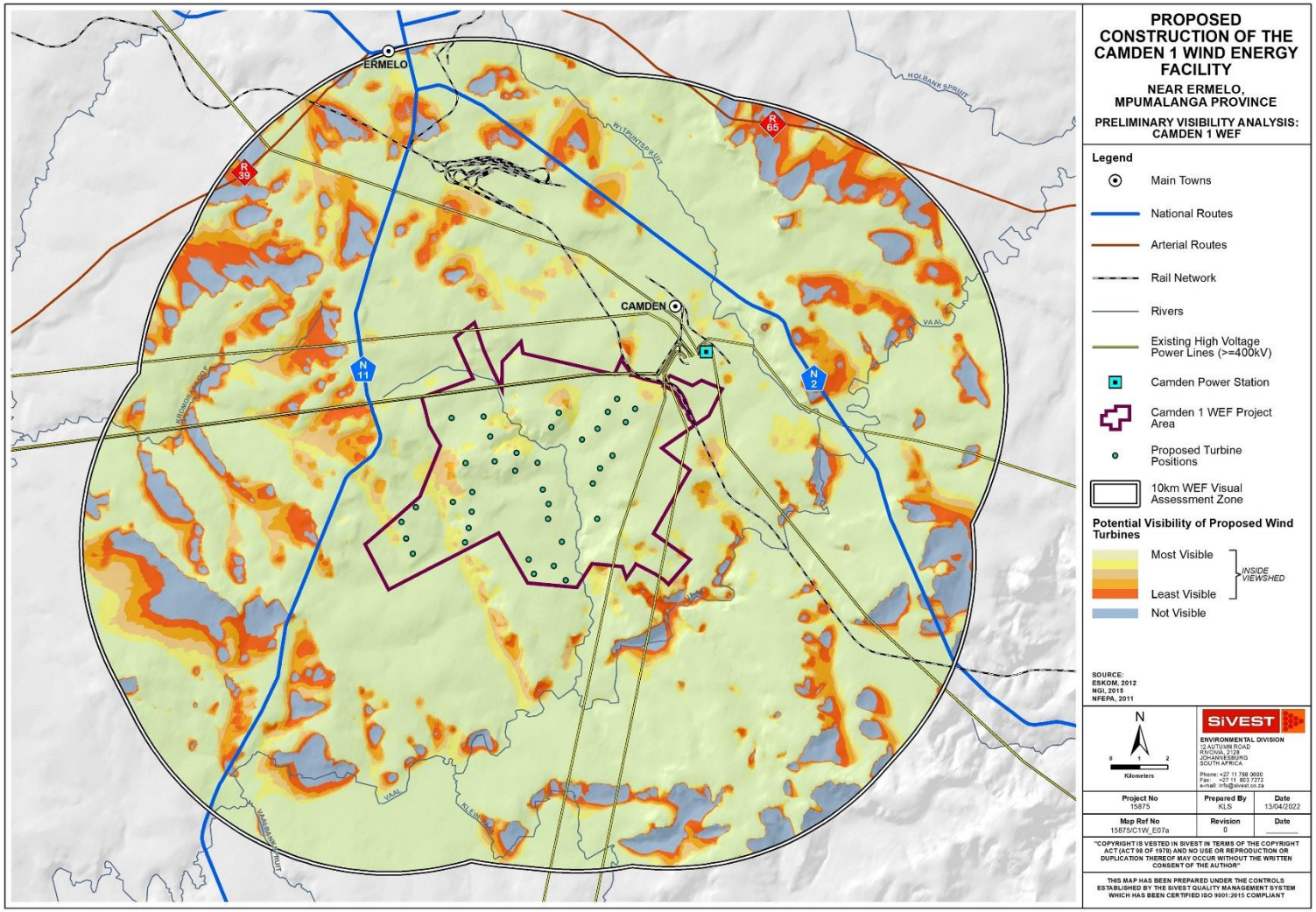

Figure 13: Potential visibility of wind turbines

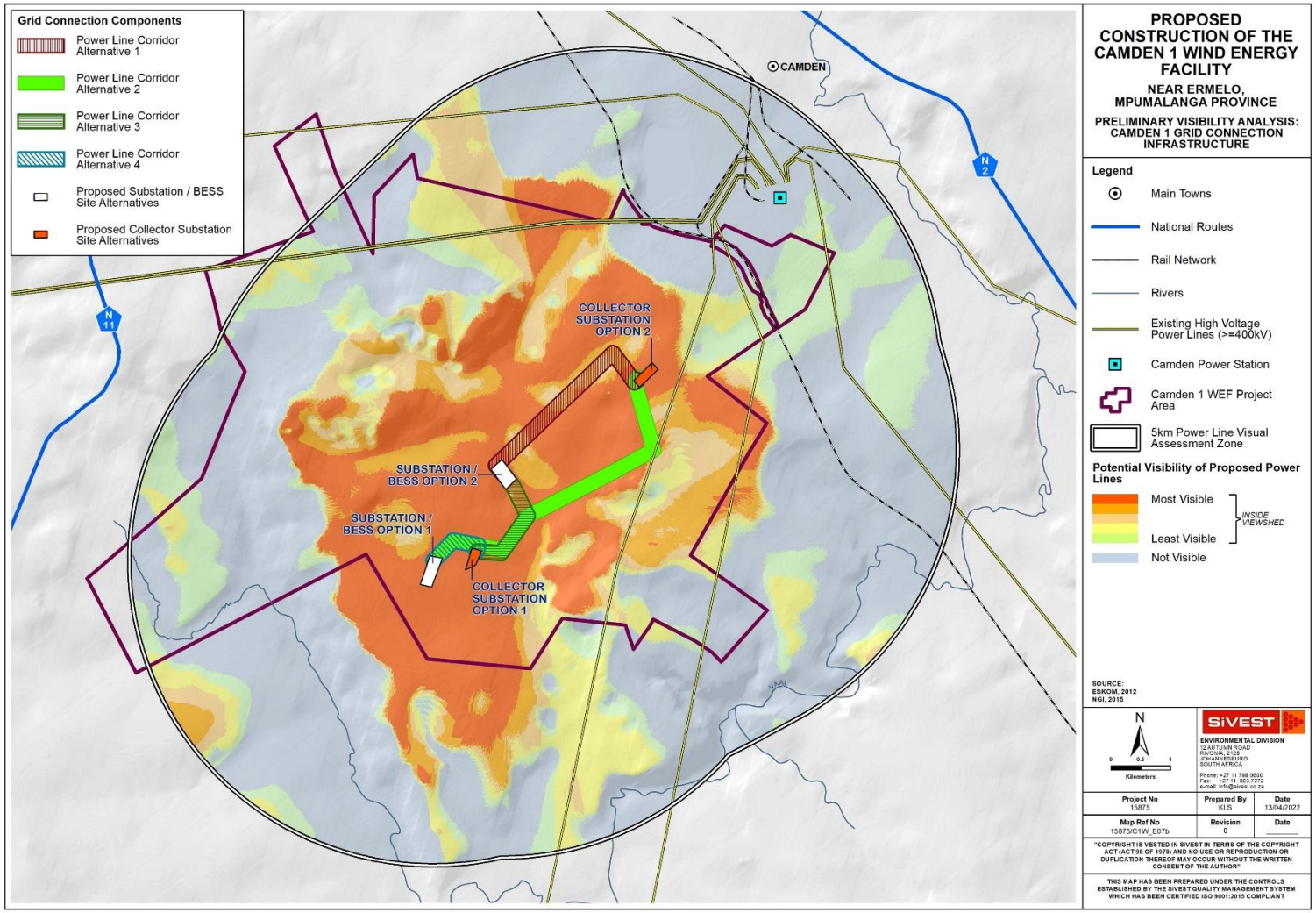

Figure 14: Potential visibility of Camden I WEF power lines

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 15**). Amersfoort Highveld Clay Grassland in the western half of the study area (**Figure 16)** 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 the eastern half of the study area is characterised by 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 17**).

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 many farmhouses in the area will restrict views from these receptor locations .

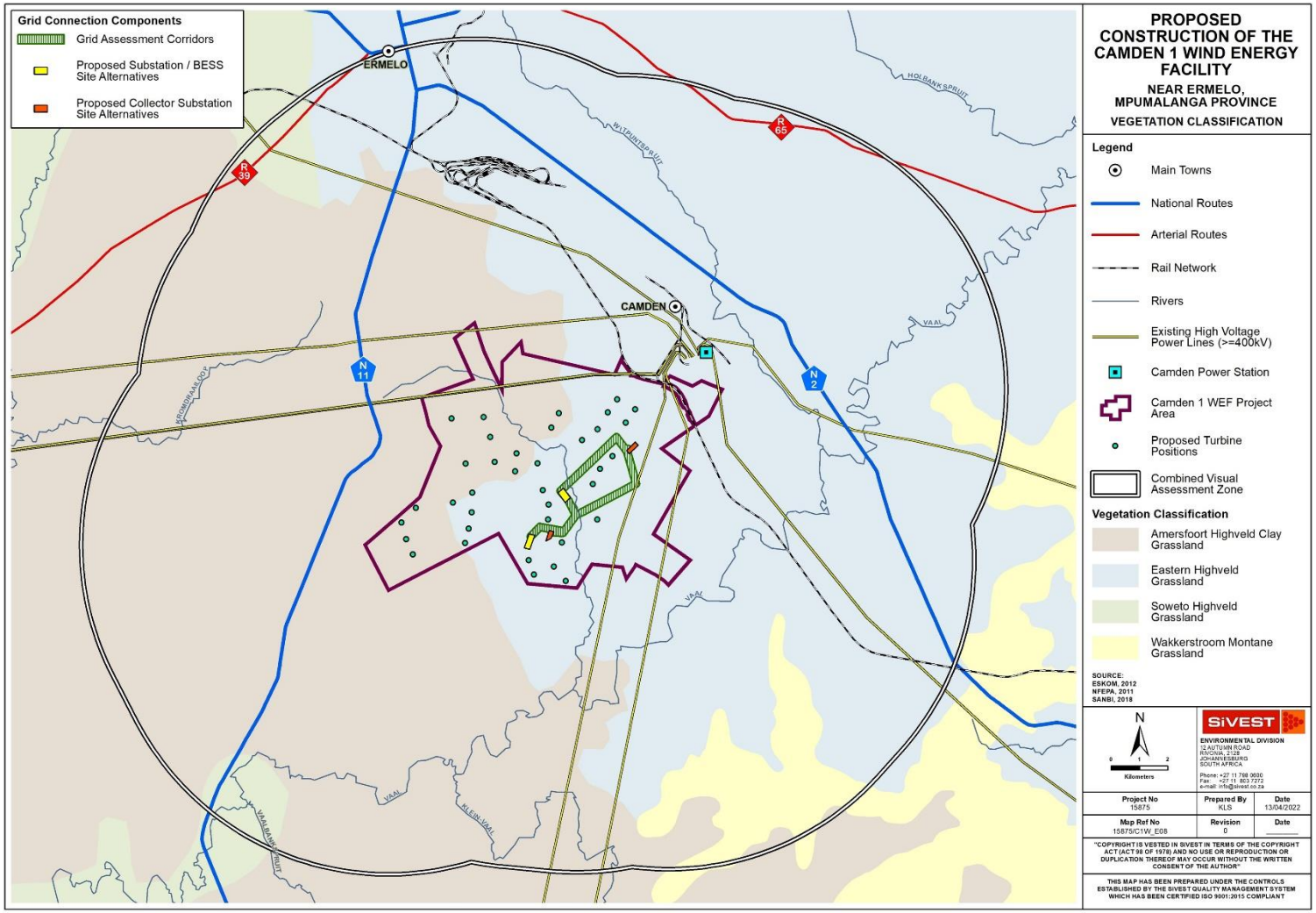

Figure 15: Vegetation Classification in the Study Area

Figure 16: Grasslands in the western sector of the study area.

Figure 17: Clusters of trees 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 18**).

Commercial agriculture is the dominant activity in the study area, with the main focus being maize cultivation (**Figure 19**) and livestock grazing (**Figure 20**). There are multiple farm portions in the study area, resulting in a relatively moderate density of rural settlement with many scattered farmsteads in evidence. Built form in much of the study area comprises farmsteads, ancillary farm buildings and workers’ dwellings, gravel access roads, telephone lines, fences and windmills (**Figure 21**).

High levels of human influence are however visible in the northern / north-eastern sector of the study area. Much of the town of Ermelo encroaches into the study area (**Figure 22**) and peri-urban areas stretching southwards from Ermelo along the N2 national route are dominated by mining activity (**Figure 23**) and associated infrastructure, including Mooiplaats and Vunene Collieries. Also located in this area is the Camden Power Station (**Figure 24**) with associated high voltage power lines (**Figure 25**), and the adjacent Camden residential area. Multiple dirt roads are further evident throughout the site connecting the various farm activities.

Other evidence of significant human influence includes a sizeable quarry (Rietspruit Crushers) located to the west of the N11 national route, as well as district roads, rail, telecommunications and high voltage electricity infrastructure (**Figure 26**).

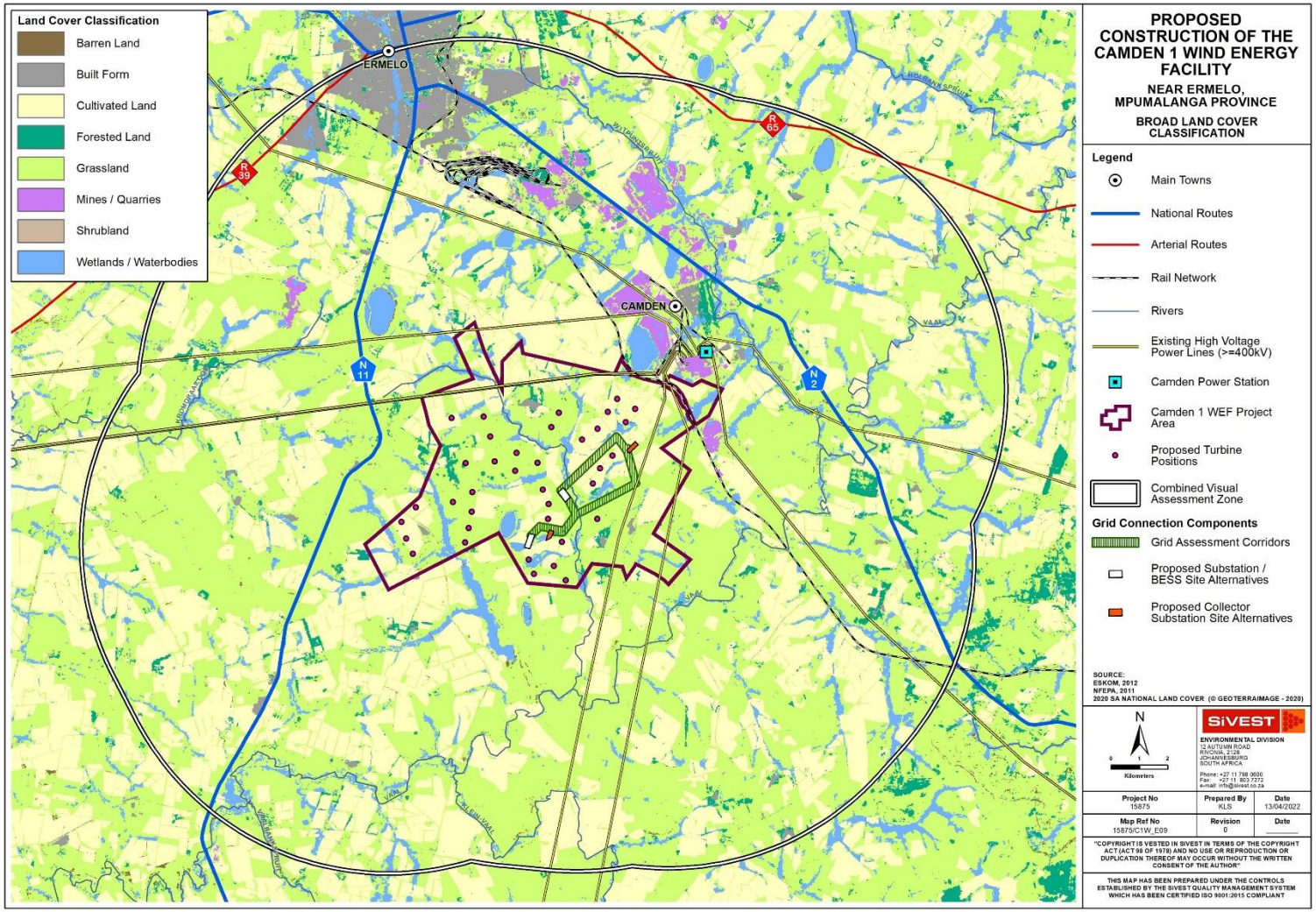

Figure 18: Land Cover Classification

Figure 19: Maize cultivation south-east of the Camden 1 WEF project area.

Figure 20: Livestock grazing is common in the study area.

Figure 21: Typical farm infrastructure in the study area.

Figure 22: View of urban development on the southern periphery of the Ermelo visible from N2 National Route (Google Earth, 2021).

Figure 23: Mine infrastructure on the outskirts of Ermelo visible from the N2.

Figure 24: View of Camden Power Station to the west of the N2 national route.

Figure 25: High voltage power lines feeding into Camden Power Station.

Figure 26: Rail infrastructure, power lines and grain silos to the south-east of the Camden 1 WEF project area.

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 Camden 1 WEF development and associated grid connection infrastructure would alter the visual character and contrast 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 and north-east where urban/industrial, peri-urban development and mining activity dominate the landscape. In addition, road, rail and electricity 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 / 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, mine dumps, industrial development and the urban infrastructure of Ermelo 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 WEF and associated grid connection infrastructure 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 WEF and associated grid connection infrastructure 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 the visual character in much of the area has been significantly transformed and degraded by urban, industrial, 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 WEF or a power line would be likely to be perceived negatively by receptors in this area as 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 WEF and associated infrastructure will alter the visual character and sense of place. In addition, the development of other renewable energy facilities in the broader area as planned will introduce an increasingly industrial character, giving rise to significant cumulative impacts										

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

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

Based on the above factors, the total score for the study area is 41, which according to the scale above, would result in the area being rated as having a low to **moderate** visual sensitivity. It should be stressed however that the concept of visual sensitivity has been utilised indicatively to provide a broad-scale indication of whether the landscape is likely to be sensitive to visual impacts and is based on the physical characteristics of the study area, economic activities and land use that predominates. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs 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 I WEF project area and as such, it is assumed that the land owners support the proposed WEF development and associated grid connection infrastructure. Accordingly, visual sensitivities normally associated with protected areas will be reduced in this instance.

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

6.3.1 WEF Site Sensitivity

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

From a visual perspective, another aspect is the direct visual impact of the turbines on any farmsteads or receptors located on the application site. Accordingly, a visual sensitivity zone of 500m has been delineated around the existing residences on the application site and also around any receptors located within 500m of the site boundary. In addition, it is recommended that a 300m visual sensitivity zone is applied on either side of the district roads which traverse the WEF project area.

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

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

6.3.2 Power Line Route Sensitivity

GIS-based visibility analysis in respect of the Camden I WEF power line route alignments determined that no sections of the route alignment are *significantly* more visible than any other. As such, in terms of visibility, no sections of the route alignment were found to be more sensitive than others.

In considering the possible visual impact of the power line or substations on any nearby farmsteads or receptors, investigation determined that there are no farmsteads within 500m of the assessment corridors. Accordingly, no areas of visual sensitivity were identified in relation to any of the corridor alternatives.

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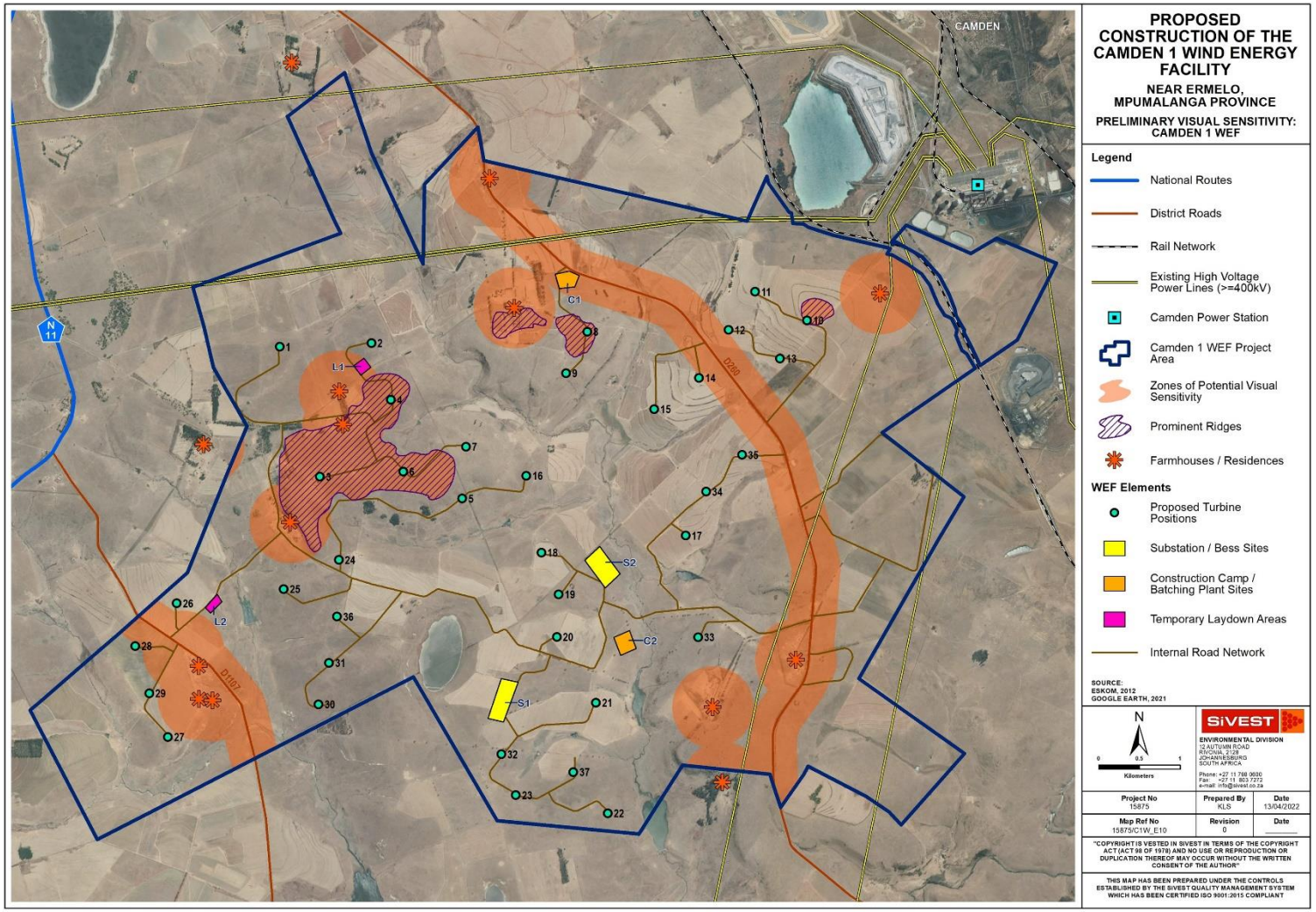

Figure 27: Zones of potential visual sensitivity on the Camden 1 WEF Site

6.3.3 Sensitivities identified by the National Screening Tool: WEF

In assessing visual sensitivity, consideration was given to the Landscape and Flicker Themes of the National Environmental Screening Tool. Under the Landscape Theme, as shown in **Figure 28** below, the tool identifies areas of Very High sensitivity in respect of WEF development on the Camden I WEF site. According to the Screening Tool, the high sensitivity rating applied to the Camden I WEF site is associated with the presence of a protected area (Langcarel Private Nature Reserve) as well as natural features such as mountain tops, high ridges and steep slopes.

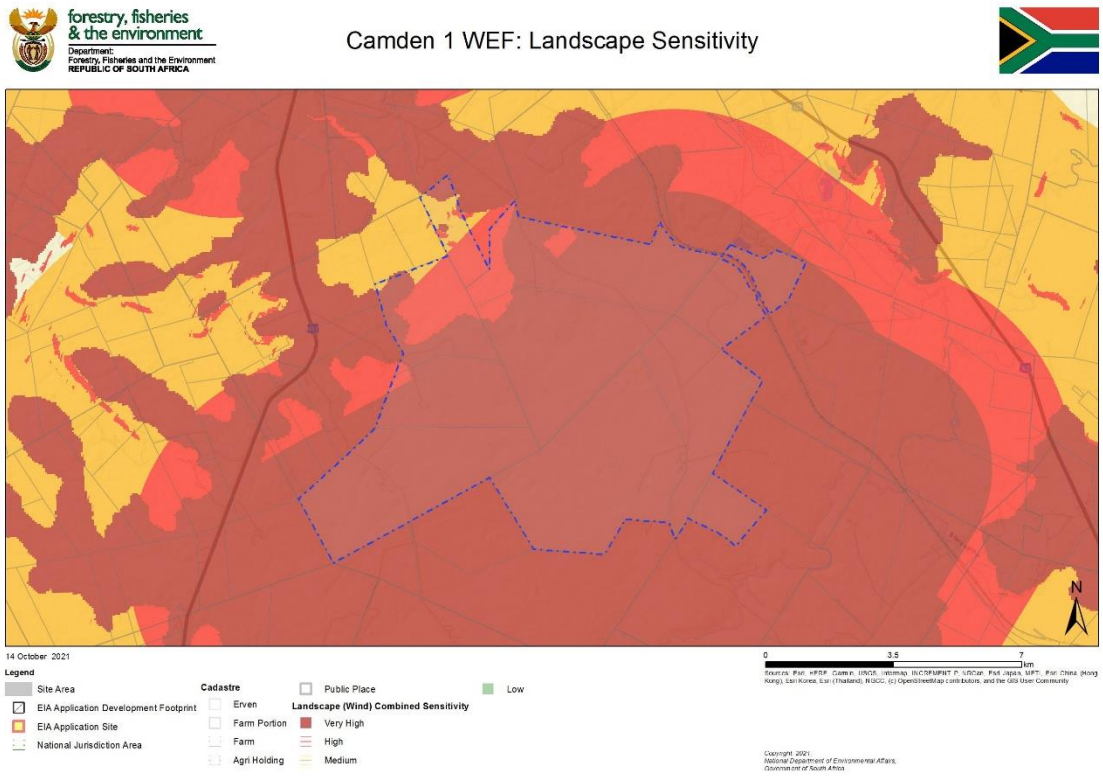

Figure 28: Relative Landscape Sensitivity (October 2021)

The flicker theme demarcates areas (1 km buffers) of sensitivity around identified receptors in the area (**Figure 29**). Under this theme, several “receptors” have been identified on the site, the majority of which are concentrated on the western and eastern boundaries of the project area. As a result of the buffers demarcated around these receptors, a significant portion of the site has been assigned a “very high” sensitivity rating.

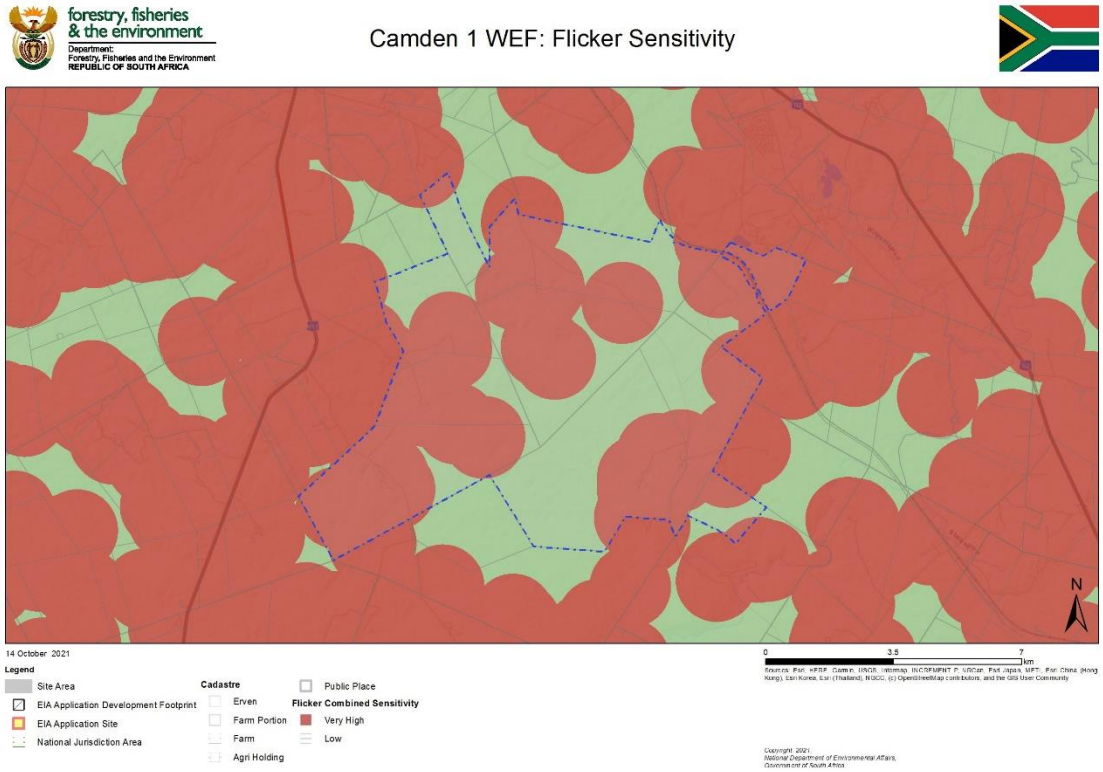

Figure 29: Flicker Sensitivity (October 2021)

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

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

6.3.4 Sensitivity Analysis Summary for WEF Development

Although the Screening Tool identifies significant areas of very high landscape and flicker sensitivity, the site sensitivity verification exercise conducted in respect of this VIA found little evidence to support this sensitivity rating. The sensitivity rating for this site is heavily influenced by the Langcarel Private Nature Reserve which is identified in the South African Protected Areas Database. As stated however, there is some doubt as to the present status of this nature reserve and much of the land within the demarcated reserve appears to be utilised for commercial cultivation. Accordingly, the site is not subject to the usual visual / landscape sensitivity associated with nature reserves.

In addition, the desktop topographic assessment of the area did not indicate the presence of mountaintops, *high* ridges or any significantly steep slopes. This assessment, confirmed by the field investigation, showed the presence of a few ridges in a largely undulating landscape. The

sensitivity analysis above has recognised these ridges and identified the higher ridges as zones where development would be least preferred.

The presence of receptors, either within the Camden I WEF project area, or within 500m of the site boundary, was confirmed by the site sensitivity verification exercise. However, an assessment of receptor locations using Google Earth showed that there were no receptors present at some of the locations identified by the National Screening Tool. The remaining (confirmed) receptors were factored into the sensitivity analysis, together with a 500m buffer which is considered sufficient to reduce any adverse effects of shadow flicker.

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

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

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 and the areas of cultivation and grassland would reduce the visual absorption capacity, this would be offset to some degree by the presence of urban, peri-urban, industrial, mining and infrastructural development in the vicinity of the proposed Camden I WEF project and associated grid connection infrastructure.

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

7 TYPICAL VISUAL IMPACTS ASSOCIATED WITH WIND ENERGY FACILITES

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

7.1 Wind Energy Facilities

As previously mentioned, at this stage it is anticipated that the proposed project will consist of up to 47 wind turbines and associated on-site infrastructure with a total generation capacity of up to 200MW. The wind turbines will have a hub height of up to 200m and a rotor diameter of up to 200m. The height of the turbines and their location on gently undulating terrain would result in the development typically being visible over a large area (**Figure 30**).

Figure 30: Wind turbines at Noupoort Wind Farm, near Noupoort, Northern Cape Province.

Internationally, studies have demonstrated that there is a direct correlation between the number of turbines and the degree of objection to a wind farm, with less opposition being encountered when fewer turbines are proposed (Devine-Wright, 2005). Certain objectors to wind farms also

mention the “sky space” occupied by the rotors of a turbine, this being the area in which the rotors would rotate.

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

7.1.1 Shadow Flicker

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

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

The impact of shadow flicker can be effectively mitigated by choosing the correct site and layout for the wind turbines, taking into consideration the orientation of the turbines relative to the nearby houses and the latitude of the site. Hence appropriate development restriction zones around residences will reduce the adverse effects of shadow flicker, while tall structures and trees will also obstruct shadows and prevent the effect of shadow flicker from impacting on surrounding residents. In this instance, appropriate restriction zones have been recommended in Section 6.3.1, and trees planted around many of the nearby farmsteads will reduce the likelihood of flicker impacts.

7.1.2 Motion-based visual intrusion

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

More interestingly, the second theory regarding this perception is related to the intrinsic value of wind in certain areas and how turbines may be an expression or extension of an otherwise

'invisible' presence. Famous winds across the world include the Mistral of the Camargue in France, the Föhn in the Alps, or the Bise in the Lavaux region of Switzerland. The wind, in these cases, is an intrinsic component of the landscape, being expressed in the shape of trees or drifts of sands, but being otherwise invisible. Bishop and Miller (2006) argue that wind turbines in these environments give expression, when moving, to this quintessential landscape element. In a South African context, this phenomenon may well be experienced if wind farms are developed in areas where typical winds, like berg winds, or the south-easter in the Cape are an intrinsic part of the environment. In this way, it may even be possible that wind farms will, through time form part of the cultural landscape of an area, and become a representation of the opportunities presented by the natural environment.

7.2 Associated On-Site Infrastructure

The infrastructure associated with the proposed Camden I WEF will include the following:

- A new IPP on-site substation;
- Medium voltage (33kV) cables, buried underground wherever technically feasible;
- A Battery Energy Storage System (BESS) located next to the onsite substation, comprising batteries, power conversion system and transformer which will all be stored in various rows of containers;
- Internal roads;
- A construction laydown / staging area;
- Operation and Maintenance (O&M) buildings:
- A temporary cement batching plant.

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

Surface clearance for cable trenches, access roads, laydown areas and other on-site infrastructure may result in the increased visual prominence of these features, thus increasing the level of contrast with the surrounding landscape. Buildings, BESS containers and associated infrastructure placed in prominent positions such as on ridge tops may break the natural skyline, drawing the attention of the viewer. In addition, security lighting on the site may impact on the nightscape (**Section 8.4**).

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

7.3 Grid Connection Infrastructure

Grid connection infrastructure for this project includes overhead 132kV power lines linking the on-site substation to proposed Camden Collector Substation, which in turn connects to Camden Power Station.

Power line towers are by their nature very large objects and thus highly visible. It is understood that the maximum tower height envisaged for the proposed power line is expected to be 35 m (approximately equivalent in height to an 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 400m apart in a linear alignment.

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

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

8 SENSITIVE VISUAL RECEPTORS

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

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

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

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

As the visibility of the development would diminish exponentially over distance (refer to **section 5.4** above), receptor locations which are closer to the WEF or power line would experience greater adverse visual impacts than those located further away.

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 for the proposed Camden I WEF identified multiple farmsteads and residences within the combined study area for the Camden I WEF and associated grid connection infrastructure. While these homesteads and residences could be considered to be receptors, not all of them would be sensitive to the proposed development. In light of this, the focus of the receptor assessment in this VIA will be on those receptors identified

as being sensitive. These would therefore include four receptors found to be linked to leisure / tourism facilities namely:

- Die Oogappel Wedding / Conference Venue;
- Indawo Game Ranch and Hotel;
- Drinkwater Guest Farm; and
- Overvaal Guest House.

Also included as sensitive receptors are two specific residences whose occupants have, in the early stages of the project, expressed some concern about the proposed development. These receptors are located on the Portion 2 and Remainder of the Farm Mooiplaats No 290.

It should be noted that, in general, farmsteads could be regarded as *potentially sensitive* visual receptors as they are located within a mostly rural setting with pastoral / natural vistas that will likely be altered by the proposed development. However, given the sheer number of farmsteads in the study area, the level of transformation and the fact that local sentiments toward the proposed development are unknown at this stage, the receptor assessment in respect of the WEF has only included only those farmsteads within 2km of the nearest of turbine. However, eleven (11) of the thirteen receptors identified are located within the Camden I WEF project area and it is known that the owners / residents are in favour of the proposed WEF development.

It was noted that residential areas within the town of Ermelo and also the residential area of Camden are located within the Camden I WEF study area. While these could be considered as receptors, they are not believed 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 thoroughfares in the study area are the N2 and N12 national routes which link Piet Retief in the east and Volksrust in the south with Ermelo to the north and Gauteng Province to the north-west. Small sections of the R39 and the R65 main roads are also within the study area for Camden 1 WEF.

The sections of these roads traversing the study area are not considered part of designated scenic routes, although these routes are important links and are likely to be utilised, to some extent, by tourists exploring this part of Mpumalanga Province. As a result, they are considered to be potentially sensitive receptor roads – i.e. roads being used by motorists who may object to the potential visual intrusion of the proposed WEF and associated infrastructure.

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

As previously stated, the South African Protected Areas Database identifies the Langcarel Private Nature Reserve within the Camden I WEF study area. There is however some doubt

as to the present status of this nature reserve and any visual appeal associated with this reserve 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 I 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 WEF and grid connection are indicated in **Figure 31** and Error! Reference source not found. respectively.

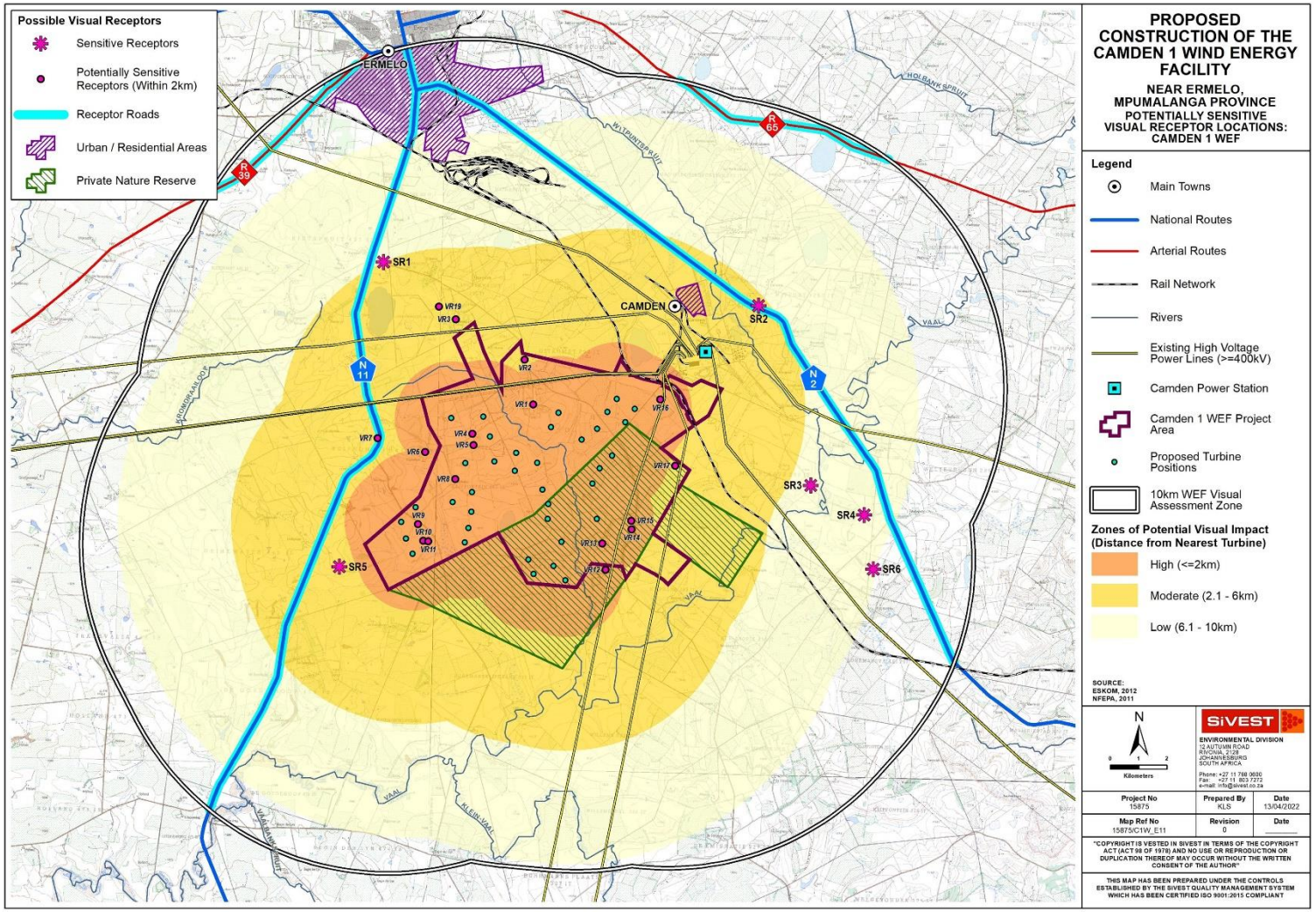

Figure 31: Sensitive receptor locations within 10kms of the Camden I WEF site

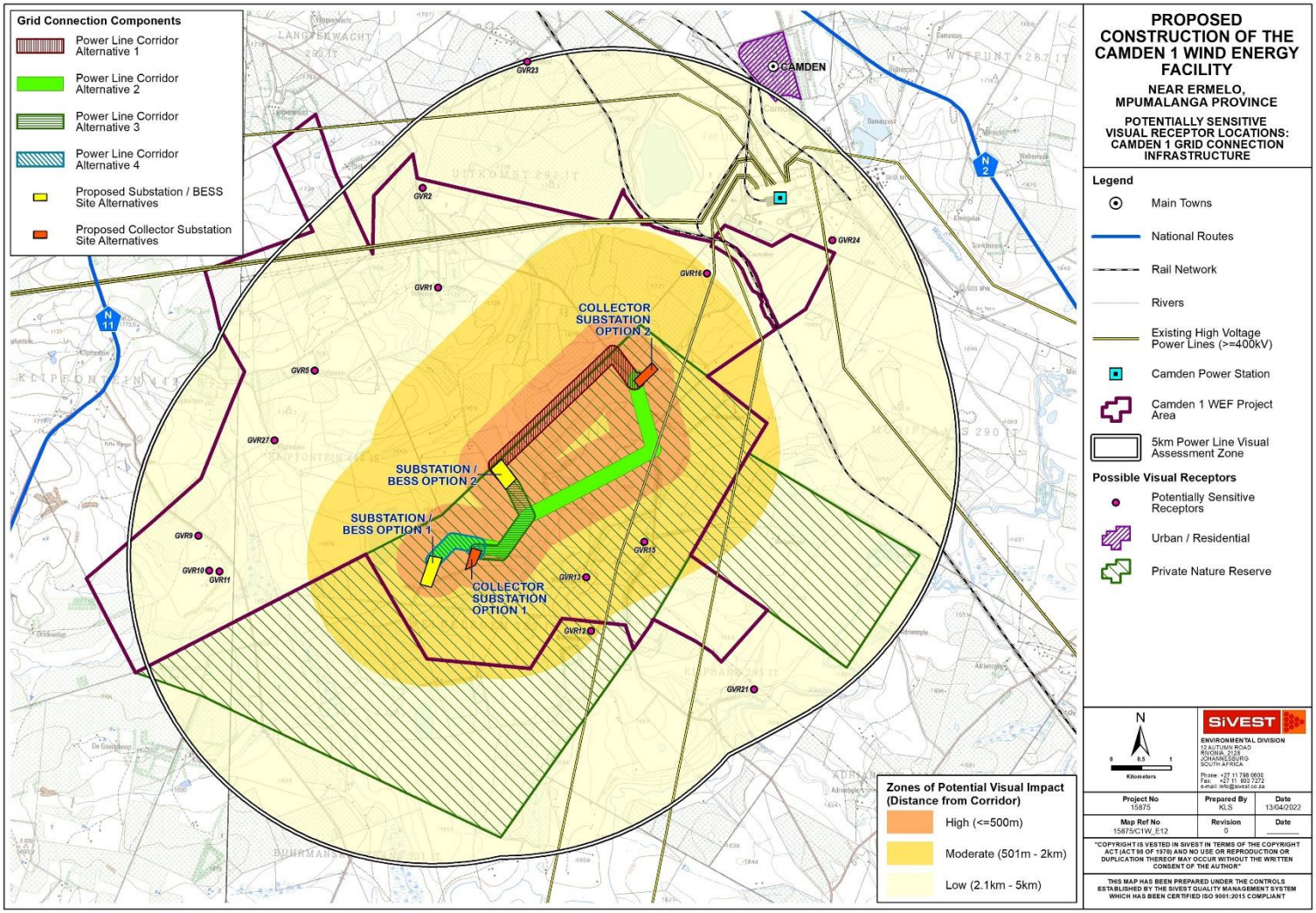

Figure 32: Potentially sensitive receptor locations within 5kms of the nearest power line corridor

8.2 Receptor Impact Rating

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

The matrix is based on the factors listed below:

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

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

8.2.1 Distance

As described above, distance of the viewer / receptor location from the development is an important factor in the context of experiencing visual impacts which will have a strong bearing on mitigating the potential visual impact. A high impact rating has been assigned to receptor locations that are located within 2km of the nearest turbine. The visual impact of a WEF beyond 10km 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 WEF have been delineated according to distance from the nearest turbine. Based on the height and scale of the WEF project, the distance intervals chosen for the zones of visual impact, as shown in **Figure 31**, are as follows:

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

Zones of visual impact for the proposed power lines have been delineated according to distance from the combined power line assessment corridors. Based on the likely height of the power line towers, the distance intervals chosen for the zones of visual impact, as shown in **Figure** 32 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, N11, R39 and R64 main roads;
    - 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 33** below.

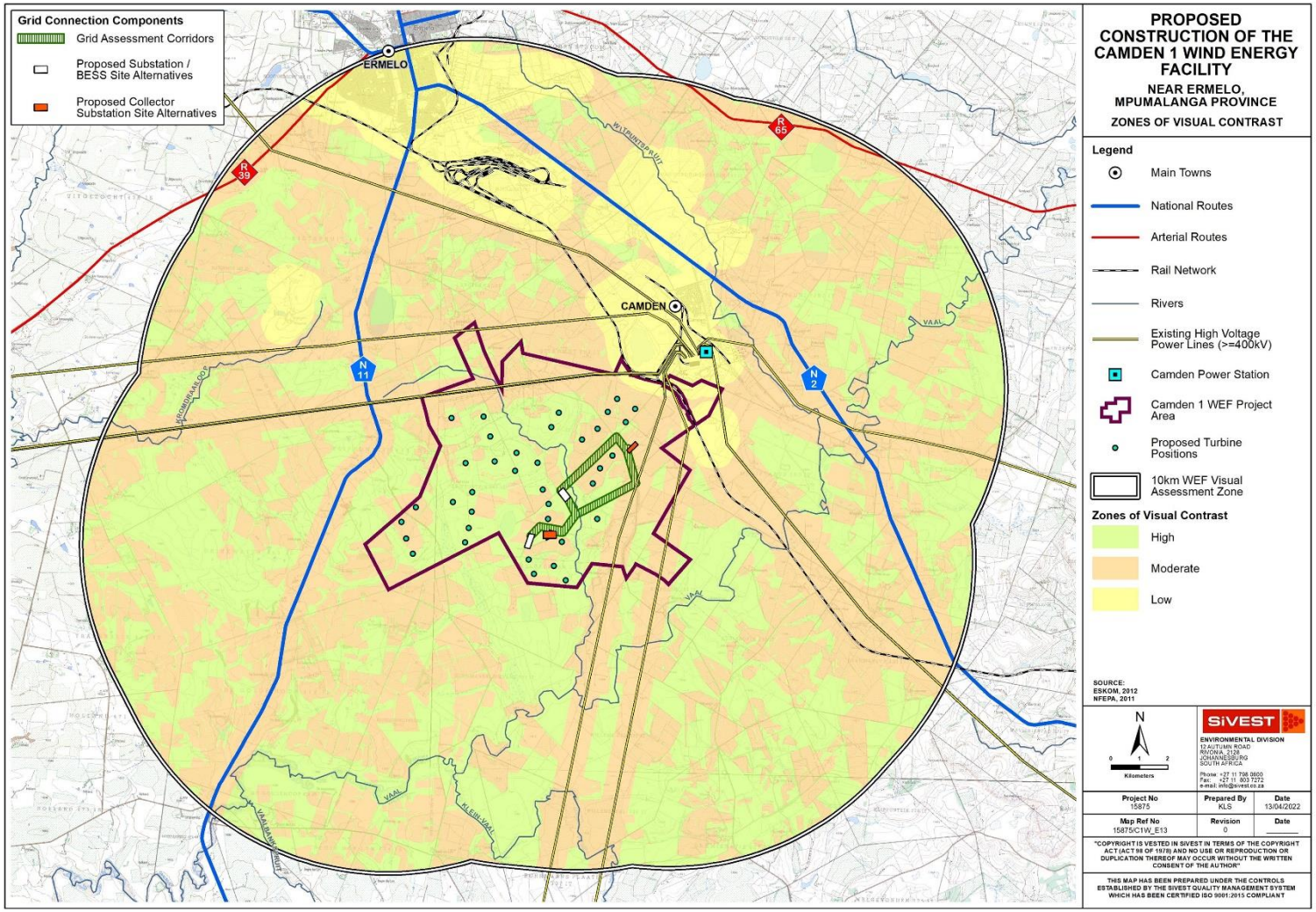

Figure 33: Zones of Visual Contrast

8.2.4 Impact Rating Matrix

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

Table 3: Rating scores

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

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

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

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

Table 5 below presents a summary of the overall visual impact of the proposed Camden I WEF on each of the sensitive visual receptor locations identified within 10kms of the boundary of the Camden I WEF application site. Also included are the five potentially sensitive receptors identified within 2km of the nearest turbine placement, but outside the Camden I WEF project area.

Table 5: Receptor impact rating for the proposed Camden I WEF Project

Receptor Location	Distance to nearest Turbine			Screening		Contrast		OVERALL IMPACT RATING	
	KMs	Rating		Rating		Rating			
SR1 - Die Oogappel	6.0	Mod	2	Mod	2	Mod	2	MODERATE	6
SR2 - Indawo Game Ranch	5.7	Mod	2	Mod	2	Mod	2	MODERATE	6
SR3 - Homestead on Ptn 2 of Mooiplaats No 290	6.8	Low	1	Mod	2	High	3	MODERATE	6
SR4 - Homestead on Rem of Mooiplaats No 290	8.9	Low	1	Low	1	Mod	2	LOW	4
SR5 - Drinkwater Guest Farm	2.5	Mod	2	Low	1	Mod	2	MODERATE	5
SR6 - Overvaal Guest House	9.9	Low	1	Low	1	Mod	2	LOW	4
VR6 - Farmstead	1.5	High	3	Mod	2	Mod	2	MODERATE	7
VR12 - Farmstead	1.5	High	3	Low	1	Mod	2	MODERATE	6

The table above shows that none of the identified sensitive receptors would experience high levels of visual impact as a result of the proposed Camden I WEF development. Four of these receptors are expected to experience only moderate levels of visual impact, while the remaining two will experience low levels of visual impact. With regard to the Indawo Game Ranch, Drinkwater Guest Farm and Overvaal Guest house, details of the levels of leisure / tourism activities on different sectors of the relevant farms are not known and as such, the impact rating matrix for these receptors is based on the assumed location of the main accommodation complex on each property.

Of the fourteen (14) *potentially* sensitive receptor locations located within 2 kms of the nearest turbine placement, twelve (12) are located within the Camden 1 WEF project area. It is known that the relevant land owners support the project and as such are not expected to perceive the proposed development in a negative light. Accordingly, these receptors have been removed from the impact rating matrix. Although the remaining two receptor locations are within 2 kms of the nearest turbine placement, they are only expected to experience moderate levels of impact as a result of the WEF development.

It should be noted that these ratings have been updated in relation to the refined turbine layout for the Camden I WEF provided by the Proponent for assessment in the EIA Phase of the project.

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

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

Receptor Location	Distance to Nearest Corridor Alternative		Screening		Contrast		OVERALL IMPACT RATING	
	KMs	Rating	Rating		Rating		Rating	
*GVR1 - Farmstead**	*2.7*	*NIL*						
GVR2 - Farmstead	4.1	Low	1	Mod	2	Mod	2	MODERATE	5
*GVR5 - Farmstead**	*3.3*	*NIL*						
GVR9 - Farmstead	3.8	Low	1	High	3	High	3	MODERATE	7
GVR10 - Farmstead	3.6	Low	1	Low	1	Mod	2	LOW	4
GVR11 - Farmstead	3.5	Low	1	High	3	Mod	2	MODERATE	6
*GVR12 - Farmstead**	*1.9*	*NIL*						
GVR13 - Farmstead	1.2	Mod	2	Low	1	Mod	2	MODERATE	5
GVR15 - Farmstead	1.2	Mod	2	Mod	2	Mod	2	MODERATE	6
*GVR16 - Farmstead**	*2.0*	*NIL*						
*GVR21 - Farmstead**	*4.2*	*NIL*						
*GVR23 - Farmstead**	*5.0*	*NIL*						
GVR24 - Farmstead	3.9	Low	1	Mod	2	Low	1	LOW	4
*GVR27 - Farmstead**	*3.2*	*NIL*						

**Receptor is outside the viewshed for the proposed power line.*

The table above shows that a total of fourteen (14) receptors were identified within 5 km of the nearest corridor alternative, none of which are considered sensitive. All of the receptors identified are assumed to be farmsteads which could be considered to be receptors. However, given the degree of transformation in the landscape, and the fact that much of the proposed route alignment is relatively close to existing high voltage power lines, it is not anticipated that all of these receptors would be sensitive to the proposed development.

Seven of the identified receptors were found to be outside the viewshed for the proposed power lines and were excluded from the assessment. Ten (10) *potentially* sensitive receptor locations are located within the Camden I WEF project area and as the relevant land owners are known to support the proposed development, they are not expected to perceive the proposed development in a negative light.

Five receptor locations are expected to experience moderate levels of impact as a result of the Camden I grid connection infrastructure, while the remaining two (2) would only experience low levels of visual impact.

As stated above, the N2 and N11 national routes, as well as the R39 and R65 main roads could be considered as potentially sensitive receptor roads. Elements of the WEF development are expected to be highly visible to motorists travelling along the National routes, but only barely visible from the R39 and R65 main roads which are some 10kms away from the nearest turbine. The likely visual impacts of the proposed development on motorists utilising the N2 and N11 would depend on the location of the different elements on the site, and would be reduced by the level of transformation and landscape degradation on the periphery of Ermelo.

In light of this, visual impacts affecting the N2 and N11 are rated as moderate.

As there are no national routes or main roads within 5 kms of the grid assessment corridors, it is not anticipated that these roads will be subjected to any visual impacts as a result of the grid connection infrastructure.

8.3 Photomontages

Photomontages (visual simulations) were originally compiled in 2019 order to provide a preliminary indication of how the proposed Camden I WEF development would appear from various viewpoints within the visual assessment area. An indicative range of locations (referred to as “view points”) was selected for modelling purposes and photomontages were produced from these viewpoints (**Figure 34**). The original wind turbine layout for Camden 1 as provided by the Proponent in 2019 was modelled in 3D, at the correct scale, and then superimposed onto landscape photographs taken during the site visit. Although the turbine layout for Camden I WEF has since been revised, the resulting photomontages are still considered relevant as they illustrate how views from each selected viewpoint could potentially be transformed by the proposed WEF development if the wind turbines are erected within the project area as proposed.

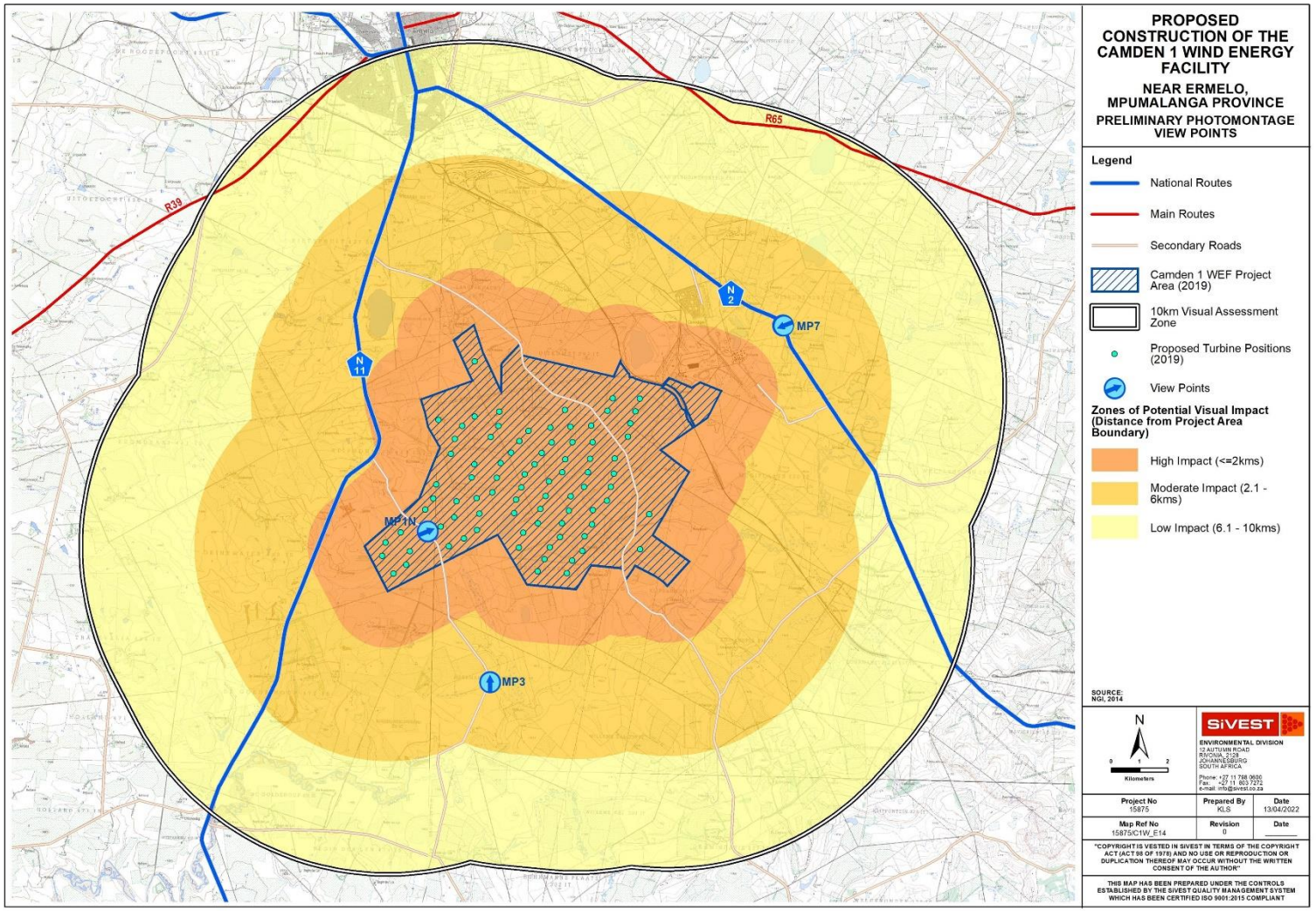

Figure 34: Photomontage viewpoints for Camden 1 WEF (conceptual 2019 layout)

8.3.1 Viewpoint MP1N

This viewpoint is within the Camden I WEF project area, on District Road D1107. This point is approximately 500m from the nearest turbine placement in the original layout and is thus in a zone of high visual impact. Hence the turbines are highly visible from this distance.

Figure 35: View east-north-east from Viewpoint MP1N - Pre-Construction

Figure 36: View east-north-east from Viewpoint MP1N – Post Construction

8.3.2 Viewpoint MP3

This viewpoint is located on District Road D1107, approximately 5km from the nearest turbine placement in the original layout and is thus in a zone of moderate visual impact. Turbines are visible from this distance, but hazy conditions tend to reduce the visibility.

Figure 37: View north from Viewpoint MP3 – Pre-Construction

Figure 38: View north from Viewpoint MP3 – Post Construction

8.3.3 Viewpoint MP7

This viewpoint is located on the N2 national route to the east of the Camden I WEF project area. This point is approximately 6km from the nearest turbine placement and is thus in a zone of low visual impact. Although turbines are visible on the horizon, at this distance, visual impacts are somewhat reduced and Camden Power Station in the foreground tends to dominate views from this location.

Figure 39: View west-south-west from Viewpoint MP7 – Pre-Construction

Figure 40: View west-south-west from Viewpoint MP7 – Post Construction

8.4 Night-time Impacts

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

The town of Ermelo, located approximately 13 km north of the Camden I WEF project area is the main source of light within the study area. The town itself and the industrial and mining development on its periphery are expected to have a significant impact on the night scene in the northern sector of the study area. Another prominent light source within the study area at night is the security lighting at the existing Camden Power Station to the east of the Camden I1 WEF project area, as well as the adjacent Camden residential area. It is expected that the lights from the power station will be visible at night from relatively far away.

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. While the operational and security lighting required for the proposed WEF project is likely to intrude on the nightscape and create some glare, the impact of the additional lighting is expected to be reduced by the presence of a significant amount of light already present within the surrounding area at night. 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 generally lit up at night and, thus light spill associated with the proposed grid connection infrastructure is only likely to emanate from the proposed on-site substation. Lighting from this facility is therefore expected to intrude on the nightscape to some degree. It should however be noted that the grid connection infrastructure will only be constructed if the proposed WEF is developed and thus the lighting impacts from the proposed substation would be subsumed by the glare and contrast of the lights associated with the WEF as a whole. As such, the grid connection infrastructure is not expected to result in significant lighting impacts.

8.5 Cumulative Impacts

Although it is important to assess the visual impacts of the proposed Camden I WEF and associated grid connection 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 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 Camden I WEF project area, 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.

8.6 Identification of Potential Impacts

Potential visual issues / impacts resulting from the proposed Camden I WEF and associated grid connection infrastructure are outlined below.

8.6.1 Construction Phase

Nature of the impact

- Potential visual intrusion resulting from large construction vehicles and equipment;
- Potential visual effect of construction laydown areas and material stockpiles.
- Potential impacts of increased dust emissions from construction activities and related traffic;

- Potential visual scarring of the landscape as a result of site clearance and earthworks; and
- Potential visual pollution resulting from littering on the construction site

Significance of impact

The significance of visual impacts associated with the WEF during construction is expected to be **Moderate** but will be reduced to **Low** with the implementation of mitigation measures.

The significance of visual impacts associated with the grid connection infrastructure during construction is expected to be **Low** but will be further reduced with the implementation of mitigation measures.

8.6.2 Operational Phase

Nature of the impact

- Potential alteration of the visual character of the area;
- Potential visual intrusion resulting from wind turbines or grid connection infrastructure dominating the skyline in a largely natural / rural area;
- Potential visual clutter caused by substation and other associated infrastructure on-site.
- Potential visual effect on surrounding farmsteads; and
- Potential alteration of the night time visual environment as a result of operational and security lighting as well as navigational lighting on top of the wind turbines.

Significance of impact

The significance of visual impacts associated with the WEF during operation is expected to be **Moderate**, and although mitigation measures will result in some minor reduction of visual impacts, the degree of significance will remain **Moderate.**

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

8.6.3 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;
- Potential visual scarring of the landscape as a result of decommissioning activities; and
- Potential visual intrusion of any remaining infrastructure on the site.

Significance of impact

The significance of visual impacts associated with the WEF during decommissioning is expected to be **Moderate** but will be reduced to **Low** with the implementation of mitigation measures.

The significance of visual impacts associated with the grid connection infrastructure during decommissioning is expected to be **Low** but will be further reduced with the implementation of mitigation measures.

8.6.4 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.

9 OVERALL VISUAL IMPACT RATING

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

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

9.1 Camden I WEF

9.1.1 Construction Phase Impact Rating

Table 7: Impact Rating for Camden I WEF during the construction phase

CONSTRUCTION PHASE: DIRECT IMPACTS																		
Impact number	**Aspect**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
Impact 1:	Visual impacts	▪ Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction. ▪ Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. ▪ Potential visual pollution resulting from littering on the construction site.	Construction	Negative	Moderate	3	2	3	4	3	**40**	**N3**	2	2	3	2	2	**18**	**N2**
					Significance	**N3- Moderate**							**N2 - Low**						

9.1.2 Construction Phase Mitigation Measures

- Carefully plan to mimimise the construction period and avoid construction delays.
- Where possible, restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.
- Inform receptors within 1km of the WEF development area of the construction programme and schedules.
- Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.
- Vegetation clearing should take place in a phased manner.
- Maintain a neat construction site by removing rubble, litter and waste materials regularly.
- Position storage / stockpile areas in unobtrusive positions in the landscape, where possible.
- Make use of existing gravel access roads where possible.
- Limit the number of vehicles and trucks travelling to and from the construction site, where possible.
- Ensure that dust suppression techniques are implemented:
    - on all access roads;
    - in all areas where vegetation clearing has taken place;
    - on all soil stockpiles.

9.1.3 Operational Phase Impact Rating

Table 8: Impact Rating for Camden I WEF during the operational phase

OPERATION PHASE: DIRECT IMPACTS																		
Impact number	**Aspect**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
Impact 1:	Visual impacts	▪ The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ The proposed WEF and associated infrastructure will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts. ▪ Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. ▪ The night time visual environment will be altered as a result of operational and security lighting at the proposed WEF.	Operation	Negative	Moderate	3	3	3	4	4	**52**	**N3**	3	3	3	4	4	**52**	**N3**
					Significance	**N3- Moderate**							**N3 - Moderate**						

9.1.4 Operational Phase Mitigation Measures

- Turbine colours should adhere to CAA requirements. Bright colours and logos on the turbines should be kept to a minimum.
- Inoperative turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work) (Vissering, 2011).
- If turbines need to be replaced for any reason, they should be replaced with turbines of similar height and scale to lessen the visual impact.
- As far as possible, limit the number of maintenance vehicles which are allowed to access the site.
- Ensure that dust suppression techniques are implemented on all gravel access roads.
- As far as possible, limit the amount of security and operational lighting present on site.
- Light fittings for security at night should reflect the light toward the ground and prevent light spill.
- Lighting fixtures should make use of minimum lumen or wattage.
- Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used.
- If possible, make use of motion detectors on security lighting.
- Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter.
- The operations and maintenance (O&M) buildings should not be illuminated at night and should be painted in natural tones that fit with the surrounding environment.
- Non-reflective surfaces should be used where possible.

9.1.5 Decommissioning Phase Impact Rating

Table 9: Impact Rating for Camden I WEF during the decommissioning phase

DECOMMISSIONING PHASE: DIRECT IMPACTS																		
Impact number	**Aspect**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**					
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
Impact 1:	Visual impacts	▪ Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts. ▪ Decommissioning activities may be perceived as an unwelcome visual intrusion. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. ▪ Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	Decommissioning	Negative	Moderate	3	2	3	4	3	**40**	**N3**	2	2	3	2	2	**18**	**N2**
					Significance	**N3- Moderate**							**N2 - Low**						

9.1.6 Decommissioning Phase 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.
- Position storage / stockpile areas in unobtrusive positions in the landscape, where possible.
- Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase.
- All cleared areas should be rehabilitated as soon as possible.
- Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.

9.1.7 Cumulative Impact Rating

Table 10: Cumulative Impact Rating for Camden I WEF

CUMULATIVE IMPACTS																		
Impact number	**Aspect**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
Impact 1:	Visual impacts	▪ Additional renewable energy developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. ▪ Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings. ▪ Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. ▪ The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.	All stages	Negative	Moderate	5	3	3	5	4	**64**	**N4**	4	3	3	4	4	**56**	**N3**
					Significance	**N4- High**							**N3 - Moderate**						

9.1.8 Cumulative Impact Mitigation Measures

- Carefully plan to minimise the construction period and avoid construction delays.
- Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible.
- Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.
- Vegetation clearing should take place in a phased manner.
- Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter.
- As far as possible, limit the number of maintenance vehicles which are allowed to access the facility.
- Ensure that dust suppression techniques are implemented on all gravel access roads.
- As far as possible, limit the amount of security and operational lighting present on site.
- Light fittings for security at night should reflect the light toward the ground and prevent light spill.
- Lighting fixtures should make use of minimum lumen or wattage.
- Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used.
- If possible, make use of motion detectors on security lighting.
- The operations and maintenance (O&M) buildings should not be illuminated at night.
- The O&M buildings should be painted in natural tones that fit with the surrounding environment.

9.2 Camden I WEF Grid Connection Infrastructure

9.2.1 Construction Phase Impact Rating

Table 11: Impact Rating for Camden I WEF 132kV Grid Connection Infrastructure during the construction phase

CONSTRUCTION PHASE: DIRECT IMPACTS																		
Impact number	**Aspect**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
Impact 1:	Visual impacts	▪ Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction. ▪ Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. ▪ Potential visual pollution resulting from littering on the construction site.	Construction	Negative	Moderate	3	2	3	2	2	**30**	**N2**	2	2	3	2	2	**18**	**N2**
					Significance	**N2- Low**							**N2 - Low**						

9.2.2 Construction Phase 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.

9.2.3 Operational Phase Impact Rating

Table 12: Impact Rating for Camden I WEF 132kV Grid Connection Infrastructure during the operational phase

OPERATIONAL PHASE: DIRECT IMPACTS																		
Impact number	**Aspect**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
Impact 1:	Visual impacts	▪ The proposed power line and substation could alter the visual character of the surrounding area and expose sensitive visual receptor locations to visual impacts. ▪ The proposed development will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts. ▪ Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. ▪ The night time visual environment could be altered as a result of operational and security lighting at the proposed substation.	Operation	Negative	Moderate	2	3	3	4	2	**24**	**N2**	2	3	3	4	2	**24**	**N2**
					Significance	**N2- Low**							**N2 - Low**						

9.2.4 Operational Phase Mitigation Measures

- Where possible, limit the number of maintenance vehicles using access roads.
- Ensure that dust suppression techniques are implemented on all gravel access roads.
- As far as possible, limit the amount of security and operational lighting present on the substation site.
- Light fittings for security at night should reflect the light toward the ground and prevent light spill.
- Lighting fixtures should make use of minimum lumen or wattage.
- Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used.
- If possible, make use of motion detectors on security lighting.
- The buildings on the substation site should not be illuminated at night and should be painted in natural tones that fit with the surrounding environment.
- Non-reflective surfaces should be used where possible.

9.2.5 Decommissioning Phase Impact Rating

Table 13: Impact Rating for Camden I WEF 132kV Grid Connection Infrastructure during the decommissioning phase

DECOMMISSIONING PHASE: DIRECT IMPACTS																		
Impact number	**Aspect**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
Impact 1:	Visual impacts	▪ Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts. ▪ Decommissioning activities may be perceived as an unwelcome visual intrusion. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. ▪ Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	Decommissioning	Negative	Moderate	3	2	3	2	2	**30**	**N2**	2	2	3	2	2	**18**	**N2**
					Significance	**N2- Low**							**N2 - Low**						

9.2.6 Decommissioning Phase 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.
- Position storage / stockpile areas in unobtrusive positions in the landscape, where possible.
- Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase.
- All cleared areas should be rehabilitated as soon as possible.
- Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.

9.2.7 Cumulative Impact Rating

Table 14: Cumulative Impact Rating for Camden I WEF 132kV Grid Connection Infrastructure

CUMULATIVE IMPACTS																		
Impact number	**Aspect**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
Impact 1:	Visual impacts	▪ Additional renewable energy and associated infrastructure developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. ▪ Visual intrusion of multiple renewable energy developments and associated infrastructure may be exacerbated, particularly in more natural undisturbed settings. ▪ Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. ▪ The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.	All stages	Negative	Moderate	5	3	3	5	4	**64**	**N4**	4	3	3	4	4	**56**	**N3**
					Significance	**N4- High**							**N3 - Moderate**						

9.2.8 Cumulative Impact Mitigation Measures

- Where possible, limit the number of maintenance vehicles using access roads.
- Non-reflective surfaces should be utilised where possible.
- Where possible, limit the amount of security and operational lighting present at the on-site substation.
- Light fittings for security at night should reflect the light toward the ground and prevent light spill.

10 COMPARATIVE ASSESSMENT OF ALTERNATIVES

A comparative assessment has been undertaken in respect of the design and layout alternatives put forward for the EIA phase of the Camden I WEF and associated grid connection infrastructure. The aim of the comparative assessment is to determine which of the alternatives would be preferred from a visual perspective. Preference ratings for each alternative have been based on the following factors:

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

The alternatives are rated as preferred; favourable, least-preferred or no-preference described in **Table 15** below.

Table 15: Description of preference ratings applied to alternatives

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

Detailed comparative assessment tables for each sub-project are provided in **Appendix D**. Summaries of the findings are however provided below.

10.1 Camden I WEF: Infrastructure Alternatives

The EIA Phase design and layout proposals for Camden I WEF include two site alternatives each for the Substation / BESS, construction camp / batching plant and temporary laydown area (**Figure 4**).

No fatal flaws were identified for any of the proposed site alternatives for the substation / BESS, laydown areas and construction camps for Camden I WEF. A summary of the preference ratings for each infrastructural element is provided below.

- Substation / BESS: No preference was determined for any of the site alternatives and both alternatives were found to be favourable.
- Temporary Construction Laydown Area: No preference was determined for any of the site alternatives and both alternatives were found to be favourable.

- Temporary Construction Camp / Cement Batching Plant: No preference was determined for any of the site alternatives and both alternatives were found to be favourable.

10.2 Camden I WEF: 132kV Grid Connection Alternatives

Two substation alternatives with four associated route alternatives are being assessed for the proposed Camden I WEF 132kV Grid Connection (**Figure 5**):

No fatal flaws were identified for either of the proposed substation site alternatives or the proposed grid connection alternatives. A summary of the preference ratings for each infrastructural element is provided below.

- Substation: No preference was determined for either of the site alternatives and both alternatives were found to be favourable.
- Grid Connection Corridors: Corridor Option 4 is the preferred option while Corridor Options 1, 2 and 3 were all found to be favourable.

10.3 No-Go Alternative

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

11 REVISED LAYOUT

Subsequent to the completion of all specialist studies, the Proponent has refined the proposed Camden I WEF layout in line with the recommendations of the various specialists. The refined layout as shown in **Figure 4** has been assessed from a visual perspective and it has been concluded that these amendments do not change the findings of this VIA.

12 CONCLUSION

A combined visual study was conducted to assess the magnitude and significance of the potential visual impacts associated with the development of the proposed Camden 1 WEF and associated grid connection infrastructure 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 the town of Ermelo in the north and north-east to a more rural / pastoral character across the remainder of the study area. Hence, although WEF and power line development would alter the visual character and contrast with this rural / pastoral character, the location of the proposed WEF and grid connection infrastructure 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 to moderate** visual sensitivity. However, an important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs.

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 six (6) sensitive receptors were identified in the study area, four (4) of which are considered to be sensitive receptors as they are linked to leisure/nature-based tourism activities in the area. None of these receptors are however expected to experience high levels of visual impact from the proposed WEF facility. An additional fourteen (14) receptors were identified within 2km of the proposed WEF development, all of which appear to be farmsteads that could be regarded as potentially sensitive visual receptors as the proposed development will likely alter vistas experienced from these locations. Twelve (12) of these farmsteads are however located within the Camden I WEF project area and as such the owners / occupants are assumed to be involved in the project and in these circumstances are not expected to view the proposed WEF in a negative light. The remaining two potentially sensitive receptors are expected to experience moderate levels of visual impact as a result of the proposed development.

A total of fourteen (14) receptors were identified within 5 km of the nearest corridor alternative, none of which are considered sensitive. All of the receptors identified are assumed to be farmsteads which could be considered to be receptors. However, given the degree of transformation in the landscape, and the fact that much of the proposed route alignment is

relatively close to existing high voltage power lines, it is not anticipated that all of these receptors would be sensitive to the proposed development.

Seven (7) of the identified receptors were found to be outside the viewshed for the proposed power lines and were excluded from the assessment. Ten (10) *potentially* sensitive receptor locations are located within the Camden I WEF project area and as the relevant land owners are known to support the proposed development, they are not expected to perceive the proposed development in a negative light.

Five receptor locations are expected to experience moderate levels of impact as a result of the Camden I grid connection infrastructure, while the remaining two (2) would only experience low levels of visual impact.
Although the N2 and N11 receptor roads traverse the study area, motorists travelling along these routes are only expected to experience moderate impacts from the proposed Camden 1 WEF. As there are no national routes or main roads within 5 kms of the grid assessment corridors, it is not anticipated that these roads will be subjected to any visual impacts as a result of the grid connection infrastructure.

A preliminary assessment of overall impacts revealed that impacts associated with all the proposed Camden I WEF and associated grid connection infrastructure (post mitigation) are of low significance during both construction and decommissioning phases. During operation however, visual impacts (post mitigation) from the Camden I WEF would be of moderate significance with relatively few mitigation measures available to reduce the visual impact. Visual impacts associated with the Camden I WEF 132kV Grid Connection project during operation would be of low significance.

Considering the presence of existing and proposed mining activity and electrical generation and distribution infrastructure, the introduction of new renewable energy facilities 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.

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

No fatal flaws were identified for either of the substation alternatives or any of the grid connection infrastructure alternatives. No preference was determined for either of the substation site alternatives and both alternatives were found to be favourable. Power Line

Corridor Option 4 was identified as the Preferred Alternative, while Power Line Corridor Options 1, 2 and 3 were found to be favourable.

12.1 Visual Impact Statement

It is SiVEST's opinion that the potential visual impacts associated with the proposed Camden I WEF and the associated grid connection infrastructure 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.

13 REFERENCES

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- Breedlove, G., 2002. A systematic for the South African Cultural Landscapes with a view to implementation. Thesis – University of Pretoria.
- Ecotricity Website: http://www.ecotricity.co.uk.
- Mucina L., and Rutherford M.C., (eds) 2006. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.
- Oberholzer, B. 2005. Guideline for involving visual & aesthetic specialists in EIA processes: *Edition 1.* CSIR Report No ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.
- Vissering, J., Sinclair, M., Margolis, A. 2011. State Clean Energy Program Guide: A Visual Impact Assessment Process for Wind Energy Projects. Clean Energy State Alliance.
- UNESCO. 2005. Operational Guidelines for the Implementation of the World Heritage Convention. UNESCO World Heritage Centre. Paris.

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

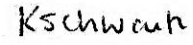
Note: Duplicate this section where there is more than one specialist.

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

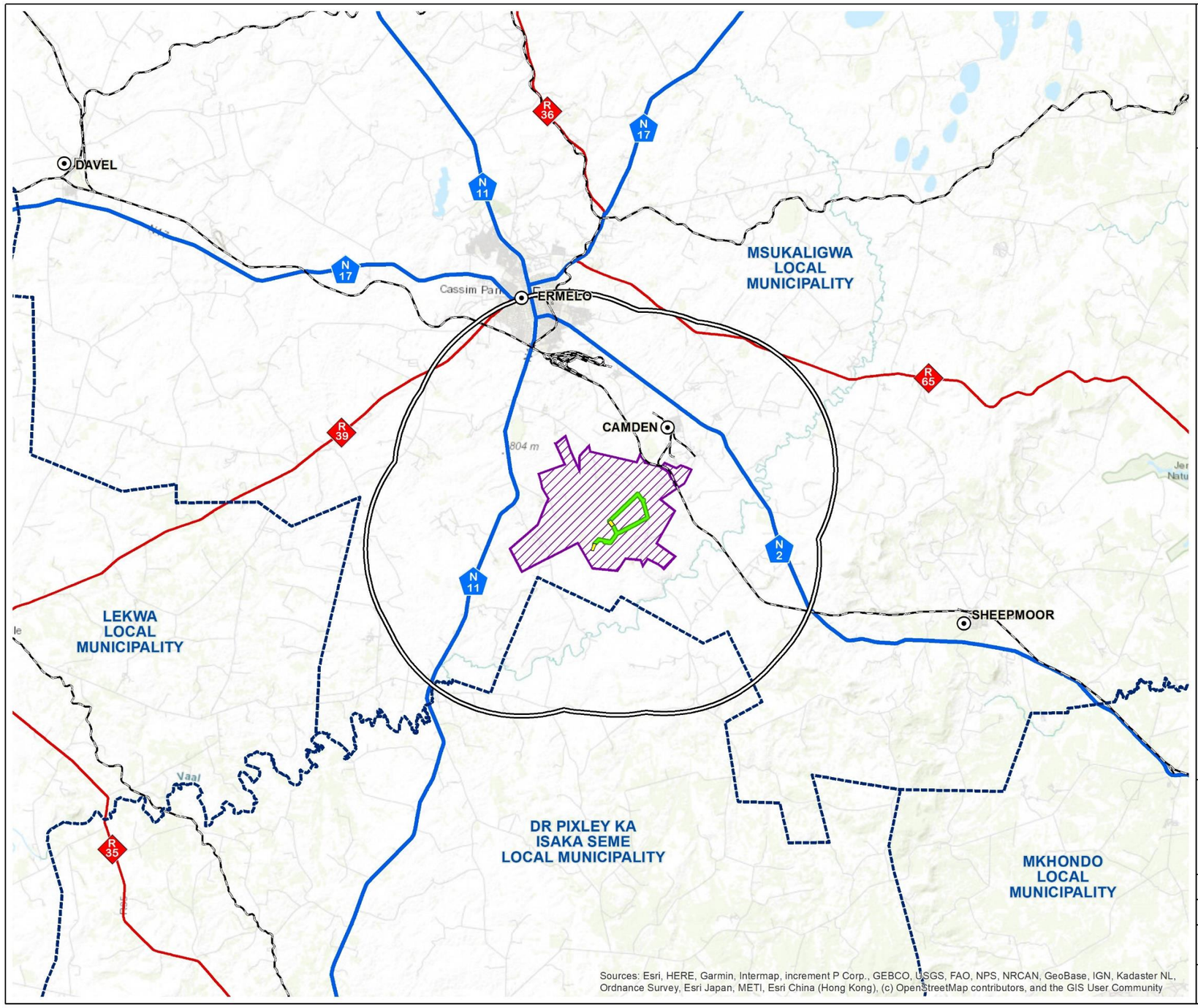
Operational Phase																				
Fauna	Fauna will be negatively affected by the operation of the wind farm due to the human disturbance, the presence of vehicles on the site and possibly by noise generated by the wind turbines as well.	2	3	2	1	4	3	36	-	Medium	**Outline/explain the mitigation measures 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 WIND ENERGY FACILITY

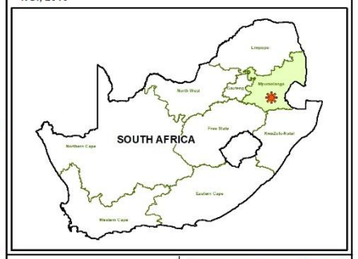
NEAR ERMELO, MPUMALANGA PROVINCE

REGIONAL CONTEXT

Legend

- Main Towns
- Local Municipal Boundaries
- Rail Network
- Combined Visual Assessment Zone
- Camden 1 WEF Project Area
- 132kV Grid Assessment Corridors
- Proposed Substation Site Alternatives

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



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Kilometers

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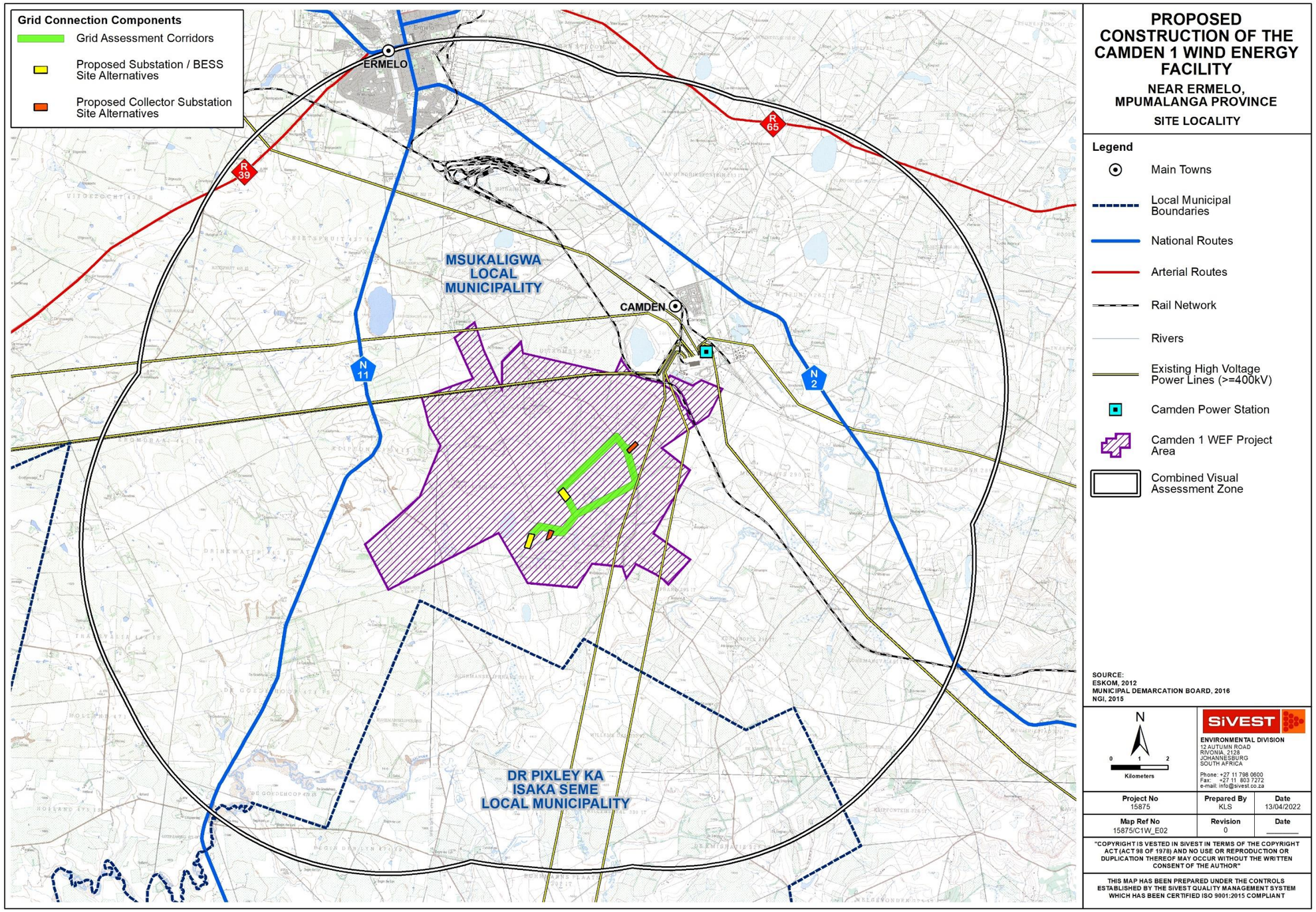
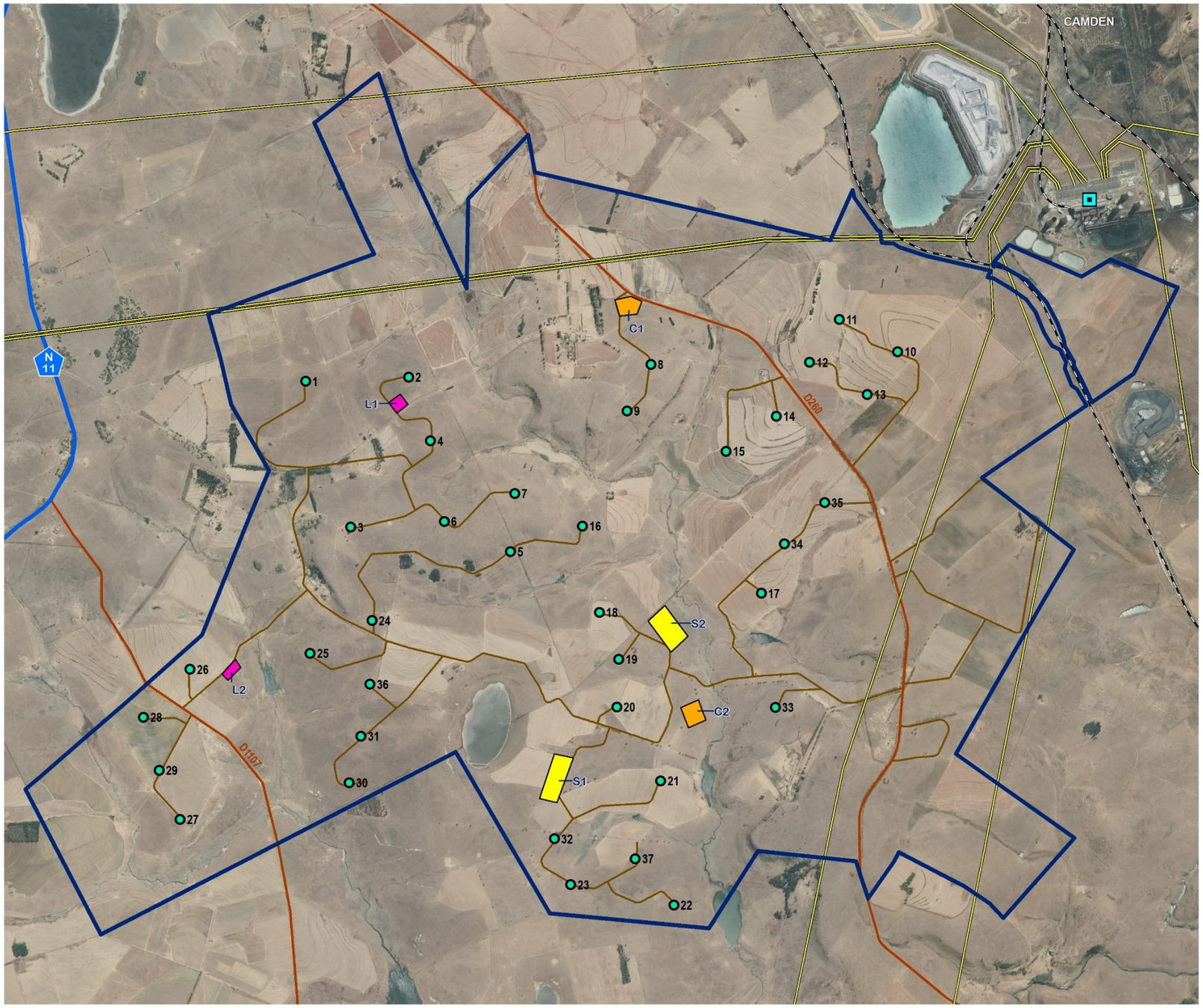
Project No	Prepared By	Date
15875	KLS	13/04/2022
Map Ref No	**Revision**	**Date**
15875/C1W_E01	0	

MAP 2: Site Locality



MAP 3: Preliminary Site Layout



PROPOSED CONSTRUCTION OF THE CAMDEN 1 WIND ENERGY FACILITY

NEAR ERMELO, MPUMALANGA PROVINCE

EIA PHASE WEF SITE LAYOUT

Legend

- National Routes
- District Roads
- Rail Network
- Existing High Voltage Power Lines (>=400kV)
- Camden Power Station
- Camden 1 WEF Project Area

WEF Elements

- Proposed Turbine Positions
- Substation / Bess Sites
- Construction Camp / Batching Plant Sites
- Temporary Laydown Areas
- Internal Road Network

SOURCE:
ESKOM, 2012
GOOGLE EARTH, 2021

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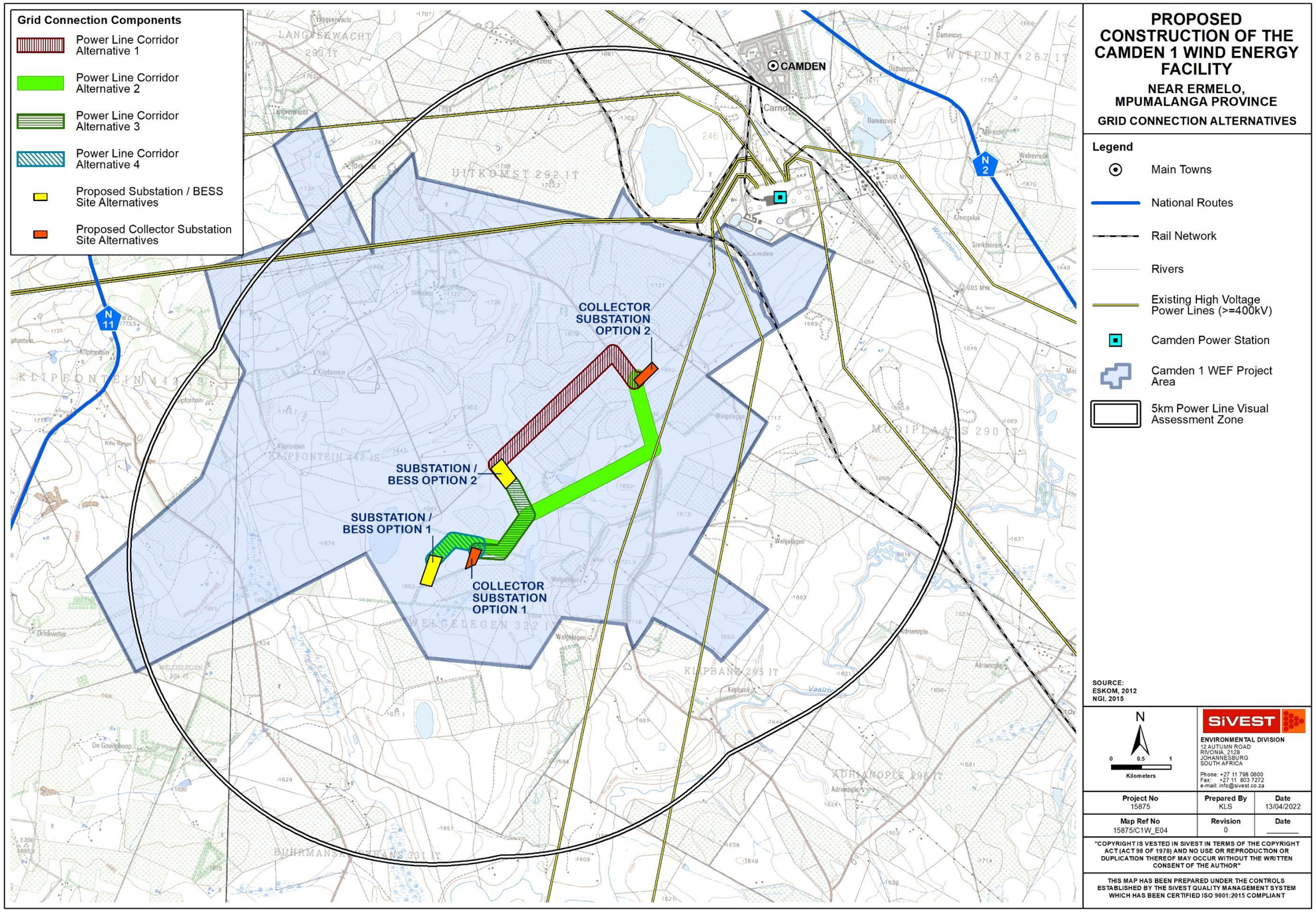
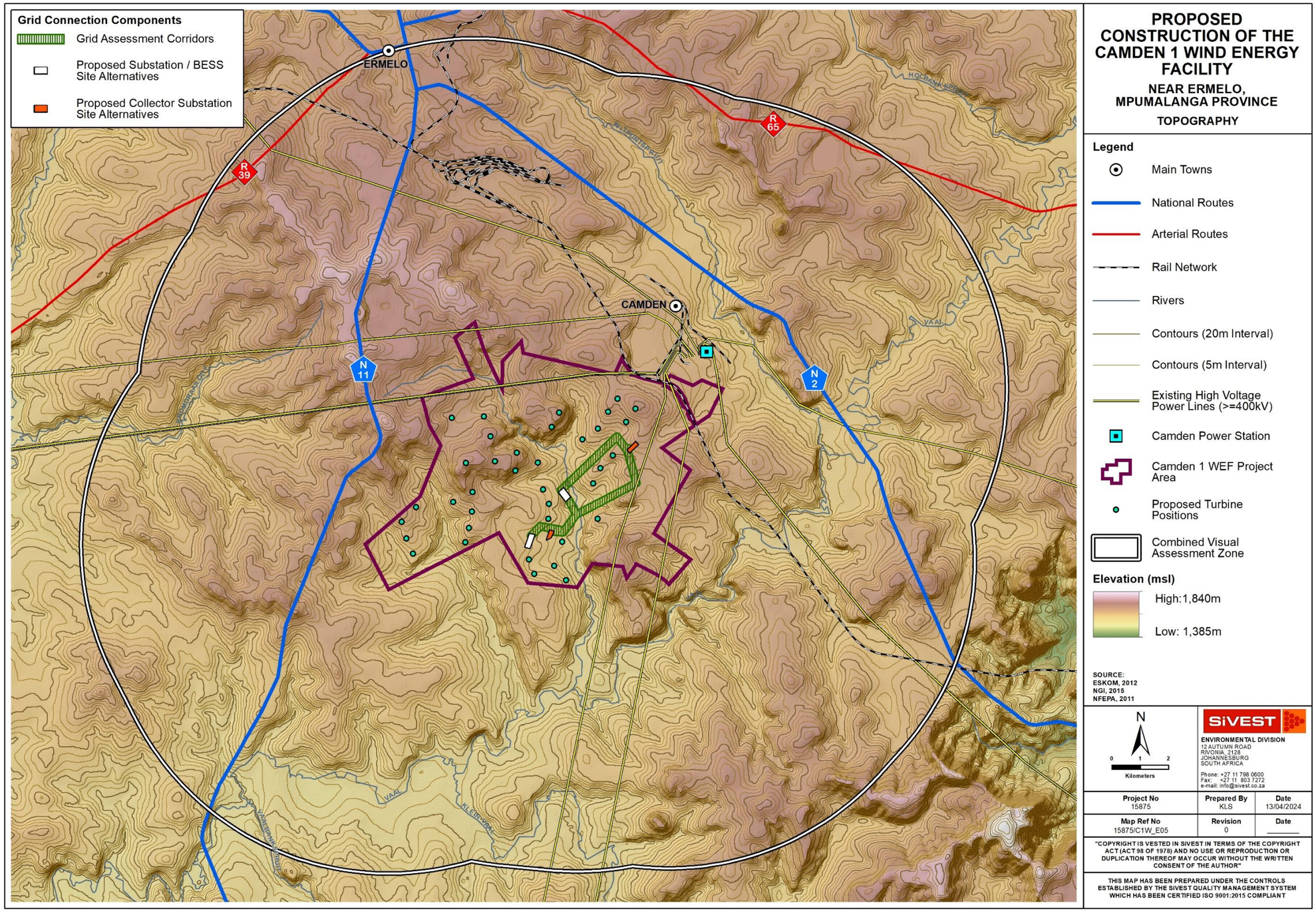
Project No	Prepared By	Date
15875	KLS	13/04/2022
Map Ref No	**Revision**	**Date**
15875/C1W_E03	0	

MAP 4: Grid Connection Alternatives



MAP 5: Topography



PROPOSED CONSTRUCTION OF THE CAMDEN 1 WIND ENERGY FACILITY

NEAR ERMELO, MPUMALANGA PROVINCE

TOPOGRAPHY

Legend

- Main Towns
- National Routes
- Arterial Routes
- Rail Network
- Rivers
- Contours (20m Interval)
- Contours (5m Interval)
- Existing High Voltage Power Lines (>=400kV)
- Camden Power Station
- Camden 1 WEF Project Area
- Proposed Turbine Positions
- Combined Visual Assessment Zone

Elevation (msl)

High:1,840m

Low: 1,385m

SOURCE:
ESKOM, 2012
NGI, 2015
NFEPA, 2011

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Kilometers

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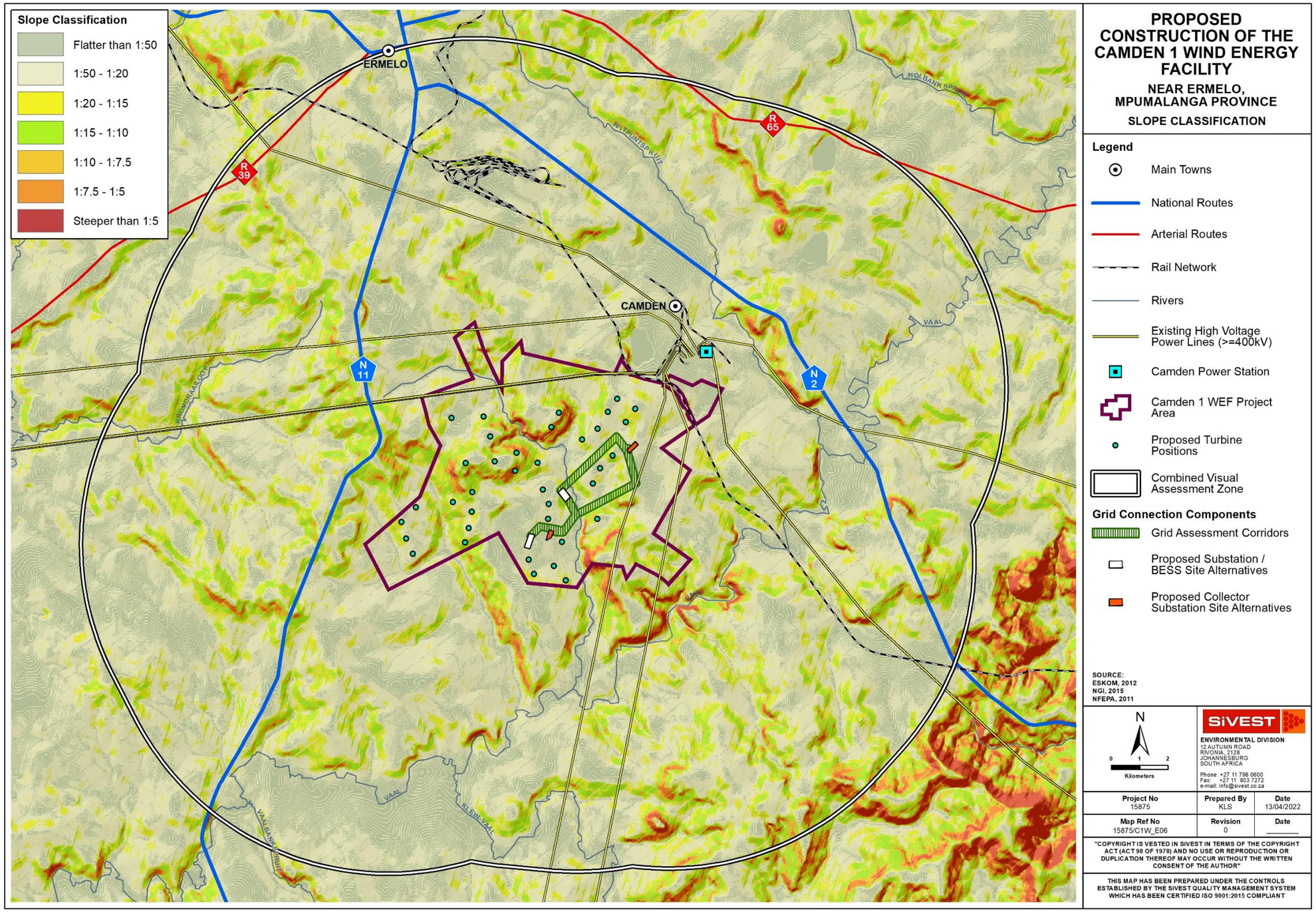
Project No	Prepared By	Date
15875	KLS	13/04/2024
Map Ref No	**Revision**	**Date**
15875/C1W_E05	0	

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

MAP 6: Slope Classification



PROPOSED CONSTRUCTION OF THE CAMDEN 1 WIND ENERGY FACILITY

NEAR ERMELO, MPUMALANGA PROVINCE

SLOPE CLASSIFICATION

Legend

- Main Towns
- National Routes
- Arterial Routes
- Rail Network
- Rivers
- Existing High Voltage Power Lines (>=400kV)
- Camden Power Station
- Camden 1 WEF Project Area
- Proposed Turbine Positions
- Combined Visual Assessment Zone

Grid Connection Components

- Grid Assessment Corridors
- Proposed Substation / BESS Site Alternatives
- Proposed Collector Substation Site Alternatives

SOURCE:
ESKOM, 2012
NGI, 2015
NFEPA, 2011

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15875	KLS	13/04/2022
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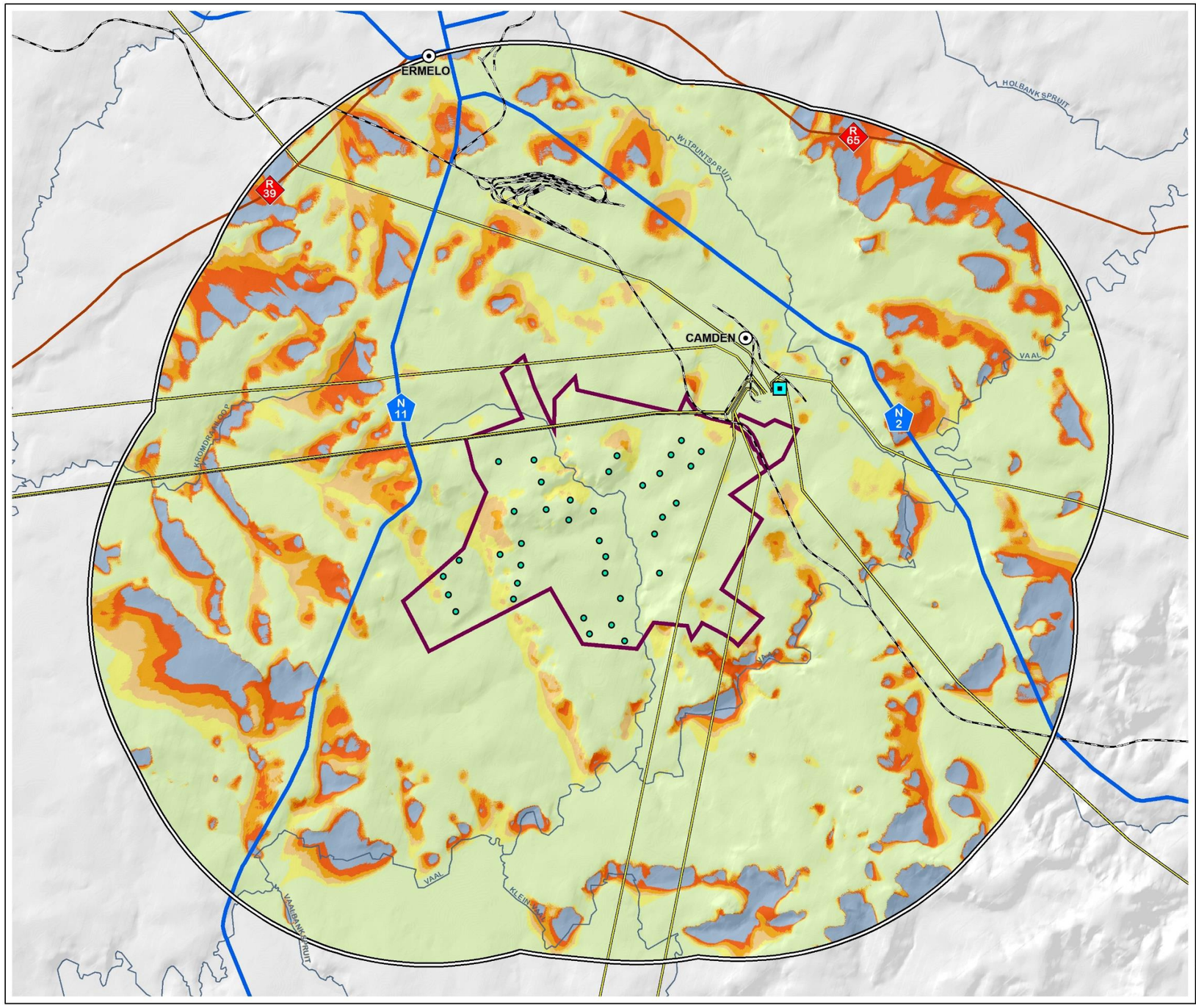
15875/C1W_E06	0	

MAP 7a: Potential Visibility of Wind Turbines



PROPOSED CONSTRUCTION OF THE CAMDEN 1 WIND ENERGY FACILITY

NEAR ERMELO, MPUMALANGA PROVINCE

PRELIMINARY VISIBILITY ANALYSIS: CAMDEN 1 WEF

Legend

- Main Towns
- National Routes
- Arterial Routes
- Rail Network
- Rivers
- Existing High Voltage Power Lines (>=400kV)
- Camden Power Station
- Camden 1 WEF Project Area
- Proposed Turbine Positions
- 10km WEF Visual Assessment Zone

Potential Visibility of Proposed Wind Turbines

- Most Visible
- Least Visible
- *INSIDE VIEWSHED*
- Not Visible

SOURCE:
ESKOM, 2012
NGI, 2015
NFEPA, 2011

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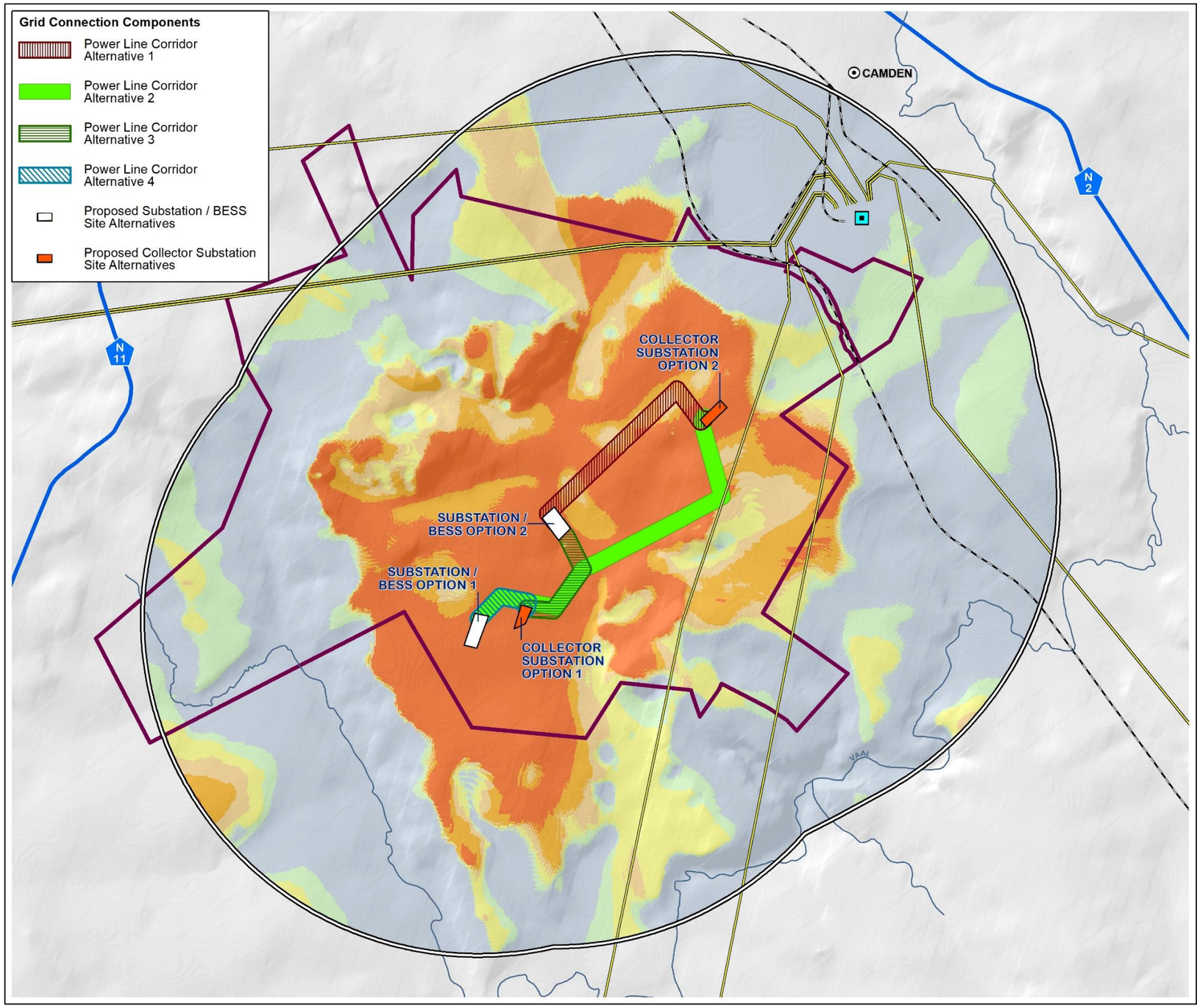
15875	KLS	13/04/2022
Map Ref No	**Revision**	**Date**
15875/C1W_E07a	0	

MAP 7b: Potential Visibility of Power Lines



PROPOSED CONSTRUCTION OF THE CAMDEN 1 WIND ENERGY FACILITY

NEAR ERMELO, MPUMALANGA PROVINCE

PRELIMINARY VISIBILITY ANALYSIS: CAMDEN 1 GRID CONNECTION INFRASTRUCTURE

Legend

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

Potential Visibility of Proposed Power Lines

- Most Visible
- Least Visible
- Not Visible

INSIDE VIEWSHED

SOURCE:
ESKOM, 2012
NGI, 2015

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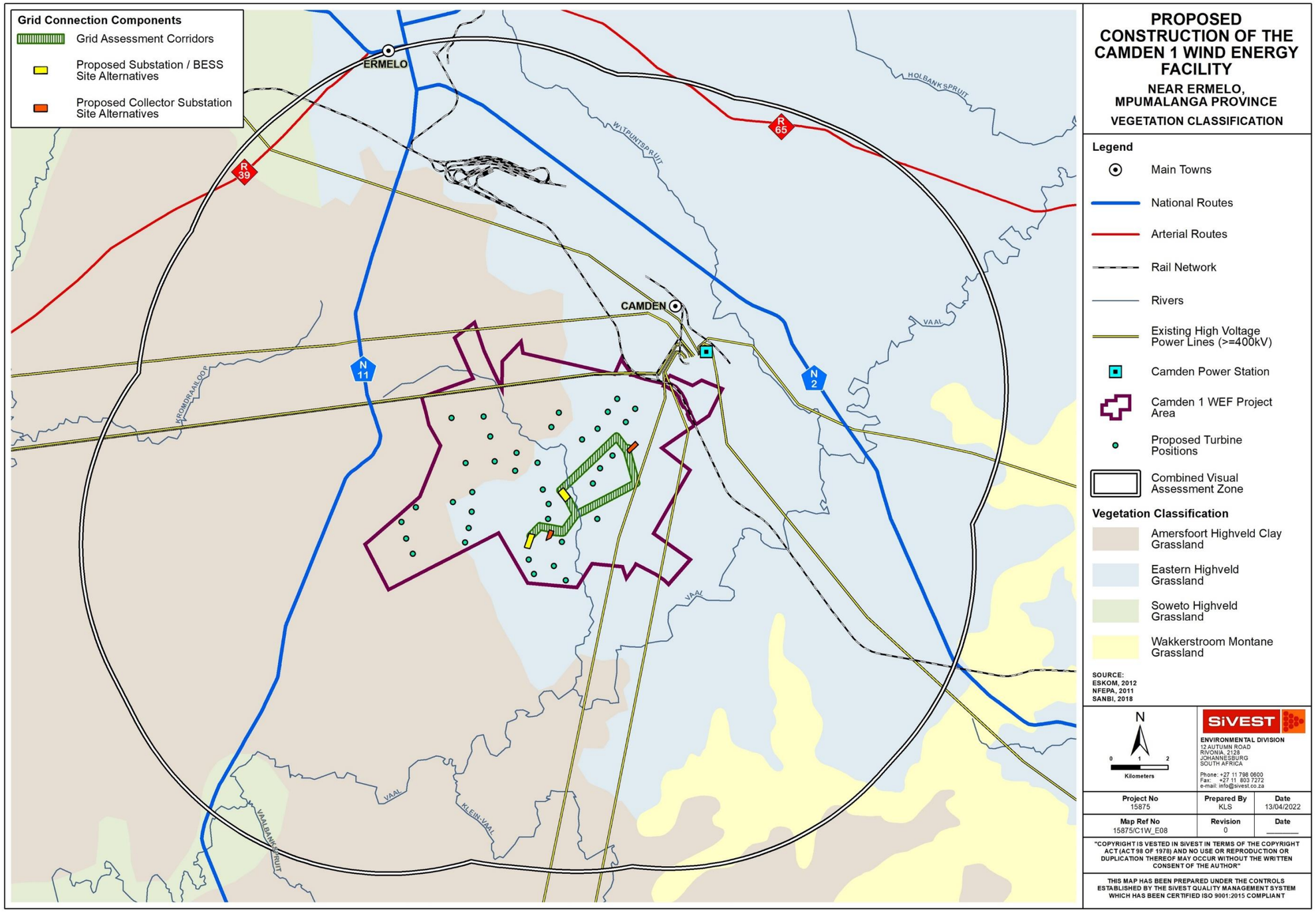
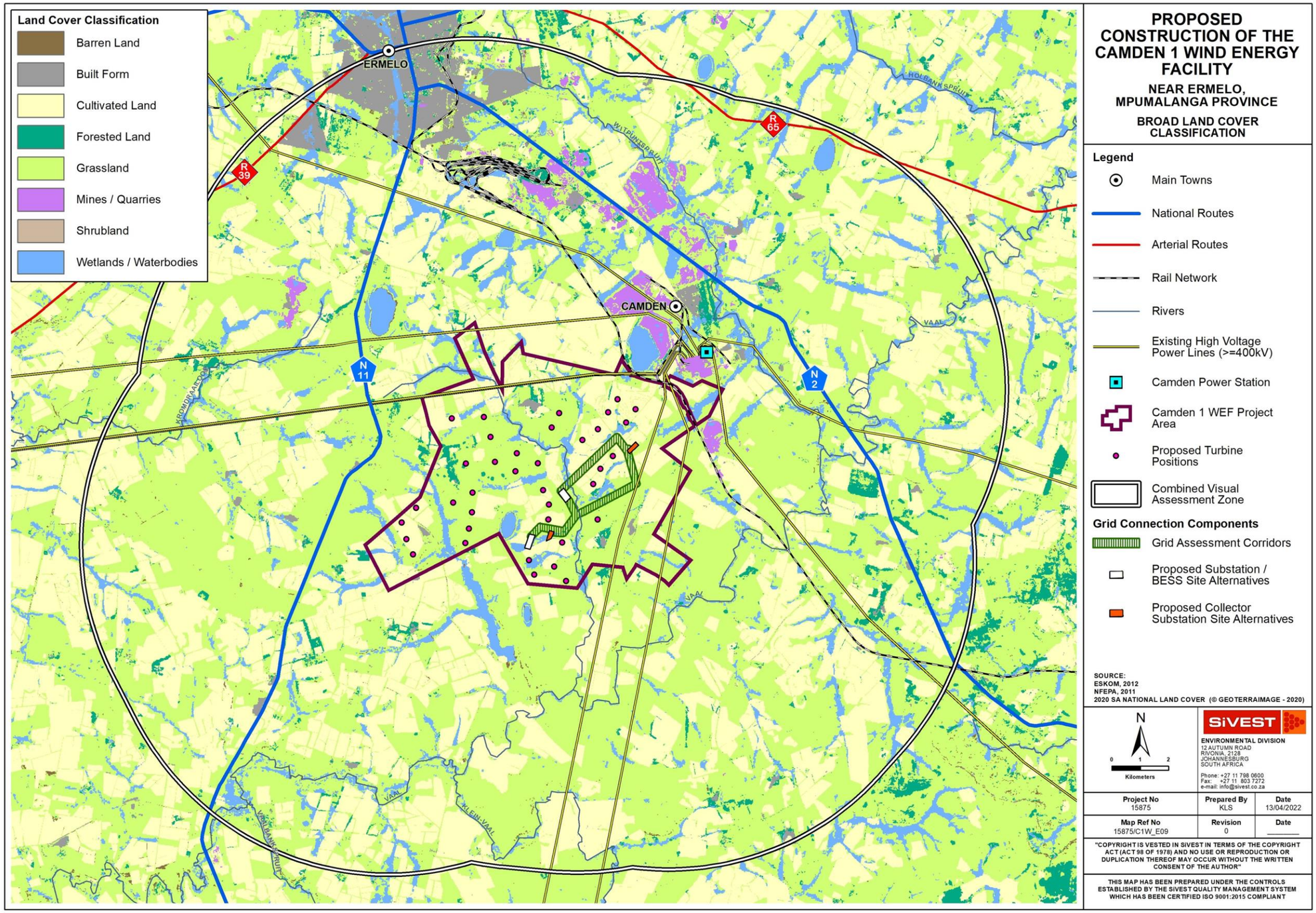
15875	KLS	13/04/2022
Map Ref No	**Revision**	**Date**
15875/C1W_E07b	0	_____

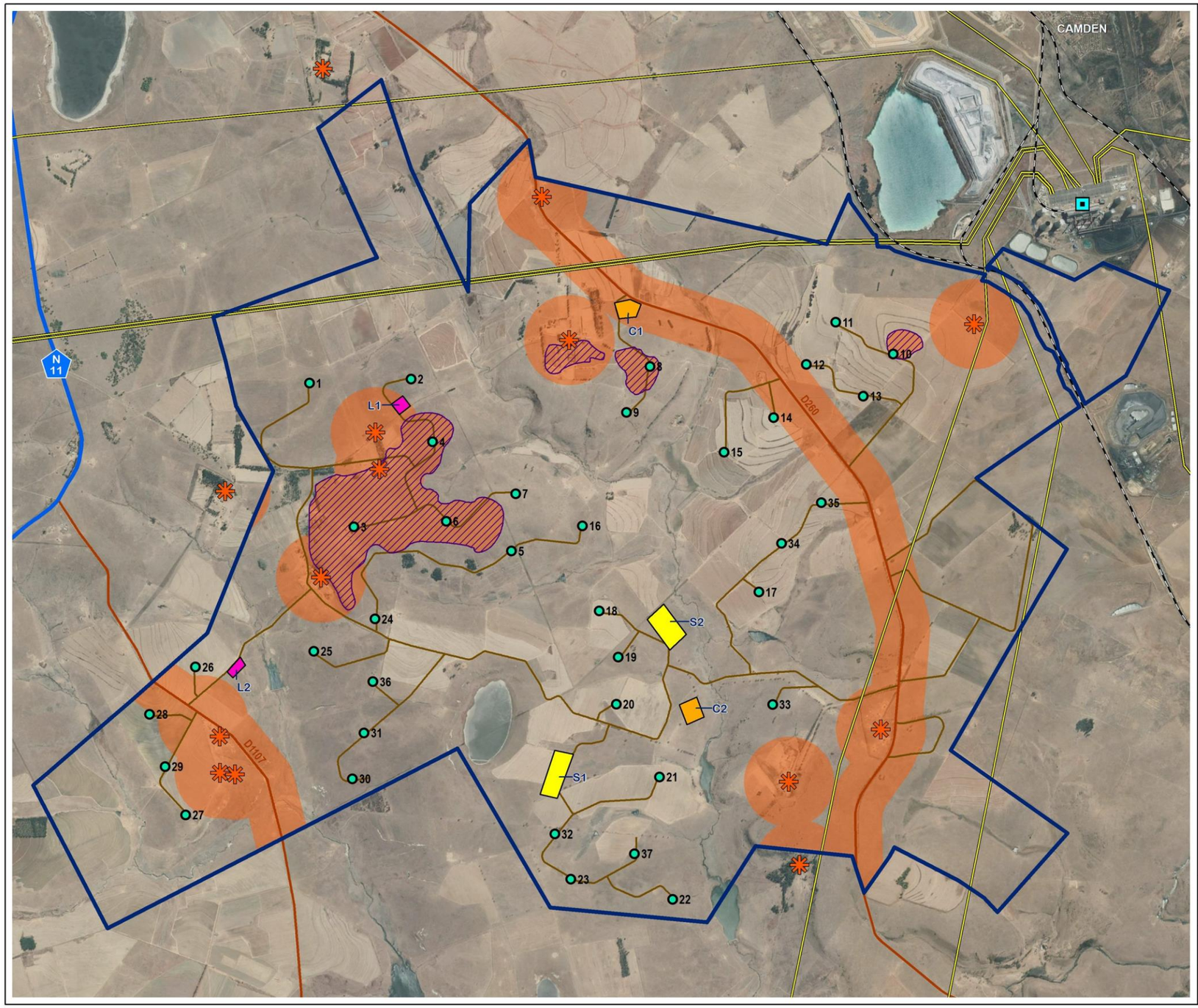
MAP 8: Vegetation Classification



MAP 9: Land Cover Classification



MAP 10: Visual Sensivity on the Camden 1 WEF Site



PROPOSED CONSTRUCTION OF THE CAMDEN 1 WIND ENERGY FACILITY

NEAR ERMELO, MPUMALANGA PROVINCE

PRELIMINARY VISUAL SENSITIVITY: CAMDEN 1 WEF

Legend

- National Routes
- District Roads
- Rail Network
- Existing High Voltage Power Lines (>=400kV)
- Camden Power Station
- Camden 1 WEF Project Area
- Zones of Potential Visual Sensitivity
- Prominent Ridges
- Farmhouses / Residences

WEF Elements

- Proposed Turbine Positions
- Substation / Bess Sites
- Construction Camp / Batching Plant Sites
- Temporary Laydown Areas
- Internal Road Network

SOURCE:
ESKOM, 2012
GOOGLE EARTH, 2021

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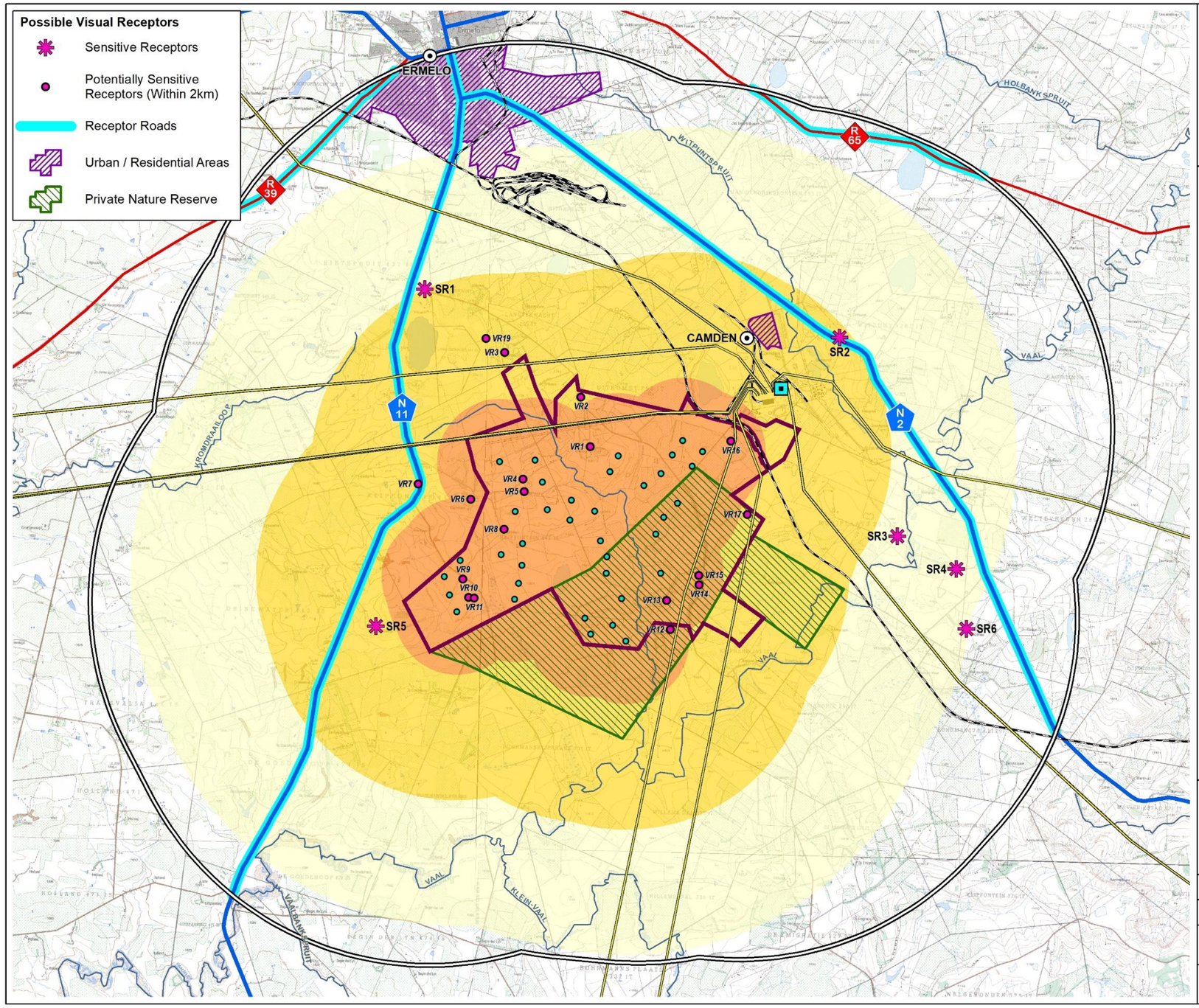
Project No	Prepared By	Date
15875	KLS	13/04/2022
Map Ref No	**Revision**	**Date**
15875/C1W_E10	0	

MAP 11: Potentially Sensitive Receptor Locations - Camden I WEF



PROPOSED CONSTRUCTION OF THE CAMDEN 1 WIND ENERGY FACILITY

NEAR ERMELO, MPUMALANGA PROVINCE

POTENTIALLY SENSITIVE VISUAL RECEPTOR LOCATIONS: CAMDEN 1 WEF

Legend

- Main Towns
- National Routes
- Arterial Routes
- Rail Network
- Rivers
- Existing High Voltage Power Lines (>=400kV)
- Camden Power Station
- Camden 1 WEF Project Area
- Proposed Turbine Positions
- 10km WEF Visual Assessment Zone

Zones of Potential Visual Impact (Distance from Nearest Turbine)

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

SOURCE:
ESKOM, 2012
NFEPA, 2011

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Kilometers

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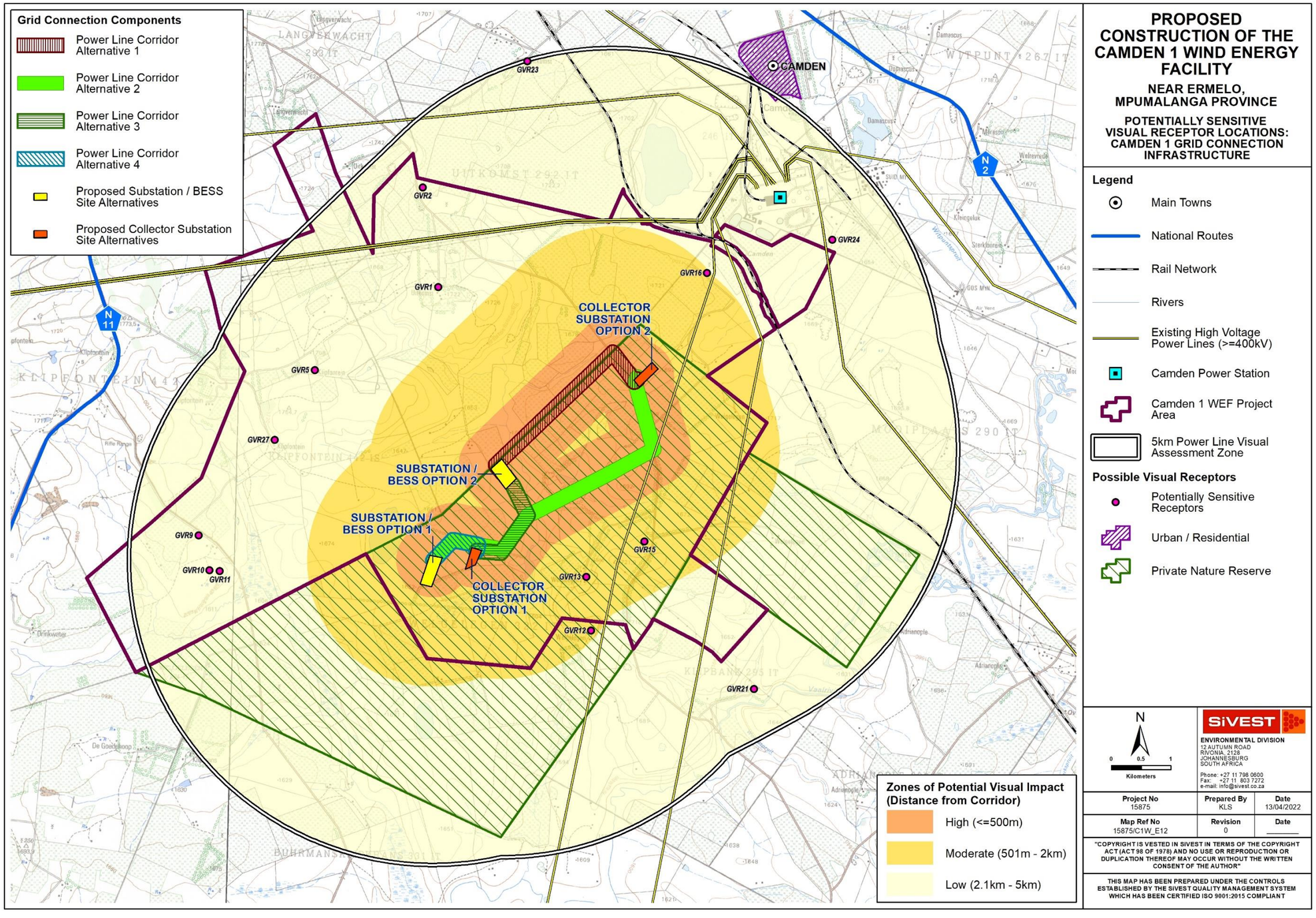
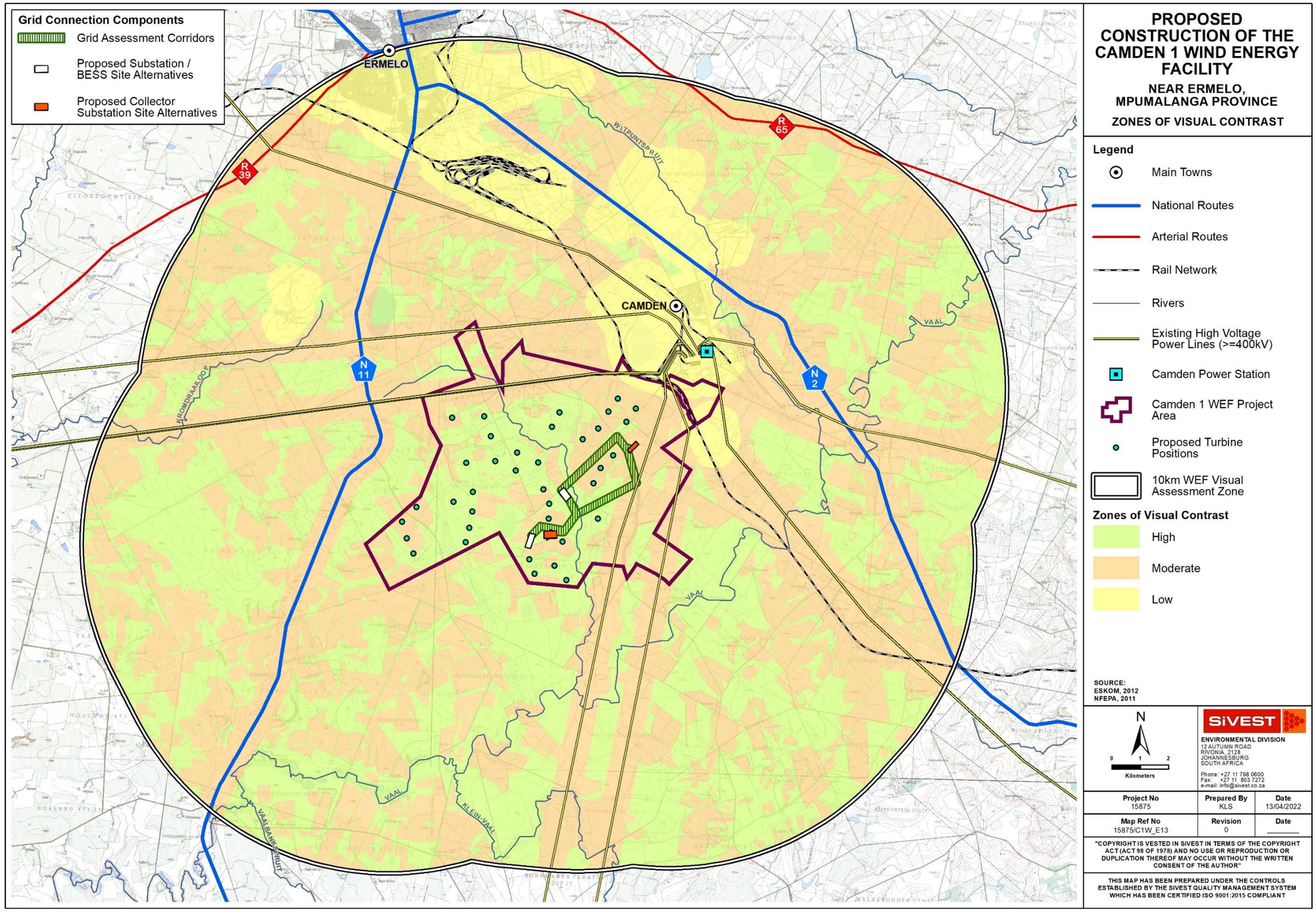
Project No	Prepared By	Date
15875	KLS	13/04/2022
Map Ref No	**Revision**	**Date**
15875/C1W_E11	0	

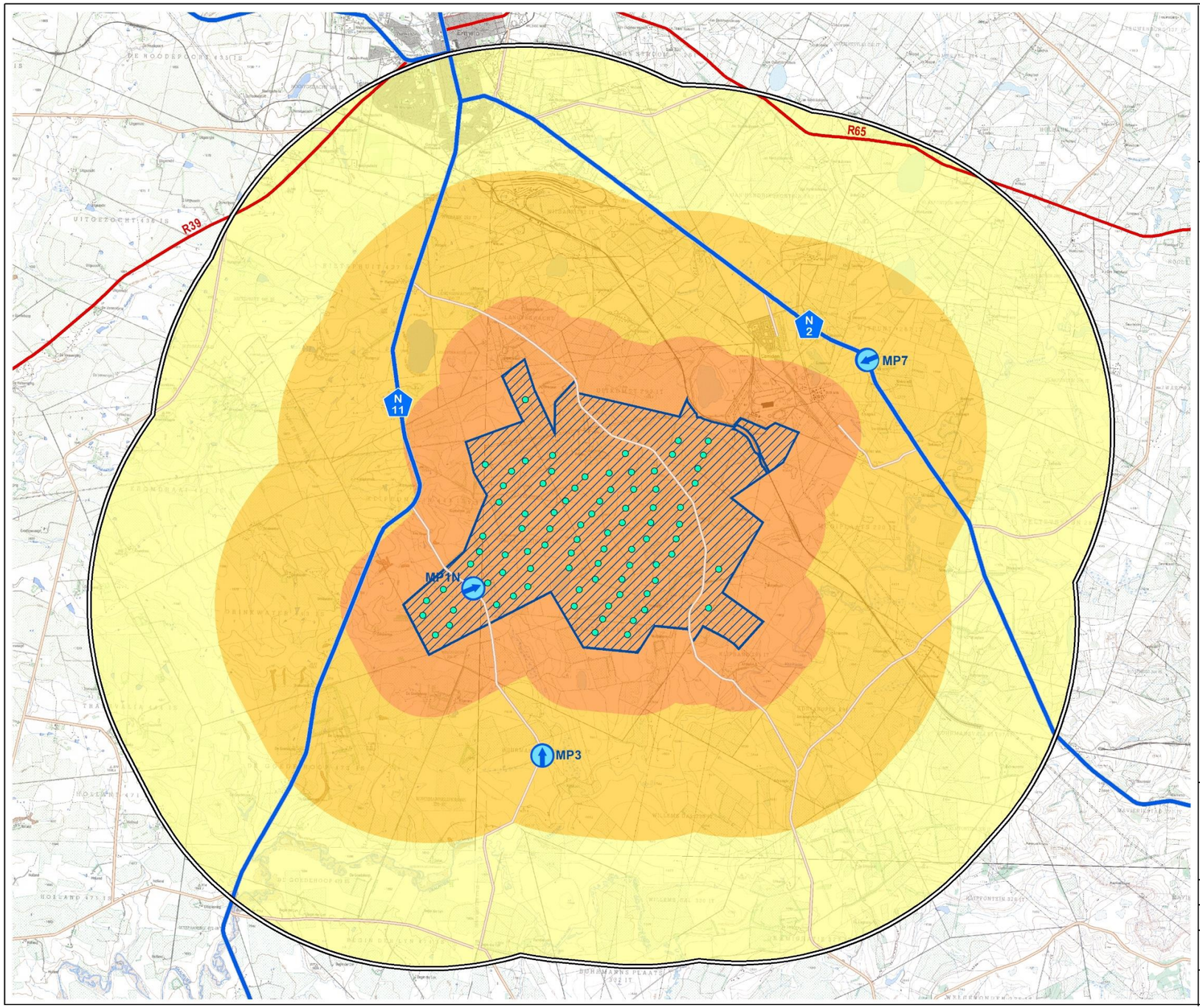
MAP 12: Potentially Sensitive Receptor Locations - Camden I WEF Grid Connection Infrastructure



MAP 13: Zones of Visual Contrast



MAP 14: Photomontage View Points



PROPOSED CONSTRUCTION OF THE CAMDEN 1 WIND ENERGY FACILITY

NEAR ERMELO, MPUMALANGA PROVINCE

PRELIMINARY PHOTOMONTAGE VIEW POINTS

Legend

- National Routes
- Main Routes
- Secondary Roads
- Camden 1 WEF Project Area (2019)
- 10km Visual Assessment Zone
- Proposed Turbine Positions (2019)
- View Points

Zones of Potential Visual Impact (Distance from Project Area Boundary)

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

SOURCE:
NGI, 2014

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Kilometers

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Project No	Prepared By	Date
15875	KLS	13/04/2022
Map Ref No	**Revision**	**Date**
15875/C1W_E14	0	

Table 1: Comparative Assessment of Alternatives – Camden I WEF On-Site Infrastructure

Alternative	Preference	Reasons (incl. potential issues)
SUBSTATION AND BESS SITE		
Option 1	Favourable	▪ Option 1 is located on relatively flat terrain in a river valley and would not be exposed on the skyline. ▪ There are no sensitive receptors within 5km of this alternative. ▪ The closest potentially sensitive receptors to this alternative are all more than 2km away. The visual impacts from Option 1 affecting these receptors are therefore rated as low. ▪ In light of the above, there are no fatal flaws associated with Option 1 and, this alternative is considered **favourable** from a visual perspective.
Option 2	Favourable	▪ Option 2 is located on sloping terrain, on the side of a river valley and as such would only be partially exposed on the skyline. ▪ There are no sensitive receptors within 5km of this alternative. ▪ The closest potentially sensitive receptors to this alternative are all more than 2km away. The visual impacts from Option 2 affecting these receptors are therefore rated as low. ▪ In light of the above, there are no fatal flaws associated with Option 2 and this alternative is considered **favourable** from a visual perspective..
TEMPORARY LAYDOWN AREAS		
Option 1	Favourable	▪ Option 1 is located on slightly higher slopes and as such would only be partially exposed on the skyline. ▪ There are no sensitive receptors within 5km of this alternative. ▪ The closest potentially sensitive receptor to this alternative is approximately 350 m away, this being VR4. The visual impacts from Option 1 affecting this receptor are therefore rated as High. However, impacts are likely to be reduced due to the fact that this receptor is located on the Camden I WEF development site and it is known that residents at this location support the WEF development. Hence these residents would not perceive the proposed development in a negative light. The remaining receptors are all more than 500 m away and would only be subjected to moderate or low levels of impact ▪ In light of the above, there are no fatal flaws associated with Option 1 and this alternative is considered **Favourable** from a visual perspective.
Option 2	Favourable	▪ Option 2 is located on slightly higher slopes and as such would only be partially exposed on the skyline. ▪ The closest sensitive receptor to this alternative is some 3.6 km away, this being SR5. Impacts from Option 2 affecting this receptor would therefore be rated as Low**.** ▪ The closest potentially sensitive receptor to this alternative is approximately 560 m away, this being VR9. The visual impacts from Option 2 affecting this receptor are therefore rated as moderate. However, impacts are likely to be reduced due to the fact that this receptor is located on the Camden I WEF development site and it is known that residents at this location support the WEF development. Hence these residents would not

Alternative	Preference	Reasons (incl. potential issues)
		perceive the proposed development in a negative light. The remaining receptors are all more than 500 m away and would only be subjected to moderate or low levels of impact ▪ In light of the above, there are no fatal flaws associated with Option 2 and this alternative is considered F**avourable** from a visual perspective.
TEMPORARY CONSTRUCTION CAMP / CEMENT BATCHING PLANT		
Option 1	Favourable	▪ Option 1 is located on slightly higher slopes and as such would only be partially exposed on the skyline. ▪ There are no sensitive receptors within 5km of this alternative. ▪ The closest potentially sensitive receptor to this alternative is approximately 600 m away, this being VR1. The visual impacts from Option 1 affecting this receptor are therefore rated as moderate. However, impacts are likely to be reduced due to the fact that this receptor is located on the Camden I WEF development site and it is known that residents at this location support the WEF development. Hence these residents would not perceive the proposed development in a negative light. The remaining receptors are all more than 500 m away and would only be subjected to moderate or low levels of impact ▪ This Option is located in relatively close proximity to high voltage power lines and is adjacent to District Road D260 and this factor would reduce the level of contrast, thus reducing the visual impact of this site alternative. ▪ In light of the above, there are no fatal flaws associated with Option 1 and this alternative is considered **Favourable** from a visual perspective.
Option 2	Favourable	▪ Option 2 is located on slightly higher slopes and as such would only be partially exposed on the skyline. ▪ There are no sensitive receptors within 5km of this alternative. ▪ The closest potentially sensitive receptor to this alternative is approximately 1.1 km away, this being VR13. The visual impacts from Option 2 affecting this receptor are therefore rated as moderate. However, impacts are likely to be reduced due to the fact that this receptor is located on the Camden I WEF development site and it is known that residents at this location support the WEF development. Hence these residents would not perceive the proposed development in a negative light. The remaining receptors are all more than 500 m away and would only be subjected to moderate or low levels of impact ▪ This Option is located in relatively close proximity to both site alternatives for the proposed substation complex, and this factor would reduce the level of contrast, thus reducing the visual impact of this site alternative. ▪ In light of the above, there are no fatal flaws associated with Option 2 and this alternative is considered **Favourable** from a visual perspective.

Table 2: Comparative Assessment of Alternatives – Camden I WEF 132kV Grid Connection Infrastructure

Alternative	Preference	Reasons (incl. potential issues)
CAMDEN I GRID		
Power Line Corridor Option 1	Favourable	▪ Corridor Option 1 is approximately 3.6 km in length, linking substation Option 2 to Camden Collector Substation Option 2 ▪ This corridor is entirely within the Camden I WEF project area. ▪ This route alignment does not traverse any ridges and as such will only be marginally exposed on the skyline. ▪ The closest potentially sensitive receptors to this alternative are all more than 2km away and as such the visual impacts from Option 1 affecting these receptors would be rated as low. ▪ There are no fatal flaws associated with Option 1 and this alternative is considered **Favourable** from a visual perspective.
Power Line Corridor Option 2	Favourable	▪ Corridor Option 2 is 5.7km in length), linking substation Option 1 to Camden Collector Substation Option 2. ▪ This corridor is entirely within the Camden I WEF project area. This route alignment does not traverse any ridges and as such will only be marginally exposed on the skyline. ▪ The closest potentially sensitive receptor to this corridor are between 1.1 and 1.2km away and are expected to be subjected to moderate levels of visual impact as a result of the power line. However, the proximity of these receptors to the existing transmission lines would reduce the level of impact experienced. The remaining receptors are all more than 2 km away and would only be subjected to low or negligible levels of impact. ▪ There are no fatal flaws associated with Option 2 and this alternative is considered **Favourable** from a visual perspective.
Power Line Corridor Option 3	Favourable	▪ Corridor Option 3 is 1.9km in length, linking substation Option 2 to Camden Collector Substation Option 1. ▪ This corridor is entirely within the Camden I WEF project area. ▪ This route alignment does not traverse any ridges and as such will only be marginally exposed on the skyline. ▪ The closest potentially sensitive receptors to this corridor are between 1.3 and 1.9km away and are expected to be subjected to moderate levels of visual impact as a result of the power line. However, the proximity of these receptors to the existing transmission lines would reduce the level of impact experienced. The remaining receptors are all more than 2 km away and would only be subjected to low or negligible levels of impact. ▪ There are no fatal flaws associated with Option 2 and this alternative is considered **Favourable** from a visual perspective.
Power Line Corridor Option 4	Preferred	▪ Corridor Option 4 is only 1km in length, linking substation Option 1 to Camden Collector Substation Option 1. ▪ This corridor is entirely within the Camden I WEF project area. ▪ This route alignment does not traverse any ridges and as such will only be marginally exposed on the skyline. ▪ The closest potentially sensitive receptor to this corridor is 1.8km away and is only expected to be subjected to moderate levels of visual impact as a result of the power line. However, the proximity

Alternative	Preference	Reasons (incl. potential issues)
		of this receptor to the existing transmission lines would reduce the level of impact experienced. The remaining receptors are all more than 2 km away and would only be subjected to low or negligible levels of impact. ▪ There are no fatal flaws associated with this option and considering the short length of the power line, this alternative is expected to result in less visual impact and as such is **Preferred** from a visual perspective.

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