DRAFT BASIC ASSESSMENT REPORT

Basic Assessment for the proposed development of the 290 MW Volta Solar Photovoltaic (PV) Facility (i.e., Volta PV Facility) and Battery Energy Storage System (BESS) and the proposed development of a 132 kV Power Line and associated EGI (i.e., Volta EGI) to the planned Artemis Main Transmission Substation (MTS) near Dealesville, Free State

APPENDIX C.2

Visual Impact Assessment

CSIR
Touching lives through innovation

Volta PV

PROPOSED DEVELOPMENT OF A 132 KV POWER LINE AND ASSOICUATED ELECTRICAL INFRASTRUCTURE NEAR DEALESVILLE, FREE STATE PROVINCE

VISUAL IMPACT ASSESSMENT

Produced for:

Volta PV (Pty) Ltd

On behalf of:

CSIR

Produced by:

LOGIS

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Final: 27 March 2023

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DECLARATION

I, **Lourens du Plessis**, as an independent consultant compiled this Scoping Visual Impact Assessment and declare that it correctly reflects the findings made at the time of the report's compilation. I further declare that I act as an independent consultant in terms of the following:

- Do not have any financial interest in the undertaking of the activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act 107 of 1998);
- Undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act,1998 (Act 107 of 1998);
- Based on information provided to me by the project proponent, and in addition to information obtained during the course of this study, will present the results and conclusion within the associated document to the best of my professional judgement.

____

Lourens du Plessis
Professional GISc Practitioner
GPr GISc 0147

EXECUTIVE SUMMARY

Volta PV (Pty) Ltd is proposing the development of Electrical Grid Infrastructure (EGI) near Dealesville in the Free State.

The study area occurs on land with an average elevation of approximately 1305 with elevations reaching 1330 on mountain tops such the Grootberg, Spitskop and Rondekop in the west. The entire study area is predominantly flat with low undulating hills. The topography or terrain morphology of the region is broadly described as *Plains and Pans* or *Slightly Undulating Plains*, and is therefore relatively flat.

The site location can be described as fairly remote, with the only populated area being the town of Dealesville. A number of homesteads occur throughout the study area.

Land cover in the study area consists predominately of grasslands and dryland agriculture. Low shrubland and bare sand are associated with the pans scattered throughout the site.

Industrial infrastructure in the region is very prominent and consists of the Perseus substation (located 2 km north east of the proposed sites) and an extensive network of high voltage powerlines that congregate at the substation.

Further to this, the proposed Volta EGI is located within the Central corridor of the Strategic Transmission Corridors, which are 5 corridors important for the planning of electricity transmission and distribution infrastructure.

Overall, the Visual Absorption Capacity (VAC) of the receiving environment can be considered to be moderate. While there is a general absence of tall growing vegetation and the topography is very flat, there are numerous existing power lines that traverse the study area. This results in a large amount of visual clutter, which allows the environment to visually 'absorb' the proposed new power line.

The greater environment has been transformed owing to dryland agriculture. Additionally there are numerous existing powerlines that lie in close proximity to the site and traverse the study area, resulting in an overall low to moderate visual quality.

The proposed power line infrastructure is located in an area where numerous existing power line infrastructure traverses the study area and culminates at the Perseus substation. The visual amenity along this infrastructure corridor has already been compromised. Additionally, numerous PV facilities have been authorized within the area. It should be kept in mind however, that the cumulative visual exposure (and potential cumulative visual impact) is not an unintended consequence of electrical grid infrastructure developments within the region, but rather a concerted effort to concentrate infrastructure within the Central Corridor of the Strategic Transmission Corridors. This is an effort to prevent the scattered proliferation of EGI beyond the Strategic Transmission Corridors and throughout the greater region.

No specific mention to visual impact sensitivity was made in the DFFE screening tool report with regards to the Grid connection infrastructure. Based on the site sensitivity verification report, the sensitivity of the visual environment for the proposed Grid connection infrastructure has been determined to be **moderate** owing to the low occurrence of visual receptors within 500m of the proposed

alignment, occurrence of numerous existing high voltage power lines that traverse the immediate area and the location of the alignment within a Strategic Transmission Corridor.

Overall, the significance of the visual impacts is expected to range from **moderate** to **low** as a result of the numerous existing power lines within close proximity to the proposed alignment and its location within the Strategic Transmission Corridor. There are a low number of potential sensitive visual receptors within a 3km radius of the proposed structures, although the possibility does exist for visitors to the region to venture in to closer proximity to the power line infrastructure. These observers may consider visual exposure to this type of infrastructure to be intrusive. It should be noted that of these receptors located within a 3km radius of the proposed alignment, a number of the homesteads are located on farms that already have authorization to construct renewable energy developments.

If mitigation is undertaken as recommended, it is concluded that the significance of most of the anticipated visual impacts will remain at or be managed to acceptable levels. As such, the Volta EGI would be considered to be acceptable from a visual impact perspective and can therefore be authorised.

1. STUDY APPROACH

1.1. Qualification and experience of the practitioner

Lourens du Plessis (t/a LOGIS) is a *Professional Geographical Information Sciences (GISc) Practitioner* registered with The South African Geomatics Council (SAGC) and specializes in Environmental GIS and Visual Impact Assessments (VIA).

Lourens has been involved in the application of Geographical Information Systems (GIS) in Environmental Planning and Management since 1990. He has extensive practical knowledge in spatial analysis, environmental modeling and digital mapping, and applies this knowledge in various scientific fields and disciplines. His GIS expertise are often utilised in Environmental Impact Assessments, Environmental Management Frameworks, State of the Environment Reports, Environmental Management Plans, tourism development and environmental awareness projects.

He holds a BA degree in Geography and Anthropology from the University of Pretoria and worked at the GisLAB (Department of Landscape Architecture) from 1990 to 1997. He later became a member of the GisLAB and in 1997, when Q-Data Consulting acquired the GisLAB, worked for GIS Business Solutions for two years as project manager and senior consultant. In 1999 he joined MetroGIS (Pty) Ltd as director and equal partner until December 2015. From January 2016 he worked for SMEC South Africa (Pty) Ltd as a technical specialist until he went independent and began trading as LOGIS in April 2017.

Lourens has received various awards for his work over the past two decades, including EPPIC Awards for ENPAT, a Q-Data Consulting Performance Award and two ESRI (Environmental Systems Research Institute) awards for *Most Analytical* and *Best Cartographic Maps*, at Annual International ESRI User Conferences. He is a co-author of the ENPAT atlas and has had several of his maps published in various tourism, educational and environmental publications.

He is familiar with the "Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes" (Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning) and utilises the principles and recommendations stated therein to successfully undertake visual impact assessments. Although the guidelines have been developed with specific reference to the Western Cape Province of South Africa, the core elements are more widely applicable across the provinces.

1.2. Information Base

This assessment was based on information from the following sources:

- Chief Directorate National (CDN) Geo-Spatial Information, varying dates. *1:50 000 Topographical Maps and Data.*
- DFFE, 2018/2020. *National Land-cover Database 2018/2020 (NLC2018/2020).*
- DFFE, 2022. *South African Protected Areas Database (SAPAD_OR_2022_Q2).*
- JAXA, 2021. Earth Observation Research Centre. *ALOS Global Digital Surface Model (AW3D30).*
- Google Earth Pro. *Up to date and recent satellite images.*
- Professional judgement based on experience gained from similar projects;
- Literature research on similar projects;

- Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of NEMA

Quality of the above information bases are rated as Good.

1.3. Assumptions and limitations

To prepare this Report, LoGis utilised only the documents and information provided by CSIR or any third parties directed to provide information and documents by CSIR. LoGis has not consulted any other documents or information in relation to this Report, except where otherwise indicated. The findings, recommendations and conclusions given in this report are based on the author's best scientific and professional knowledge, as well as, the available information. This report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken. LoGis and its staff reserve the right to modify aspects of the report including the recommendations if and when new information may become available from on-going research or further work in this field, or pertaining to this investigation.

This assessment was undertaken during the planning stage of the project and is based on information available at that time. It is assumed that all information regarding the project details provided by CSIR and the Applicant is correct and relevant to the proposed project. This Visual Impact Assessment and all associated mapping has been undertaken according to the worst-case scenario with the layout provided.

1.4. Level of confidence

Level of confidence[1] is determined as a function of:

- The information available and understanding of the study area by the practitioner:
    - 3: A high level of information is available of the study area and a thorough knowledge base could be established during site visits, surveys etc. The study area was readily accessible.
    - 2: A moderate level of information is available of the study area and a moderate knowledge base could be established during site visits, surveys etc. Accessibility to the study area was acceptable for the level of assessment.
    - 1: Limited information is available of the study area and a poor knowledge base could be established during site visits and/or surveys, or no site visit and/or surveys were carried out.

- The information available and understanding of the project and experience of this type of project by the practitioner:
    - 3: A high level of information and knowledge is available of the project and the visual impact assessor is well experienced in this type of project and level of assessment.
    - 2: A moderate level of information and knowledge is available of the project and/or the visual impact assessor is moderately experienced in this type of project and level of assessment.

[1] Adapted from Oberholzer (2005).

- 1: Limited information and knowledge is available of the project and/or the visual impact assessor has a low experience level in this type of project and level of assessment.

These values are applied as follows:

Table 1: Level of confidence.

	Information on the project & experience of the practitioner			
Information on the study area		**3**	**2**	**1**
	3	9	6	3
	2	6	4	2
	1	3	2	1

The level of confidence for this assessment is determined to be ***9*** *and indicates that the author's confidence in the accuracy of the findings is high:*

- The information available, and understanding of the study area by the practitioner is rated as **3** and
- The information available, understanding and experience of this type of project by the practitioner is rated as **3**.

1.5. Methodology

The study was undertaken using Geographical Information Systems (GIS) software as a tool to generate viewshed analyses and to apply relevant spatial criteria to the proposed facility. A detailed Digital Terrain Model (DTM) for the study area was created from topographical data provided by the Japan Aerospace Exploration Agency (JAXA), Earth Observation Research Centre, in the form of the ALOS Global Digital Surface Model "ALOS World 3D - 30m" (AW3D30) elevation model.

Visual Impact Assessment (VIA)

The VIA is determined according to the nature, extent, duration, intensity or magnitude, probability and significance of the potential visual impacts, and will propose management actions and/or monitoring programs, and may include recommendations related to the facility layout/position.

The visual impact is determined for the highest impact-operating scenario (worst-case scenario) and varying climatic conditions (i.e. different seasons, weather conditions, etc.) are not considered.

The VIA considers potential cumulative visual impacts, or alternatively the potential to concentrate visual exposure/impact within the region.

The following VIA-specific tasks were undertaken:

- **Determine potential visual exposure**

The visibility or visual exposure of any structure or activity is the point of departure for the visual impact assessment. It stands to reason that if (or where) the proposed infrastructure were not visible, no impact would occur.

The viewshed analyses of the proposed infrastructure are based on a 30m resolution AW3D30 digital terrain model of the study area.

The first step in determining the visual impact of the proposed infrastructure is to identify the areas from which the structures would be visible. The type of structures, the dimensions, the extent of operations and their support infrastructure are taken into account.

- **Determine visual distance/observer proximity to the facility**

In order to refine the visual exposure of the infrastructure on surrounding areas/receptors, the principle of reduced impact over distance is applied in order to determine the core area of visual influence for this type of infrastructure.

Proximity radii for the proposed infrastructure are created in order to indicate the scale and viewing distance of the facility and to determine the prominence of the structures in relation to their environment.

The visual distance theory and the observer's proximity to the facility are closely related, and especially relevant, when considered from areas with a high viewer incidence and a predominantly (anticipated) negative visual perception of the proposed infrastructure.

- **Determine viewer incidence/viewer perception (sensitive visual receptors)**

The next layer of information is the identification of areas of high viewer incidence (i.e. main roads, residential areas, settlements, etc.) that may be exposed to the project infrastructure.

This is done in order to focus attention on areas where the perceived visual impact of the facility will be the highest and where the perception of affected observers will be negative.

Related to this data set, is a land use character map, that further aids in identifying sensitive areas and possible critical features (i.e. tourist facilities, protected areas, etc.), that should be addressed.

- **Determine the visual absorption capacity of the landscape**

This is the capacity of the receiving environment to absorb the potential visual impact of the proposed facility. The VAC is primarily a function of the vegetation, and will be high if the vegetation is tall, dense and continuous. Conversely, low growing, sparse and patchy vegetation will have a low VAC.

The VAC would also be high where the environment can readily absorb the structure in terms of texture, colour, form and light / shade characteristics of the structure. On the other hand, the VAC for a structure contrasting markedly with one or more of the characteristics of the environment would be low.

The VAC also generally increases with distance, where discernible detail in visual characteristics of both environment and structure decreases.

- **Calculate the visual impact index**

The results of the above analyses are merged in order to determine the areas of likely visual impact and where the viewer perception would be negative. An area with short distance visual exposure to the proposed infrastructure, a high viewer incidence and a predominantly negative perception would therefore have a higher value (greater impact) on the index. This focusses the attention to the critical areas of potential impact and determines the potential **magnitude** of the visual impact.

Geographical Information Systems (GIS) software is used to perform all the analyses and to overlay relevant geographical data sets in order to generate a visual impact index.

- **Determine impact significance**

The potential visual impacts are quantified in their respective geographical locations in order to determine the significance of the anticipated impact on identified receptors. Significance is determined as a function of extent, duration, magnitude (derived from the visual impact index) and probability. Potential cumulative and residual visual impacts are also addressed. The results of this section are displayed in impact tables and summarised in an impact statement.

- **Propose mitigation measures**

The preferred alternative (or a possible permutation of the alternatives) will be based on its potential to reduce the visual impact. Additional general mitigation measures will be proposed in terms of the planning, construction, operation and decommissioning phases of the project.

- **Reporting and map display**

All the data categories, used to calculate the visual impact index, and the results of the analyses will be displayed as maps in the accompanying report. The methodology of the analyses, the results of the visual impact assessment and the conclusion of the assessment will be addressed in this VIA report.

- **Site visit**

A site visit was undertaken in order to verify the results of the spatial analyses and to identify any additional site-specific issues that may need to be addressed in the VIA report. It should be noted that, from a visual perspective, the different seasons do not influence the results of the impact assessment, and as such regardless of the timing of the site visit, the level of confidence for the assessment and findings is high. A photographic survey was made of the site and surrounding potentially affected area from several selected viewpoints. The site visit was undertaken on the 21 October 2022 for the duration of the entire day.

2. BACKGROUND

Volta PV (Pty) Ltd is proposing the development of Electrical Grid Infrastructure (EGI) near Dealesville in the Free State.

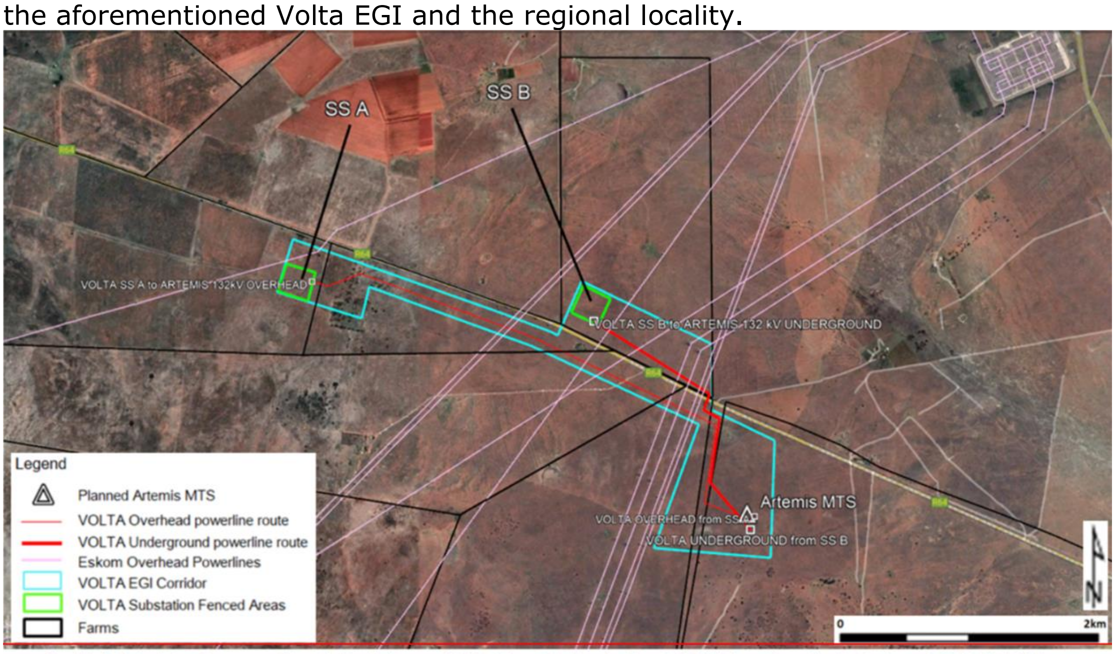
The proposed Volta EGI will be constructed on the following farm portions:

- Mooihoek (RE/1551)
- Cornelia (RE/1550)
- Modderpan (RE/750)
- Klipfontein (RE/305)
- Leliehoek (RE/748)
- Oxford (1/1030)

The proposed transmission line would consist of a 132 kV (single or double circuit) located within servitude of up to 18 m wide and will be positioned within a 30 m wide corridor. The power line will run from the proposed Volta PV facility (to the west) to the planned Artemis Main Transmission Substation (to the east), over a distance of approximately 4 Km (Figure 1). An alternative has been proposed that includes an underground cable running from the Volta substation B to the Artemis MTS of approximately 2.04 Km in length. This is to avoid the congestion of overhead lines en-route from the Volta substation B to the Artemis MTS.

Associated infrastructure will include permanent access/service tracks (where no existing roads exist) as well as temporary laydown areas and site camps that will be rehabilitated after construction.

The study area is situated within the Tokologo Local Municipality, which falls within the Lejweleputswa District Municipality in the Free State Province. The affected farm portions comprise approximately 2 750 ha of which a 157 ha portion of these properties has been earmarked for the proposed Volta EGI project site. Please refer to the maps displayed in this report for the location of the aforementioned Volta EGI and the regional locality.



Credits/ Metadata: Basemap: Google Earth: Image 2023: Maxar Technologies, CNES/Airbus, Coordinate System: CGS WGS 1984

Figure 1: Proposed alignment and corridor (EGI corridor in blue, thin red line 132 kV overhead line, bold red line 132 kV underground cable, substations green)

The proposed grid connection infrastructure is indicated on the maps displayed within this report. Sample images of typical 132kV power line towers are displayed below.

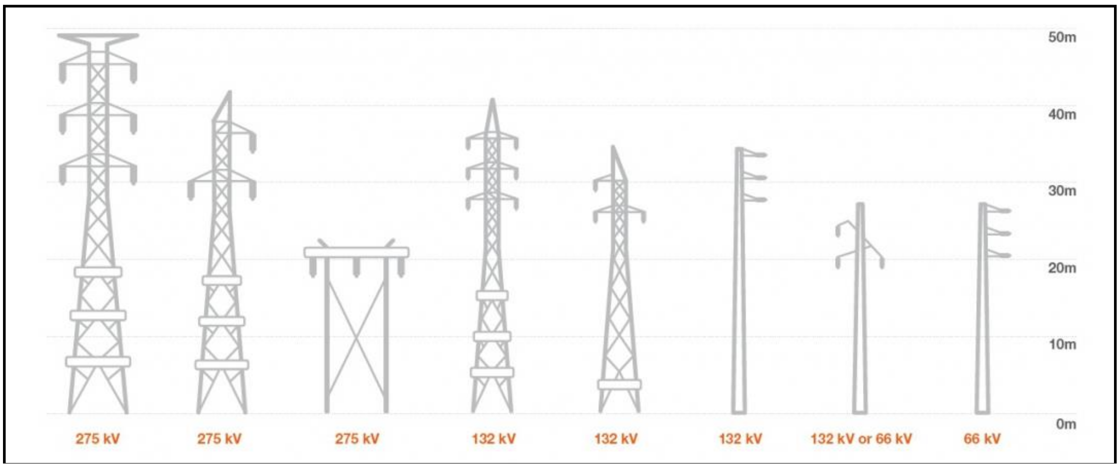


Figure 2: Schematic representation of power line towers

Figure 3: Typical 132 kV power line structures

3. TERMS OF REFERENCE

This report is the undertaking of a Visual Impact Assessment (VIA) of the proposed Volta Electrical Grid Connection Infrastructure as described above.

The specialist was required to determine the Site Sensitivity Verification Requirements in terms of Government Gazette 43110, Government Notice (GN) 320, and provide a Site Sensitivity Verification Report, including 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. Following this, prepare a description and mapping baseline of the visual resources and sensitivity of the study area, including viewsheds and recommended buffers, in GIS format.

The determination of the potential visual impacts is undertaken in terms of nature, extent, duration, magnitude, probability and significance of the construction and operation of the proposed infrastructure. In addition, the determination of impacts must be assessed to determine the potential direct, indirect and cumulative impacts of the proposed development on the receiving environment from a visual perspective, both without and with mitigation, for the construction, operational and decommissioning phases of the project. Any protocols, legal and permit requirements that are relevant to this project and the implications thereof should be identified.

The study area for the visual impact assessment encompasses a geographical area of 265km² (the extent of the full page maps in this report). The study area includes a 3km buffer zone (area of potential visual influence) from the proposed development footprint.

The study area includes the small town of Dealesville, the R64 arterial road, and a number of farm dwellings or homesteads.

Anticipated issues related to the potential visual impact of the proposed Volta EGI include the following:

- The visibility of the infrastructure to, and potential visual impact on, observers travelling along the R64 arterial road and various secondary roads.
- The visibility of the infrastructure to, and potential visual impact on residents of dwellings within the study area, with specific reference to the farm residences in closer proximity to the proposed development.
- The potential visual impact of the infrastructure on the visual character or sense of place of the region.
- The potential visual impact of the infrastructure on tourist routes or tourist destinations/facilities (if present).
- The potential visual impact of the construction of ancillary infrastructure (i.e. internal access roads, buildings, etc.) on observers in close proximity to the facility.
- The visual absorption capacity of the natural vegetation and topography (if applicable).
- The potential visual impact of operational, safety and security lighting of the infrastructure at night on observers residing in close proximity of the facility.
- The potential cumulative visual impact of the proposed power lines in relation to other infrastructure and built forms.
- Potential visual impacts associated with the construction, operations and decommissioning phases.
- The potential to mitigate visual impacts and inform the design process.

It is envisaged that the issues listed above may constitute a visual impact at a local and/or regional scale.

Once impacts have been identified, provide recommendations with regards to potential monitoring programmes and determine mitigation and/or management measures which could be implemented to reduce the effect of negative impacts and enhance the effect of positive impacts including the identification of best practice management actions, monitoring requirements, and rehabilitation guidelines to be included in the Environmental Management Programme (EMPr).

4. RELEVANT LEGISLATION AND GUIDELINES

The following legislation and guidelines have been considered in the preparation of this report:

- **The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA):** This report is in line with Appendix 6 of NEMA: Environmental Impact Assessment (EIA) Regulations (2014, as amended) which details the minimum requirements a specialist report must contain for an Environmental Impact Assessment.
- **Guideline for Involving Visual and Aesthetic Specialists in EIA Processes (DEADP, Provincial Government of the Western Cape, 2005):** This guideline was developed for use in the Western Cape, however in the absence of the development of any other guideline, this provides input for the preparation of visual specialist input into EIA processes. The guideline documents the requirements for visual impact assessment, typical issues that trigger the need for specialist visual input, the scope and extent of a visual assessment, information required, as well as the assessment ad reporting of visual impacts and management actions.
- **Screening Tool as per Regulation 16 (1)(v) of the Environmental Impact Assessment Regulations, 2014 as amended:** a Screening report was generated for this proposed project, whereby a visual impact assessment was identified as one of the specialist studies that would be required.

5. THE AFFECTED ENVIRONMENT

The study area is situated within the Tokologo Local Municipality, which falls within the Lejweleputswa District Municipality in the Free State Province. The proposed site is located approximately 4 km north west of Dealesville, 42 km south east of Boshof and 66 km north west of Bloemfontein.

The study area occurs on land with an average elevation of approximately 1305 with elevations reaching 1330 on mountain tops such the Grootberg, Spitskop and Rondekop in the west. The entire study area is predominantly flat with low undulating hills. The topography or terrain morphology of the region is broadly described as *Plains and Pans* or *Slightly Undulating Plains*, and is therefore relatively flat.

Figure 4: Flat topography

The surrounding area is known for numerous salt pans of which Klippan and Annaspan to the north east of the proposed sites are the most prominent. See **Map 1** for the shaded relief/topography map of the study area.

The site location can be described as fairly remote, with the only populated area being the town of Dealesville. A number of homesteads occur throughout the study area. Some of these in the study area include:

- Carlton
- Valleidam
- Modderpan
- Gouda
- Beestedam
- Oxford
- Kelverdon

Roosteyn Safari's, who specialise in hunting safaris, is located 2.5 km north west of the proposed site, while Tarentaalrand Safari Lodge, a guesthouse, is located 10 km north west.

It is uncertain whether all of these farmsteads are inhabited or not. It stands to reason that farmsteads that are not currently inhabited will not be visually impacted upon at present. These farmsteads do, however retain the potential to be affected visually should they ever become inhabited again in the future. For this reason, the author of this document operates under the assumption that they are all inhabited. It should be noted that two (2) homesteads located within the farm portions earmarked for the PV development have been confirmed to be uninhabited. These homesteads will not be taken into consideration during the impact assessment.

Figure 5: Typical dwelling in Dealesville

Figure 6: Informal settlements

Land cover in the study area consists predominately of grasslands and dryland agriculture. Low shrubland and bare sand are associated with the pans scattered throughout the site. See **Map 2** for the broad land cover types map of the study area.

The two (2) vegetation types present on the proposed sites are Western Free State Clay Grassland and Vaal-Vet Sandy Grassland.

Figure 7: Grassland vegetation

The R64, which bisects the study area, is a provincial route that connects Bloemfontein with Kimberly via Dealesville and Boshof. Other than this arterial road, a limited number of secondary roads cross the study area.

Figure 8: View of the site from the R64

Industrial infrastructure in the region is very prominent and consists of the Perseus substation (located 2 km north east of the proposed sites) and an extensive network of high voltage powerlines that congregate at the substation. These include:

- Hydra/Perseus 2 400kV Overhead Line
- Hydra/Perseus 3 400kV Overhead Line
- Leander/Perseus 1 400kV Overhead Line
- Perseus/Theseus 1 400kV Overhead Line
- Beta/Perseus 2 400kV Overhead Line
- Beta/Perseus 3 400kV Overhead Line
- Grootvlei/Perseus 1 400kV Overhead Line
- Perseus/Harvard 1 275kV Overhead Line
- Perseus/Harvard 2 275kV Overhead Line
- Everest/Perseus 1 275kV Overhead Line
- Perseus/Boundary 1 275kV Overhead Line
- Perseus/Boundary 2 275kV Overhead Line
- Hydra/Perseus 1 765kV Overhead Line
- Alpha/Beta 2 765kV Overhead Line
- Alpha/Beta 1 765kV Overhead Line
- Mercury/Perseus 1 765kV Overhead Line
- Beta/Perseus 1 765kV Overhead Line
- Gamma/Perseus 1 765kV Overhead Line

Figure 9: Perseus Substation

Figure 10: Example of the numerous power lines that traverse the area

There are no designated protected areas within the region and no major tourist attractions or destinations were identified within the study area.

Further to this, the proposed Volta EGI is located within the Central corridor of the Strategic Transmission Corridors, which are 5 corridors important for the planning of electricity transmission and distribution infrastructure. Refer to **Figure 11** for the corridors.

Strategic Transmission Corridors were developed in terms of SIP 10: Electricity Transmission and Distribution for all. The objective for these corridors is that strategic electrical grid infrastructure is expanded in an environmentally responsible and efficient manner that responds effectively to the country's economic and social development needs.

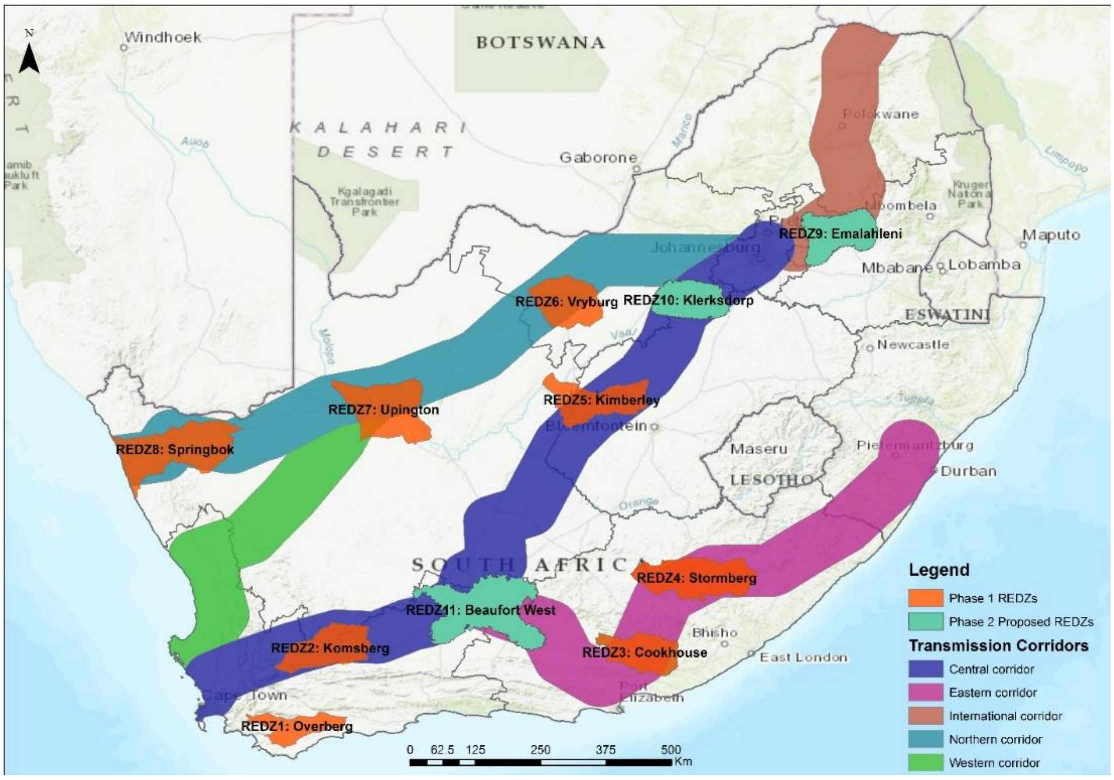
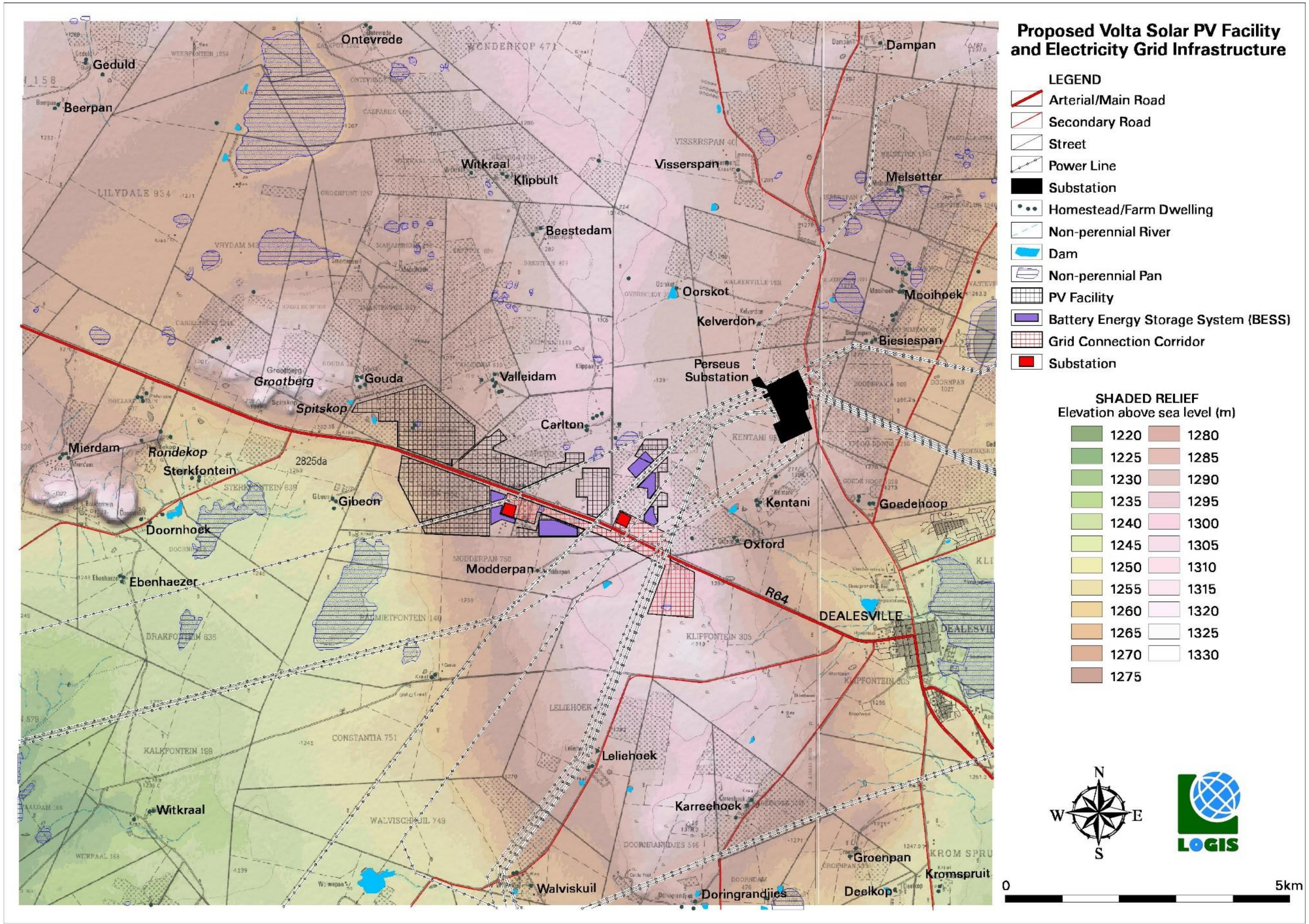
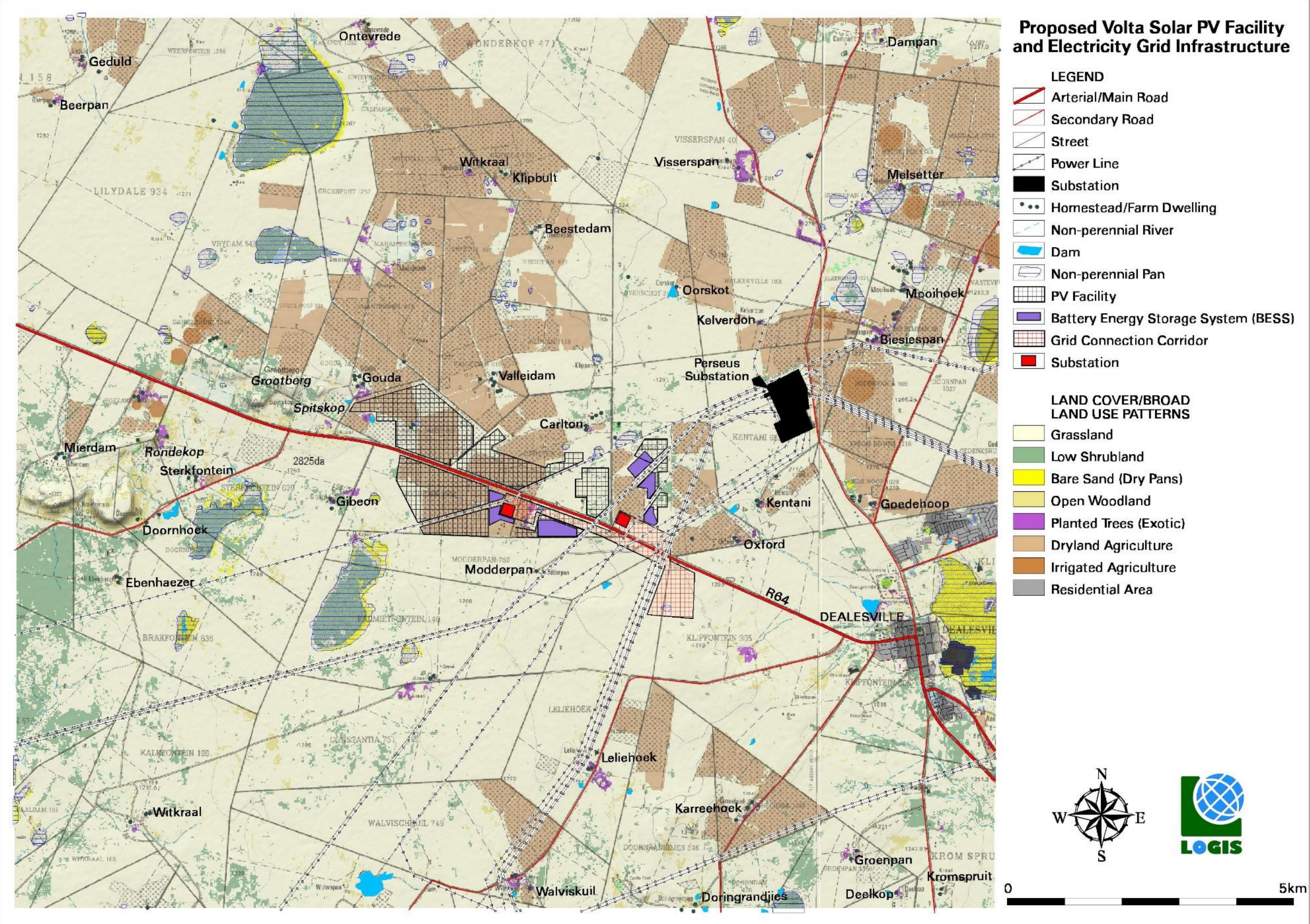


Figure 11: Renewable Energy Development Zone (REDZ) and Transmission corridors.



Map 1: Shaded relief map of the study area



Map 2: Land cover and broad land use patterns

6. RESULTS

This report and the results that follow focuses on the worst case scenario (i.e. assuming that all cables will be overhead). Should the alternative be constructed, whereby a portion of the cable would be underground (substation B to Artemis), the visual impact would be reduced.

6.1. Potential visual exposure

The result of the viewshed analysis for the proposed Volta EGI is shown on the map below (**Map 3**). The viewshed analysis was undertaken from a representative number of vantage points along the alignment at an offset of 32m above ground level. The viewshed analyses were restricted to a 3km radius due to the fact that visibility beyond this distance is expected to be negligible/highly unlikely for the relatively constrained vertical dimensions of this type of infrastructure (i.e. a 132kV-400kV power line) that have a height of up to approximately 32m.

Map 3 also indicates proximity radii from the development footprint in order to show the viewing distance (scale of observation) of the facility in relation to its surrounds.

The viewshed analysis includes the effect of vegetation cover and existing structures on the exposure of the proposed infrastructure.

Figure 12: Example of 132 kV overhead power lines

Results

It is expected that the grid connection infrastructure may theoretically be highly visible within the 3km visual corridor due to the generally flat terrain it traverses. However, it should be noted that the potential visual exposure will not occur in isolation, but rather in conjunction with the existing substation and network of power lines that traverse the site.

The following is evident from the viewshed analyses:

0 – 0.5 km

It is expected that the infrastructure would be highly visible within this zone. The potential sensitive visual receptors within this zone include the R64 arterial road that runs adjacent to the alignment and it is expected that the EGI would be highly visible to observers travelling along this road.

A single homestead is located within this zone, however it has been confirmed to be uninhabited.

0.5 – 1.5 km

Visual exposure within this zone is still highly concentrated and it is anticipated that the alignment would be highly visible within this zone.

The potential sensitive visual receptors within this zone include residents of the following homesteads:

- Modderpan
- Oxford

Observers travelling along small sections of the R64 and various secondary roads.

1.5 – 3 km

Within a 1.5 – 3 km radius, the visual exposure becomes slightly fragmented, particularly to the south east, though overall visual exposure is still very concentrated.

The potential sensitive visual receptors within this zone include residents of the following:

- Leliehoek
- Kentani
- Carlton
- Valleidam
- Gibeon

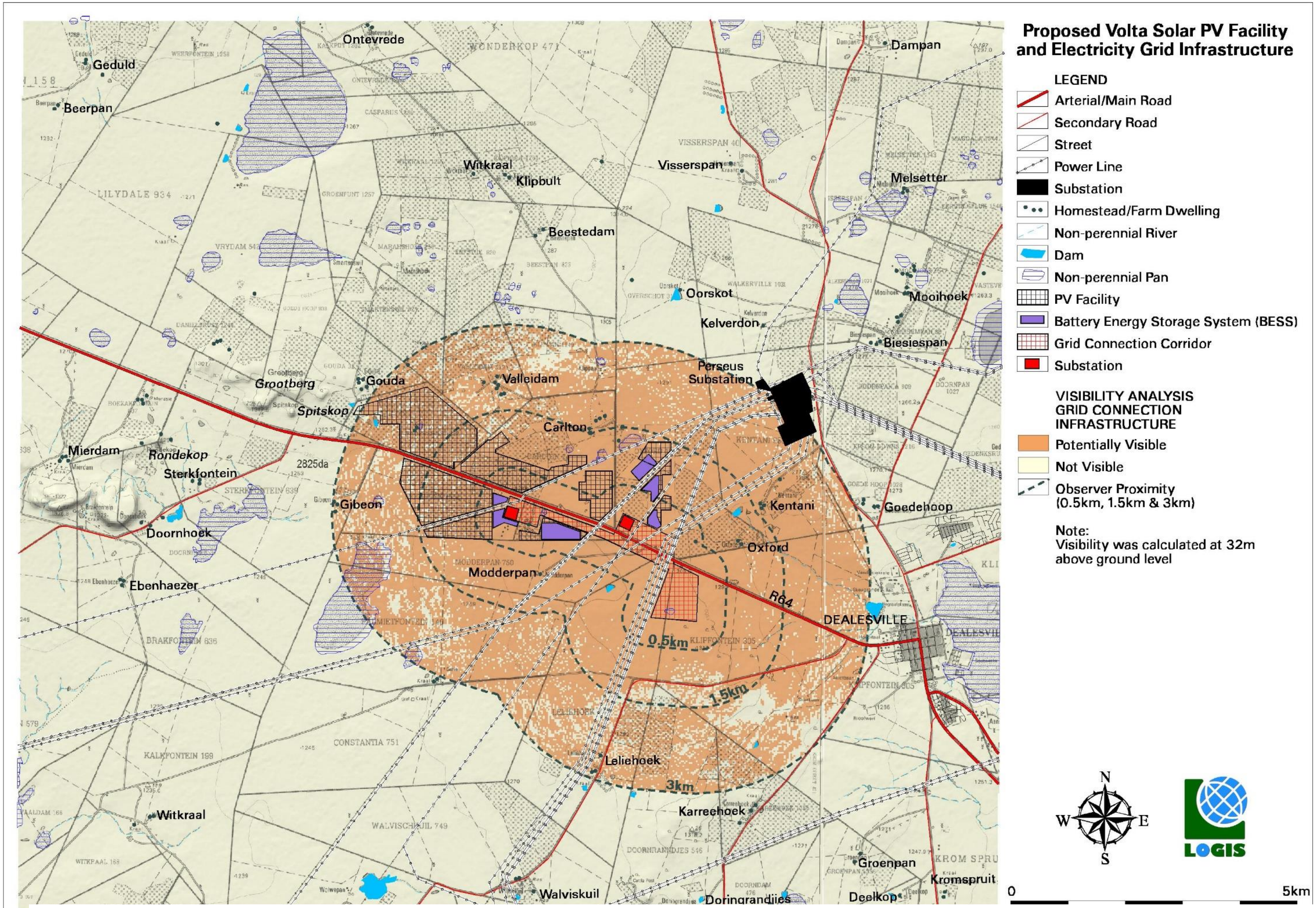
Observers travelling along small sections of the R64 and various secondary roads.

> 3 km

At distances exceeding 3km the intensity of visual exposure is expected to be very low and highly unlikely due to the distance between the object (development) and the observer.

Conclusion

In general terms it is envisaged that the grid connection infrastructure, where visible from shorter distances (e.g. less than 0.5km and potentially up to 3km), and where sensitive visual receptors may find themselves within this zone, may constitute a high visual prominence, potentially resulting in a visual impact. The incidence rate of sensitive visual receptors is however expected to be low, due to the generally remote location of the proposed infrastructure and the low number of potential observers. It should once again be noted that the potential visual exposure will not occur in isolation, but rather in conjunction with the existing power line infrastructure in the study area.



Map 3: Viewshed analysis of the proposed electrical grid infrastructure

6.2. Cumulative visual assessment

Cumulative visual impacts can be defined as the additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments. In this case the 'development' would the new 132kV power line as seen in conjunction with the existing (or proposed/authorised) grid connection infrastructure in close proximity

Cumulative visual impacts may be:

- Combined, where several power lines are within the observer's arc of vision at the same time;
- Successive, where the observer has to turn his or her head to see the various structures of a power line; and
- Sequential, when the observer has to move to another viewpoint to see different power line structures, or different views of the same power line (such as when travelling along a route).

The visual impact assessor is required (by the competent authority) to identify and quantify the cumulative visual impacts and to propose potential mitigating measures. This is often problematic as most regulatory bodies do not have specific rules, regulations or standards for completing a cumulative visual assessment, nor do they offer meaningful guidance regarding appropriate assessment methods. There are also not any authoritative thresholds or restrictions related to the capacity of certain landscapes to absorb the cumulative visual impacts of the power line infrastructure.

To complicate matters even further, cumulative visual impact is not just the sum of the impacts of two developments. The combined effect of both may be much greater than the sum of the two individual effects, or even less.

The cumulative impact of the proposed grid connection infrastructure on the landscape and visual amenity is a product of:

- The distance between the power lines;
- The distance over which the structures are visible;
- The overall character of the landscape and its sensitivity to the structures;
- The siting and design of the power line; and
- The way in which the landscape is experienced.

The specialist is required to conclude if the proposed development will result in any unacceptable loss of visual resource considering the industrial infrastructure proposed in the area.

Conclusion

The proposed power line infrastructure is located within an area where there is a large network of existing power lines that traverse the study area and congregate at the existing Perseus substation (located approximately 3km from the proposed power line). Additionally, numerous PV facilities have been authorized within the area. It should be kept in mind however, that the cumulative visual exposure (and potential cumulative visual impact) is not an unintended consequence of electrical grid infrastructure developments within the region, but rather a concerted effort to concentrate infrastructure within the Central Corridor of the Strategic Transmission Corridors. This is an effort to prevent the scattered proliferation of EGI beyond the Strategic Transmission Corridors and throughout the greater region.

In light of this, and the generally remote location of the site, the potential cumulative visual impact is considered to be within acceptable limits.

6.3. Visual distance/observer proximity to the facility

The proximity radii are based on the anticipated visual experience of the observer over varying distances. The distances are adjusted upwards for larger grid connection infrastructure (e.g. 400kV power lines) and downwards for smaller structures (e.g. 132kV power line) due to variations in height. This methodology was developed in the absence of any known and/or accepted standards for South African power line infrastructure.

The principle of reduced impact over distance is applied in order to determine the core area of visual influence for these types of structures.

The proximity radii, based on the dimensions of the proposed development footprint are indicated on **Map 4**, and include the following:

- 0 – 0.5 km. Very short distance view where the facility would dominate the frame of vision and constitute a very high visual prominence.
- 0.5 – 1.5 km. Short distance view where the structures would be easily and comfortably visible and constitute a high visual prominence.
- 1.5 – 3 km. Medium to longer distance view where the facility would become part of the visual environment, but would still be visible and recognisable. This zone constitutes a moderate visual prominence.
- > 3 km. Long distance view of the facility where the structures are not expected to be immediately visible and not easily recognisable. This zone constitutes a lower visual prominence for the facility.

The visual distance theory and the observer's proximity to the facility are closely related, and especially relevant, when considered from areas with a high viewer incidence and a potentially negative visual perception of the proposed infrastructure.

6.4. Viewer incidence/viewer perception

The number of observers and their perception of a structure determine the concept of visual impact. If there are no observers or if the visual perception of the structure is favourable to all the observers, there would be no visual impact.

It is necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed grid connection infrastructure. It would be impossible not to generalise the viewer incidence and sensitivity to some degree, as there are many variables when trying to determine the perception of the observer: regularity of sighting, cultural background, state of mind, purpose of sighting, etc. which would create a myriad of options.

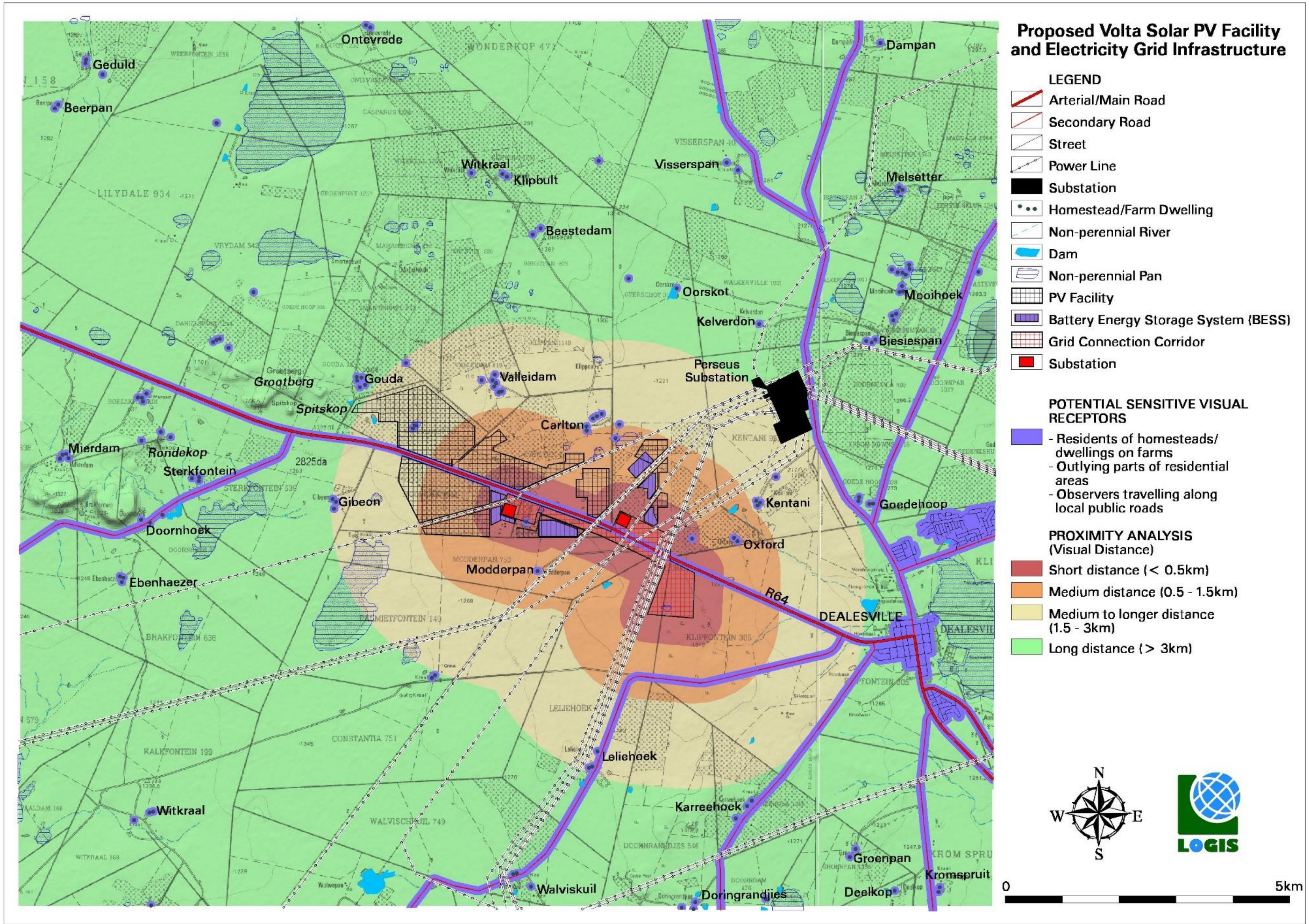
Viewer incidence within the study area is anticipated to be the highest along the R64 arterial road that runs just north of the alignment. Travellers using this road may be negatively impacted upon by visual exposure to the infrastructure.

Additional sensitive visual receptors are located at the farm residences (homesteads) throughout the study area. It is expected that the viewer's perception, unless the observer is associated with (or supportive of) the facility, would generally be negative.

Due to the fairly remote location of the proposed Volta EGI, and the ill populated nature of the receiving environment, there are only a limited number of potential sensitive visual receptor sites within closer proximity to the proposed development site. These receptor sites were listed in **Section 6.1**.

The potential sensitive visual receptor sites and areas of higher viewer incidence are indicated on **Map 4**.

The author (at the time of the compilation of this report) is not aware of any objections raised against the proposed Volta EGI.



Map 4: Proximity analysis and potential sensitive visual receptors

6.5. Visual absorption capacity

Land cover is predominantly *grassland* and dryland agriculture. The area is dominated by nearly continuous grasses often devoid of taller plants such as trees and shrubs.

Overall, the Visual Absorption Capacity (VAC) of the receiving environment can be considered to be moderate. While there is a general absence of tall growing vegetation and the topography is very flat, there are numerous existing power lines that traverse the study area. This results in a large amount of visual clutter, which allows the environment to visually 'absorb' the proposed new power line.

Where homesteads and settlements occur, some more significant vegetation and trees may have been planted, which would contribute to the visual absorption capacity (i.e. shielding the observers from the infrastructure). As this is not a consistent occurrence, however, VAC will not be taken into account for any of the homesteads or settlements, thus assuming a worst case scenario in the impact assessment.

Figure 13: Grasslands devoid of trees and shrubs- low VAC

6.6. Visual impact index

The combined results of the visual exposure, viewer incidence/perception and visual distance of the proposed Volta EGI are displayed on **Map 5**. Here the weighted impact and the likely areas of impact have been indicated as a visual impact index. Values have been assigned for each potential visual impact per data category and merged to calculate the visual impact index.

The criteria (previously discussed in this report) which inform the visual impact index are:

- Visibility or visual exposure of the structures
- Observer proximity or visual distance from the structures
- The presence of sensitive visual receptors
- The perceived negative perception or objections to the structures (if applicable)

- The visual absorption capacity of the vegetation cover or built structures (if applicable)

An area with short distance visual exposure to the proposed infrastructure, a high viewer incidence and a potentially negative perception (i.e. a sensitive visual receptor) would therefore have a **higher** value (greater impact) on the index. This helps in focussing the attention to the critical areas of potential impact and determining the potential **magnitude** of the visual impact.

The index indicates that **potentially sensitive visual receptors** within a 0.5 km radius of the proposed facility may experience a **very high** visual impact. The magnitude of visual impact on sensitive visual receptors subsequently subsides with distance to; **high** within a 0.5–1.5 km radius (where/if sensitive receptors are present) and **moderate** within a 1.5–3 km radius (where/if sensitive receptors are present). Receptors beyond 3km are expected to have a **low** potential visual impact.

Magnitude of the potential visual impact

0 – 0.5 km

The grid connection infrastructure may have a visual impact of **very high** magnitude on observers travelling along the R64 arterial road (site 1).

A single homestead is located within this zone, however it has been confirmed to be uninhabited.

0.5 – 1.5 km

The grid connection infrastructure may have a visual impact of **high** magnitude on the following observers:

Residents of/visitors to:

- Oxford (site 2)
- Modderpan (site 3)

Observers travelling along the R64 arterial Road and various secondary roads.

Note: Residents of Modderpan are located on farms earmarked for approved solar energy facilities and is also located directly adjacent to two (2) existing powerlines. This thereby reduces the probability of this impact occurring as a visual intrusion already exists.

1.5 – 3 km

The grid connection infrastructure may have a visual impact of **moderate** magnitude on the following observers:

Residents of/visitors to:

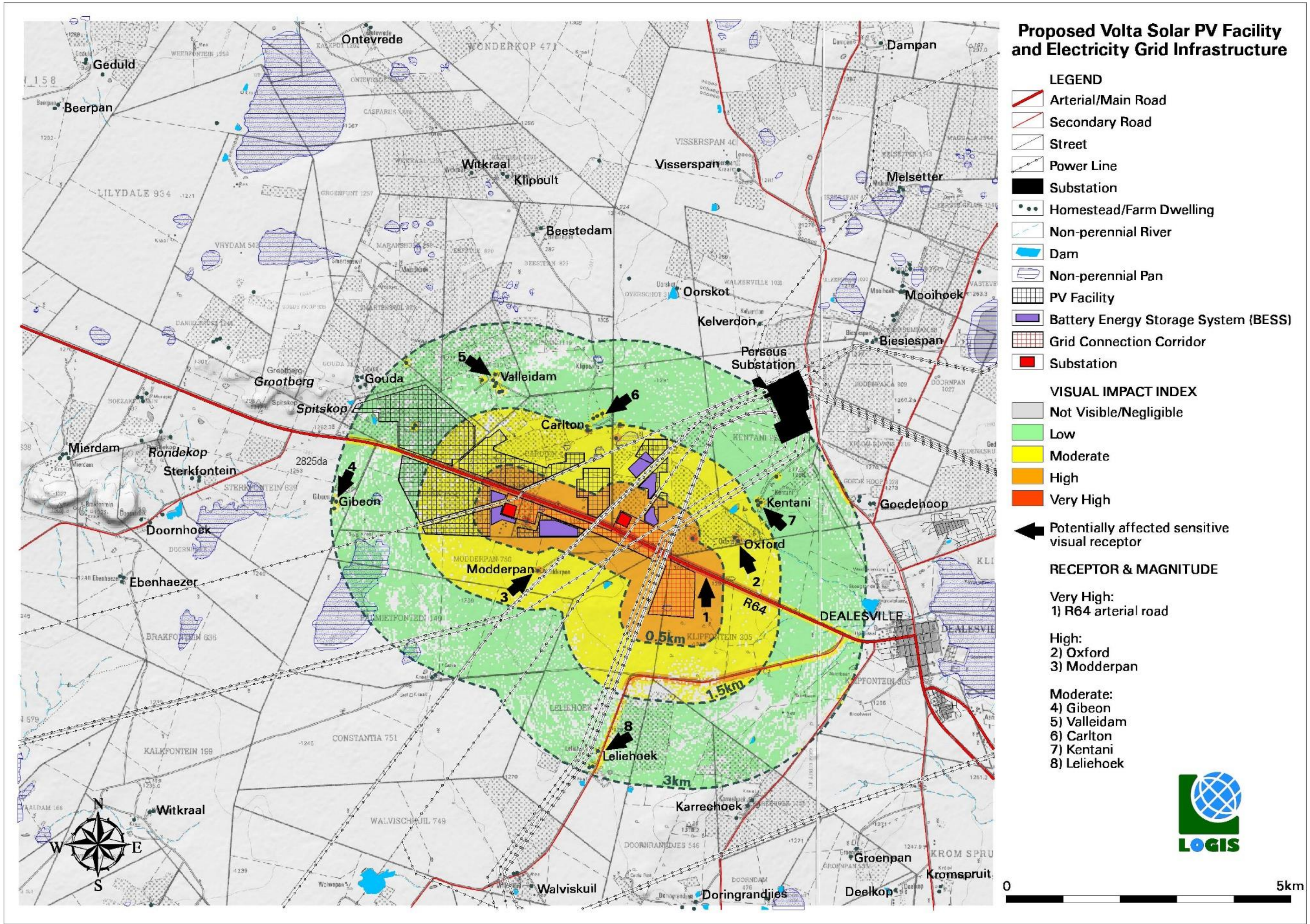
- Gibeon (site 4)
- Valleidam (site 5)
- Carlton (site 6)
- Kentani (site 7)
- Leliehoek (site 8)

Observers travelling along the R64 arterial Road and various secondary roads.

Note: Residents of Leliehoek, Kentani, Carlton and Gibeon are located on farms earmarked for proposed/approved solar energy facilities. Additionally, the presence of numerous existing powerlines in close proximity to the affected homesteads reduces the probability of this impact occurring as a visual intrusion already exists.

Notes:

Where homesteads are derelict or deserted, the visual impact will be non-existent, until such time as it is inhabited again.



Map 5: Visual impact index

6.7. Visual impact assessment: impact rating methodology

The previous section of the report identified specific areas where likely visual impacts would occur and indicate the expected **magnitude** of potential impact. This section will attempt to quantify these potential visual impacts in their respective geographical locations and in terms of the identified issues (see **Section 3:** SCOPE OF WORK) related to the visual impact.

The methodology for the assessment of potential visual impacts states the **nature** of the potential visual impact (e.g. the visual impact on users of major roads in the vicinity of the proposed PV facility) and includes a table quantifying the potential visual impact according to the following criteria:

- **Extent** - long distance (very low = 1), medium to longer distance (low = 2), short distance (medium = 3) and very short distance (high = 4)[2].
- **Duration** - very short (0-1 yrs. = 1), short (2-5 yrs. = 2), medium (5-15 yrs. = 3), long (>15 yrs. = 4), and permanent (= 5).
- **Magnitude** - None (= 0), minor (= 2), low (= 4), medium/moderate (= 6), high (= 8) and very high (= 10)[3].
- **Probability** – very improbable (= 1), improbable (= 2), probable (= 3), highly probable (= 4) and definite (= 5).
- **Status** (positive, negative or neutral).
- **Reversibility** - reversible (= 1), recoverable (= 3) and irreversible (= 5).
- **Significance** - low, medium or high.

The **significance** of the potential visual impact is equal to the **consequence** multiplied by the **probability** of the impact occurring, where the consequence is determined by the sum of the individual scores for magnitude, duration and extent (i.e. **significance = consequence (magnitude + duration + extent) x probability**).

The significance weighting for each potential visual impact (as calculated above) is as follows:

- <30 points: Low (where the impact would not have a direct influence on the decision to develop in the area)
- 31-60 points: Medium/moderate (where the impact could influence the decision to develop in the area)
- >60: High (where the impact must have an influence on the decision to develop in the area)

6.8. Visual impact assessment

The primary visual impacts of the proposed grid connection infrastructure are assessed below.

6.8.1. Planning and Construction phase impacts

6.8.1.1. Potential visual impact of construction activities on sensitive visual receptors in close proximity to the proposed infrastructure

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[2] Long distance = > 3km. Medium to longer distance = 1.5 – 3km. Short distance = 0.5 – 1.5km. Very short distance = < 0.5km (refer to Section 6.3. Visual distance/observer proximity to the facility).

[3] This value is read from the visual impact index. Where more than one value is applicable, the higher of these will be used as a worst case scenario.

During construction, there may be a noticeable increase in heavy vehicles utilising the roads to the development site that may cause, at the very least, a visual nuisance to other road users and landowners in closer proximity (< 0.5 km) to the construction activities.

Construction activities may potentially result in a **high** (significance rating = 80), temporary visual impact, that may be mitigated to **moderate** (significance rating = 40).

A mitigating factor in this scenario is the low occurrence of receptors within the receiving environment and the fact that the single homestead is confirmed to uninhabited which makes the probability of this impact occurring on this receptor highly unlikely. Additionally observers travelling along the R64 will only experience a visual impact for a brief period of time.

Table 2: Visual impact of construction activities on sensitive visual receptors in close proximity to the proposed grid connection infrastructure.

Nature of Impact: Visual impact of construction activities on sensitive visual receptors in close proximity to the proposed grid connection infrastructure.		
	Without mitigation	***With mitigation***
Extent	Very short distance **(4)**	Very short distance **(4)**
Duration	Short term **(2)**	Short term **(2)**
Magnitude	Very High **(10)**	Low **(4)**
Probability	Definite **(5)**	Highly probable **(4)**
Significance	High **(80)**	Moderate **(40)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

Planning:

- Retain and maintain natural vegetation (if present) immediately adjacent to the development footprint.

Construction:

- Ensure that vegetation cover adjacent to the development footprint (if present) is not unnecessarily removed during the construction phase, where possible.
- Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.
- Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
- Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.
- Reduce and control construction dust using approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
- Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts.
- Rehabilitate all disturbed areas (if present/if required) immediately

after the completion of construction works.
Residual impacts: None, provided rehabilitation works are carried out as specified.

6.8.2. Operational phase impacts

6.8.2.1. Potential visual impact on sensitive visual receptors located within a 0.5 km radius of the grid connection infrastructure

The grid connection infrastructure is expected to have a **moderate** visual impact (significance rating = 36) on observers travelling along the R64.

A mitigating factor within this scenario is the absence of any inhabited homesteads within close proximity to the proposed site and the fact that the visual impact of the power line will largely be absorbed by the presence of the existing power lines. Additionally, observers traveling along the roads will only be exposed to the visual intrusion for a short period of time. This reduces the probability of this impact occurring.

No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice. The table below illustrates this impact assessment.

Table 3: Visual impact on observers in close proximity to the proposed grid connection infrastructure.

Nature of Impact: Visual impact on residents and observers travelling along the R64 within a 0.5 Km radius of the grid connection infrastructure.		
	Without mitigation	***With mitigation***
Extent	Very short distance **(4)**	Very short distance **(4)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Very high **(10)**	Moderate **(6)**
Probability	Improbable **(2)**	Improbable **(2)**
Significance	Moderate **(36)**	Moderate **(36)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation / Management: <u>Planning:</u> ➢ Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint, where possible. ➢ Consult adjacent landowners (if present) in order to inform them of the development and to identify any (valid) visual impact concerns. ➢ Investigate the potential to screen affected receptor sites (if applicable and located within 1km of the facility) with planted vegetation cover. <u>Operations:</u> ➢ Maintain the general appearance of the facility as a whole.		
Residual impacts: The visual impact will be removed after decommissioning, provided the infrastructure is removed. Failing this, the visual impact will remain.		

6.8.2.2. Potential visual impact on sensitive visual receptors within a 0.5 – 1.5 km radius

The grid connection infrastructure could have a **low** visual impact (significance rating = 30) on residents of Oxford and Modderpan and observers travelling along the R64.

A mitigating factor within this scenario is the very low occurrence of receptors within close proximity to the proposed site and the fact that the visual impact of the power line will largely be absorbed by the presence of the existing power lines, thereby reducing the likelihood of this impact occurring. Additionally, observers traveling along the roads will only be exposed to the visual intrusion for a short period of time. This reduces the probability of this impact occurring.

No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice. The table below illustrates this impact assessment.

Table 4: Visual impact of the proposed structure within a 0.5 – 1.5 km radius.

Nature of Impact: Visual impact on observers travelling along the R64, secondary roads and residences within a 0.5 – 1.5 km radius of the grid connection infrastructure		
	Without mitigation	***With mitigation***
Extent	Short distance **(3)**	Short distance **(3)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	High **(8)**	High **(8)**
Probability	Improbable **(2)**	Improbable **(2)**
Significance	Low **(30)**	Low **(30)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, however best practice measures are recommended.	
Mitigation / Management: Planning: ➢ Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint. Operations: ➢ Maintain the general appearance of the facility as a whole.		
Residual impacts: The visual impact will be removed after decommissioning, provided the infrastructure is removed. Failing this, the visual impact will remain.		

6.8.2.3. Potential visual impact on sensitive visual receptors within a 1.5 – 3km radius

The grid connection infrastructure could have a **low** visual impact (significance rating = 24) on observers (road users and resident/visitors to homesteads) within 1.5 – 3km radius of the facility structures.

A mitigating factor within this scenario is the very low occurrence of receptors within close proximity to the proposed site and the fact that the visual impact of the power line will largely be absorbed by the presence of the existing power lines, thereby reducing the likelihood of this impact occurring. Additionally, observers traveling along the roads will only be exposed to the visual intrusion for a short period of time. This reduces the probability of this impact occurring.

No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice. The table below illustrates this impact assessment.

Table 5: Visual impact of the proposed structure within a 1.5 – 3km radius.

Nature of Impact: Visual impact on observers travelling along the R64, secondary roads and residences within a 1.5 – 3 km radius of the grid connection infrastructure		
	Without mitigation	***With mitigation***
Extent	Med to long distance **(2)**	Med to long distance **(2)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Moderate **(6)**	Moderate **(6)**
Probability	Improbable **(2)**	Improbable **(2)**
Significance	Low **(24)**	Low **(24)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, however best practice measures are recommended.	
Mitigation / Management: Planning: ➢ Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint. Operations: ➢ Maintain the general appearance of the facility as a whole.		
Residual impacts: The visual impact will be removed after decommissioning, provided the infrastructure is removed. Failing this, the visual impact will remain.		

6.8.2.4. Decommissioning impacts

During decommissioning there may be a noticeable increase in heavy vehicles utilising the roads to the site that may cause, at the very least, a visual nuisance to other road users and landowners in closer proximity (< 0.5 km) to the decommissioning activities.

Decommissioning activities may potentially result in a **high** (significance rating = 65), temporary visual impact, that may be mitigated to **moderate** (significance rating = 36).

A mitigating factor in this scenario is the low occurrence of receptors within the receiving environment and the fact that the single homestead is confirmed to uninhabited which makes the probability of this impact occurring on this receptor highly unlikely. Additionally observers travelling along the R64 will only experience a visual impact for a brief period of time.

Table 6: Visual impact of decommissioning activities on sensitive visual receptors in close proximity to the proposed facility.

Nature of Impact:
Visual impact of construction activities on sensitive visual receptors in close

proximity to the proposed facility.		
	Without mitigation	***With mitigation***
Extent	Very short distance **(4)**	Very short distance **(4)**
Duration	Very Short term **(1)**	Very Short term **(1)**
Magnitude	High **(8)**	Low **(4)**
Probability	Definite **(5)**	Highly probable **(4)**
Significance	High **(65)**	Moderate **(36)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: Decommissioning: ➢ Remove infrastructure not required for the post-decommissioning use of the site. ➢ Rehabilitate all areas as per the rehabilitation plan undertaken. Consult an ecologist regarding rehabilitation specifications. ➢ Monitor rehabilitated areas post-decommissioning and implement remedial actions as required.		
Residual impacts: None, provided rehabilitation works are carried out as specified.		

6.8.2.4. Secondary (indirect) and cumulative impacts

The potential visual impact of the proposed grid connection infrastructure on the sense of place of the region.

Sense of place refers to a unique experience of an environment by a user, based on his or her cognitive experience of the place. Visual criteria, specifically the visual character of an area (informed by a combination of aspects such as topography, level of development, vegetation, noteworthy features, cultural / historical features, etc.), plays a significant role.

An impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light.

The greater environment has been transformed owing to dryland agriculture. Additionally there are numerous existing powerlines that lie in close proximity to the site and traverse the study area. It should also be noted that numerous applications for other EGI have been approved in the surrounding area and should all of them be constructed, it would have an impact on the sense of place of the region. Based on all of this the visual quality is deemed to be low to moderate.

The anticipated visual impact of the proposed grid connection infrastructure on the regional visual quality (i.e. beyond 3 km of the proposed infrastructure), and by implication, on the sense of place, is difficult to quantify, but is generally expected to be of **low** significance.

Table 7: The potential impact on the sense of place of the region.

Nature of Impact: The potential impact on the sense of place of the region.		
	Without mitigation	***With mitigation***

Extent	Medium to longer distance **(2)**	Medium to longer distance **(2)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Low **(4)**	Low **(4)**
Probability	Improbable **(2)**	Improbable **(2)**
Significance	Low **(20)**	Low **(20)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented	
Generic best practise mitigation/management measures: <u>Planning:</u> ➢ Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint/servitude, where possible. <u>Operations:</u> ➢ Maintain the general appearance of the facility as a whole. <u>Decommissioning:</u> ➢ Remove infrastructure not required for the post-decommissioning use. ➢ Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.		
Residual impacts: The visual impact will be removed after decommissioning, provided the infrastructure is removed. Failing this, the visual impact will remain.		

The potential cumulative visual impact of the grid connection infrastructure on the visual quality of the landscape.

Cumulative visual impacts may be experienced as a result of where a combination of several powerlines are within a receptors line of sight at the same time, where the receptor has to turn their head to see several of the power lines or when the receptor has to move from one viewpoint to another to either see different developments or different views of the same development (such as when travelling along a road).

The cumulative visual impact is not just the totality of the impacts of two developments. The combined impact may be greater than the sum of the two individual developments, or in rare cases even less. The cumulative visual impact is assessed as the product of the distance between the power lines, the distance over which the structures are visible, the overall character of the landscape and its sensitivity to the structures, the siting and design of the power line and the way in which the landscape is experienced by sensitive visual receptors.

The construction of the grid connection infrastructure may increase the cumulative visual impact of industrial type infrastructure within the region.

Industrial infrastructure in the region is very prominent and consists of the Perseus substation (located 2 km north east of the proposed sites) and an extensive network of high voltage powerlines that congregate at the substation. These include:

- Hydra/Perseus 2 400kV Overhead Line
- Hydra/Perseus 3 400kV Overhead Line

- Leander/Perseus 1 400kV Overhead Line
- Perseus/Theseus 1 400kV Overhead Line
- Beta/Perseus 2 400kV Overhead Line
- Beta/Perseus 3 400kV Overhead Line
- Grootvlei/Perseus 1 400kV Overhead Line
- Perseus/Harvard 1 275kV Overhead Line
- Perseus/Harvard 2 275kV Overhead Line
- Everest/Perseus 1 275kV Overhead Line
- Perseus/Boundary 1 275kV Overhead Line
- Perseus/Boundary 2 275kV Overhead Line
- Hydra/Perseus 1 765kV Overhead Line
- Alpha/Beta 2 765kV Overhead Line
- Alpha/Beta 1 765kV Overhead Line
- Mercury/Perseus 1 765kV Overhead Line
- Beta/Perseus 1 765kV Overhead Line
- Gamma/Perseus 1 765kV Overhead Line

It should also be noted that numerous applications for other EGI have been approved in the surrounding area and should all of them be constructed, it would drastically increase the amount of powerlines within the area and contribute to the overall cumulative impact. However, the cumulative visual exposure (and potential cumulative visual impact) is not an unintended consequence of electrical grid infrastructure developments within the region, but rather a concerted effort to concentrate infrastructure within the Central Corridor of the Strategic Transmission Corridors. This is an effort to prevent the scattered proliferation of EGI beyond the Strategic Transmission Corridors and throughout the greater region.

In light of this, the potential cumulative visual impact is considered to be within acceptable limits.

The anticipated cumulative visual impact of the proposed grid connection infrastructure is expected to be of **moderate** significance (significance rating = 36). This is considered to be acceptable from a visual impact perspective due to its location within a Strategic Transmission Corridor.

Table 8: The potential cumulative visual impact on the visual quality of the landscape.

Nature of Impact: The potential cumulative visual impact of the grid connection infrastructure on the visual quality of the landscape.		
	Overall impact of the proposed project considered in isolation (with mitigation)	***Cumulative impact of the project and other projects within the area (with mitigation)***
Extent	Medium to longer distance **(2)**	Medium to longer distance **(2)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Low **(4)**	Moderate **(6)**
Probability	Probable **(3)**	Probable **(3)**
Significance	Low **(30)**	Moderate **(36)**
Significance Ranking	**3**	**3**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No

<table>
<tr><td>Can impacts be mitigated?</td><td>No, only best practise measures can be implemented</td></tr>
<tr><td colspan="2">Generic best practise mitigation/management measures:
Planning:
➢ Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint where possible.
Operations:
➢ Maintain the general appearance of the facility as a whole.
Decommissioning:
➢ Remove infrastructure not required for the post-decommissioning use.
➢ Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.</td></tr>
<tr><td colspan="2">Residual impacts:
The visual impact will be removed after decommissioning, provided the infrastructure is removed. Failing this, the visual impact will remain.</td></tr>
</table>

6.9. The potential to mitigate visual impacts

The primary visual impact, namely the appearance of the proposed grid connection infrastructure is not possible to mitigate. The functional design of the structures cannot be changed in order to reduce visual impacts.

Secondary impacts anticipated as a result of the proposed grid connection infrastructure (i.e. visual character and sense of place) are also not possible to mitigate.

The following mitigation is however possible:

- Retain/re-establish and maintain natural vegetation in all areas immediately adjacent to the development footprint/servitude. This measure will help to soften the appearance of the grid connection infrastructure within its context.

- Mitigation of visual impacts associated with the construction phase, albeit temporary, would entail proper planning, management and rehabilitation of the construction site. Recommended mitigation measures include the following:

    - Ensure that vegetation is not unnecessarily cleared or removed during the construction period.
    - Plan the placement of laydown areas (if required) and any potential temporary construction camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.
    - Restrict the activities and movement of construction workers and vehicles to the immediate construction area and existing access roads.
    - Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.
    - Reduce and control construction dust through the use of appropriate and effective dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
    - Restrict construction activities to daylight hours as far as possible, in order to negate or reduce the visual impacts associated with lighting.
    - Rehabilitate all disturbed areas, construction areas, roads, slopes etc. immediately after the completion of construction works. If necessary, an ecologist must be consulted to assist or give input into rehabilitation specifications.

- During operation, the maintenance of the grid connection infrastructure will ensure that the infrastructure does not degrade, therefore aggravating visual impact.

- Roads must be maintained to forego erosion and to suppress dust, and rehabilitated areas must be monitored for rehabilitation failure. Remedial actions must be implemented as a when required.

- Once the grid connection infrastructure has exhausted its life span, all associated infrastructure not required for the post rehabilitation use of the site/servitude should be removed and all disturbed areas appropriately rehabilitated. An ecologist should be consulted to give input into rehabilitation specifications.

- All rehabilitated areas should be monitored for at least a year following decommissioning, and remedial actions implemented as and when required.

Good practice requires that the mitigation of both primary and secondary visual impacts, as listed above, be implemented and maintained on an ongoing basis.

7. IMPACT STATEMENT

The findings of the Visual Impact Assessment undertaken for the proposed grid connection infrastructure is that the visual environment surrounding the site, especially within a 0.5 km radius (and potentially up to a radius of 1.5 km) of the proposed infrastructure, may be visually impacted during the anticipated operational lifespan of the grid connection infrastructure.

The following is a summary of impacts remaining, assuming mitigation as recommended, is exercised:

- During construction, there may be a noticeable increase in heavy vehicles utilising the roads to the development site that may cause, at the very least, a visual nuisance to other road users and landowners in the area. Construction activities may potentially result in a **high** visual impact that may be mitigated to **moderate**.

- The grid connection infrastructure is expected to have a **moderate** visual impact on observers within a 0.5 km radius (i.e. travelling along the R64). The visual impact of the power line will largely be absorbed by the presence of the existing power line infrastructure.

- The grid connection infrastructure could have a **low** visual impact on observers within 0.5- 1.5 km radius (i.e. on residents of Oxford and Modderpan and observers travelling along the R64).

- The grid connection infrastructure could have a **low** visual impact on observers (road users and resident/visitors to homesteads) within 1.5 – 3km radius of the facility structures.

- During decommissioning there may be a noticeable increase in heavy vehicles utilising the roads to the site that may cause, at the very least, a visual nuisance to other road users and landowners in closer proximity (< 1 km) to the decommissioning activities. Decommissioning activities may potentially result in a **high** (significance rating = 65), temporary visual impact, that may be mitigated to **moderate** (significance rating = 36).

- The anticipated visual impact of the proposed grid connection on the regional visual quality (i.e. beyond 3km of the proposed infrastructure), and by implication, on the sense of place, is difficult to quantify, but is generally expected to be of **low** significance.

- The anticipated cumulative visual impact of the proposed grid connection infrastructure is expected to be of **moderate** significance. This is considered to be acceptable from a visual impact perspective due to its location within a Strategic Transmission Corridor.

The anticipated visual impacts listed above (i.e. post mitigation impacts) range from **moderate** to **low** significance. Anticipated visual impacts on sensitive visual receptors (if and where present) in close proximity to the proposed infrastructure are not considered to be fatal flaws.

Considering all factors, it is recommended that the development of the grid connection infrastructure as proposed be supported; subject to the implementation of the recommended mitigation measures (**Section 6.9.**) and management programme (**Section 9.**).

NO GO ALTERNATIVE
In the no-go alternative, there would be no EGI and therefore no additional visual intrusion on the landscape and on surrounding farmsteads.

8. CONCLUSION AND RECOMMENDATIONS

The construction and operation of the proposed grid connection infrastructure may have a visual impact on the study area, especially within a 0.5 km radius (and potentially up to a radius of 1.5 km) of the proposed power line. The visual impact will differ amongst places, depending on the distance from the facility.

The greater environment has been transformed owing to dryland agriculture. Additionally there are numerous existing powerlines that lie in close proximity to the site and traverse the study area, resulting in an overall low to moderate visual quality.

There are no protected areas within the study area and the area is not a known tourist destination.

The proposed power line infrastructure is located in an area where numerous existing power line infrastructure traverses the study area and culminates at the Perseus substation. The visual amenity along this infrastructure corridor has already been compromised. Additionally, numerous PV facilities have been authorized within the area. It should be kept in mind however, that the cumulative visual exposure (and potential cumulative visual impact) is not an unintended consequence of electrical grid infrastructure developments within the region, but rather a concerted effort to concentrate infrastructure within the Central Corridor of the Strategic Transmission Corridors. This is an effort to prevent the scattered proliferation of EGI beyond the Strategic Transmission Corridors and throughout the greater region.

No specific mention to visual impact sensitivity was made in the DFFE screening tool report with regards to the Grid connection infrastructure. Based on the site sensitivity verification report, the sensitivity of the visual environment for the proposed Grid connection infrastructure has been determined to be moderate owing to the low occurrence of visual receptors within 500m of the proposed alignment, occurrence of numerous existing high voltage power lines that traverse the immediate area and the location of the alignment within a Strategic Transmission Corridor. Refer to Appendix 1 for the full site sensitivity verification report.

According to the Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning (DEA&DP) Guideline for Involving Visual and Aesthetic Specialists in the EIA Process (Oberholzer, 2005), the criteria that determine whether or not a visual impact constitutes a potential fatal flaw are categorised as follows:

1. Non-compliance with Acts, Ordinances, By-laws and adopted policies relating to visual pollution, scenic routes, special areas (e.g. identified or acknowledged scenic/cultural/pastoral landscapes) or proclaimed heritage sites.
2. Non-compliance with conditions of existing Records of Decision.
3. Impacts that may be evaluated to be of high significance and that are considered by the majority of the stakeholders and decision-makers to be unacceptable.

In terms of the above and to the knowledge of the author, the proposed development is compliant with all Acts, Ordinances, By-laws and adopted policies in terms of visual impacts, as well as, conditions of existing Records of Decisions.

Since no objections have been reported from stakeholders or decision-makers within the region to the knowledge of the author, this assessment has adopted a risk averse approach by assuming that the perception of most (if not all) of the sensitive visual receptors (bar the landowners of the properties earmarked for the development and other authorized renewable energy projects), would be predominantly negative towards the development.

Therefore, with the information available to the specialist at the time of writing this report, it cannot be empirically determined that the statistical majority of objecting stakeholders were exceeded. If evidence to the contrary surfaces during the progression of the development application, the specialist reserves the right to revise the statement below.

Overall, the significance of the visual impacts is expected to range from **moderate** to **low** as a result of the numerous existing power lines within close proximity to the proposed alignment and its location within the Strategic Transmission Corridor. There are a low number of potential sensitive visual receptors within a 3km radius of the proposed structures, although the possibility does exist for visitors to the region to venture in to closer proximity to the power line infrastructure. These observers may consider visual exposure to this type of infrastructure to be intrusive. It should be noted that of these receptors located within a 3km radius of the proposed alignment, a number of the homesteads are located on farms that already have authorization to construct renewable energy developments.

Additionally, it should be noted that the above results investigated the worst case scenario (i.e. assuming that all cables will be overhead). Should the alternative be constructed, whereby a portion of the cable would be underground (substation B to Artemis), the visual impact would be reduced somewhat.

A number of mitigation measures have been proposed (**Section 6.9.**). Regardless of whether or not mitigation measures will reduce the significance of the anticipated visual impacts, they are considered to be good practice and should all be implemented and maintained throughout the construction, operation and decommissioning phases of the proposed facility.

It should be noted that the results/deductions in this report are based solely from a visual perspective in relation to potential visual impacts and sensitive visual receptors and exclude any potential issues/comments/fatal flaws identified by other specialist studies.

If mitigation is undertaken as recommended, it is concluded that the significance of most of the anticipated visual impacts will remain at or be managed to acceptable levels. As such, the Volta EGI would be considered to be acceptable from a visual impact perspective and can therefore be authorised.

9. MANAGEMENT PROGRAMME

The following management plan tables aim to summarise the key findings of the visual impact report and suggest possible management actions in order to mitigate the potential visual impacts. Refer to the tables below.

Table 8: Management programme – Planning.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the planning of the proposed grid connection infrastructure.		
Project Component/s	Grid connection infrastructure	
Potential Impact	Primary visual impact due to the presence of the grid connection infrastructure in the landscape.	
Activity/Risk Source	The viewing of the above mentioned by observers on or near the site (i.e. within 0.5 km of the site) as well as within the region.	
Mitigation: Target/Objective	Optimal planning of infrastructure to minimise the visual impact.	
Mitigation: Action/control	**Responsibility**	**Timeframe**
Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.	Project proponent / contractor	Early in the planning phase.
Retain and maintain natural vegetation (if present) immediately adjacent to the development footprint.	Project proponent/ design consultant	Early in the planning phase.
Make use of existing roads wherever possible and plan the layout and construction of roads and infrastructure with due cognisance of the topography to limit cut and fill requirements.	Project proponent/ design consultant	Early in the planning phase.
Plan all roads, ancillary buildings and ancillary infrastructure in such a way that clearing of vegetation is minimised.	Project proponent/ design consultant	Early in the planning phase.

Consolidate infrastructure and make use of already disturbed sites rather than undisturbed areas.		
Consult a lighting engineer in the design and planning of lighting to ensure the correct specification and placement of lighting and light fixtures for the Facility and the ancillary infrastructure. The following is recommended: o Shield the sources of light by physical barriers (walls, vegetation, or the structure itself). o Limit mounting heights of fixtures, or use foot-lights or bollard lights. o Make use of minimum lumen or wattage in fixtures. o Making use of down-lighters or shielded fixtures. o Make use of Low Pressure Sodium lighting or other low impact lighting. o Make use of motion detectors on security lighting, so allowing the site to remain in darkness until lighting is required for security or maintenance purposes.	Project proponent / design consultant	Early in the planning phase.
Performance Indicator	Minimal exposure (limited or no complaints from I&APs) of ancillary infrastructure and lighting at night to observers on or near the site (i.e. within 3km) and within the region.	
Monitoring	Monitor the resolution of complaints on an ongoing basis (i.e. during all phases of the project).	

Table 9: Management programme – Construction.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the construction of the proposed grid connection infrastructure.		
Project Component/s	Construction site and activities	
Potential Impact	Visual impact of general construction activities, and the potential scarring of the landscape due to vegetation clearing and resulting erosion.	
Activity/Risk Source	The viewing of the above mentioned by observers on or near the site.	
Mitigation: Target/Objective	Minimal visual intrusion by construction activities and intact vegetation cover outside of immediate construction work areas.	
Mitigation: Action/control	**Responsibility**	**Timeframe**
Ensure that vegetation cover adjacent to the development footprint (if present) is not unnecessarily removed during the construction phase, where possible.	Project proponent / contractor	Early in the construction phase.
Reduce the construction phase through careful logistical planning and productive implementation of resources wherever possible.	Project proponent / contractor	Early in the construction phase.
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	Project proponent / contractor	Throughout the construction phase.
Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.	Project proponent / contractor	Throughout the construction phase.
Reduce and control construction dust through the use of approved dust	Project proponent / contractor	Throughout the construction phase.

suppression techniques as and when required (i.e. whenever dust becomes apparent).		
Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting, where possible.	Project proponent / contractor	Throughout the construction phase.
Rehabilitate all disturbed areas (if present/if required) immediately after the completion of construction works.	Project proponent / contractor	Throughout and at the end of the construction phase.
Performance Indicator	Vegetation cover on and in the vicinity of the site is intact (i.e. full cover as per natural vegetation present within the environment) with no evidence of degradation or erosion.	
Monitoring	Monitoring of vegetation clearing during construction (by contractor as part of construction contract). Monitoring of rehabilitated areas quarterly for at least a year following the end of construction (by contractor as part of construction contract).	

Table 10: Management programme – Operation.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the operation of the proposed grid connection infrastructure.		
Project Component/s	grid connection infrastructure	
Potential Impact	Visual impact of facility degradation and vegetation rehabilitation failure.	
Activity/Risk Source	The viewing of the above mentioned by observers on or near the site.	
Mitigation: Target/Objective	Well maintained and neat facility.	
Mitigation: Action/control	**Responsibility**	**Timeframe**
Maintain roads and servitudes to forego erosion and to suppress dust.	Project proponent / operator	Throughout the operation phase.
Monitor rehabilitated areas, and implement remedial action as and when required.	Project proponent / operator	Throughout the operation phase.
Investigate and implement (should it be required) the potential to screen visual impacts at affected receptor sites.	Project proponent / operator	Throughout the operation phase.
Performance Indicator	Well maintained and neat facility with intact vegetation on and in the vicinity of the facility.	
Monitoring	Monitoring of the entire site on an ongoing basis (by operator).	

Table 11: Management programme – Decommissioning.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the decommissioning of the proposed grid connection infrastructure.		
Project Component/s	Grid connection infrastructure	
Potential Impact	Visual impact of residual visual scarring and vegetation rehabilitation failure.	
Activity/Risk Source	The viewing of the above mentioned by observers on or near the site.	
Mitigation: Target/Objective	Only the infrastructure required for post decommissioning use of the site retained and rehabilitated vegetation in all disturbed areas.	
Mitigation: Action/control	**Responsibility**	**Timeframe**
Remove infrastructure not required for the post-decommissioning use of the site.	Project proponent / operator	During the decommissioning phase.
Rehabilitate access roads and servitudes not required for the post-decommissioning	Project proponent / operator	During the decommissioning phase.

use of the site. If necessary, an ecologist should be consulted to give input into rehabilitation specifications.		
Monitor rehabilitated areas quarterly for at least a year following decommissioning, and implement remedial action as and when required.	Project proponent / operator	Post decommissioning.

Performance Indicator	Vegetation cover on and in the vicinity of the site is intact (i.e. full cover as per natural vegetation within the environment) with no evidence of degradation or erosion.
Monitoring	Monitoring of rehabilitated areas quarterly for at least a year following decommissioning.

10. REFERENCES/DATA SOURCES

Chief Directorate National Geo-Spatial Information, varying dates. *1:50 000 Topographical Maps and Data.*

DFFE, 2018. *National Land-cover Database 2018 (NLC2018).*

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APPENDIX 1: SITE SENSTIVITY VERIFICATION REPORT

SITE SENSITIVITY VERIFICATION FOR THE PROPOSED DEVELOPMENT OF ELECTRICAL GRID INFRASTRUCTURE NEAR DEALESVILLE, FREE STATE PROVINCE

Produced for:

Volta PV (Pty) Ltd

On behalf of:

CSIR

Produced by:

LOGIS

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- March 2023 -

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DECLARATION

I, **Lourens du Plessis**, as an independent consultant compiled this Scoping Visual Impact Assessment and declare that it correctly reflects the findings made at the time of the report's compilation. I further declare that I, act as an independent consultant in terms of the following:

- Do not have any financial interest in the undertaking of the activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act107 of 1998);
- Undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act,1998 (Act 107 of 1998);
- Based on information provided to me by the project proponent, and in addition to information obtained during the course of this study, will present the results and conclusion within the associated document to the best of my professional judgement.

____

Lourens du Plessis
Professional GISc Practitioner
GPr GISc 0147

INTRODUCTION

Volta PV (Pty) Ltd is proposing the development of Electrical Grid Infrastructure (EGI) near Dealesville in the Free State.

The proposed Volta EGI will be constructed on the following farm portions:

- Mooihoek (RE/1551)
- Cornelia (RE/1550)
- Modderpan (RE/750)
- Klipfontein (RE/305)
- Leliehoek (RE/748)
- Oxford (1/1030)

The proposed transmission line would consist of a 132 kV (single or double circuit) located within servitude of up to 18 m wide and will be positioned within a 30 m wide corridor. The power line will run from the proposed Volta PV facility (to the west) to the planned Artemis Main Transmission Substation (to the east), over a distance of approximately 4 Km (Figure 1). An alternative has been proposed that includes an underground cable running from the Volta substation B to the Artemis MTS of approximately 2.04 Km in length. This is to avoid the congestion of overhead lines en-route from the Volta substation B to the Artemis MTS.

Associated infrastructure will include permanent access/service tracks (where no existing roads exist) as well as temporary laydown areas and site camps that will be rehabilitated after construction.

Figure 1: Proposed alignment and corridor (EGI corridor in blue, thin red line 132 kV overhead line, bold red line 132 kV underground cable, substations green)

In accordance with GN 320 and GN 1150 (20 March 2020) of the NEMA EIA Regulations of 2014 (as amended), prior to commencing with a specialist assessment, a site sensitivity verification must be undertaken to confirm the current land use and environmental sensitivity of the proposed project areas as identified by the National Web-Based Environmental Screening Tool (i.e., Screening Tool).

METHODOLOGY

The site sensitivity verification visual assessment was undertaken using the following information sources:

- Topographical maps and GIS generated data were sourced from the Surveyor General, Surveys and Mapping in Mowbray, Cape Town;
- Chief Directorate National (CDN) Geo-Spatial Information, varying dates. *1:50 000 Topographical Maps and Data.*
- DFFE, 2018/2020. *National Land-cover Database 2018/2020 (NLC2018/2020).*
- DFFE, 2022. *South African Protected Areas Database (SAPAD_OR_2022_Q2).*
- JAXA, 2021. Earth Observation Research Centre. *ALOS Global Digital Surface Model (AW3D30).*
- Google Earth Pro. *Up to date and recent satellite images.*
- Professional judgement based on experience gained from similar projects;
- Literature research on similar projects;
- Observations made and photographs taken during site visits;
- Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of NEMA

OUTCOME OF SITE SENSITIVTY VERIFICATION

3.1. DFFE Screening Tool

No specific mention to visual impact sensitivity was made in the DFFE screening tool with regards to the Grid connection infrastructure.

3.2. AFFECTED ENVIRONMENT

The study area is situated within the Tokologo Local Municipality, which falls within the Lejweleputswa District Municipality in the Free State Province. The proposed site is located approximately 4 km north west of Dealesville, 42 km south east of Boshof and 66 km north west of Bloemfontein.

The study area occurs on land with an average elevation of approximately 1305 with elevations reaching 1330 on mountain tops such the Grootberg, Spitskop and Rondekop in the west. The entire study area is predominantly flat with low undulating hills. The topography or terrain morphology of the region is broadly described as *Plains and Pans* or *Slightly Undulating Plains*, and is therefore relatively flat.

The site location can be described as fairly remote, with the only populated area being the town of Dealesville. A number of homesteads occur throughout the study area.

Land cover in the study area consists predominately of grasslands and dryland agriculture. Low shrubland and bare sand are associated with the pans scattered throughout the site. See **Map 1** for the broad land cover types map of the study area.

The R64 (located north of the EGI), which bisects the study area, is a provincial route that connects Bloemfontein with Kimberly via Dealesville and Boshof. Other than this arterial road, a limited number of secondary roads cross the study area.

Industrial infrastructure in the region is very prominent and consists of the Perseus substation (located 2 km north east of the proposed sites) and an extensive network of high voltage powerlines that congregate at the substation.

There are no designated protected areas within the region and no major tourist attractions or destinations were identified within the study area.

Further to this, the proposed Volta EGI is located within the Central corridor of the Strategic Transmission Corridors, which are 5 corridors important for the planning of electricity transmission and distribution infrastructure.

3.3. RESULTS

In order to determine the overall visual sensitivity of the proposed sites in the absence of any mitigation, the following matrix was utilized:

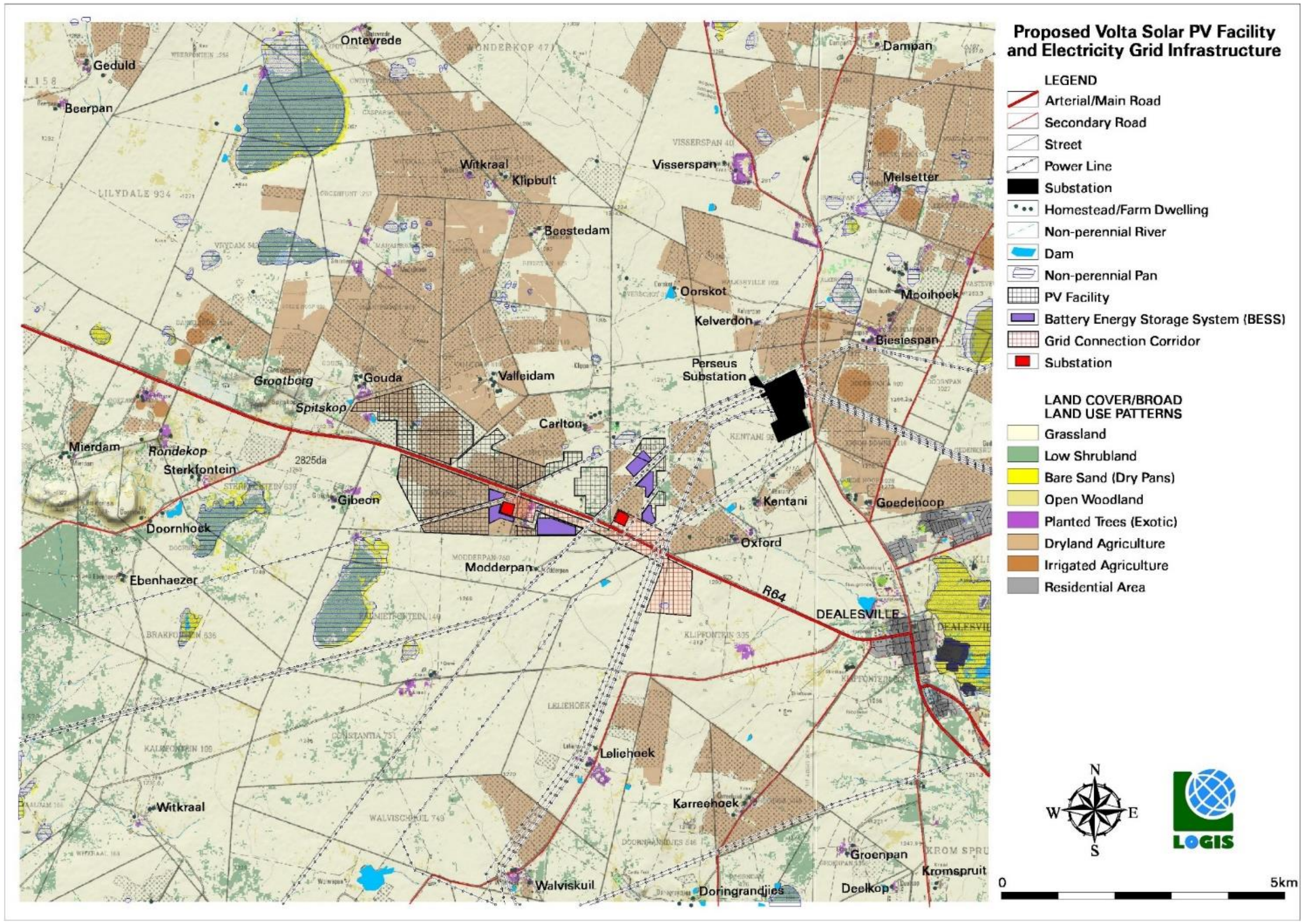
Sensitive Receptor	Very High Sensitivity (4)	High Sensitivity (3)	Moderate Sensitivity (2)	Low Sensitivity (1)
Topographic features incl mountain ridges	Within 250 m	Within 250-500 m	Within 500m – 1 Km	>1 Km
Steep slopes	Slopes with more than 1:4	Slopes between 1:4 and 1:10	-	-
Major rivers, water bodies, perennial rivers and wetlands with scenic value	Within 250 m	Within 250-500 m	Within 500 m – 1 Km	>1 Km
Coastal zone	Within 1 Km	Within 1-2 Km	Within 2-3 Km	>3 Km
Protected area: National Parks	Within 2 Km	Within 2-4 Km	Within 4-6 Km	>6 Km
Protected areas: Nature Reserves	Within 1 Km	Within 1-2 Km	Within 2-3 Km	>3 Km
Private reserves and game farms	Within 500 m	Within 500m- 1 Km	Within 1-2 Km	>2 Km
Cultural landscape	On the site itself	Within 500 m	Within 500 m – 1 Km	>1 Km
Heritage Sites Grades I, ii and iii	On the site itself	Within 500 m	Within 500 m – 1 Km	>1 Km
Towns and Villages	Within 500 m	Within 500m- 1 Km	Within 1-2 Km	>2 Km
Home/farmsteads	Within 500 m	Within 500m- 1 Km	Within 1-2 Km	>2 Km
National Roads	Within 500 m	Within 500m- 1 Km	Within 1-2 Km	>2 Km
Provincial/arterial roads	Within 1 Km	Within 1-3 Km	Within 3-6 Km	>6 Km
Scenic routes	Within 500 m	Within 500m- 1 Km	Within 1-2 Km	>2 Km
Passenger rail lines	Within 250 m	Within 250 – 500 m	Within 500 m – 1 Km	>1 Km
Located with Renewable energy development zone	No	-	-	Yes- Central Transmission Corridor
VAC	Low VAC	Moderate VAC	High VAC	Very High VAC
Visual Quality	Natural environment intact with no built	Natural environment intact with limited built	Natural environment somewhat intact with fair amount	Built infrastructure is dominant with little to no

	infrastructure	infrastructure	of built infrastructure	natural environment remaining
Presence of existing infrastructure	Absent	Very low densities	Present in moderate quantities	High densities
Total	**Moderate (33)**			

Table 1: Matrix to determine overall visual sensitivity for the proposed Volta EGI

Overall visual sensitivity rating:

- Low (0-19)
- Moderate (20-38)
- High (39-57)
- Very High (58-76)



Map 5: Land cover and broad land use patterns within the study area

CONCLUSION

The greater environment has been transformed owing to dryland agriculture. Additionally there are numerous existing powerlines that lie in close proximity to the site and traverse the study area, resulting in an overall low to moderate visual quality.

Visual Absorption Capacity (VAC) of the receiving environment is deemed to be low owing to the low growing vegetation, predominant land use (dryland agriculture) and the high contrast of the proposed PV panels within the surrounding environment.

The immediate area surrounding the proposed sites is sparsely populated with majority of people residing in the residential areas of Dealesville and informal settlement to the east. The R64, which bisects the study area, is a provincial route that connects Bloemfontein with Kimberly via Dealesville and Boshof. Other than this arterial road, a limited number of secondary roads cross the study area.

Homesteads and farmsteads, by virtue of their visually exposed nature, are considered to be sensitive visual receptors. Residential receptors in natural contexts are more sensitive than those in more built-up contexts, due to the absence of visual clutter in these undeveloped and undisturbed areas. Commuters and possible tourists using the main arterial and secondary roads may also be negatively impacted upon by the visual exposure to the proposed facilities, however, this intrusion would be fleeting.

No specific mention to visual impact sensitivity was made in the DFFE screening tool report with regards to the Grid connection infrastructure. Based on the above findings, the sensitivity of the visual environment for the proposed Grid connection infrastructure is **moderate** due to:

- Low occurrence of visual receptors within 500m of the proposed alignment
- Provincial/ arterial road located within 1 Km
- Occurrence of numerous existing high voltage power lines that traverse the immediate area
- Location of the alignment within a Strategic Transmission Corridor

REFERENCES

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