APPENDIX

# F-7 VISUAL

# VISUAL IMPACT ASSESSMENT FOR THE PROPOSED IMPUMELELO WIND ENERGY FACILITY GRID CONNECTION INFRASTRUCTURE

Prepared for: ENERTRAG SOUTH AFRICA (PTY) LTD

Authority References: TBA

SLR Project No.: 720.05085.00010
Report No.: Version 1
Revision No.:
December 2022

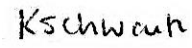
# DOCUMENT INFORMATION

| | |
|---|---|
| Title | Visual Impact Assessment for The Proposed Impumelelo Wind Energy Facility Grid Connection Infrastructure |
| Project Manager | Kerry Lianne Schwartz |
| Project Manager Email | klschwartz@slrconsulting.com |
| Author | Kerry Lianne Schwartz |
| Reviewer | Liandra Scott Shaw |
| Keywords | |
| Status | Draft |
| Report No. | Version 1 |
| SLR Company | SLR Consulting (South Africa) |

# DOCUMENT REVISION RECORD

| Rev No. | Issue Date | Description | Issued By |
|---|---|---|---|
| A | | | |

# REPORT SIGN OFF AND APPROVALS



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**Kerry Lianne Schwartz**
**(Project Manager)**

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**Liandra Scott Shaw**
**(Reviewer)**

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# EXECUTIVE SUMMARY

Impumelelo Wind (Pty) Ltd (hereafter referred to as "Impumelelo") is proposing to develop Electrical Grid Infrastructure (EGI) comprising a 132kV powerline and associated infrastructure near Secunda in Mpumalanga Province. The aim of the project is to transmit the electricity generated by the proposed Impumelelo Wind Energy Facility (WEF) to the Zandfontein Substation some 30km away.

This proposed EGI project is currently the subject of an Environmental Authorisation (EA) application being submitted under the Environmental Impact Assessment (EIA) Regulations, 2014, as amended. The proposed Impumelelo WEF and associated on-site infrastructure is the subject of a separate on-going Environmental Impact Assessment (EIA) Process which is currently being undertaken in parallel to this Basic Assessment (BA) process. The competent authority for this BA is the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (MDARDLEA).

This Visual Impact Assessment (VIA) is being undertaken as part of the BA process.

The VIA has determined that the study area has a somewhat mixed visual character, transitioning from the heavily transformed urban / peri-urban landscape associated with the Embalenhle and Evander urban areas and the Sasol Secunda fuel plant in the north-east and Impumelelo Mine in the south-west to a more rural / pastoral character across the remainder of the study area. Hence, although EGI development would alter the visual character and contrast with this rural / pastoral character, the location of the proposed EGI in relatively close proximity to these transformed areas as well as the associated extensive powerline network will significantly reduce the level of contrast.

A broad-scale assessment of visual sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a **low** visual sensitivity. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs. No formal protected areas, leisure-based tourism activities or ***sensitive*** receptor locations were identified in the study area, thus confirming the low level of visual sensitivity.

The desktop assessment did however identify multiple farmsteads within the study area that could be considered to be receptors, although not all of them would be sensitive to the proposed development. These farmsteads are however regarded as *potentially* sensitive visual receptors as elements of the proposed development could potentially alter natural or semi-natural vistas experienced from these locations. At this stage however, local sentiments towards the proposed development are not known.

A total of forty-five (45) receptors were identified within 5 kms of the Impumelelo EGI combined assessment corridor, three (3) of which are outside the viewshed for the EGI. None of the remaining receptors are considered sensitive.

Only one (1) potentially sensitive receptor (VR40) is expected to experience high levels of visual impact. This receptor, along with VR35, VR36 and VR41, is located within the Impumelelo WEF project area and as such the respective landowners are not expected to perceive the proposed development in a negative light

Thirty (30) receptor locations are expected to experience moderate levels of impact as a result of the Impumelelo EGI development, while the remaining fourteen (14) would only experience low levels of visual impact.

Although the R50 Main Road could be considered a potentially sensitive receptor road, the likely visual impacts of the proposed development on motorists utilising this route would be reduced by the level of transformation and landscape degradation visible from the road and also by the presence of high voltage powerlines adjacent to the road. Visual impacts affecting the R50 are rated therefore rated as **LOW.**

A preliminary assessment of overall impacts revealed that visual impacts (post mitigation) associated with the proposed Impumelelo EGI are of **LOW** significance during construction, operation and decommissioning phases, with a number of mitigation measures available.

Considering the presence of existing mining and industrial activity and proposals for renewable energy facilities in the broader area, the introduction of new EGI 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 route 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 either of the site alternatives and both alternatives were found to be **Favourable** from a visual perspective.

From a visual perspective therefore, the proposed Impumelelo EGI project is deemed acceptable, and the Environmental Authorisation (EA) should be granted. SLR Consulting 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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# ACRONYMS AND ABBREVIATIONS

| Acronym / Abbreviation | Definition |
|---|---|
| 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 |
| DSR | Draft Scoping Report |
| DEM | Digital Elevation 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 |
| MDARDLEA | Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs |
| NGI | National Geo-Spatial Information |
| PV | Photovoltaic |
| REF | Renewable Energy Facility |
| REIPPP | Renewable Energy Independent Power Producer Programme |
| SANBI | South African National Biodiversity Institute |
| SEF | Solar Energy Facility |
| VIA | Visual Impact Assessment |
| VR | Visual Receptor |
| WEF | Wind Energy Facility |

# GLOSSARY

| Definitions | |
|---|---|
| **Anthropogenic feature** | An unnatural feature resulting from human activity. |
| **Cultural landscape** | A representation of the combined worlds of nature and of man illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal (World Heritage Committee, 1992). |
| **Sense of place** | The unique quality or character of a place, whether natural, rural or urban. It relates to uniqueness, distinctiveness or strong identity. |
| **Scenic route** | A linear movement route, usually in the form of a scenic drive, but which could also be a railway, hiking trail, horse-riding trail or 4x4 trail. |
| **Sensitive visual receptors** | An individual, group or community that is subject to the visual influence of the proposed development and is adversely impacted by it. They will typically include locations of human habitation and tourism activities. |
| **Slope Aspect** | Direction in which a hill or mountain slope faces. |
| **Study area / Visual assessment zone** | The study area or visual assessment zone is assumed to encompass a zone of 5 km from the outer boundary of the proposed Solar PV Facility application site. |
| **Viewpoint** | A point in the landscape from where a particular project or feature can be viewed. |
| **Viewshed / Visual Envelope** | The geographical area which is visible from a particular location. |
| **Visual character** | The pattern of physical elements, landforms and land use characteristics that occur consistently in the landscape to form a distinctive visual quality or character. |
| **Visual contrast** | The degree to which the development would be congruent with the surrounding environment. It is based on whether or not the development would be in conformity 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. |

# Visual Impact Assessment for The Proposed Impumelelo Wind Energy Facility Grid Connection Infrastructure

## 1. INTRODUCTION

This report serves as the Visual Specialist Basic Assessment Report input that was prepared as part of the Basic Assessment (BA) for the proposed development of a 132kV gridline and associated infrastructure, near Secunda in Mpumalanga Province.

### 1.1 SCOPE AND OBJECTIVES

Impumelelo Wind (Pty) Ltd (hereafter referred to as "Impumelelo") is proposing to develop Electrical Grid Infrastructure (EGI) comprising a 132kV powerline and associated infrastructure near Secunda in Mpumalanga Province. The aim of the project is to transmit the electricity generated by the proposed Impumelelo Wind Energy Facility (WEF) to the Zandfontein Substation, some 30 km away.

This proposed EGI project is currently the subject of an Environmental Authorisation (EA) application being submitted under the Environmental Impact Assessment (EIA) Regulations, 2014, as amended. The proposed Impumelelo WEF and associated on-site infrastructure is the subject of a separate on-going Environmental Impact Assessment (EIA) Process which is currently being undertaken in parallel to this Basic Assessment (BA) process. The competent authority for this BA is the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (MDARDLEA).

This Visual Impact Assessment (VIA) is being undertaken as part of the BA process.

Prior to commencing with the Visual Specialist Assessment in accordance with the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on the Visual Theme (Government Notice 320, dated 20 March 2020), a site sensitivity verification was undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool).

The aim of the VIA is to identify potential visual issues associated with the proposed development, as well as to determine the potential extent of visual impacts. This involves characterising the visual environment of the area and identifying areas of potential visual sensitivity that may be subject to visual impacts. This visual assessment focuses on the potentially sensitive visual receptor locations and provides an assessment of the magnitude and significance of the visual impacts associated with the proposed development.

### 1.2 DETAILS OF SPECIALIST

This specialist assessment was undertaken by Kerry Schwartz of SLR Consulting, a GIS specialist with more than 20 years' experience in the application of GIS technology in various environmental, regional planning and infrastructural projects. Kerry's GIS skills have been extensively utilised in projects throughout South Africa and in other Southern African countries. Kerry has also undertaken many VIAs in recent years.

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

## 1.3 TERMS OF REFERENCE

Specific requirements for the Visual Impact Assessment (VIA) are outlined below.

- Comply with the Assessment Protocols that were published on 20 March 2020, in Government Gazette 43110, GN 320. This specifically includes Part A, which provides the Site Sensitivity Verification Requirements where a Specialist Assessment is required but no Specific Assessment Protocol has been prescribed.
- Provide a Site Sensitivity Verification Report based on the requirements documented in the Assessment Protocols published on 20 March 2020, in Government Gazette 43110, GN 320.
- Compile a Visual Impact Assessment (VIA) in compliance with Appendix 6 of the 2014 NEMA EIA Regulations (as amended). The Specialist Assessment must also be in adherence to any additional relevant legislation and guidelines that may be deemed necessary. It must also comply with the report templates provided by the Environmental Assessment Practitioner (EAP).
- Provide inputs to the Draft BA Report to include a description of the affected environment and environmental sensitivities, key legislation, key issues and detailed assessment of impacts. A template for such inputs will be provided by the EAP.
- The specialist must undertake a site visit in order to identify the level of sensitivity assigned to the project area on the Screening Tool, and to verify and confirm this sensitivity and land-use, as well as to comply with the requirements of Part A of the Assessment Protocols published on 20 March 2020, in Government Gazette 43110, GN 320.
- Determine, describe and map the baseline environmental condition and sensitivity of the study area. Specify set-backs or buffers, and provide clear reasons for these recommendations.
- Provide sensitivities in KMZ or similar GIS format.
- Provide review input on the preferred powerline routing and infrastructure layout following the sensitivity analysis and layout identification.
- The report must describe the visual character of the local area. Any significant visual features or visual disturbances should be identified and mapped, as well as any sensitive visual receptors within the proposed project area or within viewsheds of the projects.
- Visual character and visual absorption capacity should be described.
- Viewsheds for various elements of the proposed development should be calculated, defined and presented, and the varying sensitivities of these viewsheds must be highlighted.
- Mapping of visual sensitivity of the site will require consideration of visual receptors outside the site, and sensitivity to development on the site for potentially affected visual receptors of “very high” sensitivity.
- Assessment to be based on a site visit, visual modelling, and a photographic survey of the surrounding region from which the landscape and visual baselines can be prepared. The assessment must also consider the maps generated by the National Screening Tool.
- Identify and assess the potential direct, indirect and cumulative impacts of the proposed development on the receiving environment from a visual perspective. Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology must follow that

contained in Section B of this Terms of Reference (ToR), as provided by the Environmental Assessment Practitioner (EAP).

- Schematic portrayals of the visual impact of the proposed project infrastructure on the different viewsheds identified must be presented. All impacts should be considered under varying conditions as appropriate to the study i.e., day, night, clear weather, cloudy weather etc.
- Maps depicting viewsheds/line of sight across the site should be generated and included in the reports. These maps should indicate current viewsheds/visual landscape/obstructions as well as expected visual impacts during the construction, operational and decommissioning phases of the proposed development.
- Identify any protocols, legal and permit requirements that are relevant to this project and the implications thereof.
- Provide recommendations with regards to potential monitoring programmes.
- Determine mitigation and/or management measures which could be implemented to as far as possible reduce the effect of negative impacts and enhance the effect of positive impacts. Also identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This must be included in the EMPr.
- Incorporate and address all review comments made by the Project Team (EAP and Project Applicant) during the various revisions of the specialist report.
- Incorporate and address all issues and concerns raised by Stakeholders, Competent Authority, I&APs and the public during the Public Participation Process (where relevant and applicable).
- Review the Generic EMPr for 1) Powerlines and 2) Substations (GN 435) and confirm if there are any specific environmental sensitivities or attributes present on the site and any resultant site specific impact management outcomes and actions that are not included in the pre-approved generic EMPr (Part B – Section 1). If so, provide a list of these specific impact management outcomes and actions based on the format of the report template provided by the EAP.

# 2. APPROACH AND METHODOLOGY

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

## 2.1 PHYSICAL LANDSCAPE CHARACTERISTICS

Physical landscape characteristics such as topography, vegetation and land use are important factors influencing the visual character and visual sensitivity of the study area. Baseline information about the physical characteristics of the study area was initially sourced from spatial databases provided by National Geospatial Information (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 a site visit.

## 2.2 IDENTIFICATION OF SENSITIVE AND POTENTIALLY SENSITIVE RECEPTOR LOCATIONS

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

## 2.3 FIELDWORK AND PHOTOGRAPHIC REVIEW

A two (2) day site visit was undertaken between the 25th and 26th of January 2022 (mid-summer). The aim of the site visit was to:

- verify the landscape characteristics identified via desktop means;
- conduct a photographic survey of the proposed study area;
- verify 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
- assist with the assessment and rating of receptor impacts.

## 2.4 IMPACT ASSESSMENT

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

A separate rating matrix was used to assess the visual impact of the proposed EGI project on the visual receptor locations (both sensitive and potentially sensitive), as identified. This matrix is based on three 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.

## 2.5 CONSULTATION WITH I&APS

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

## 2.6 INFORMATION SOURCES

The main sources of information which were utilised for the VIA are listed in Error! Reference source not found. below:

**Table 1: Sources of Information**

| Data / Information | Source | Date | Type | Description |
|---|---|---|---|---|
| Elevation data | NGI | 2011 | Spatial | 5m contour national coverage - prone to inaccuracies. |
| 1: 50 000 Topographical Maps | NGI | Various | Spatial | Topographical map series used as background. |

| Data / Information | Source | Date | Type | Description |
|---|---|---|---|---|
| Land Cover Data | DFFE (GEOTERRAIMAGE) | 2020 | Spatial | 2020 South African National Land-Cover Dataset. |
| Vegetation Classification | SANBI | 2018 | Spatial | SANBI VegMap based on vegetation Rutherford & Mucina classification 2012. |
| Satellite Imagery | Google Earth | 2022 | Spatial | Google Earth Imagery. |
| South African National Protected Areas Database (SAPAD) | DFFE | 2022, Q1 | Spatial | Spatial delineation of protected areas in South Africa. Updated quarterly. |
| National Protected Areas Expansion Strategy (NPAES) | SANBI | 2008 | Spatial | Spatial delineation of protected areas in South Africa. |
| The National web-based Environmental Screening Tool. | DFFE | 2022 | Report & spatial | High level identification of areas of environmental sensitivities. |
| SA REEA | DFFE | 2022, Q2 | Spatial | SA Renewable Energy EIA Application Database (REEA) |

## 2.7 ASSUMPTIONS, KNOWLEDGE GAPS AND LIMITATIONS

Assumptions, knowledge gaps and limitations relevant to this study are outlined below:

- This visual study has been undertaken based on the project description provided by the Developer and the EAP at the inception of the project.
- Powerlines are very large structures by nature and could impact on receptors that are located relatively far away, particularly in areas of very flat terrain. Given the nature of the receiving environment and the height of the various components of the proposed EGI, the study area or visual assessment zone is assumed to encompass a zone of 5 km from the outer boundary of the combined powerline assessment corridors. This 5 km limit on the visual assessment zone relates to the importance of distance when assessing visual impacts. Although the proposed development may still be visible beyond 5 km, the degree of visual impact would be considerably diminished and as such the need to assess the impact on potential receptor locations beyond this distance would not be warranted.
- The identification of visual receptors involved a combination of desktop assessment as well as field-based observation. Initially Google Earth imagery was used to identify potential receptors within the study area. Where possible, these receptor locations were verified and assessed during a site visit which was undertaken between the 25$^{th}$ and 26$^{th}$ of January 2022. 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, several broad assumptions have been made in terms of the likely sensitivity of the receptors to the proposed development. It should be noted that not all receptor locations would necessarily perceive the proposed development in a negative way. This is usually dependent on the use of the facility, the economic dependency of the occupants on the scenic quality of views from the facility and on people's perceptions of the value of "Green Energy". Sensitive receptor locations typically include sites such as tourism facilities and scenic locations within natural settings which are likely to be adversely affected by the visual intrusion of the proposed development. Thus, the presence of a receptor in an area potentially affected by the proposed development does not necessarily mean that any visual impact will be experienced.

- The potential visual impact at each visual receptor location was assessed using a matrix developed for this purpose. The matrix is based on three main parameters relating to visual impact and, although relatively simplistic, it provides a reasonably accurate indicative assessment of the degree of visual impact likely to be experienced at each receptor location as a result of the proposed development. It is however important to note the limitations of quantitatively assessing a largely subjective or qualitative type of impact and as such the matrix should be seen merely as a representation of the likely visual impact at a receptor location.
- The exact status of all the receptors could not be verified during the field investigation and as such the receptor impact rating was largely undertaken via desktop means.
- Receptors that were assumed to be farmsteads were still regarded as being potentially sensitive to the visual impacts associated with the proposed development and were thus assessed as part of the VIA.
- Based on the project description provided by the Developer, all analysis for this VIA is based on a worst-case scenario where the maximum height of powerline towers and associated structures is assumed to be 40m.
- Due to the varying scales and sources of information; maps may have minor inaccuracies. Terrain data for this area, derived from the NGI's 5 m Contour Database, 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 analysis did not take into account any existing vegetation cover or built infrastructure which may screen views of the proposed development. This analysis should therefore be seen as a conceptual representation or a worst-case scenario.
- No feedback regarding the visual environment has been received from the public participation process to date. Any feedback from the public during the review period of the Draft Basic Assessment Report (DBAR) will however be incorporated into further drafts of this report, if relevant.
- This study includes a broad assessment of the potential cumulative impacts of other renewable energy developments on the existing landscape character and on the identified sensitive receptors. This assessment is based on the information available at the time of writing the report and where information has not been available, broad assumptions have been made as to the likely impacts of these developments.
- No visualisation modelling was undertaken for the proposed development as this is not normally required for linear infrastructure. This can however be provided should the Public Participation process identify the need for this exercise.
- It should be noted that the site visit was undertaken in late January 2022, during mid-summer, which is characterised by higher levels of rainfall and increased vegetation cover. In these

conditions, slightly reduced levels of visual impact will be experienced from receptor locations in the surrounding area.

- In clear weather conditions, powerlines and associated infrastructure would present a greater contrast with the surrounding landscape than they would on a cloudy overcast day. The field investigation was conducted during clear to partly cloudy weather conditions.

# 3. DESCRIPTION OF PROJECT ASPECTS RELEVANT TO THE VISUAL IMPACT ASSESSMENT

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

The proposed EGI is intended to feed the electricity generated by the proposed Impumelelo WEF into a step down substation for private off-take by nearby mining and industrial operations. The electricity will be transferred from the proposed on-site substation at the proposed Impumelelo WEF via a 132 kV power line which extends approximately 30 km in length to Zandfontein Substation.

Powerline assessment corridors with a width of approximately 500 m are being assessed to allow flexibility when determining the final route alignment. The proposed powerline however only requires a 31 m wide servitude which would be positioned within the corridor as required by Eskom.

The type of powerline towers being considered at this stage include both steel lattice and monopole towers and it is assumed that these towers will be located approximately 200 m to 250 m apart. The towers will be up to 40 m in height, depending on the terrain, but will ensure minimum overhead line clearances from buildings and surrounding infrastructure. The exact location of the towers will be determined during the final stages of the powerline design process.

## 3.1 VISUAL IMPLICATIONS

Powerline towers, substations and associated structures are very large objects and thus highly visible. According to the project description as outlined above, the maximum tower height envisaged for the proposed powerline is 40 m (equivalent in height to a thirteen-storey building). Although a tower / pylon 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 proposed powerline comprises a series of towers typically spaced approximately 200 m to 250 m apart in a linear alignment.

The degree of visibility of an object informs the level and intensity of the visual impact, but other factors also influence the nature of the visual impact. The landscape and aesthetic context of the environment in which the object is placed, as well as the perception of the viewer are also important factors. In the context of a powerline, the type of tower used as well as the degree to which the towers would impinge upon or obscure a view is also a factor that will influence the experience of the visual impacts.

As described above, powerlines are not features of the natural environment but are rather representative of human (anthropogenic) alteration of the natural environment. Thus, powerlines could be perceived to be highly incongruous in the context of a largely natural landscape. The height and linear nature of the

proposed powerline will exacerbate this incongruity, as the towers may impinge on views within the landscape. In addition, the practice of clearing any taller vegetation from areas within the powerline servitude can increase the visibility and incongruity of the structure. In a largely natural, bushier setting, vegetation clearance will cause fragmentation of the natural vegetation cover, thus making the proposed powerline more visible and drawing the viewer's attention.

The viewer's / receptor's perception of the development is also very important as certain receptors may not consider the development of a powerline to be a negative visual impact. The scenic / aesthetic value of an area and the prevalent land use practices also tend to affect people's perception of whether a powerline is an unwelcome intrusion, and this in turn will determine the sensitivity of the identified receptors to the proposed development.

Powerlines and substations are often perceived as a visual intrusion in areas where value is placed on the scenic or aesthetic character of the area, and where activities, which are based upon the enjoyment of, or exposure to, the scenic or aesthetic features of the area are practiced. Sensitivity to visual impacts is typically most pronounced in areas set aside for conservation of the natural environment (such as protected natural areas or conservancies), or in areas in where the natural character or scenic beauty of the area attracts visitors (tourists). Residents and visitors to these areas may perceive powerlines and associated infrastructure to be an unwelcome intrusion that would degrade the natural character and scenic beauty of the area, and which could potentially even compromise the practicing of tourism activities in the area.

Conversely, the presence of other anthropogenic objects associated with the built environment may influence the perception of whether a powerline is a visual impact. Where industrial-type built-form exists, (such as renewable energy facilities, mining activities, roads, railways and other electricity infrastructure), the visual environment could be considered to be "degraded" and thus the introduction of a new powerline and associated infrastructure into this setting may be considered to be less of a visual impact than if there was no existing built infrastructure visible.

In this context therefore, the visual contrast associated with the introduction of new powerline and substation development will be lessened due to the presence of the heavily transformed peri-urban landscape associated with Secunda and Embelenhle as well as mining activity and existing powerline and road infrastructure that dominates the north-eastern sector of the study area.

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

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

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

# 4. BASELINE ENVIRONMENTAL DESCRIPTION

## 4.1 GENERAL DESCRIPTION

### 4.1.1 Site Locality

The proposed Impumelelo EGI project is located approximately 13 km east of Secunda in the Govan Mbeki Local Municipality, extending into the Dipaleseng Local Municipality in Mpumalanga Province (**Map 1 in Appendix F**).

The proposed 132 kV powerline route alternatives are shown in **Map 2** in **Appendix F**.

### 4.1.2 Topography

The broader area surrounding the proposed Impumelelo EGI is characterised by a mix of flat to undulating plains (**Figure 1** and **Figure 2**) intersected by shallow river valleys. Areas of slightly higher elevation occur in the south-western sector of the study area. Slopes across the study area are relatively gentle to moderate, with steeper slopes being largely associated with the more incised river valleys.

**Figure 1: View north from the R547 Main Road showing flat to slightly undulating plains typical of the study area**

**Figure 2: View north-east towards Impumelelo Mine showing slightly undulating terrain affecting much of the combined grid assessment corridor.**

The topography and slope characteristics of the study area are illustrated in **Map 3 and Map 4 in Appendix F,** respectively.

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 view 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 powerline towers are large structures (potentially up to 40 m in height), these structures could potentially be visible from an extensive area around the grid connection infrastructure. GIS technology was used to undertake a preliminary visibility analysis for the proposed powerline route alignments. This analysis was based on points at 250 m intervals along the centre line of the corridor alternatives, and assumes a tower height of 40 m. The resulting viewshed indicates the geographical area from where the proposed powerlines would theoretically be visible, i.e., the zone of visual influence (or viewshed). This analysis is based entirely on topography (relative elevation and aspect) and does not take into account any existing vegetation cover or built infrastructure which may screen views of the proposed development. In addition, detailed topographic data was not available for the broader study area and as such the viewshed analysis does not take into account any localised topographic variations which may constrain views. This analysis should therefore be seen as a conceptual representation or a worst-case scenario.

The resulting viewshed, as shown in **Map 5 in Appendix F**. indicates that sections of the proposed powerline would be visible from most parts of the study area, although the undulating topography has resulted in some (limited) areas falling outside the combined viewshed for the proposed powerline. In addition, the degree of visibility from areas at the southern end of the grid assessment corridors is noticeably lower than in the remainder of the study area.

### 4.1.3 Vegetation

According to Mucina and Rutherford (2006), the study area is dominated by the Soweto Highveld Grassland vegetation type (**Map 6 in Appendix F**) which is characterised by short to medium-high dense, tufted grassland (**Figure 3**).

**Figure 3: Grassland visible in the south-western sector of the study area.**

Much of the natural vegetation cover has however been partly removed or transformed by cultivation and clusters of tall exotic trees scattered across the study area, around farmsteads and along access roads (**Figure 4**).

**Figure 4: Typical example of tall trees planted around a farmhouse within the study area.**

Visual Implications

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

### 4.1.4 Land Use

According to the South African National Land Cover dataset (Geoterraimage 2020), much of the visual assessment area is classified as “Cultivated Land” interspersed with significant areas of “Grassland” and “waterbodies”. Small tracts of forested land and numerous water bodies are scattered throughout the study area (**Map 7** in **Appendix F**).

Commercial agriculture is the dominant activity in the study area, with the main focus being maize cultivation (**Figure 5**) with some limited livestock (**Figure 6**) and game farming. 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, power and telephone lines and fences.

**Figure 5: Commercial agriculture in the study area**

**Figure 6: View from R547 Main Road of cattle grazing in the study area.**

High levels of human influence are however visible in the north-eastern sector the study area. The town of Embalenhle lies on the north-eastern boundary of the study area while Evander, and the Sasol Secunda Fuel Plant are both just outside the study area. The peri-urban areas associated with the towns extending into the study area are dominated by industrial / mining activity. In addition, the Impumelelo Mine (**Figure 7**), located in the south-western sector of the study area has resulted in significant transformation in the

landscape. These activities have resulted in a significant degree of transformation in the study area. High voltage power lines (Figure 10), contribute further to the overall transformation of the landscape in this area, with 400kV lines traversing the southern and eastern sectors of the study area.

**Figure 7: View of Impumelelo Mine in the south-western sector of the study area**

**Figure 8: High voltage powerlines traversing the southern sector of the study 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 Impumelelo powerline development could potentially alter the visual character and contrast with the typical land use and/or pattern and form of human elements present across much of the study area.

In this instance however, high levels of human transformation and visual degradation are evident in the study area, most noticeably in the north-east, where urban/industrial, peri-urban development and mining activity dominate the landscape. In addition, roads and high voltage powerlines have further degraded the visual character of the study area to some degree, and this factor will reduce the level of contrast of the proposed development.

### 4.1.5 Visual Character

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 sector of the study area where the towns of Embalenhle and Evander, as well as mining activities have resulted in a high degree of visual degradation. Further transformation is evident to the south where Impumelelo Mine is located close to the powerline assessment corridors. The more transformed character of the landscape is an important factor in this context, as the introduction of the proposed powerline 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.

Considering this, it is important to assess whether the introduction of a powerline and associated 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, mining and infrastructural development.

### 4.1.6 Visual Absorption Capacity

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

Although the undulating topography in the study area and the areas of cultivation and grassland would reduce the visual absorption capacity, this would be offset considerably by the presence of urban/industrial, mining and infrastructural development in the vicinity of the proposed Impumelelo EGI project.

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

### 4.1.7 Sensitive Visual Receptor Locations

A sensitive visual receptor location is defined as a location from where receptors would potentially be impacted by a proposed development. Adverse impacts often arise where a new development is seen as an intrusion that 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, depending 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 / 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 I&APs, as raised during the public participation process conducted as part of the Environmental Assessment study.

As the visibility of the development would diminish exponentially over distance, receptors that are closer to the development would experience greater adverse visual impacts than those located further away. Zones of visual impact were therefore delineated based on distance bands measured from the edge of the Impumelelo EGI combined assessment corridor. Based on the height and scale of the project, the distance intervals chosen for these zones of visual impact are as follows:

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

The degree of visual impact experienced will vary from one receptor location 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 development. These may be positive (a symbol of progression toward a less polluted future) or negative (foreign objects degrading the natural landscape); and
- Degree to which the viewer will accept a change in the typical character of the surrounding area.

Preliminary desktop assessment did not identify any formal protected areas or leisure-based tourism activities in the study area for the proposed Impumelelo EGI. The desktop assessment did however identify multiple farmsteads and residences within the study area. While these homesteads and residences could be considered to be receptors, not all of them would be sensitive to the proposed development and given the number of farmsteads, it was not possible to confirm the presence of receptors at all the identified locations. Notwithstanding these limitations, all the identified receptor locations were assessed as part of the VIA as they are still regarded as being potentially sensitive to the visual impacts associated with the proposed development. ***None of these receptor locations was found to be sensitive.***

Although most of the receptor locations are believed to be farmsteads, they are regarded as ***potentially*** sensitive visual receptors as the proposed development could potentially alter natural or semi-natural vistas experienced from these locations. At this stage however, local sentiments towards the proposed development are not known.

It was noted that residential areas within the town of Embalenhle are located within the Impumelelo EGI study area. While these could be considered as receptors, they are not considered to be sensitive due to their location within built-up, heavily transformed areas. Residential areas within the town of Evander are outside the study area.

In many cases, roads along which people travel, are regarded as sensitive receptors. The primary thoroughfares in the study area is the R50 Main Road which traverses the north-eastern sector of the study area, linking Standerton to the south with the N17 National Route and Kinross to the North. The section of this road traversing the study area is not however considered part of a designated scenic route, although

the route is an important link and is likely to be utilised, to some extent, by tourists en route to other parts of Mpumalanga Province. As a result it is considered to be a potentially sensitive receptor road – i.e., a road being used by motorists who may object to the potential visual intrusion of the proposed new powerline infrastructure.

The R547 Main Road and several other thoroughfares in the study area are primarily used as local access roads and do not form part of any scenic tourist routes. These roads are not specifically valued or utilised for their scenic or tourism potential and are therefore not regarded as visually sensitive.

The potentially sensitive visual receptor locations identified within the study area for the proposed Impumelelo EGI are indicated in **Map 8 in Appendix F**.

### 4.1.8 Receptor Impact Rating

In order to assess the impact of the proposed EGI on the identified potentially sensitive receptor locations, a matrix has been developed that takes into account 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.

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 500 m of the proposed EGI combined assessment corridor. Beyond 5 km, the impact of the powerline infrastructure diminishes considerably, as the development would appear to merge with the elements on the horizon.

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, a series of low hills or a mine dump located between a receptor location and an object could completely shield the object from the receptor. As such, where views of the proposed development are completely screened, the receptor has been assigned an overriding negligible impact rating, as the development would not impose any impact on the receptor.

The visual contrast of a development refers to the degree to which the proposed 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 visual receptors within a specific context. A development that is incongruent with the surrounding area could have a significant visual impact on visual receptors as it may change the visual character of the landscape.

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 powerlines (>=88kV);
  - areas within 500m of main roads;
  - areas within 500m of railway infrastructure;
  - areas within 500m of cultivated land, commercial forest plantations and urban smallholdings.
- **Low** –
  - areas within 500m of urban / industrial / built-up areas;
  - areas within 500m of mines / quarries etc.

The receptor impact rating matrix returns a score (**Table 2)** which in turn determines the visual impact rating assigned to each receptor location.

**Table 2: 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 3** below.

**Table 3: Visual assessment matrix used to rate the impact of the proposed development on potentially sensitive receptors**

| VISUAL FACTOR | VISUAL IMPACT RATING | | | |
|---|---|---|---|---|
| | **HIGH** | **MODERATE** | **LOW** | **OVERRIDING FACTOR: NEGLIGIBLE** |
| **Distance of receptor away from proposed development** | <= 500 m<br><br>**Score 3** | 500 m - 2 km<br><br>**Score 2** | 2 km - 5 km<br><br>**Score 1** | >5 km |
| **Presence of screening factors** | No / almost no screening factors – development highly visible<br><br>**Score 3** | Screening factors partially obscure the development<br><br>**Score 2** | Screening factors obscure most of the development<br><br>**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)<br><br>**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)<br><br>**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)<br><br>**Score 1** | |

The full impact rating for the identified receptors within 5 kms of the Impumelelo EGI combined assessment corridor is provided in **Appendix E**. However, a summary of the overall visual impact is presented in **Table 4**.

**Table 4: Summary receptor impact rating for Impumelelo EGI**

| OVERALL IMPACT RATING | NUMBER OF SENSITIVE RECEPTORS | NUMBER OF POTENTIALLY SENSITIVE RECEPTORS |
|---|---|---|
| HIGH | 0 | 1 |
| MODERATE | 0 | 30 |
| LOW | 0 | 14 |
| **TOTAL INCLUDED IN ASSESSMENT** | **0** | **45** |
| *OUTSIDE VIEWSHED* | *0* | *3* |

The table above shows that a total of forty-five (45) receptors were identified within 5 kms of the Impumelelo EGI combined assessment corridor, three (3) of which are outside the viewshed for the EGI. None of the remaining receptors are considered sensitive. As previously mentioned, most of the locations identified are assumed to be farmsteads and although these residences could be considered to be receptors, given the degree of transformation in the landscape, not all of them would be sensitive to the proposed development

Only one (1) potentially sensitive receptor (VR40) is expected to experience high levels of visual impact. This receptor, along with VR35, VR36 and VR41, is located within the Impumelelo WEF project area and as such the respective land-owners are not expected to perceive the proposed development in a negative light

Thirty (30) receptor locations are expected to experience moderate levels of impact as a result of the Impumelelo EGI development, while the remaining fourteen (14) would only experience low levels of visual impact.

As stated above, the R50 Main Road could be considered a potentially sensitive receptor road. Although elements of the EGI development are expected to be visible from the R546 Main Road, the likely visual impacts of the proposed development on motorists utilising this route would be reduced by the level of transformation and landscape degradation visible from the road and also by the presence of high voltage powerlines adjacent to the road.

In light of this, visual impacts affecting the R50 are rated as **low**.

### 4.1.9 Night-time Visual Baseline

The visual impact of lighting on the nightscape is largely dependent on the existing lighting present in the surrounding area at night. The night scene in areas where there are numerous light sources will be visually degraded by the existing light pollution and therefore additional light sources are unlikely to have a significant impact on the nightscape. In contrast, introducing new light sources into a relatively dark night

sky will impact on the visual quality of the area at night. It is thus important to identify a night-time visual baseline before exploring the potential visual impact of the proposed development at night.

The towns of Embalenhle and Evander, located to the north-east are the main sources of light within the broader area. The towns, in conjunction with the Sasol Secunda fuel plant to the east of the study area as well as mining activities in the study area are expected to have a significant impact on the night scene in the study area.

Other light sources in the broader area would largely emanate from the many farmsteads dotted across the study area and also from vehicles travelling along the R50 and R547 main roads and local access roads that pass through the site. Overall, the visual character of the night environment within the study area is considered to be moderately 'polluted' and will therefore **not** be regarded as pristine.

However, power lines and associated towers or pylons are not usually lit up at night and, thus light spill associated with the proposed electrical infrastructure project is only likely to emanate from the proposed substation. Although the lighting required at the substation site would normally be expected to intrude on the nightscape, night time impacts of this lighting will be reduced by the fact the night environment is already moderately polluted. It should also be noted that the EGI project will only be constructed if the proposed Impumelelo WEF is also developed. Light sources for this facility will include operational and security lighting and thus the lighting impacts from the proposed on-site substation would be subsumed by the glare and contrast of the lighting associated with the WEF. As such, the substation alone is not expected to result in significant lighting impacts.

### 4.1.10 Existing and Proposed Renewable Energy Developments

Although it is important to assess the visual impacts of the proposed Impumelelo EGI 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 mining / quarrying activities,
- existing industrial development including the Sasol Secunda synthetic fuel plant; and
- other existing / proposed renewable energy facilities within a 30km radius.

Existing mining / quarrying and industrial development have already resulted in large scale visual impacts, especially to the north and east of the Impumelelo EGI study area. 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. The South African Renewable Energy EIA Application Database from DFFE (REEA_OR_2022_Q2) records only two approved renewable energy project within 55kms of the Impumelelo project area. One of these is a 75MW Solar Photovoltaic (PV) facility located on several portions of the Farm Grootvlei No 453 IR, some 31 km south-east of the Impumelelo EGI project

area, in close proximity to Grootvlei Power Station and well-established mining developments. The second project is the Tutuka 65.9MW Solar and associated infrastructure project, this being a Solar Photovoltaic (PV) facility located at the Tutuka Power Station, some 38km south east of the Impumelelo EGI project area;

Considering the distance of these projects from the Impumelelo EGI Project Area, it is not anticipated that this development will result in any significant cumulative impacts affecting the landscape or the visual receptors within the visual assessment zone for the Impumulelo EGI project.

However, it is known that the Impumulelo EGI project forms part of a larger Renewable Energy cluster of projects proposed in the greater Secunda area. This complex, including wind (Impumelelo and Mukondeleli WEFs) and solar facilities (Vhuvhili SEF) as well as associated grid connection infrastructure, will affect much of the landscape to the south and south-west of Secunda.

From a visual perspective, the concentration of renewable energy facilities in close proximity to existing mining and industrial development as proposed will further change the visual character of the area on the periphery of the Secunda / Embalenhle / Evander urban areas 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.

## 4.2 PROJECT SPECIFIC DESCRIPTION

As the focus of the VIA is largely on the potential impacts of the proposed development on the landscape and the receptors ***in the surrounding area***, the baseline information for the Impumelelo EGI project area is much the same as that for the broader area. The topography within the project area will however influence the level of visibility of the proposed development and the prevalent land cover will determine the level of contrast that will be associated with the proposed development. Accordingly, project specific baseline information has only been examined in respect of topography / visibility and land use / land cover.

### 4.2.1 Topography

The grid assessment corridors for Impumelelo EGI run from an area of slightly higher elevation down to the Zandfontein Substation located to the east of the Waterval River valley. Hence although sections of the proposed powerline route alignment will traverse some areas of higher elevation, overall the route alignment is not expected to have any significant impact on the skyline. In addition, topographic variations in the surrounding area will limit views of the new infrastructure from some parts of the study area, although across the remainder of the study area there would be little topographic shielding to reduce visibility from many of the locally occurring receptor locations.

### 4.2.2 Land Use

Much of the EGI assessment corridor traverses areas of cultivation, grasslands and waterbodies and as such, the proposed development could potentially alter the visual character and contrast significantly with the

typical land use present within the corridor. The level of contrast would however be reduced by the presence of nearby existing high voltage powerlines and road infrastructure, as well as urban development and mining activity at the north-eastern end of the corridor.

## 4.3 IDENTIFICATION OF ENVIRONMENTAL SENSITIVITIES

### 4.3.1 Sensitivities identified by the National Web-Based Environmental Screening Tool

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

### 4.3.2 Outcome of the Specialist 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 receiving environment, a matrix has been developed based on the characteristics of the receiving environment which, according to the Guidelines for Involving Visual and Aesthetic Specialists in the EIA Processes, indicate that visibility and aesthetics are likely to be 'key issues' (Oberholzer: 2005).

Based on the criteria in the matrix (**Table 5**), the visual sensitivity of the area is broken up into a number of categories, as described below:

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

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

**Table 5: 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 pastoral with some areas of scenic value, although some areas are significantly transformed. | | | | | | | | | | |
| Presence of sensitive visual receptors | No sensitive receptors have been identified in the study area, although *potentially* sensitive receptors are present. | | | | | | | | | | |
| Aesthetic sense of place / visual character | Visual character is a typical rural / pastoral landscape, although significantly transformed by urban / industrial development and mining activity. | | | | | | | | | | |
| Irreplaceability / uniqueness / scarcity value | Few areas of scenic value were found within the study area. | | | | | | | | | | |
| 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 | No tourism/leisure-based facilities were found in the area | | | | | | | | | | |
| International / regional / local status of the environment | Study area is typical of rural / pastoral landscapes, although significantly transformed by urban development and mining activity. | | | | | | | | | | |
| **Scenic quality under threat / at risk of change | Introduction of new powerlines will alter the visual character and sense of place, 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 32, which according to the scale above, would result in the area being rated as having a **LOW** visual sensitivity. It should be stressed however that the concept of visual sensitivity has been utilised indicatively to provide a broad-scale indication of whether the landscape is likely to be sensitive to visual impacts and is based on the physical characteristics of the study area, economic activities and land use that predominates. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs and this has been factored into the sensitivity rating above. The presence of visual receptors is examined in more detail in **Section 4.1.7** of this report. However, no formal protected areas, leisure-based tourism activities or sensitive receptor locations were identified in the study area.

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

Using GIS-based visibility analysis, it was possible to determine which sectors of the combined assessment corridor would be visible to the highest numbers of receptors in the study area. This analysis confirmed that areas of higher elevation are visible to greater numbers of potentially sensitive receptors. Hence the visual prominence of a tall structure such as a powerline tower would be exacerbated if located on any ridges or a relatively higher-lying plateaus. It is noted that a small section of the proposed powerline route alignment traverses an area of relatively higher elevation that could be seen as an area of potentially high visual sensitivity. **However, due to the relatively low number of potentially sensitive receptors in the area, the presence of existing powerlines and road infrastructure as well as the fact that the study area as a whole is rated as having a low visual sensitivity, the sensitivity rating of this area would be reduced to "Medium".**

In determining visual sensitivity, consideration must be given to the direct visual impact of the powerlines on any farmsteads or receptors located in, or within 500m of, the combined assessment corridor. Five (5) receptors were found to be within 500m of the combined assessment corridor and a 500m zone of potential visual sensitivity has been delineated around each of these farmsteads. However, two of these receptors, namely VR41 and VR42, are located within the Impumelelo WEF project area, and it is assumed that the owners of these properties are involved in the development and are unlikely to view the proposed EGI in a negative light. The remaining three (3), namely VR9, VR13 and VR28 are all located in relatively close proximity to the R357 Main Road, while VR9 and VR13 are also relatively close to existing high voltage powerlines. These factors are expected to reduce the visual impacts on these receptor locations resulting from the Impumelelo EGI project. Hence the zones of potential visual sensitivity, **as shown in Map 9** in Appendix F, are not considered to be "no go areas", but rather should be viewed as a zones of *potential* visual sensitivity.

### 4.3.3 Sensitivity Analysis Summary Statement

A site sensitivity verification (**Appendix C**) has been conducted in respect of the VIA for the proposed Impumelelo EGI based on a desktop-level assessment supported by field-based observation. This exercise has verified the absence of any areas identified as visually sensitive during the course of the specialist VIA.

# 5. ALTERNATIVE DEVELOPMENT FOOTPRINTS

Specialists have been requested to assess the following powerline routing alternatives as shown on **Map 2** in **Appendix F**:

- Corridor Alternative 1 will extend from the on-site substation Option 1 at the proposed Impumelelo WEF to the Zandfontein Substation.
- Corridor Alternative 2 will extend from the on-site substation Option 2 at the proposed Impumelelo WEF to the Zanfontien Substation.

A comparative assessment has been undertaken in respect of the powerline route alternatives and substation sites 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 10 below.

**Table 6: 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 are provided in **Appendix G**. Summaries of the findings are however provided below.

It should be noted that both route alternatives follow the same alignment for most of their length. However, no fatal flaws were identified for either of the proposed powerline route alternatives. No preference was determined for any of the corridor alternatives and both alternatives were found to be **favourable**.

# 6. ISSUES, RISKS AND IMPACTS

## 6.1 IDENTIFICATION OF KEY ISSUES

### 6.1.1 Key Issues Identified

The potential visual issues / impacts identified during the BA process for the proposed Impumelelo EGI project include:

- Potential visual intrusion resulting from vehicles and equipment during construction and decommissioning phases;
- Potential impacts of increased dust emissions from construction / decommissioning activities and related traffic during construction and decommissioning phases;
- Potential visual scarring of the landscape as a result of site clearance and earthworks during construction;
- Potential alteration of the visual character of the area during operation;
- Potential visual intrusion resulting from powerlines located on ridge lines and higher plateaus;
- Potential alteration of the night time visual environment as a result operational and security lighting associated with the development;
- Potential visual intrusion of any remaining electrical infrastructure on the site during decommissioning; and
- Combined visual impacts (i.e., cumulative visual impacts) from the associated powerlines and electrical infrastructure to support several renewable energy facilities in the broader area could potentially alter the sense of place and visual character of the area.

## 6.2 IDENTIFICATION OF POTENTIAL IMPACTS/RISKS

Potential visual issues / impacts identified during the VIA resulting from the proposed Impumelelo powerline and associated infrastructure, together with possible mitigation measures are outlined below.

### 6.2.1 Construction Phase: Potential Impact 1

- Potential alteration of the visual character and sense of place resulting from construction activities.
- Potential visual impacts of construction affecting receptors in the study area, including:
    - visual intrusion resulting from large construction vehicles and equipment;
    - visual effect of construction laydown areas and material stockpiles;
    - impacts of increased dust emissions from construction activities and related traffic;
    - visual scarring of the landscape as a result of site clearance and earthworks; and
    - visual pollution resulting from littering on the construction site.

### 6.2.2 Operational Phase: Potential Impact 2:

- Potential alteration of the visual character and sense of place;
- Potential visual impacts affecting receptors in the study area, including:

- visual intrusion resulting from the presence of powerlines, particularly in more natural undisturbed settings;
- impacts of increased dust emissions from maintenance vehicles accessing the site via gravel roads; and
- visual scarring of the landscape as a result of site clearance and earthworks.
- Potential alteration of the night time visual environment as a result operational and security lighting associated with the development.
-

### 6.2.3 Decommissioning Phase: Impact 3

- Potential visual impacts of decommissioning affecting receptors in the study area, including:
  - visual intrusion resulting from vehicles and equipment involved in the decommissioning process;
  - impacts of increased dust emissions resulting from decommissioning activities and related traffic;
  - visual scarring of the landscape as a result of decommissioning activities; and
  - visual intrusion of any remaining infrastructure on the site.

### 6.2.4 Cumulative Impacts: Impact 4

- Combined visual impacts from several renewable energy facilities in the broader area could potentially alter the sense of place and visual character of the area; and
- Combined visual impacts from several renewable energy facilities in the broader area could potentially exacerbate visual impacts on visual receptors.

## 7. OVERALL IMPACT RATING

The EIA Regulations, 2014 (as amended) require that an overall rating for visual impact be provided to allow the visual impact to be assessed alongside other environmental parameters. The impact matrices for visual impacts associated with the proposed construction, operation and decommissioning of the proposed 132kV powerline are presented below together with preliminary mitigation measures. The mitigation measures have been determined based on best practice and literature reviews.

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

## 7.1 CONSTRUCTION PHASE

### 7.1.1 Impact Rating

Error! Not a valid bookmark self-reference. below presents the detailed impact ratings associated with the construction of the Impumelelo EGI, project together with the recommended mitigation measures.

**Table 7: Direct Visual Impacts during Construction**

| 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.<br>▪ Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.<br>▪ 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.<br>▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers.<br>▪ 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.<br>▪ 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** | | | | | | |

### 7.1.2 Mitigation Measures

- Carefully plan to minimise 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.
- Position 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.
- 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 suitable 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.

## 7.2 OPERATIONAL PHASE

### 7.2.1 Impacts

Error! Reference source not found. below presents the detailed impact ratings associated with the operation of the Impumelelo EGI project, together with the recommended mitigation measures.

**Table 8: Direct Visual Impacts during Operation**

| 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.<br>▪ The proposed development will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts.<br>▪ Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers.<br>▪ 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** | | | | | | |

### 7.2.2 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 whilst adhering to safety standards.
- Light fittings for security at night should reflect the light toward the ground and prevent light spill.
- Lighting fixtures should make use of minimum lumen or wattage whilst adhering to safety standards.
- 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 unless required to adhere to safety standards and should be painted in natural tones that fit with the surrounding environment.
- Non-reflective surfaces should be used where possible.

## 7.3 DECOMMISSIONING PHASE

### 7.3.1 Impacts

Error! Reference source not found. below presents the detailed impact ratings associated with the decommissioning of the Impumelelo EGI project, together with the recommended mitigation measures.

**Table 9: Direct Visual Impacts during Decommissioning**

| 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.<br>▪ Decommissioning activities may be perceived as an unwelcome visual intrusion.<br>▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers.<br>▪ 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.<br>▪ 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** | | | | | | |

### 7.3.2 Mitigation Measures

- All infrastructure that is not required for post-decommissioning use should be removed.
- Carefully plan to minimize the decommissioning period and avoid delays.
- 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.

## 7.4 CUMULATIVE IMPACTS

### 7.4.1 Impacts

Error! Reference source not found. below presents the detailed impact ratings associated with potential cumulative impacts resulting from the construction, operation and decommissioning of the Impmelelo powerline and associated infrastructure, together with the recommended mitigation measures.

**Table 10: Cumulative Visual Impacts**

| CUMULATIVE IMPACTS | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Impact number** | **Aspect** | **Description** | **Stage** | **Character** | **Ease of Mitigation** | **Pre-Mitigation** | | | | | | | **Post-Mitigation** | | | | | | |
| | | | | | | **(M+** | **E+** | **R+** | **D)x** | **P=** | **S** | **Rating** | **(M+** | **E+** | **R+** | **D)x** | **P=** | **S** | **Rating** |
| **Impact 1:** | Visual impacts | ▪ 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.<br>▪ Visual intrusion of multiple renewable energy developments and associated infrastructure may be exacerbated, particularly in more natural undisturbed settings.<br>▪ 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.<br>▪ 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** | | | | | | |

### 7.4.2 Mitigation Measures

- Implementation of the mitigation measures as recommended above

## 7.5 NO-GO IMPACTS

***Nature of the impact***

The 'No Go' alternative is essentially the option of not developing the Impumelelo EGI 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.

***Significance of impact without mitigation measures***

Not applicable.

***Significance of impact with mitigation measures***

Not applicable.

## 7.6 IMPACT ASSESSMENT SUMMARY

The impact assessment summary is provided in **Table 11**.

**Table 11: Overall Impact Significance (Post Mitigation)**

| Phase | Overall Impact Significance |
|---|---|
| Construction | Low (4) |
| Operational | Low (4) |
| Decommissioning | Low (4) |
| Cumulative | Moderate (3) |

# 8. LEGISLATIVE AND PERMIT REQUIREMENTS

Key legal requirements pertaining to the proposed 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). As part of the EIA process, the need for a VIA to be undertaken has been identified in order to assess the visual impact of the proposed Impumelelo EGI.

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 GN R 320 (20 March 2020 and Appendix 6 of 2014 NEMA EIA Regulations (as amended).

# 9. CONCLUSION

A visual study was conducted to assess the magnitude and significance of the potential visual impacts associated with the development of the proposed Impumelelo EGI near Secunda 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 Embalenhle and Evander urban areas and the Sasol Secunda fuel plant in the north-east and Impumelelo Mine in the south-west to a more rural / pastoral character across the remainder of the study area. Hence, although EGI development would alter the visual character and contrast with this rural / pastoral character, the location of the proposed EGI in relatively close proximity to these transformed areas as well as the associated extensive powerline network will significantly reduce the level of contrast.

A broad-scale assessment of visual sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a low visual sensitivity. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs. No formal protected areas, leisure-based tourism activities or ***sensitive*** receptor locations were identified in the study area, thus confirming the low level of visual sensitivity.

The desktop assessment did however identify multiple farmsteads and residences within the study area that could be considered to be receptors, although not all of them would be sensitive to the proposed development. These farmsteads are however regarded as potentially sensitive visual receptors as elements of the proposed development could potentially alter natural or semi-natural vistas experienced from these locations. At this stage however, local sentiments towards the proposed development are not known.

A total of forty-five (45) receptors were identified within 5 kms of the Impumelelo EGI combined assessment corridor, three (3) of which are outside the viewshed for the EGI. None of the remaining receptors are considered sensitive.

Only one (1) potentially sensitive receptor (VR40) is expected to experience high levels of visual impact. This receptor, along with VR35, VR36 and VR41, is located within the Impumelelo WEF project area and as such the respective land-owners are not expected to perceive the proposed development in a negative light

Thirty (30) receptor locations are expected to experience moderate levels of impact as a result of the Impumelelo EGI development, while the remaining fourteen (14) would only experience low levels of visual impact.

Although the R50 Main Road could be considered a potentially sensitive receptor road, the likely visual impacts of the proposed development on motorists utilising this route would be reduced by the level of transformation and landscape degradation visible from the road and also by the presence of high voltage powerlines adjacent to the road. Visual impacts affecting the R50 are rated therefore rated as **LOW.**

A preliminary assessment of overall impacts revealed that impacts (post mitigation) associated with the proposed Impumelelo EGI are of **LOW** significance during construction, operation and decommissioning phases, with a number of mitigation measures available.

Considering the presence of existing mining and industrial activity and proposals for other renewable energy facilities in the broader area, the introduction of new EGI 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 route 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 either of the site alternatives and both alternatives were found to be **Favourable** from a visual perspective.

## 9.1 VISUAL IMPACT STATEMENT

It is SLR Consulting's opinion that the potential visual impacts associated with the proposed Impumelelo EGI are negative and of moderate significance. Given the absence of sensitive receptors and the significant level of human transformation and landscape degradation in areas near the proposed Impumelelo EGI, the project is deemed acceptable from a visual perspective and the EA should be granted. SLR Consulting 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.

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## APPENDIX A: SPECIALIST EXPERTISE

- Please add 2-3-page CV that includes specialist details, and relevant expertise that the specialist has to compile this specialist report.

Appendix A

# SEPCIALIST EXPERTISE

# CURRICULUM VITAE

## KERRY LIANNE SCHWARTZ

SENIOR GIS CONSULTANT

EMPA, South Africa

## QUALIFICATIONS

| | | |
|---|---|---|
| BA | 1982 | Geography, Leeds Trinity University, UK |

## EXPERTISE

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

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

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

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

## PROJECTS

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

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

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

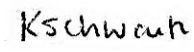
| | |
|---|---|
| **Fatal Flaw Assessments for various proposed Renewable Energy Facilities** | Kerry was responsible for GIS analysis and mapping in support of fatal flaw assessment for renewable energy projects in the Northern Cape and Western Cape Provinces. |
| | **Strategic Planning** |
| **Lesotho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

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

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

## MEMBERSHIPS

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



04 February 2022

## APPENDIX B - SPECIALIST STATEMENT OF INDEPENDENCE

- Note from the CSIR: Specialists to please include a signed and commissioned copy of the specialist declaration form. CSIR to provide Specialist declaration forms.

## APPENDIX C - SITE SENSITIVITY VERIFICATION

Prior to commencing with the specialist assessment in accordance with Appendix 6 of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014, a site sensitivity verification was undertaken in order to confirm the current land use and environmental sensitivity of the proposed Impumelelo Electrical Grid Infrastructure (EGI) project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool). This site sensitivity verification was undertaken in adherence to the gazetted Environmental Assessment Protocols, specifically with 'Part A - General Protocol for the Site Sensitivity Verification and Minimum Report Content Requirements where a Specialist Assessment is required but no specific Environmental Theme Protocol has been prescribed' (GG 43110 / GNR 320, 20 March 2020).

The details of the site sensitivity verification are noted below:

| | |
|---|---|
| **Date of Site Visit** | 25 – 26 January 2022 |
| **Specialist Name** | Assessment undertaken by Kerry Schwartz<br>Field investigation undertaken by Stephan Jacobs and Gugu Dhlamini |
| **Professional Registration Number** | South African Geomatics Council – GTc GISc 1187 |
| **Specialist Affiliation / Company** | SLR Consulting |

### 1. Site Sensitivity Verification

A site sensitivity verification has been conducted in support of the Visual Impact Assessment (VIA) for the Impumelelo EGI near Secunda in Mpumalanga Province. The verification exercise is based on a desktop-level assessment supported by field-based observation and involved an assessment of factors as outlined below.

#### 1.1 Physical landscape characteristics

Physical landscape characteristics such as topography, vegetation and land use are important factors influencing the visual character and visual sensitivity of the study area. Baseline information about the physical characteristics of the study area was sourced from spatial databases provided by NGI, the South African National Biodiversity Institute (SANBI) and the South African National Land Cover Dataset (Geoterraimage – 2020). The characteristics identified via desktop analysis were then checked against the findings of the site visit.

### 1.2 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 by way of a desktop assessment as well as field-based investigation. Google Earth imagery (2022) was used to identify potential receptors within the study area and where possible, these receptor locations were then checked against the findings of the field investigation.

### 1.3 Fieldwork and photographic review

A two (2) day site visit was undertaken between the 25th and the 26th of January 2022 (mid summer). The purpose of the site visit was to:

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

### 1.4 Sources of Information

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

- Elevation data (5m contours) 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 (2020);
- Vegetation classification data extracted from the South African National Biodiversity Institute's (SANBI's) VEGMAP 2018 dataset;
- Google Earth Satellite imagery 2022;
- South African Renewable Energy EIA Application Database from Department of Environmental Affairs (incremental release Quarter 2 2022);
- The National Web-Based Environmental Screening Tool, Department of Forestry, Fisheries and Environment (DFFE);

## 2. Outcome of Site Sensitivity Verification

The assessment has shown that, overall the study area has a somewhat mixed visual character, transitioning from the heavily transformed urban / peri-urban landscape associated with the Embalenhle and Evander urban areas and the Sasol Secunda fuel plant in the north-east and Impumelelo Mine in the south-west to a more rural / pastoral character across the remainder of the study area. Hence, although EGI development would alter the visual character and contrast with this rural / pastoral character, the location of the proposed EGI in relatively close proximity to these transformed areas as well as the associated extensive powerline network will significantly reduce the level of contrast.

A broad-scale assessment of landscape sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a low visual sensitivity. No formal protected areas, leisure-based tourism activities or ***sensitive*** receptor locations were identified in the study area, thus confirming the low level of visual sensitivity.

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

Using GIS-based visibility analysis, it was possible to determine which sectors of the combined assessment corridor would be visible to the highest numbers of receptors in the study area. This analysis confirmed that areas of higher elevation are visible to greater numbers of potentially sensitive receptors. Hence the visual prominence of a tall structure such as a powerline tower would be exacerbated if located on any ridges or a relatively higher-lying plateaus. It is noted that a small section of the proposed powerline route alignment traverses an area of relatively higher elevation that could be seen as an area of potentially high visual sensitivity. **However, due to the relatively low number of potentially sensitive receptors in the area, the presence of existing powerlines and road infrastructure as well as the fact that the study area as a whole is rated as having a low visual sensitivity, the sensitivity rating of this area would be reduced to "Medium".**

In determining visual sensitivity, consideration must be given to the direct visual impact of EGI on any farmsteads or receptors located in, or within 500m of, the combined assessment area. Five (5) receptors were found to be within 500m of the combined assessment corridor and a 500m zone of potential visual sensitivity has been delineated around each of these farmsteads. However, two of these receptors, namely VR41 and VR42, are located within the Impumelelo WEF project area, and it is assumed that the owners of these properties are involved in the development and are unlikely to view the proposed EGI in a negative light. The remaining three (3), namely VR9, VR13 and VR28 are all located in relatively close proximity to the R357 Main Road, while VR9 and VR13 are also relatively close to existing high voltage powerlines. These factors are expected to reduce the visual impacts on these receptor locations resulting from the Impumelelo EGI project. These zones of potential sensitivity are **not considered a "no go" area**, but rather should be viewed as zones where visual impacts may occur.

The zones of potential visual sensitivity are shown in Error! Reference source not found..

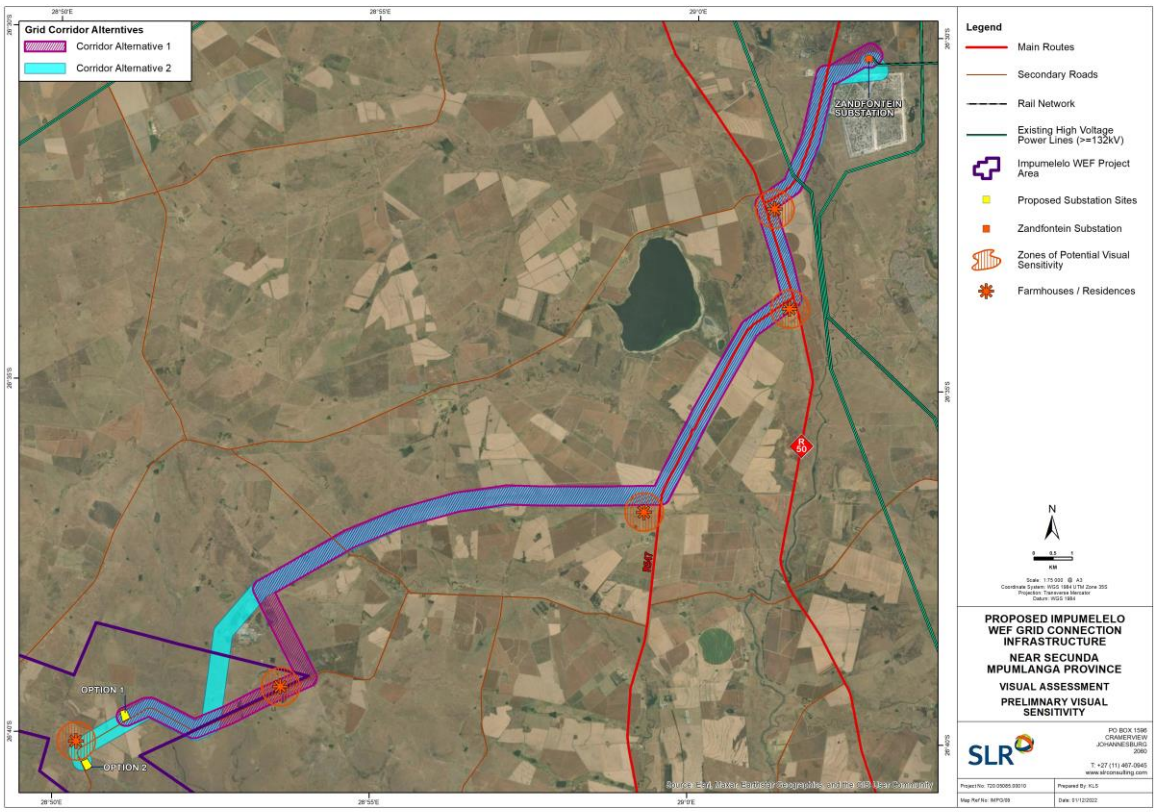



**Figure 1: Areas of Potential Visual Sensitivity affecting the Impumelelo EGI Combined Assessment Corridor**

## 3. National Environmental Screening Tool

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

## 4. Conclusion

A site sensitivity verification has been conducted in respect of the Visual Impact Assessment (VIA) for the proposed development of the EGI for the proposed Impumelelo WEF. This verification has been based on a desktop-level assessment supported by field-based observation.

As stated above, the National Environmental Screening Tool does not identify any Landscape Sensitivities in respect of powerline development in the area. Accordingly, the areas identified as visually sensitive (**Figure 1**) have been verified.

# APPENDIX D: IMPACT ASSESSMENT METHODOLOGY

Appendix D

# IMPACT ASSESSMENT METHODOLOGY

# IMPACT ASSESSMENT METHODOLOGY

## SCOPING PHASE

### REPORTING REQUIREMENTS

- Project Description
- Legislative Context (as applicable)
- Assumptions and limitations
- Description of Baseline Environment – including sensitivity mapping
- Identification and high-level screening of impacts
- Plan of Study for EIA

### HIGH-LEVEL SCREENING OF IMPACTS AND MITIGATION

Appendix 2 of GNR 982, as amended, requires the identification of the significance of potential impacts during scoping. To this end, an impact screening tool has been used in the scoping phase. The screening tool is based on two criteria, namely probability; and, consequence (**Table 0-3**), where the latter is based on general consideration to the intensity, extent, and duration.

The scales and descriptors used for scoring probability and consequence are detailed in **Table 0-3** and **Table 0-2** respectively.

**Table 0-1: Probability Scores and Descriptors**

| SCORE | DESCRIPTOR |
|---|---|
| **4** | **Definite**: The impact will occur regardless of any prevention measures |
| **3** | **Highly Probable**: It is most likely that the impact will occur |
| **2** | **Probable**: There is a good possibility that the impact will occur |
| **1** | **Improbable:** The possibility of the impact occurring is very low |

**Table 0-2: Consequence Score Descriptions**

| SCORE | NEGATIVE | POSITIVE |
|---|---|---|
| 4 | Very severe: An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated. | Very beneficial: A permanent and very substantial benefit to the affected system(s) or party(ies), with no real alternative to achieving this benefit. |

The Pavilion, 1st Floor
Cnr Portswood and Beach Road, Waterfront
Cape Town, 8001
South Africa

T: +27 21 481 8700
F: +086 606 7121
www.wsp.com

| | | |
|---|---|---|
| 3 | Severe: A long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming or some combination of these. | Beneficial: A long term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these. |
| 2 | Moderately severe: A medium to long term impacts on the affected system(s) or party (ies) that could be mitigated. | Moderately beneficial: A medium to long term impact of real benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are equally difficult, expensive and time consuming (or some combination of these), as achieving them in this way. |
| 1 | Negligible: A short to medium term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary. | Negligible: A short to medium term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are easier, cheaper and quicker, or some combination of these. |

**Table 0-3: Significance Screening Tool**

**CONSEQUENCE SCALE**

| PROBABILITY SCALE | | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| | 1 | Very Low | Very Low | Low | Medium |
| | 2 | Very Low | Low | Medium | Medium |
| | 3 | Low | Medium | Medium | High |
| | 4 | Medium | Medium | High | High |

The nature of the impact must be characterised as to whether the impact is deemed to be positive (+ve) (i.e. beneficial) or negative (-ve) (i.e. harmful) to the receiving environment/receptor. For ease of reference, a colour reference system (**Table 0-4**) has been applied according to the nature and significance of the identified impacts.

**Table 0-4: Impact Significance Colour Reference System to Indicate the Nature of the Impact**

| Negative Impacts (-ve) | Positive Impacts (+ve) |
|---|---|
| Negligible | Negligible |
| Very Low | Very Low |
| Low | Low |
| Medium | Medium |
| High | High |

## EIA PHASE

## REPORTING REQUIREMENTS

- Project Description
- Legislative Context (as applicable)
- Assumptions and limitations
- Description of methodology (as required)
- Update and/or confirmation of Baseline Environment – including update and / or confirmation of sensitivity mapping
- Identification and description of Impacts
- Full impact assessment (including Cumulative)
- Mitigation measures
- Impact Statement

Ensure that all reports fulfil the requirements of the relevant Protocols.

## ASSESSMENT OF IMPACTS AND MITIGATION

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

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct[1], indirect[2], secondary[3] as well as cumulative[4] impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e. residual impact). The significance of environmental aspects is determined and ranked by considering the criteria[5] presented in **Table 0-5**.

**Table 0-5: Impact Assessment Criteria and Scoring System**

| CRITERIA | SCORE 1 | SCORE 2 | SCORE 3 | SCORE 4 | SCORE 5 |
|---|---|---|---|---|---|
| **Impact Magnitude (M)**<br>The degree of alteration of the affected environmental receptor | Very low:<br>No impact on processes | Low:<br>Slight impact on processes | Medium:<br>Processes continue but in a modified way | High:<br>Processes temporarily cease | Very High:<br>Permanent cessation of processes |

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

| CRITERIA | SCORE 1 | SCORE 2 | SCORE 3 | SCORE 4 | SCORE 5 |
|---|---|---|---|---|---|
| **Impact Extent (E)** The geographical extent of the impact on a given environmental receptor | Site: Site only | Local: Inside activity area | Regional: Outside activity area | National: National scope or level | International: Across borders or boundaries |
| **Impact Reversibility (R)** The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change | Reversible: Recovery without rehabilitation | | Recoverable: Recovery with rehabilitation | | Irreversible: Not possible despite action |
| **Impact Duration (D)** The length of permanence of the impact on the environmental receptor | Immediate: On impact | Short term: 0-5 years | Medium term: 5-15 years | Long term: Project life | Permanent: Indefinite |
| **Probability of Occurrence (P)** The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation | Improbable | Low Probability | Probable | Highly Probability | Definite |
| **Significance (S)** is determined by combining the above criteria in the following formula: | $[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$ | | | | |
| **IMPACT SIGNIFICANCE RATING** | | | | | |
| **Total Score** | **4 to 15** | **16 to 30** | **31 to 60** | **61 to 80** | **81 to 100** |
| **Environmental Significance Rating (Negative (-))** | **Very low** | **Low** | **Moderate** | **High** | **Very High** |
| **Environmental Significance Rating (Positive (+))** | **Very low** | **Low** | **Moderate** | **High** | **Very High** |

## IMPACT MITIGATION

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during Project implementation to verify that actual impacts are the same as those predicted in this report.

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

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

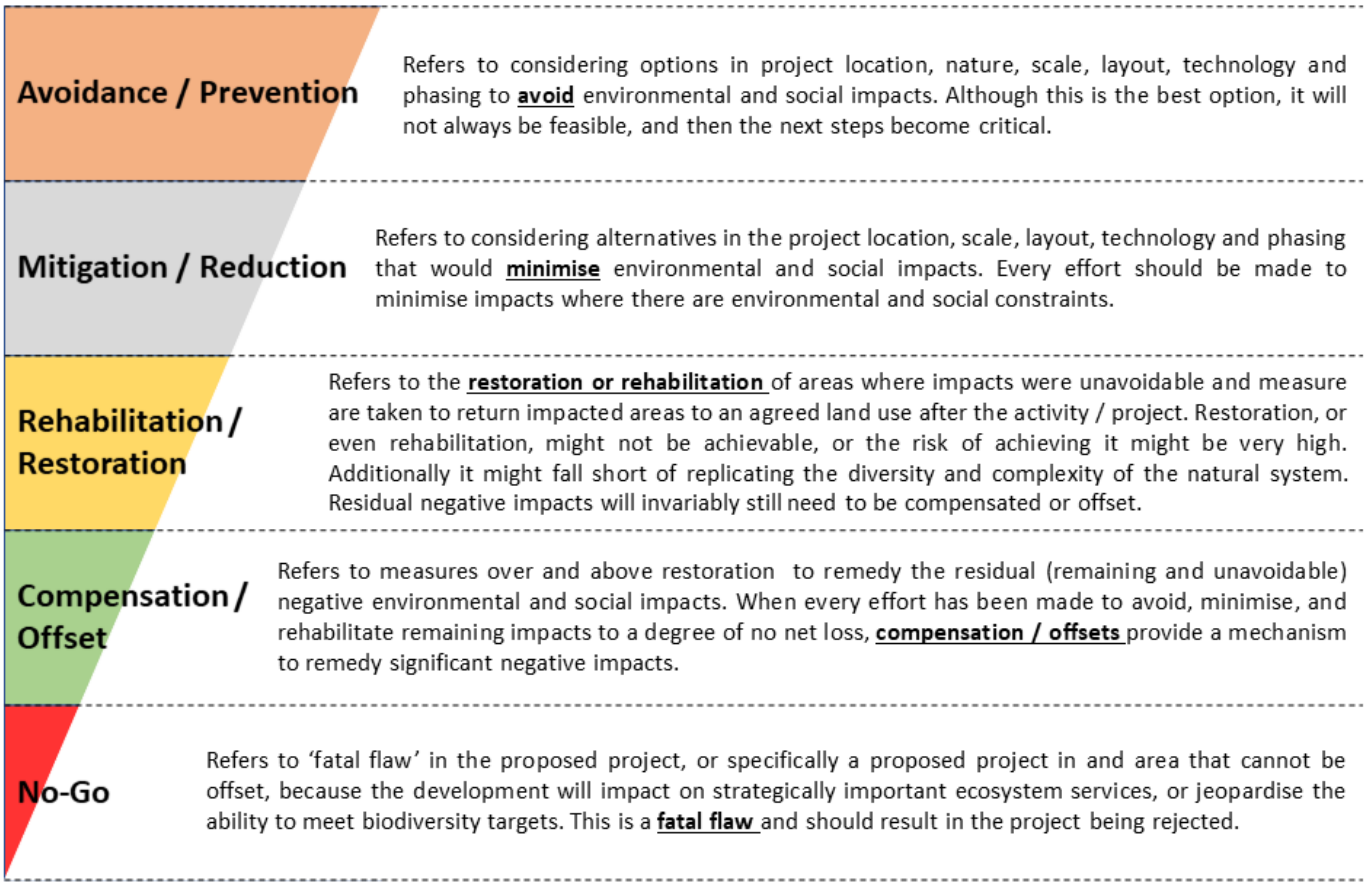



**Figure 1: Mitigation Sequence/Hierarchy**

## APPENDIX E: RECEPTOR IMPACT RATING FOR IMPUMELELO EGI

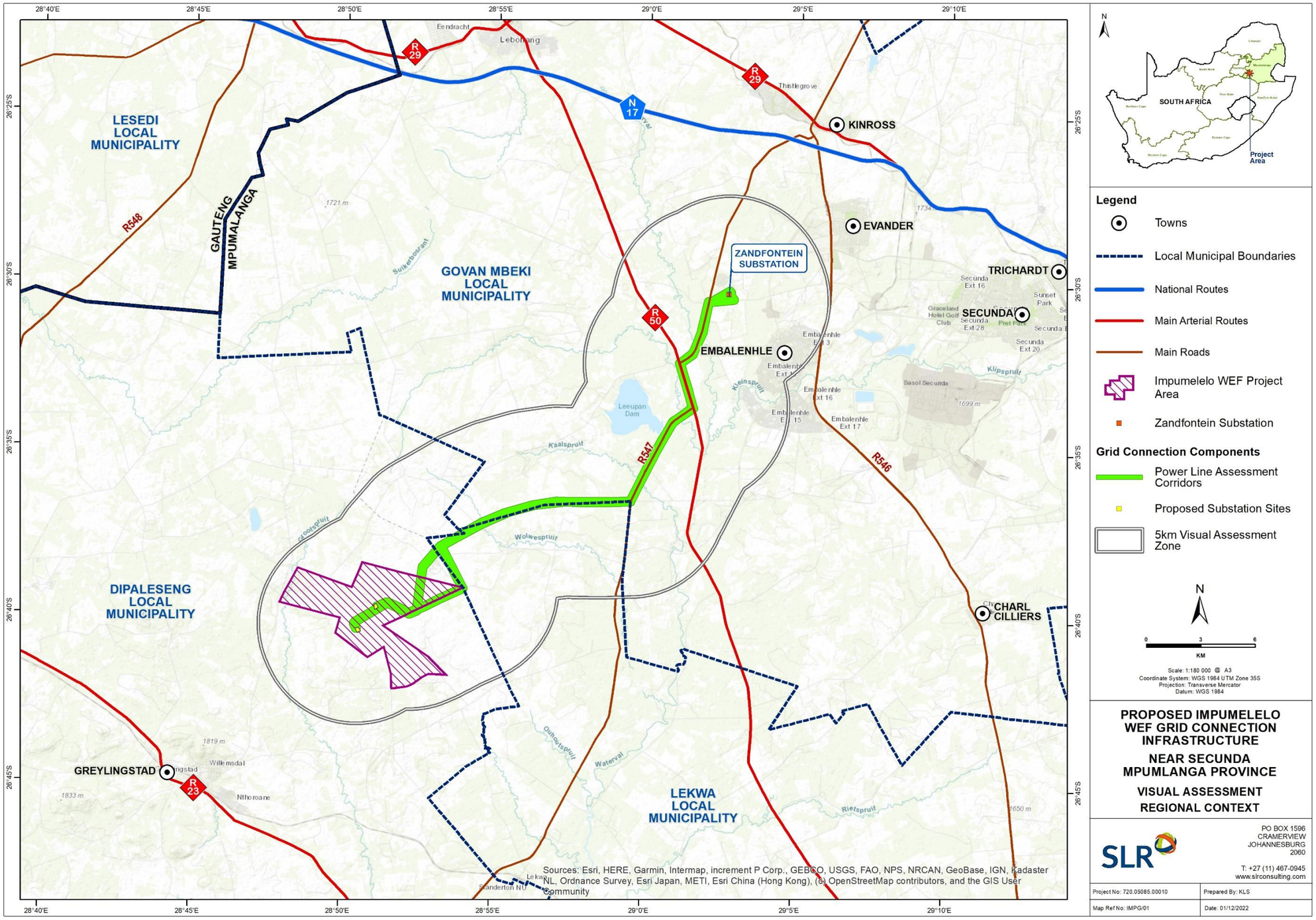
| Receptor Location | Distance from Assessment Corridor | | | Screening | | Contrast | | OVERALL IMPACT RATING | |
|---|---|---|---|---|---|---|---|---|---|
| | KMs | Rating | | Rating | | Rating | | Rating | |
| *INSIDE VIEWSHED* | | | | | | | | | |
| VR1 - Farmstead | 3.2 | Low | 1 | Mod | 2 | High | 3 | MODERATE | 6 |
| VR2 - Adullam Mission | 2.8 | Low | 1 | Low | 1 | Mod | 2 | LOW | 4 |
| VR3 - Farmstead | 2.0 | Low | 1 | Low | 1 | Mod | 2 | LOW | 4 |
| VR4 - Farmstead | 4.5 | Low | 1 | Low | 1 | Mod | 2 | LOW | 4 |
| VR5 - Farmstead | 3.3 | Low | 1 | Mod | 2 | Mod | 2 | MODERATE | 5 |
| VR6 - Farmstead | 3.0 | Low | 1 | Mod | 2 | Mod | 2 | MODERATE | 5 |
| VR7 - Farmstead | 1.6 | Mod | 2 | Mod | 2 | Mod | 2 | MODERATE | 6 |
| VR8 - Farmstead | 1.1 | Mod | 2 | Mod | 2 | Mod | 2 | MODERATE | 6 |
| VR9 - Farmstead | 0.0 | High | 3 | Mod | 2 | Mod | 2 | MODERATE | 7 |
| VR10 - Farmstead | 2.3 | Low | 1 | Low | 1 | Mod | 2 | LOW | 4 |
| VR11 - Farmstead | 3.0 | Low | 1 | Low | 1 | High | 3 | MODERATE | 5 |
| VR12 - Farmstead | 3.1 | Low | 1 | Low | 1 | High | 3 | MODERATE | 5 |
| VR13 - Farmstead | 0.0 | High | 3 | Mod | 2 | Mod | 2 | MODERATE | 7 |
| VR14 - Farmstead | 3.4 | Low | 1 | Mod | 2 | Mod | 2 | MODERATE | 5 |
| VR15 - Farmstead | 4.4 | Low | 1 | Low | 1 | Mod | 2 | LOW | 4 |
| VR16 - Farmstead | 0.8 | Mod | 2 | Mod | 2 | Mod | 2 | MODERATE | 6 |
| VR17 - Farmstead | 2.2 | Low | 1 | Low | 1 | Mod | 2 | LOW | 4 |
| VR18 - Farmstead | 2.3 | Low | 1 | Low | 1 | Mod | 2 | LOW | 4 |
| VR19 - Farmstead | 2.5 | Low | 1 | Low | 1 | Mod | 2 | LOW | 4 |
| VR20 - Farmstead | 4.9 | Low | 1 | Low | 1 | Mod | 2 | LOW | 4 |
| VR21 - Farmstead | 3.5 | Low | 1 | High | 3 | Mod | 2 | MODERATE | 6 |
| VR23 - Farmstead | 1.9 | Mod | 2 | Mod | 2 | Mod | 2 | MODERATE | 6 |
| VR24 - Farmstead | 2.6 | Low | 1 | Mod | 2 | Mod | 2 | MODERATE | 5 |
| VR25 - Farmstead | 4.0 | Low | 1 | Low | 1 | Mod | 2 | LOW | 4 |
| VR26 - Farmstead | 0.7 | Mod | 2 | Mod | 2 | Mod | 2 | MODERATE | 6 |
| VR27 - Farmstead | 1.1 | Mod | 2 | Mod | 2 | Mod | 2 | MODERATE | 6 |
| VR28 - Farmstead | 0.2 | High | 3 | Mod | 2 | Mod | 2 | MODERATE | 7 |
| VR29 - Farmstead | 0.9 | Mod | 2 | Low | 1 | Mod | 2 | MODERATE | 5 |
| VR30 - Farmstead | 2.8 | Low | 1 | Low | 1 | Mod | 2 | LOW | 4 |
| VR31 - Farmstead | 4.4 | Low | 1 | Mod | 2 | Mod | 2 | MODERATE | 5 |
| VR32 - Farmstead | 3.0 | Low | 1 | Mod | 2 | Mod | 2 | MODERATE | 5 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| VR33 - Farmstead | 2.7 | Low | 1 | Mod | 2 | Mod | 2 | MODERATE | 5 |
| *VR35 - Farmstead^* | *2.8* | *Low* | *1* | *Mod* | *2* | *Mod* | *2* | *MODERATE* | *5* |
| *VR36 - Farmstead^* | *1.1* | *Mod* | *2* | *Mod* | *2* | *Mod* | *2* | *MODERATE* | *6* |
| VR37 - Farmstead | 2.9 | Low | 1 | Mod | 2 | Mod | 2 | MODERATE | 5 |
| VR38 - Farmstead | 2.7 | Low | 1 | Low | 1 | Mod | 2 | LOW | 4 |
| VR39 - Farmstead | 3.4 | Low | 1 | Low | 1 | Mod | 2 | LOW | 4 |
| *VR40 - Farmstead^* | *0.0* | *High* | *3* | *High* | *3* | *Mod* | *2* | *HIGH* | *8* |
| *VR41 - Farmstead^* | *0.0* | *High* | *3* | *Low* | *1* | *Mod* | *2* | *MODERATE* | *6* |
| VR42 - Farmstead | 4.9 | Low | 1 | Low | 1 | Mod | 2 | LOW | 4 |
| VR43 - Farmstead | 4.5 | Low | 1 | Mod | 2 | Mod | 2 | MODERATE | 5 |
| VR45 - Farmstead | 3.9 | Low | 1 | Mod | 2 | Mod | 2 | MODERATE | 5 |
| VR46 - Farmstead | 3.5 | Low | 1 | Mod | 2 | Mod | 2 | MODERATE | 5 |
| VR47 - Farmstead | 4.9 | Low | 1 | Mod | 2 | Mod | 2 | MODERATE | 5 |
| VR48 - Farmstead | 4.9 | Low | 1 | Mod | 2 | Mod | 2 | MODERATE | 5 |
| ***OUTSIDE VIEWSHED*** | | | | | | | | | |
| *VR22 - Farmstead* | *4.9* | | | | | | | | |
| *VR34 - Farmstead* | *5.0* | | | | | | | | |
| *VR44 - Farmstead* | *4.2* | | | | | | | | |

*^ Receptor is inside the Impumelelo WEF project area*

# APPENDIX F: MAPS

## *MAP 1: Regional Context*




**PROPOSED IMPUMELELO WEF GRID CONNECTION INFRASTRUCTURE**

**NEAR SECUNDA MPUMLANGA PROVINCE**

**VISUAL ASSESSMENT**

**REGIONAL CONTEXT**

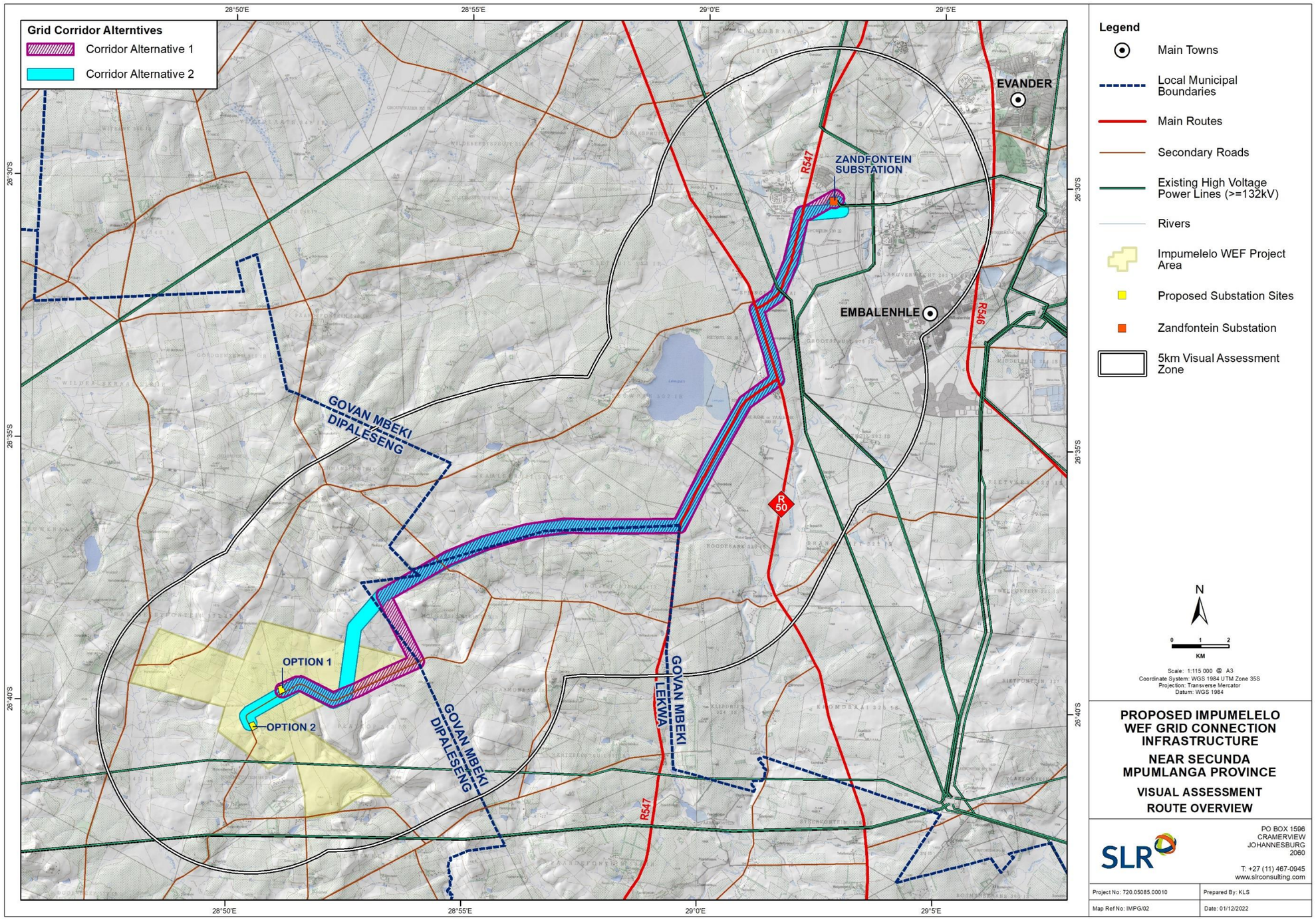

SLR

PO BOX 1596
CRAMERVIEW
JOHANNESBURG
2060

T: +27 (11) 467-0945
www.slrconsulting.com


| | |
|---|---|
| Project No: 720.05085.00010 | Prepared By: KLS |
| Map Ref No: IMPG/01 | Date: 01/12/2022 |

## *MAP 2: Route Overview*




**PROPOSED IMPUMELELO WEF GRID CONNECTION INFRASTRUCTURE**

**NEAR SECUNDA MPUMLANGA PROVINCE**

**VISUAL ASSESSMENT**

**ROUTE OVERVIEW**


SLR

PO BOX 1596
CRAMERVIEW
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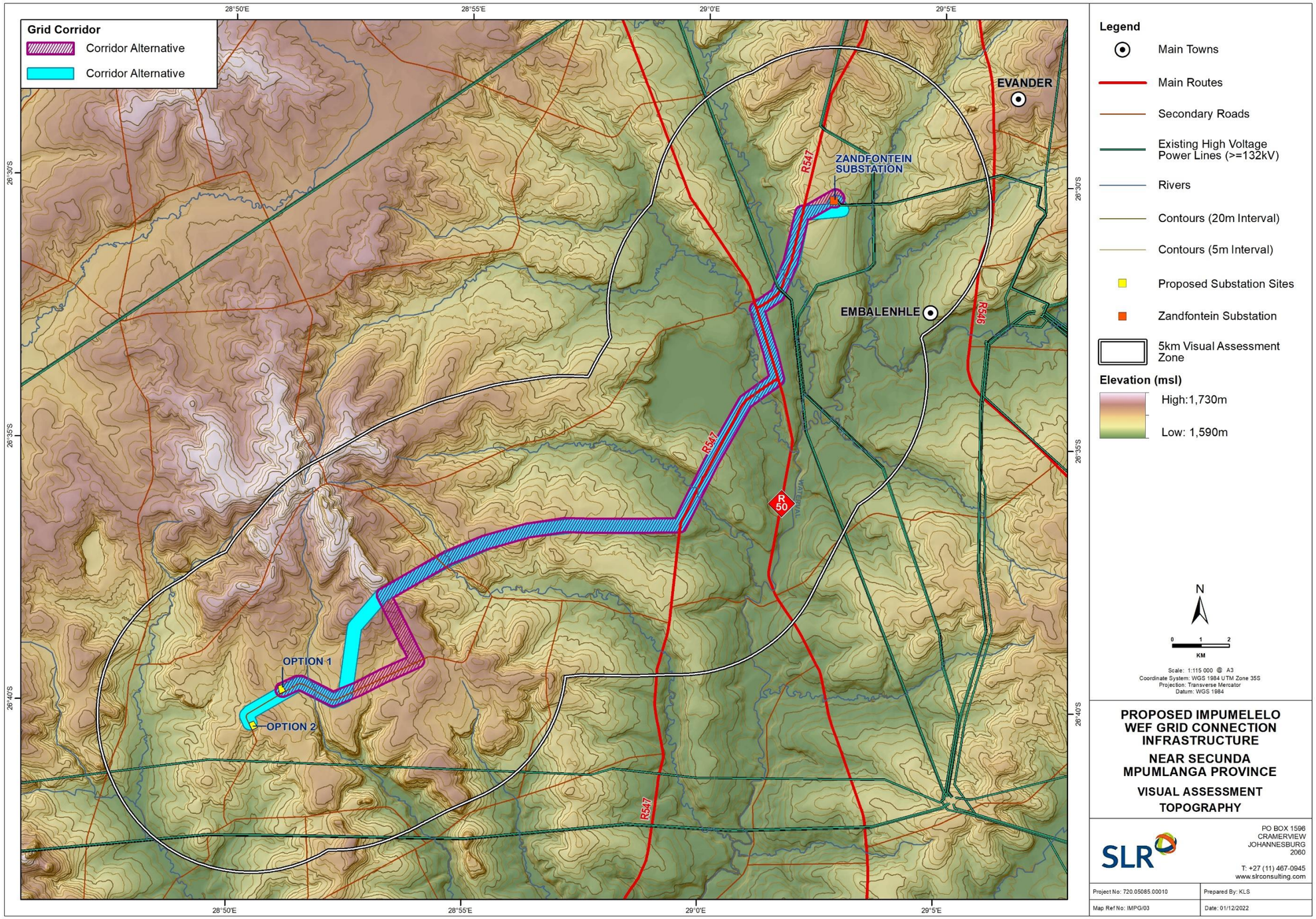
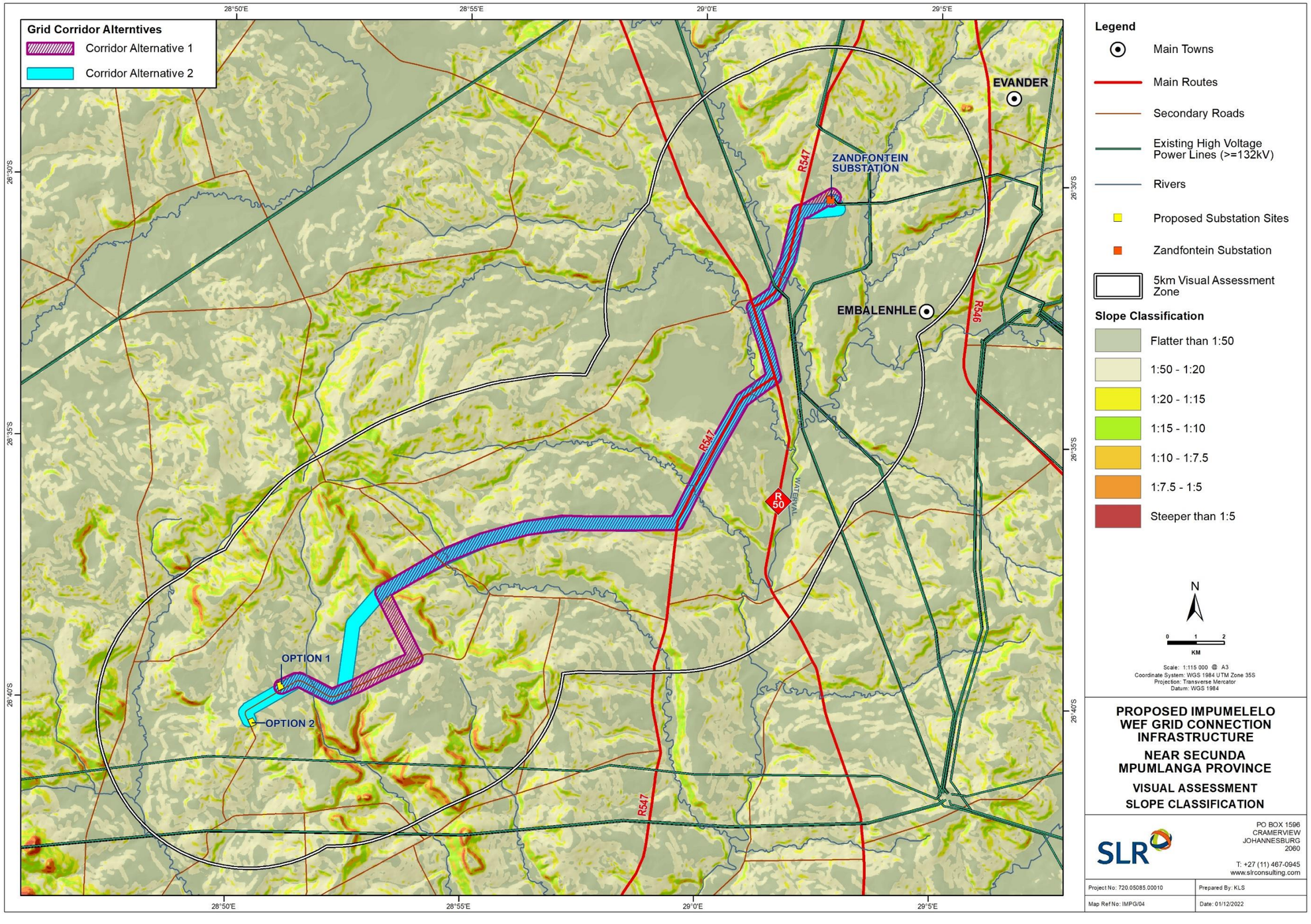
## *MAP 3: Topography*



## *MAP 4: Slope Classification*




**Legend**

- Main Towns
- Main Routes
- Secondary Roads
- Existing High Voltage Power Lines (>=132kV)
- Rivers
- Proposed Substation Sites
- Zandfontein Substation
- 5km Visual Assessment Zone

**Slope Classification**

- Flatter than 1:50
- 1:50 - 1:20
- 1:20 - 1:15
- 1:15 - 1:10
- 1:10 - 1:7.5
- 1:7.5 - 1:5
- Steeper than 1:5

N

0 1 2
KM

Scale: 1:115 000 @ A3
Coordinate System: WGS 1984 UTM Zone 35S
Projection: Transverse Mercator
Datum: WGS 1984

**PROPOSED IMPUMELELO WEF GRID CONNECTION INFRASTRUCTURE**

**NEAR SECUNDA MPUMLANGA PROVINCE**

**VISUAL ASSESSMENT**

**SLOPE CLASSIFICATION**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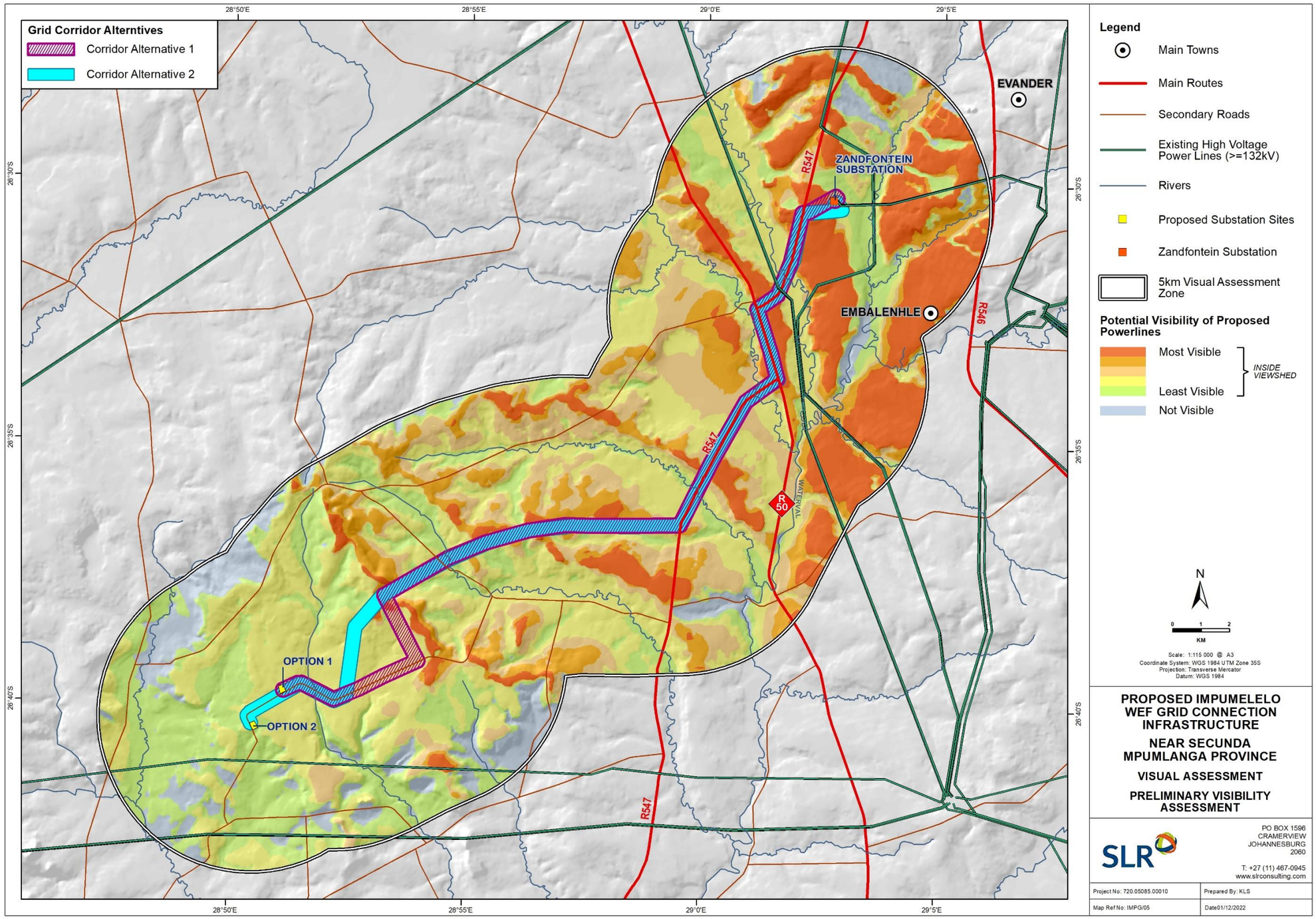
## *MAP 5: Potential Visibility of EGI*




**PROPOSED IMPUMELELO WEF GRID CONNECTION INFRASTRUCTURE**

**NEAR SECUNDA MPUMLANGA PROVINCE**

**VISUAL ASSESSMENT**

**PRELIMINARY VISIBILITY ASSESSMENT**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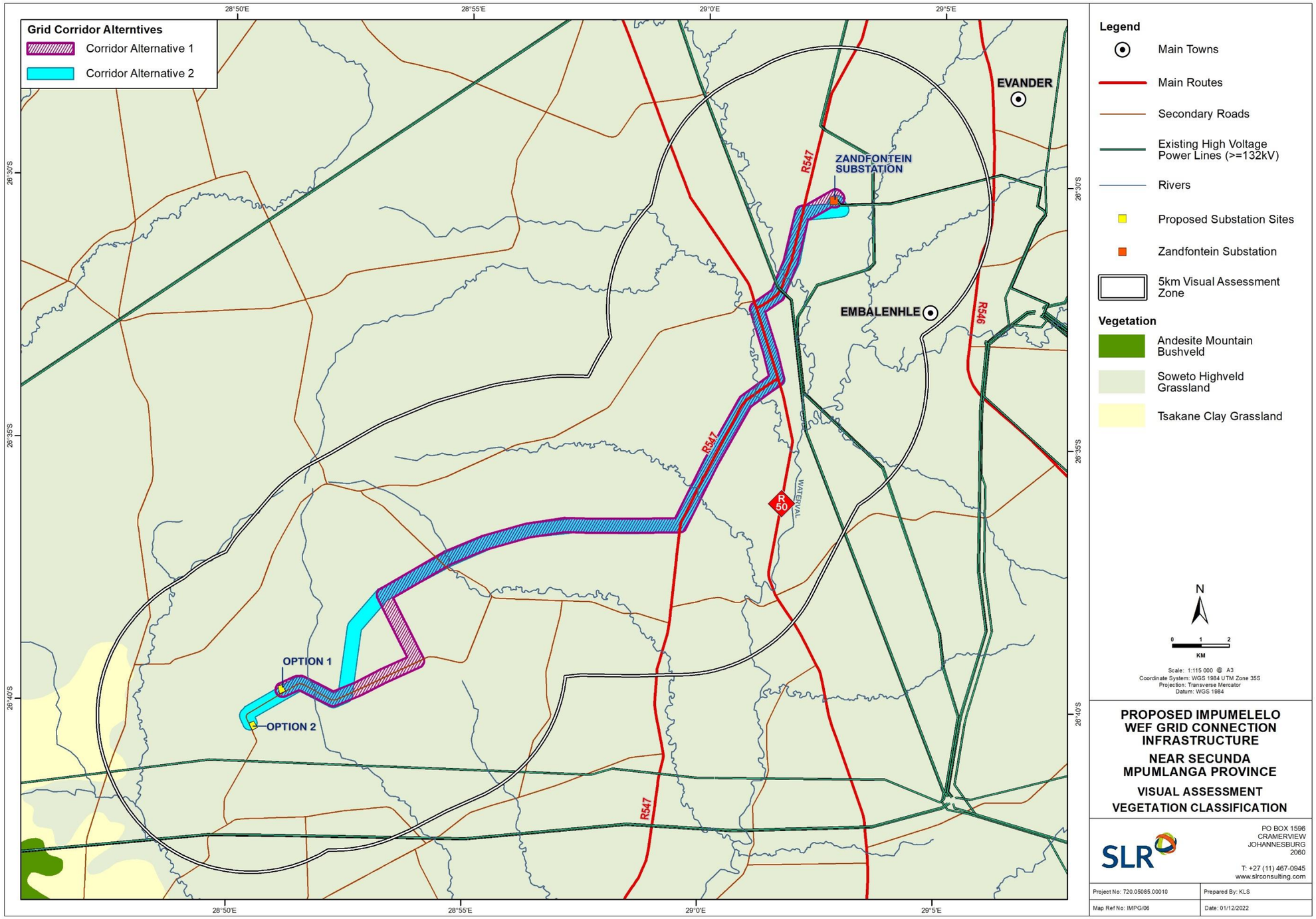
## *MAP 6: Vegetation Classification*




**PROPOSED IMPUMELELO WEF GRID CONNECTION INFRASTRUCTURE**

**NEAR SECUNDA MPUMLANGA PROVINCE**

**VISUAL ASSESSMENT**

**VEGETATION CLASSIFICATION**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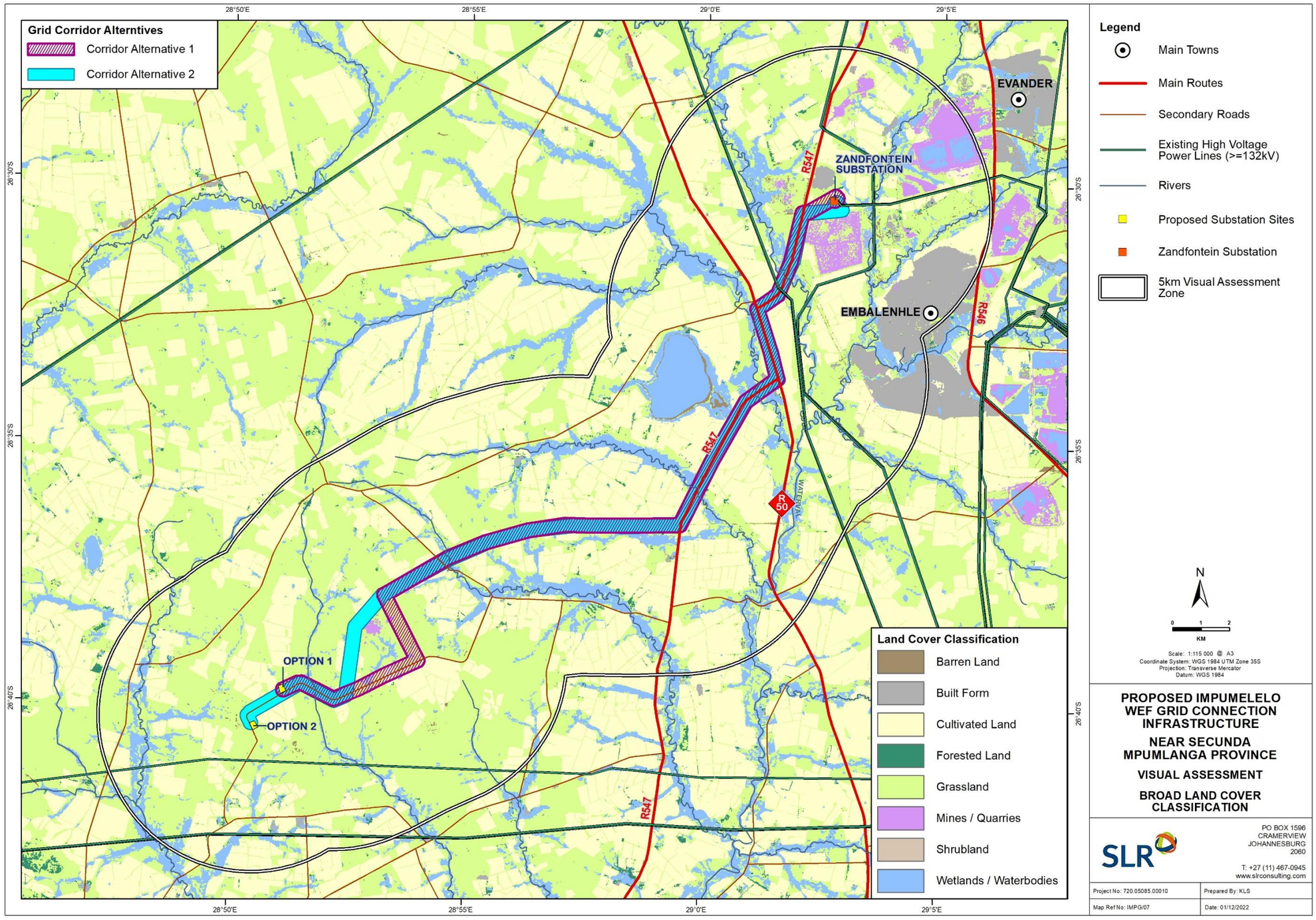
## *MAP 7: Land Cover Classification*




**PROPOSED IMPUMELELO WEF GRID CONNECTION INFRASTRUCTURE**

**NEAR SECUNDA MPUMLANGA PROVINCE**

**VISUAL ASSESSMENT**

**BROAD LAND COVER CLASSIFICATION**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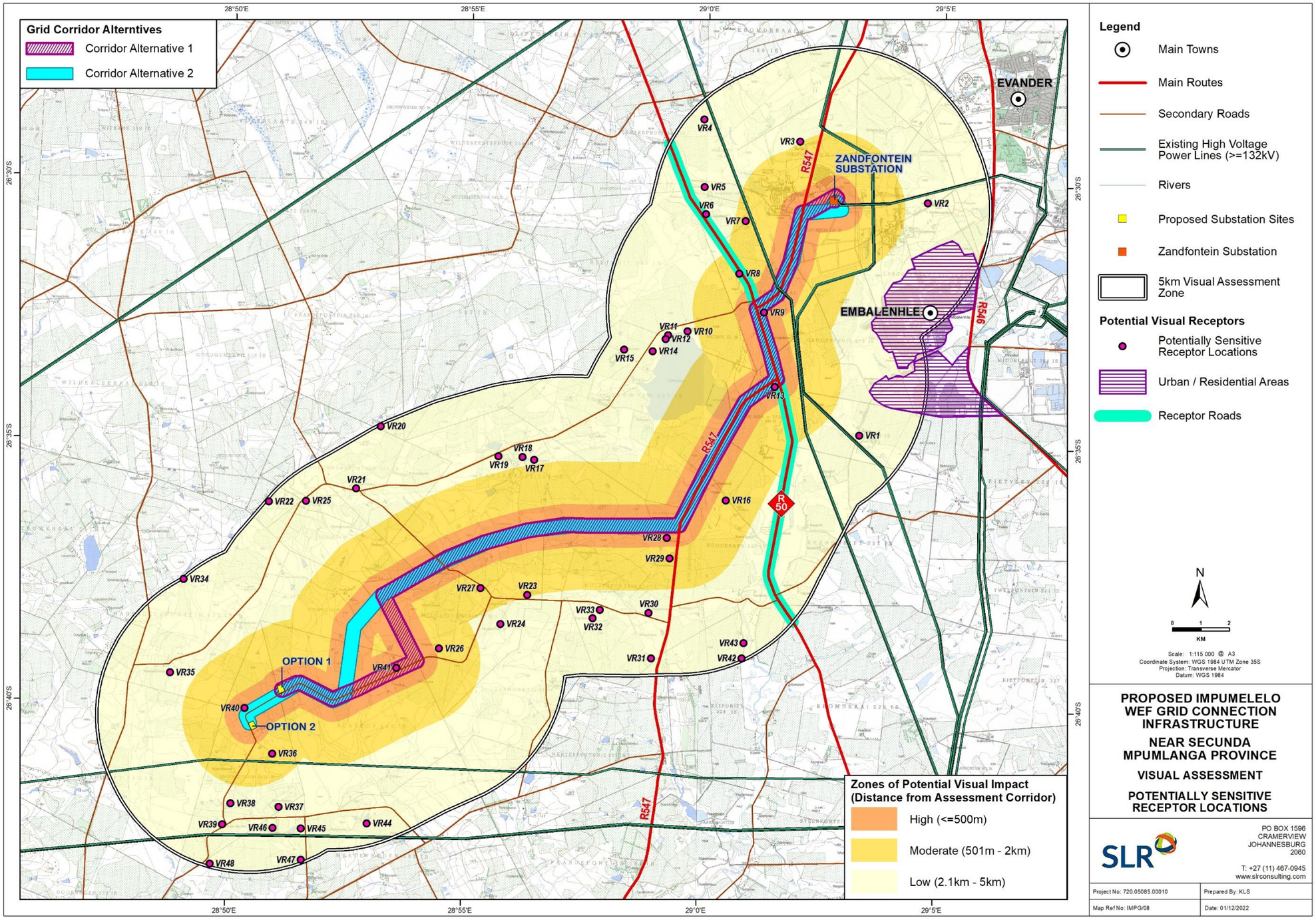
## *MAP 8: Potentially Sensitive Receptor Locations*




**PROPOSED IMPUMELELO WEF GRID CONNECTION INFRASTRUCTURE**

**NEAR SECUNDA MPUMLANGA PROVINCE**

**VISUAL ASSESSMENT**

**POTENTIALLY SENSITIVE RECEPTOR LOCATIONS**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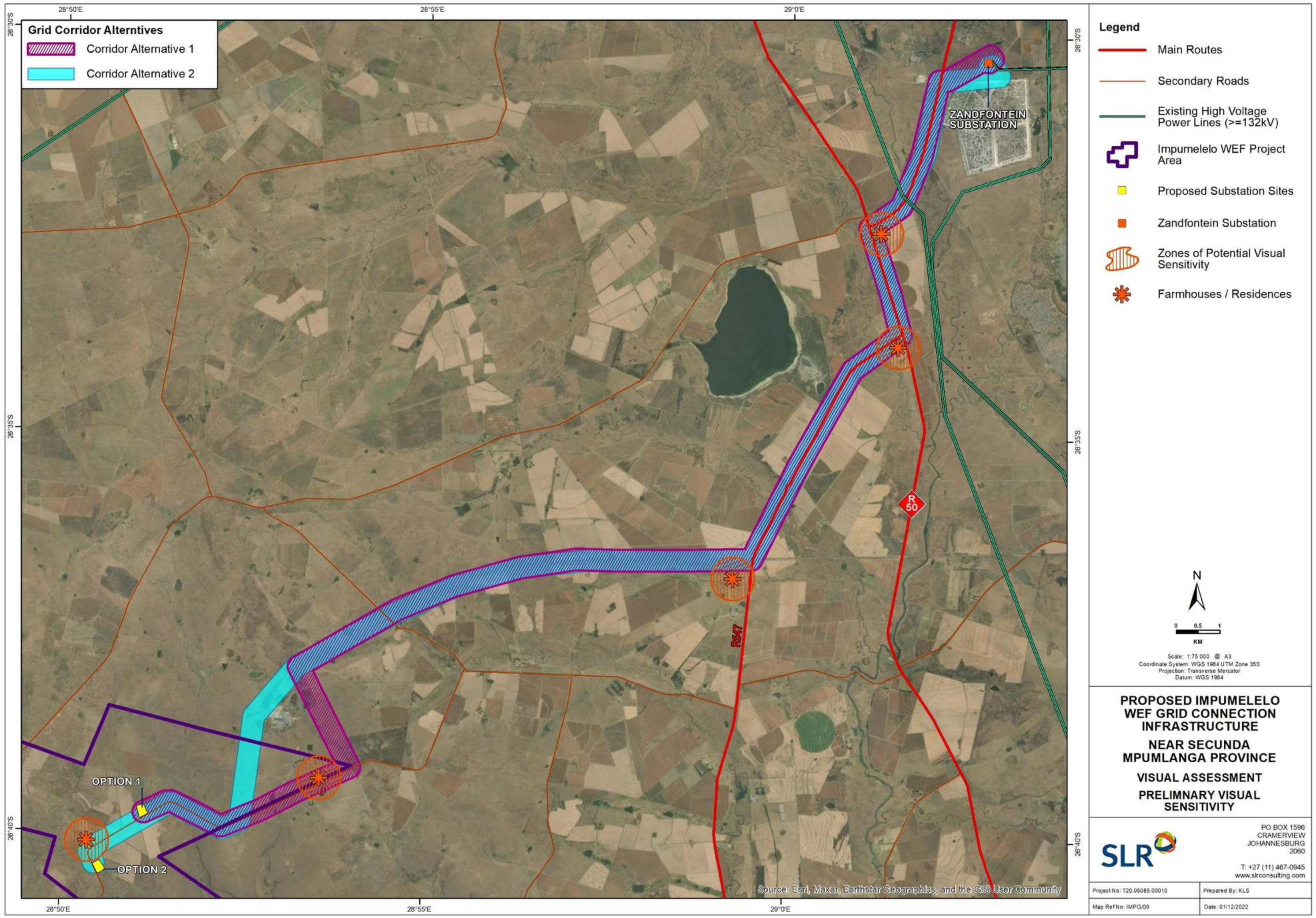
## *MAP 9: Visual Sensitivity on the Impumelelo EGI Assessment Corridor*



# APPENDIX G: COMPARATIVE ASSESSMENT OF ALTERNATIVES

**Table 1: Comparative Assessment of Alternatives – Impumelelo EGI 132kV Grid Connection Corridors**

| Alternative | Preference | Reasons (incl. potential issues) |
|---|---|---|
| **VHUVHILI 132kV POWERLINES** | | |
| Power Line Corridor Alternative 1 | Favourable | ▪ Power Line Corridor Alternative 1 is approximately 33.3 km in length, linking substation Option 1 to the Zandfontein Substation.<br>▪ Although this route alignment traverses some areas of higher elevations, much of the corridor will not be exposed on the skyline.<br>▪ There are no sensitive receptors within 5km of this alternative.<br>▪ There are three (3) potentially sensitive receptors located inside the assessment corridor for Alternative 1 and a fourth receptor is within 500m of the assessment corridor. These receptors are expected to experience high levels of visual impact as a result of the EGI project although these impacts would be reduced due to the proximity of the existing road and high voltage powerline infrastructure. In addition, one receptor, VR41 is located within the project area for Impumelelo WEF and as such the land owners are not expected to perceive the proposed development in a negative light.<br>▪ The remaining receptors are all more than 1km away and would experience moderate to low levels of visual impact.<br>▪ There are no fatal flaws associated with Alternative 1 and this alternative is considered **Favourable** from a visual perspective. |
| Power Line Corridor Alternative 2 | Favourable | ▪ Power Line Corridor Alternative 2 is approximately 33.7 km in length, linking substation Option 2 to the proposed Zandfontein Substation.<br>▪ Although this route alignment traverses some areas of higher elevations, much of the corridor will not be exposed on the skyline.<br>▪ There are no sensitive receptors within 5km of this alternative.<br>▪ There are three (3) potentially sensitive receptors located inside the assessment corridor for Alternative 2 and a fourth receptor is within 500m of the assessment corridor. These receptors are expected to experience high levels of visual impact as a result of the EGI project although these impacts would be reduced due to the proximity of the existing road and high voltage powerline infrastructure. In addition, one receptor, VR40 is located within the project area for Impumelelo WEF and as such the land owners are not expected to perceive the proposed development in a negative light.<br>▪ The remaining receptors are all more than 1km away and would experience moderate to low levels of visual impact.<br>▪ There are no fatal flaws associated with Alternative 2 and this alternative is considered **Favourable** from a visual perspective. |

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| Report Number: | Version 1 |
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