THE PROPOSED KAREEKLOOF SOLAR PV FACILITY ELECTICAL GRID INFRASTRUCTURE, NORTHERN CAPE PROVINCE, SOUTH AFRICA

Visual Impact Assessment

Draft v_3

DATE: 29 July 2024

Document prepared for Cape EAPrac (Pty) Ltd
On behalf of Kareekloof Energy (Pty) Ltd

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LIST OF ACRONYMS

APHP	Association of Professional Heritage Practitioners
BLM	Bureau of Land Management (United States)
BPEO	Best Practicable Environmental Option
CALP	Collaborative for Advanced Landscape Planning
DEM	Digital Elevation Model
DoC	Degree of Contrast
EIA	Environmental Impact Assessment
EMPr	Environmental Management Plan
GIS	Geographic Information System
GPS	Global Positioning System
IDP	Integrated Development Plan
IEMA	Institute of Environmental Management and Assessment (United Kingdom)
KOP	Key Observation Point
LVIA	Landscape and Visual Impact Assessment
MAMSL	Metres above mean sea level
NELPAG	New England Light Pollution Advisory Group
PNR	Private Nature Reserve
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment

VRM	Visual Resource Management
VRMA	Visual Resource Management Africa
ZVI	Zone of Visual Influence

GLOSSARY OF TECHNICAL TERMS

Technical Terms	**Definition** (Oberholzer, 2005)
Degree of Contrast	The measure in terms of the form, line, colour and texture of the existing landscape in relation to the proposed landscape modification in relation to the defined visual resource management objectives.
Visual intrusion	Issues are concerns related to the proposed development, generally phrased as questions, taking the form of "what will the impact of some activity be on some element of the visual, aesthetic or scenic environment".
Receptors	Individuals, groups or communities who would be subject to the visual influence of a particular project.
Sense of place	The unique quality or character of a place, whether natural, rural or urban.
Scenic corridor	A linear geographic area that contains scenic resources, usually, but not necessarily, defined by a route.
Viewshed	The outer boundary defining a view catchment area, usually along crests and ridgelines. Similar to a watershed. This reflects the area, or the extent thereof, where the landscape modification would probably be seen.
Visual Absorption Capacity	The potential of the landscape to conceal the proposed project.

Technical Term	**Definition** (USDI., 2004)
Key Observation Point	Receptors refer to the people located in the most critical locations, or key observation points, surrounding the landscape modification, who make consistent use of the views associated with the site where the landscape modifications are proposed. KOPs can either be a single point of view that an observer/evaluator uses to rate an area or panorama, or a linear view along a roadway, trail, or river corridor.
Visual Resource Management	A map-based landscape and visual impact assessment method development by the Bureau of Land Management (USA).
Zone of Visual Influence	The ZVI is defined as 'the area within which a proposed development may have an influence or effect on visual amenity.'

1 DFFE SPECIALIST REPORTING REQUIREMENTS

1.1 Specialist declaration of independence

Table 1. Specialist declaration of independence.

All intellectual property rights and copyright associated with VRM Africa's services are reserved, and project deliverables, including electronic copies of reports, maps, data, shape files and photographs, may not be modified or incorporated into subsequent reports in any form, or by any means, without the written consent of the author. Reference must be made to this report, should the results, recommendations or conclusions in this report be used in subsequent documentation. Any comments on the draft copy of the Visual Impact Assessment (VIA) must be put in writing. Any recommendations, statements or conclusions drawn from, or based upon, this report, must make reference to it.

This document was completed by Silver Solutions 887 cc trading as VRM Africa, a Visual Impact Study and Mapping organisation located in George, South Africa. VRM Africa cc was appointed as an independent professional visual impact practitioner to facilitate this VIA. I, Stephen Stead, hereby declare that VRM Africa, an independent consulting firm, has no interest or personal gains in this project whatsoever, except receiving fair payment for rendering an independent professional service.

Stephen Stead
APHP accredited VIA Specialist

1.2 Specialist report requirements in terms of Appendix 6 of the EIA Regulations (2014), as amended in 2017

Table 2: Specialist report requirements table.

A specialist report prepared in terms of the Environmental Impact Regulations of 2014 (as amended in 2017) must contain:	**Relevant section in report**
Details of the specialist who prepared the report	Stephen Stead, owner / director of Visual Resource Management Africa. steve@vrma.co.za Cell: 0835609911
The expertise of that person to compile a specialist report including a curriculum vitae	Registration with Association of Professional Heritage Practitioners
A declaration that the person is independent in a form as may be specified by the competent authority	Table 1
An indication of the scope of, and the purpose for which, the report was prepared	Terms of Reference
A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Baseline Assessment
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	12th June 2024. Seasonal variation is not relevant.
A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Methodology
Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternative;	Baseline Visual Inventory
An identification of any areas to be avoided, including buffers	Visual Resource Management Classes
A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	VRM Constraints Map
A description of any assumptions made and any uncertainties or gaps in knowledge;	Assumptions and Limitations
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	***12 June 2023***
A description of the findings and potential implications of such findings on the impact of the proposed activity or activities	Visual Impact Assessment
Any mitigation measures for inclusion in the EMPr	Environmental Management Plan

A specialist report prepared in terms of the Environmental Impact Regulations of 2014 (as amended in 2017) must contain:	Relevant section in report
Any conditions for inclusion in the environmental authorisation	NA
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	NA
A reasoned opinion as to whether the proposed activity or portions thereof should be authorised	Opportunities and Constraints
Regarding the acceptability of the proposed activity or activities; and	Conclusion
If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	It is the recommendation that the proposed development should commence WITH MITIGATION for the key reasons motivated in the Executive Summary.
A description of any consultation process that was undertaken during the course of carrying out the study	EIA process
A summary and copies if any comments that were received during any consultation process	None received
Any other information requested by the competent authority.	None received

1.3 DFFE Screening Tool Site Sensitivity Verification

In terms of Part A of the Assessment Protocols published in GN 320 on 20 March 2020, site sensitivity verification is required relevant to the DFFE Screening Tool. **No landscape issues were listing in the DFFE database, but Landscape and Visual screening assessment were listed as a requirement**. The SSV review was informed by the ***site visit that was undertaken on the 12 June 2023.*** During the survey, photographs and comments were recorded and can be viewed in Annexure A, with the associated map of the survey points as well as the survey tracks. The DFFE Screening Tool did not flag landscape as a risk but did request that a screening be undertaken.

2 EXECUTIVE SUMMARY

Visual Resource Management Africa CC (VRMA) was appointed by Cape EAPrac (Pty) Ltd. to undertake a ***Visual Impact Assessment*** for the proposed Electrical Grid Infrastructure (EGI) for the Kareekloof Energy PV on behalf of Kareekloof Energy (Pty) Ltd. VRMA was also involved in the assessment of the proposed PV facility that is currently in EIA Phase.

CONCLUSION

The finding of this Level 3 landscape and visual impact assessment is that while the local Nama-karoo sense of place will be significantly altered, it is the recommendation that the proposed development should commence WITH MITIGATION for the following key reasons:

- Moderate Zone of Visual Influence with no tourism activities or tourist view-corridors.
- The area is remote, and few receptors were identified with local landscapes not being utilised as a tourist visual resource.
- The local area is located within the Central Strategic Transmission Corridor, with three large 400kV powerlines routed through the local landscape to that degrade local landscape resources to some degree.
- No residential receptors located within Very High Visual Exposure and only a single farm access road.

With the location of the proposed Krypton MTS to the east of the site, it is highly likely that multiple OHPL will be routed within clear view of the project grid connection. The result is that a PV/ OHPL massing effect is likely to take place, degraded local visual resources. However, this landscape change is unlikely to be a significant landscape risk as the local area has a moderate level of scenic quality, and there are no tourist or ecotourism activities taking place within the anticipated project zone of visual influence.

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POLICY FIT: High Positive

In terms of *international best practice*, the proposed landscape modification will not trigger any issues as there are no significant landscape/ cultural landscape features within the project area there were no significant cultural/ landscape visual resources found on the site or immediate surrounds that are flagged by international landscape guidelines. No significant, international landscapes are located within the proposed project zone of visual influence.

In terms of regional and local planning fit for planned landscape and visual related themes, the **expected visual/ landscape policy fit of the landscape change is rated High.** While not within a REDZ, there are no other RE projects within the zone of visual influence, and the site is already degraded to some degree from the existing Eskom power line that transects the site. The project is also within the central strategic powerline corridor area, and as such, further powerlines are likely to be routing through the vicinity. As such, the proposed OHPL planning fit is rated High Positive.

METHODOLOGY: Visual Resource Management

The methodology for determining landscape significance is based on the United States Bureau of Land Management's Visual Resource Management (VRM) method (USDI., 2004). This GIS-based method allows for increased objectivity and consistency by using

standard assessment criteria to classify the landscape type into four VRM Classes, with Class I being the most valued and Class IV, the least. The Classes are derived from *Scenic Quality*, *Visual Sensitivity Levels*, and *Distance Zones*. Specifically, the methodology involved: site survey; review of legal framework; determination of Zone of Visual Influence (ZVI); identification of Visual Issues and Visual Resources; assessment of Potential Visual Impacts; and formulation of Mitigation Measures.

ZONE OF VISUAL INFLUENCE: Local/ Wide-area

The visible extent, or viewshed, is "the outer boundary defining a view catchment area, usually along crests and ridgelines" (Oberholzer, 2005). In order to define the extent of the possible influence of the proposed project, a viewshed analysis was undertaken from the proposed site at a specified height above ground level. The viewshed extent **is defined as** Local for the following reasons:

- The extent is predominantly contained within the Foreground/ Mid Ground but due to the height of the monopoles in relation to the flat terrain to the north, west and east, the viewshed has the potential to extend further into these sectors.
- The hilly landscape of the surrounding terrain fragments clear views of the substations and OHPL, with exposure to the proposed landscape change mainly contained to the foreground areas.
- The relatively small visual footprint of the monopoles contains the ZVI to within the Foreground/ Mid-ground (6km approx.)

VISUAL ABSORPTION CAPACITY Low

Land use is a crucial factor in determining landscape character, especially regarding the Visual Absorption Capacity (VAC) of the landscapes. Oberholzer defines VAC as the potential of the landscape to conceal the proposed project (Oberholzer, 2005). i.e.

- High VAC – e.g., effective screening by vegetation and structures.
- Moderate VAC - e.g., partial screening by vegetation and structures.
- Low VAC - e.g., little screening by vegetation or structures.

Of relevance to the project is that the VAC is defined as Low as there is limited vegetation or structures that could be used for visual screening as there are no large trees in the landscape, the karoo scrub vegetation is low in height and there are only three remote farmsteads in the locality. While there are existing OHPL in the local landscape, these routings are far apart and do not generate a massing effect such that they would increase the VAC levels. There is a 19kV powerline along which a section of the proposed 132kV line would be co-aligned, but in general, the VAC of the site is Low.

RECEPTORS AND KOPS: One KOPs with Very High Visual Exposure

Key Observation Points (KOPs) are the people (receptors) located in strategic locations surrounding the property that make consistent use of the views associated with the site where the landscape modifications are proposed.

There are three farmsteads within the ZVI, with two occupied and the third abandoned. The two occupied receptors are the property owners and proponents of the development. As such, only a single KOP was located within the project ZVI which is the small and remote Farm Access Road that passes the north of the project site. No residential areas were located within the project ZVI.

SCENIC QUALITY: Medium to High

The overall Scenic Quality is rated Medium to High. The grasslands and Nama-Karoo scrub do add to the rural agricultural sense of place but are not unique landscape elements. The southern inselberg creates significant landforms that are a key factor influencing the local and regional scenic quality. While there are large Eskom distribution OHPL in the landscape, the three lines are well spaced such that they do not generate a massing effect. The single OHPL routed through the project area does degrade the local landscape to some degree.

RECEPTOR SENSITIVITY Low

The area is remote, with very few receptors and the amount of use of the landscape is rated Low. Public Interest is rated Low as the area is seldom seen and is visually associated with the three existing Eskom OHPL within the local landscape. Other than remote farm access road, the site has no high exposure receptors.

VISUAL RESOURCE MANAGEMENT ASSESSMENT

The BLM has defined four Classes that represent the relative value of the visual resources of an area and are defined making use of the VRM Matrix:

i. **Classes I and II** are the most valued.
ii. **Class III** represent a moderate value.
iii. **Class IV** is of least value

<u>Class I</u> (No-go)

- Any river / streams and associated flood lines buffers identified as significant in terms of the WULA process.
- Any wetlands identified as significant in terms of the WULA process.
- Any ecological areas (or plant species) identified as having a high significance.
- Any heritage area identified as having a high significance.
- **50m buffer on the rural farm roads.**

No specific visual or landscape constraints were identified within the study area, although the washes do add to the Nama-karoo sense of place. Sensitive surface water hydrology areas would need to be excluded as per the specialists' findings. The 50m buffer on the rural farm roads is to maintain some view corridor sense of place.

<u>Class II</u> (Not recommended)

- **Not applicable.**

With Medium scenic quality and Low expected sensitivity to landscape change, there were no landscapes where receptors are likely to perceive landscape change as highly negative. As such, no Class II areas were defined.

<u>Class III</u> (Suitable with mitigation)

- **Nama-Karoo**

While there are some landscape resources related to the inselbergs, the area is remote with limited receptors, and these is a strong presence of OHPL in the local landscape. The Nama-karoo areas would be suitable for development with best practice in mitigation.

Lights at night mitigation is also a requirement for the substations in order to ensure that the existing dark-sky sense of place of this portion of the karoo is not significantly degraded.

<u>Class IV</u> (Suitable without mitigation)

- **Not applicable.**

While the Visual Inventory rating for the Nama-Karoo was defined as Class IV due to medium scenic quality but low receptor sensitivity, the Visual Resource Management rating was upgraded to Class III due to the rural agricultural nature of the receiving landscape. To ensure that the local change is contained to some degree, some light mitigation is required to restrict the ZVI. As such, Class IV is not applicable in this rural landscape.

EXPECTED LANDSCAPE AND VISUAL IMPACT SIGNIFICANCE

Significance	High (-ve)	Medium (-ve)
Comment	Over a long-time period, the light spillage from the over-head security lights has the potential to significantly degrade the existing karoo dark sky sense of place.	With mitigation and the reduction in the development area with visual setbacks, the Operational Phase impact will be moderated to some degree, with careful use of lights at night to ensure that the current dark-sky sense of place is retained.

CUMULATIVE EFFECTS

Cumulatives	Medium (-ve)	Low (-ve)
Comment	The development without mitigation could set a precedent for development of further substation and OHPL projects in this area with light spillage detracting from the local landscape character form intervisibility.	With mitigation and retaining the visual setback buffers and limited light spillage, intervisibility could be reduced. The area is also remote with the local landscapes not being utilised as a visual resource.

PRELIMINARY MITIGATIONS MEASURES

Landscape Element	Mitigation	Motivation
Setback	50 m setback	With mitigation and retaining the visual setback buffers, intervisibility could be reduced. The area is also remote and already strongly visual associated with OHPL.
Lights	Control of lights at night	with careful use of lights at night to ensure that the current dark-sky sense of place is retained

3 INTRODUCTION

Visual Resource Management Africa CC (VRMA) was appointed by Cape EAPrac (Pty) Ltd. to undertake a ***Visual Impact Assessment*** for the proposed Electrical Grid Infrastructure (EGI) for the Kareekloof Energy PV on behalf of Kareekloof Energy (Pty) Ltd. The project is located in the Northern Cape in the Pixley ka Seme District Municipality. The closest main town is that of De Aar, located approximately 53km to the southwest of the site.

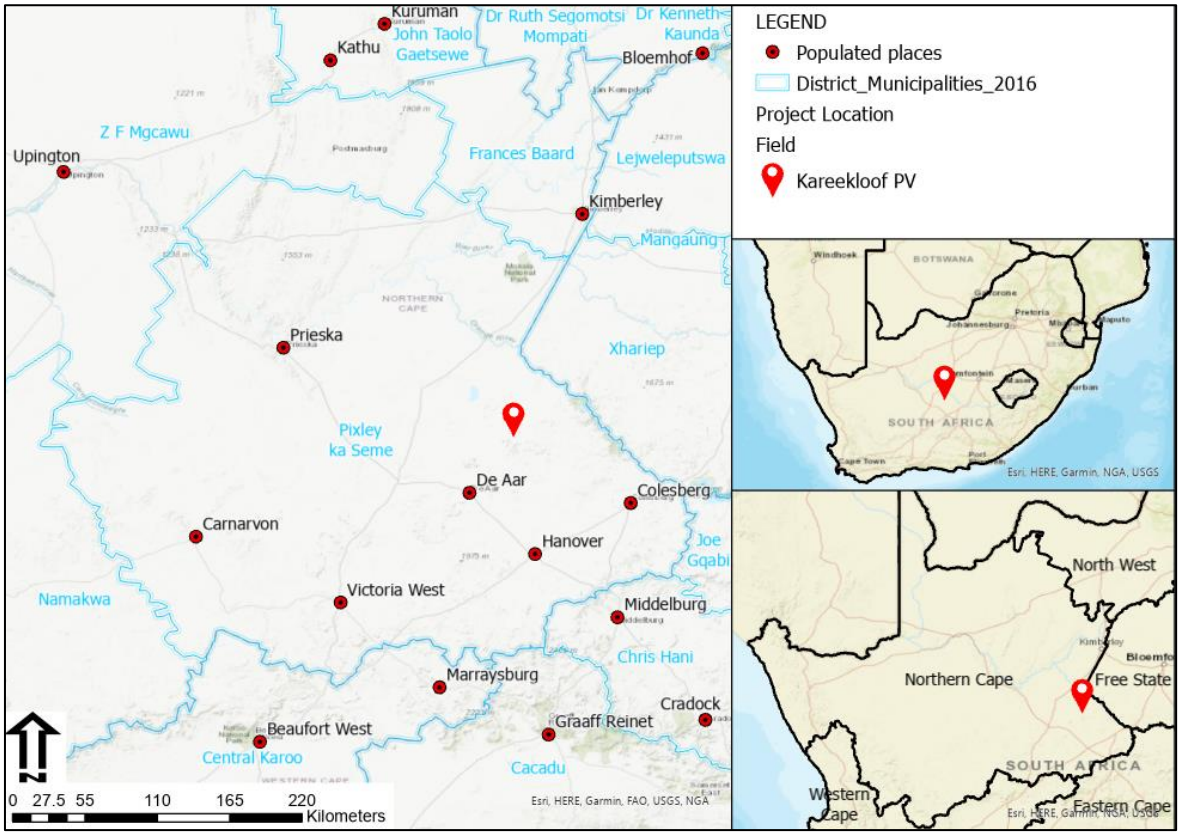

Figure 1: National and regional locality map.

3.1 Terms of Reference

The scope of this study is to cover the entire proposed project area. The broad terms of reference for the study are as follows:

- Collate and analyse all available secondary data relevant to the affected proposed project area. This includes a site visit of the full site extent, as well as of areas where potential impacts may occur beyond the site boundaries.
- Specific attention is to be given to the following:
  - Quantifying and assessing existing scenic resources/visual characteristics on, and around, the proposed site.
  - Evaluation and classification of the landscape in terms of sensitivity to a changing land use.
  - Determining viewsheds, view corridors and important viewpoints in order to assess the visual impacts of the proposed project.
  - Determining visual issues, including those identified in the public participation process.

- Reviewing the legal framework that may have implications for visual/scenic resources.
- Assessing the significance of potential visual impacts resulting from the proposed project for the construction, operation and decommissioning phases of the proposed project.
- Assessing the potential cumulative impacts associated with the visual impact.
- Generate photomontages of the proposed landscape modification.
- Identifying possible mitigation measures to reduce negative visual impacts for inclusion into the proposed project design, including input into the Environmental Management Programme report (EMPr).

3.2 Study Team

Contributors to this study are summarised in the table below.

Table 3: Authors and Contributors to this Report.

Aspect	Person	Organisation / Company	Qualifications
Landscape and Visual Assessment (author of this report)	Stephen Stead	VRMA	• MSc Geography, 2023 (UKZN). • 20 years of experience in visual assessments including renewable energy, power lines, roads, dams across southern Africa. • Registered with the Association of Professional Heritage Practitioners since 2014.

3.3 Visual Assessment Approach

The full methodology used in the assessment can be found in Annexure B, with this section outlining the key elements of the assessment process. The process that VRM Africa follows when undertaking a VIA is based on the United States Bureau of Land Management's (BLM) Visual Resource Management method (USDI., 2004). This mapping and GIS-based method of assessing landscape modifications allows for increased objectivity and consistency by using standard assessment criteria.

- *"Different levels of scenic values require different levels of management. For example, management of an area with high scenic value might be focused on preserving the existing character of the landscape, and management of an area with little scenic value might allow for major modifications to the landscape. Determining how an area should be managed first requires an assessment of the area's scenic values".*
- *"Assessing scenic values and determining visual impacts can be a subjective process. Objectivity and consistency can be greatly increased by using the basic design elements of form, line, colour, and texture, which have often been used to describe and evaluate landscapes, to also describe proposed projects. Projects that repeat these design elements are usually in harmony with their surroundings; those that don't create contrast. By adjusting project designs so the elements are repeated, visual impacts can be minimized"* (USDI., 2004).

Baseline Phase Summary

The VRM process involves the systematic classification of the broad-brush landscape types within the receiving environment into one of four VRM Classes. Each VRM Class is associated with management objectives that serve to guide the degree of modification of the proposed site. The Classes are derived by means of a simple matrix with the three variables being the scenic quality, the expected receptor sensitivity to landscape change, and the distance of the proposed landscape modification from key receptor points. The Classes are not prescriptive and are utilised as a guideline to determine visual carrying capacity, where they represent the relative value of the visual resources of an area. Classes I and II are the most valued, Class III represents a moderate value; and Class IV is of least value. The VRM Classes are not prescriptive and are used as a guideline to determine the carrying capacity of a visually preferred landscape as a basis for assessing the suitability of the landscape change associated with the proposed project.

Table 4: VRM Class Matrix Table

		VISUAL SENSITIVITY LEVELS								
		High			Medium			Low		
SCENIC QUALITY	A (High)	II	II	II	II	II	II	II	II	II
	B (Medium)	II	III	III/ IV *	III	IV	IV	IV	IV	IV
	C (Low)	III	IV	IV	IV	IV	IV	IV	IV	IV
DISTANCE ZONES		Fore/middle ground	Background	Seldom seen	Fore/middle ground	Background	Seldom seen	Fore/middle ground	Background	Seldom seen

* If adjacent areas are **Class III** or lower, assign **Class III**, if higher, assign **Class IV**

The visual objectives of each of the classes are listed below:

- The Class I objective is to preserve the existing character of the landscape and the level of change to the characteristic landscape should be very low and must not attract attention. Class I is assigned when a decision is made to maintain a natural landscape.
- The Class II objective is to retain the existing character of the landscape and the level of change to the characteristic landscape should be low. The proposed development may be seen but should not attract the attention of the casual observer, and should repeat the basic elements of form, line, colour and texture found in the predominant natural features of the characteristic landscape.
- The Class III objective is to partially retain the existing character of the landscape, where the level of change to the characteristic landscape should be moderate. The proposed development may attract attention, but should not dominate the view of the casual observer, and changes should repeat the basic elements found in the predominant natural features of the characteristic landscape; and
- The Class IV objective is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the landscape can be high, and the proposed development may dominate the view and be

the major focus of the viewer's (s') attention without significantly degrading the local landscape character.

Impact Phase Summary

To determine impacts, a degree of contrast exercise is undertaken. This is an assessment of the expected change to the receiving environment in terms of the form, line, colour and texture, as seen from the surrounding Key Observation Points. This determines if the proposed project meets the visual objectives defined for each of the Classes. If the expected visual contrast is strong, mitigation recommendations are to be made to assist in meeting the visual objectives. To assist in the understanding of the proposed landscape modifications, visual representation, such as photomontages or photos depicting the impacted areas, can be generated. There is an ethical obligation in the visualisation process, as visualisation can be misleading if not undertaken ethically.

3.4 VIA Process Outline

The following approach was used in understanding the landscape processes and informing the magnitude of the impacts of the proposed landscape modification. The table below lists a number of standardised procedures recommended as a component of best international practice.

Table 5: Methodology Summary Table

Action	***Description***
Site Survey	The identification of existing scenic resources and sensitive receptors in and around the study area to understand the context of the proposed development within its surroundings to ensure that the intactness of the landscape and the prevailing sense of place are taken into consideration.
Project Description	Provide a description of the expected project, and the components that will make up the landscape modification.
Reviewing the Legal Framework	The legal, policy and planning framework may have implications for visual aspects of the proposed development. The heritage legislation tends to be pertinent in relation to natural and cultural landscapes, while Strategic Environmental Assessments (SEAs) for renewable energy provide a guideline at the regional scale.
Determining the Zone of Visual Influence	This includes mapping of viewsheds and view corridors in relation to the proposed project elements, in order to assess the zone of visual influence of the proposed project. Based on the topography of the landscape as represented by a Digital Elevation Model, an approximate area is defined which provides an expected area where the landscape modification has the potential to influence landscapes (or landscape processes) or receptor viewpoints.
Identifying Visual Issues and Visual Resources	Visual issues are identified during the public participation process, which is being carried out by others. The visual, social or heritage specialists may also identify visual issues. The significance and proposed mitigation of the visual issues are addressed as part of the visual assessment.
Assessing Potential Visual Impacts	An assessment is made of the significance of potential visual impacts resulting from the proposed project for the construction, operational and decommissioning phases of the project. The rating of visual significance

Action	*Description*
	is based on the methodology provided by the Environmental Assessment Practitioner (EAP).
Formulating Mitigation Measures	Possible mitigation measures are identified to avoid or minimise negative visual impacts of the proposed project. The intention is that these would be included in the project design, the Environmental Management Programme report (EMPr) and the authorisation conditions.

3.5 Impact Assessment Methodology

The following impact criteria were used to assess visual impacts. The criteria were defined by the Western Cape *DEA&DP Guideline for involving Visual and Aesthetic Specialists in EIA Processes* (Oberholzer, 2005).

Table 6. DEA&DP Visual and Aesthetic Guideline Impact Assessment Criteria Table.

Criteria	Definition
Extent	The spatial or geographic area of influence of the visual impact, i.e.: • *site-related:* extending only as far as the activity. • *local:* limited to the immediate surroundings. • *regional:* affecting a larger metropolitan or regional area. • *national:* affecting large parts of the country. • *international:* affecting areas across international boundaries.
Duration	The predicted life-span of the visual impact: • *short term,* (e.g., duration of the construction phase). • *medium term,* (e.g., duration for screening vegetation to mature). • *long term,* (e.g., lifespan of the project). • *permanent,* where time will not mitigate the visual impact.
Intensity	The magnitude of the impact on views, scenic or cultural resources. • *low,* where visual and scenic resources are not affected. • *medium,* where visual and scenic resources are affected to a limited extent. • *high,* where scenic and cultural resources are significantly affected.
Probability	The degree of possibility of the visual impact occurring: • *improbable,* where the possibility of the impact occurring is very low. • *probable,* where there is a distinct possibility that the impact will occur. • *highly probable,* where it is most likely that the impact will occur. • *definite,* where the impact will occur regardless of any prevention measures.
Significance	The significance of impacts can be determined through a synthesis of the aspects produced in terms of their nature, duration, intensity, extent and probability, and be described as: • *low,* where it will not have an influence on the decision. • *medium,* where it should have an influence on the decision unless it is mitigated. • *high,* where it would influence the decision regardless of any possible mitigation.

3.6 Assumptions and Uncertainties

- Digital Elevation Models (DEM) and viewsheds were generated using ASTER elevation data (NASA, 2009). Although every effort to maintain accuracy was undertaken, as a result of the DEM being generated from satellite imagery and not being a true representation of the earth's surface, the viewshed mapping is approximate and may not represent an exact visibility incidence. Thus, specific features identified from the DEM and derive contours (such as peaks and conical hills) would need to be verified once a detailed survey of the project area has taken place.
- The use of open-source satellite imagery was utilised for base maps in the report.
- Some of the mapping in this document was created using Bing Maps, Open-Source Map, ArcGIS Online and Google Earth Satellite imagery.
- The project deliverables, including electronic copies of reports, maps, data, shape files and photographs are based on the author's professional knowledge, as well as available information.
- VRM Africa reserves the right to modify aspects of the project deliverables if and when new/additional information may become available from research or further work in the applicable field of practice or pertaining to this study.
- As access to farms and private property is often limited due to security reasons, limiting access to private property in order that photographs from specific locations are taken. 3D modelling is used to reflect the expected landscape change area where applicable.
- Mapping makes use of the SANBI BGIS webmap (SANBI, 2018)

4 PROJECT DESCRIPTION

The following project information was provided by the client that will be incorporated into the assessment and proposed infrastructure relating to the project. The following table outlines the scope of the project, with reference to the extent, heights, and expects landscape change depiction as provide by the proponent/ architects involved in the project design and development.

Table 7: Project Information Table

Applicant Details	Description
Applicant Name:	Kareekloof Energy (Pty) Ltd
Project Name:	**Kareekloof Energy PV and BESS Electrical Grid Infrastructure**

The project involves the development of a Electrical Grid Infrastructure for the Kareekloof Solar PV Facility. The necessary associated infrastructure, including overhead powerlines, switching station and collector substation. The proposed project will include the following infrastructure:

Table 8: Project Description Table

TECHNOLOGY DETAILS	
Grid Connection (Not included in this assessment but also assessed by VRMA)	Grid Connection Infrastructure for each grid connection: • Onsite Switching Station, adjacent to the IPP Substation. • 132kV Overhead Power Line – 30m height from the switching station, with a length of <10 km to a yet to be determined connection point Eskom Krypton Substation).

Cr: Relay and Power Systems (Green Building Africa, n.d.)

Figure 2. Example of what a small onsite substation could look like.

(Source: Jawatha, India. www.nccprojects.com)

Figure 3: Photographic example of what the proposed OHPL could look like.

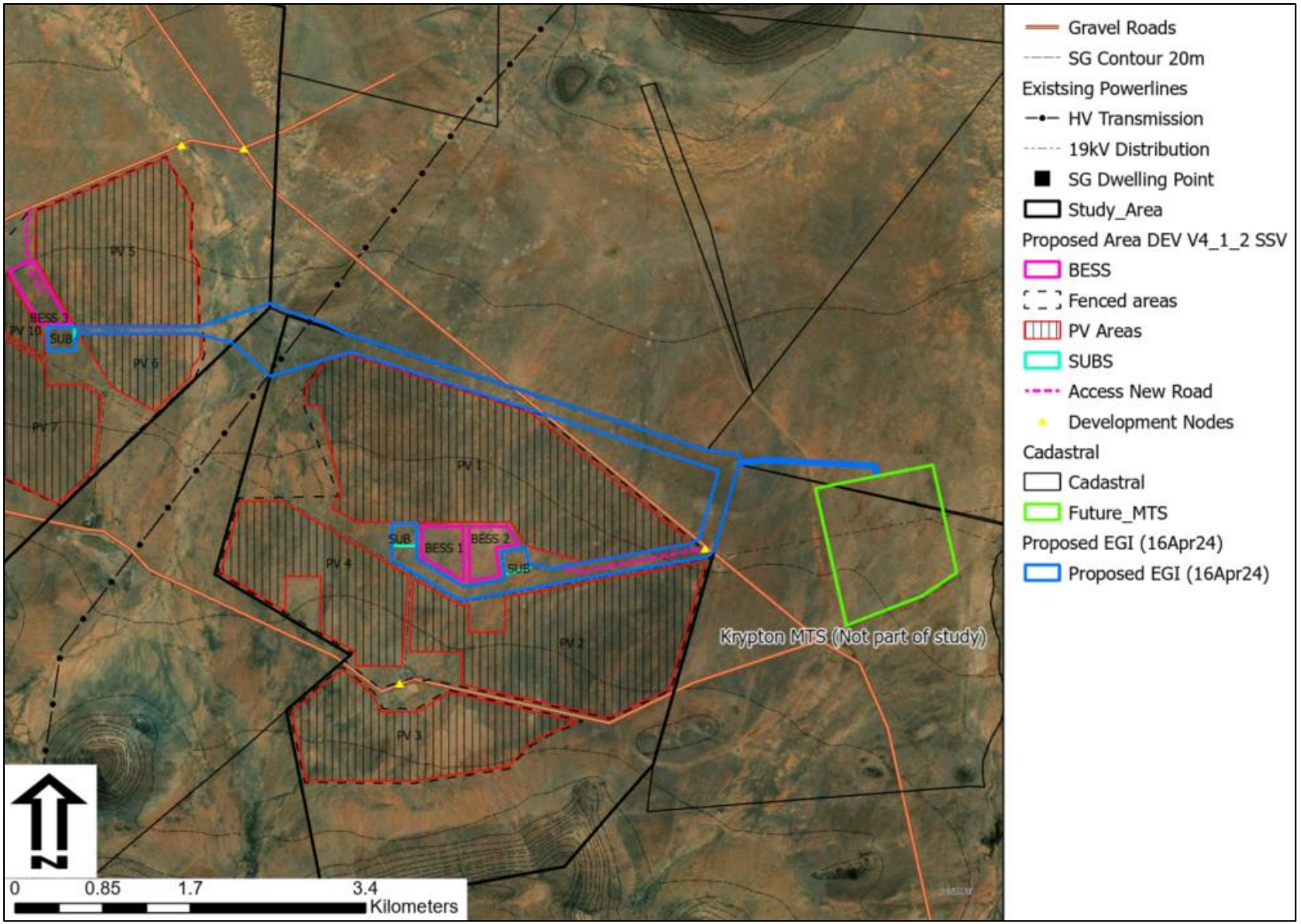

Figure 4: Proposed routing corridor map with the Krypton MTS not part of the study.

5 LEGAL FRAMEWORK

In order to comply with the Visual Resource Management requirements, it is necessary to relate the proposed landscape modification in terms of international best practice in understanding landscapes and landscape processes. The proposed project also needs to be evaluated in terms of 'policy fit'. This requires a review of International, National and Regional best practice, policy and planning for the area to ensure that the scale, density and nature of activities or developments are harmonious and in keeping with the planned sense of place and character of the area.

5.1 International Good Practice

For cultural landscapes, the following documentation provides good practice guidelines, specifically:

- Guidelines for Landscape and Visual Impact Assessment (GLVIA), Second Edition.
- International Finance Corporation (IFC).
- Millennium Ecosystem Assessment (MEA).
- United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Convention (WHC).

5.1.1 Guidelines for Landscape and Visual Impact Assessment, Second Edition

The Landscape Institute and the Institute of Environmental Management and Assessment (United Kingdom) have compiled a book outlining best practice in landscape and visual impact assessment. This has become a key guideline for LVIA in the United Kingdom. "The principal aim of the guideline is to encourage high standards for the scope and context of landscape and visual impact assessments, based on the collegiate opinion and practice of the members of the Landscape Institute and the Institute of Environmental Management and Assessment. The guidelines also seek to establish certain principles and will help to achieve consistency, credibility and effectiveness in landscape and visual impact assessment, when carried out as part of an EIA" (The Landscape Institute, 2003);

In the introduction, the guideline states that 'Landscape encompasses the whole of our external environment, whether within village, towns, cities or in the countryside. The nature and pattern of buildings, streets, open spaces and trees – and their interrelationships within the built environment – are an equally important part of our landscape heritage" (The Landscape Institute, 2003: Pg. 9). The guideline identifies the following reasons why landscape is important in both urban and rural contexts, in that it is:

- An essential part of our natural resource base.
- A reservoir of archaeological and historical evidence.
- An environment for plants and animals (including humans).
- A resource that evokes sensual, cultural and spiritual responses and contributes to our urban and rural quality of life; and
- Valuable recreation resources. (The Landscape Institute, 2003).

5.1.2 International Finance Corporation (IFC)

The IFC Performance Standards (IFC, 2012) do not explicitly cover visual impacts or assessment thereof. Under IFC PS 6, ecosystem services are organized into four categories, with the third category related to cultural services which are defined as "the non-

material benefits people obtain from ecosystems" and "may include natural areas that are sacred sites and areas of importance for recreation and aesthetic enjoyment" (IFC, 2012).

However, the IFC Environmental Health and Safety Guidelines for Electric Power Transmission and Distribution (IFC, 2007) specifically identifies the risks posed by power transmission and distribution projects to create visual impacts to residential communities. It recommends mitigation measures to be implemented to minimise visual impact. These should include the siting of powerlines and the design of substations with due consideration to landscape views and important environmental and community features. Prioritising the location of high-voltage transmission and distribution lines in less populated areas, where possible, is promoted.

IFC PS 8 recognises the importance of cultural heritage for current and future generations and aims to ensure that projects protect cultural heritage. The report defines Cultural Heritage as "(i) tangible forms of cultural heritage, such as tangible moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values; (ii) unique natural features or tangible objects that embody cultural values, such as sacred groves, rocks, lakes, and waterfalls" (IFC, 2012). The IFC PS 8 defines Critical Heritage as "one or both of the following types of cultural heritage: (i) the internationally recognized heritage of communities who use or have used within living memory the cultural heritage for long-standing cultural purposes; or (ii) legally protected cultural heritage areas, including those proposed by host governments for such designation" (IFC, 2012).

Legally protected cultural heritage areas are identified as important in the IFC PS 8 report. This is for "the protection and conservation of cultural heritage, and additional measures are needed for any projects that would be permitted under the applicable national law in these areas". The report states that "in circumstances where a proposed project is located within a legally protected area or a legally defined buffer zone, the client, in addition to the requirements for critical cultural heritage, will meet the following requirements:

- Comply with defined national or local cultural heritage regulations or the protected area management plans.
- Consult the protected area sponsors and managers, local communities and other key stakeholders on the proposed project; and
- Implement additional programs, as appropriate, to promote and enhance the conservation aims of the protected area". (IFC, 2012).

5.1.3 Millennium Ecosystem Assessment

In the Ecosystems and Human Well-being document compiled by the Millennium Ecosystem Assessment in 2005, Ecosystems are defined as being "essential for human well-being through their provisioning, regulating, cultural, and supporting services. Evidence in recent decades of escalating human impacts on ecological systems worldwide raises concerns about the consequences of ecosystem changes for human well-being". (Millennium Ecosystem Assessment, 2005)

The Millennium Ecosystem Assessment defined the following non-material benefits that can be obtained from ecosystems*:*

- Inspiration: Ecosystems provide a rich source of inspiration for art, folklore, national symbols, architecture, and advertising.
- Aesthetic values: Many people find beauty or aesthetic value in various aspects of ecosystems, as reflected in the support for parks, scenic drives, and the selection of housing locations.
- Sense of place: Many people value the “sense of place” that is associated with recognised features of their environment, including aspects of the ecosystem.
- Cultural heritage values: Many societies place high value on the maintenance of either historically important landscapes (“cultural landscapes”) or culturally significant species; and
- Recreation and ecotourism: People often choose where to spend their leisure time based in part on the characteristics of the natural or cultivated landscapes in a particular area. (Millennium Ecosystem Assessment, 2005)

The Millennium Ecosystem Assessment Ecosystems and Human Well-being: Synthesis report indicates that there has been a “rapid decline in sacred groves and species” in relation to spiritual and religious values, and aesthetic values have seen a “decline in quantity and quality of natural lands”. (Millennium Ecosystem Assessment, 2005)

5.2 National and Regional Legislation and Policies

In order to comply with the Visual Resource Management requirements, it is necessary to clarify which National and Regional planning policies govern the proposed development area to ensure that the scale, density and nature of activities or developments are harmonious and in keeping with the sense of place and character of the area as mapped in Figure 5 below.

- DEA&DP Visual and Aesthetic Guidelines.
- REDZ Planning.
- Regional and Local Municipality Planning and Guidelines.

Table 9: List of key planning informants to the project.

Theme	**Requirements**
Province	Northern Cape
District Municipality	Pixley ka Seme
Local Municipality	Renosterberg
REDZ	Not located in a REDZ
STRATEGIC CORRIDOR	Central Strategic Powerline Corridor

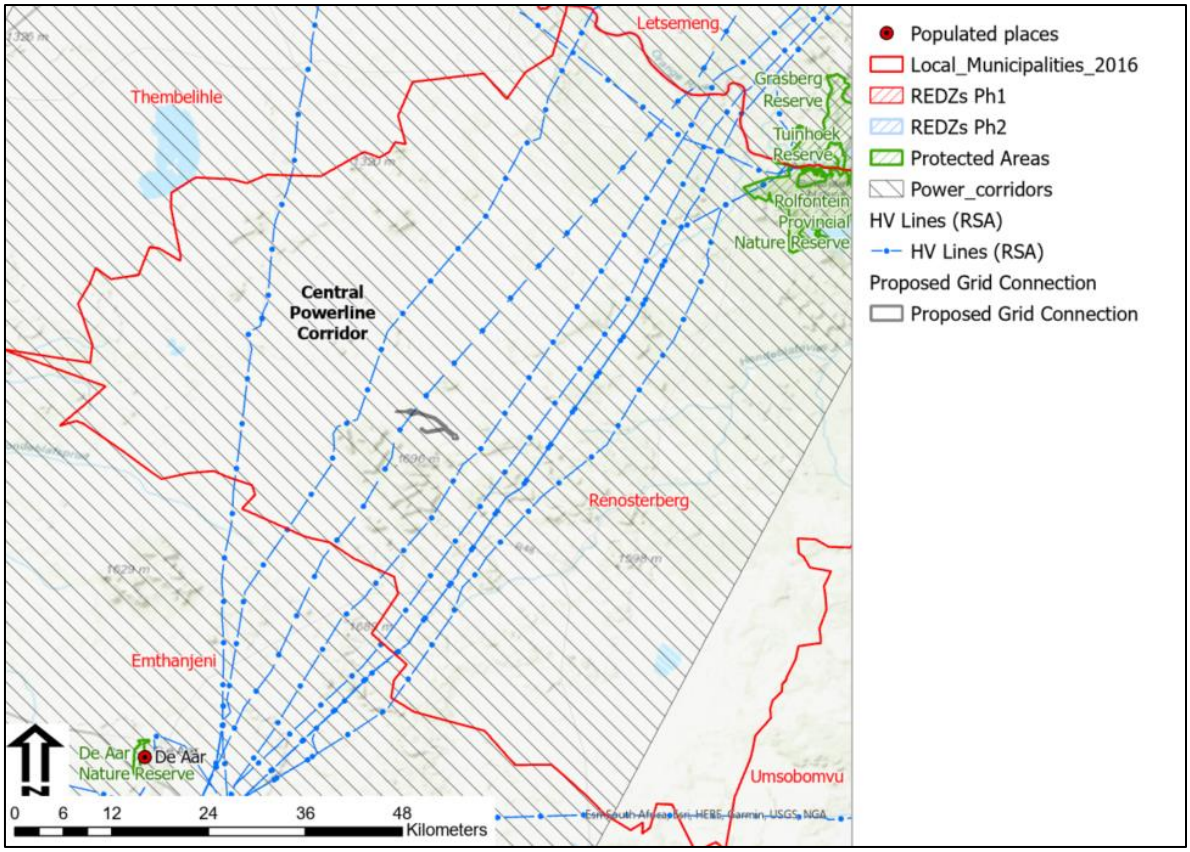

Figure 5: Planning locality map depicting the local, district and national planning zones.

5.2.1 DEA&DP Visual and Aesthetic Guidelines

Reference to the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) Guideline for involving visual and aesthetic specialists in Environmental Impact Assessment (EIA) processes is provided in terms of southern African best practice in Visual Impact Assessment. The report compiled by Oberholzer states that the Best Practicable Environmental Option (BPEO) should address the following:

- Ensure that the scale, density and nature of activities or developments are harmonious and in keeping with the sense of place and character of the area. The BPEO must also ensure that development must be located to prevent structures from being a visual intrusion (i.e., to retain open views and vistas).
- Long term protection of important scenic resources and heritage sites.
- Minimisation of visual intrusion in scenic areas.
- Retention of wilderness or special areas intact as far as possible.
- Responsiveness to the area's uniqueness, or sense of place." (Oberholzer, 2005)

5.2.2 REDZ Planning

A Strategic Environmental Assessment commissioned by the Department of Environmental Affairs, undertaken by the CSIR, identified Renewable Energy Development Zones (REDZs) (Department of Environment Affairs). These are gazetted geographical areas in which several wind and solar PV development projects will have the lowest negative impact on the environment while yielding the highest possible social and economic benefit to the country.

The project is not located in a REDZ but is located within the Central Strategic Powerline Corridor. As such, further powerline infrastructure is likely to take place.

5.2.3 Other Renewable Energy Projects

There are other Renewable Energy facilities within close vicinity of the proposed project. Within the 30km distance from the project, there is the Scatec Solar project located to the northwest, and the AE-AMD PV project located to the northeast. Both these projects are located just outside of the 12km distance and are highly unlikely to result in intervisibility. There are also two wind farms proposed to the south of the site located approximately 24km from the site. Due to topographic screening from raised terrain to the south, these wind farms RE projects will fall outside the project ZVI.

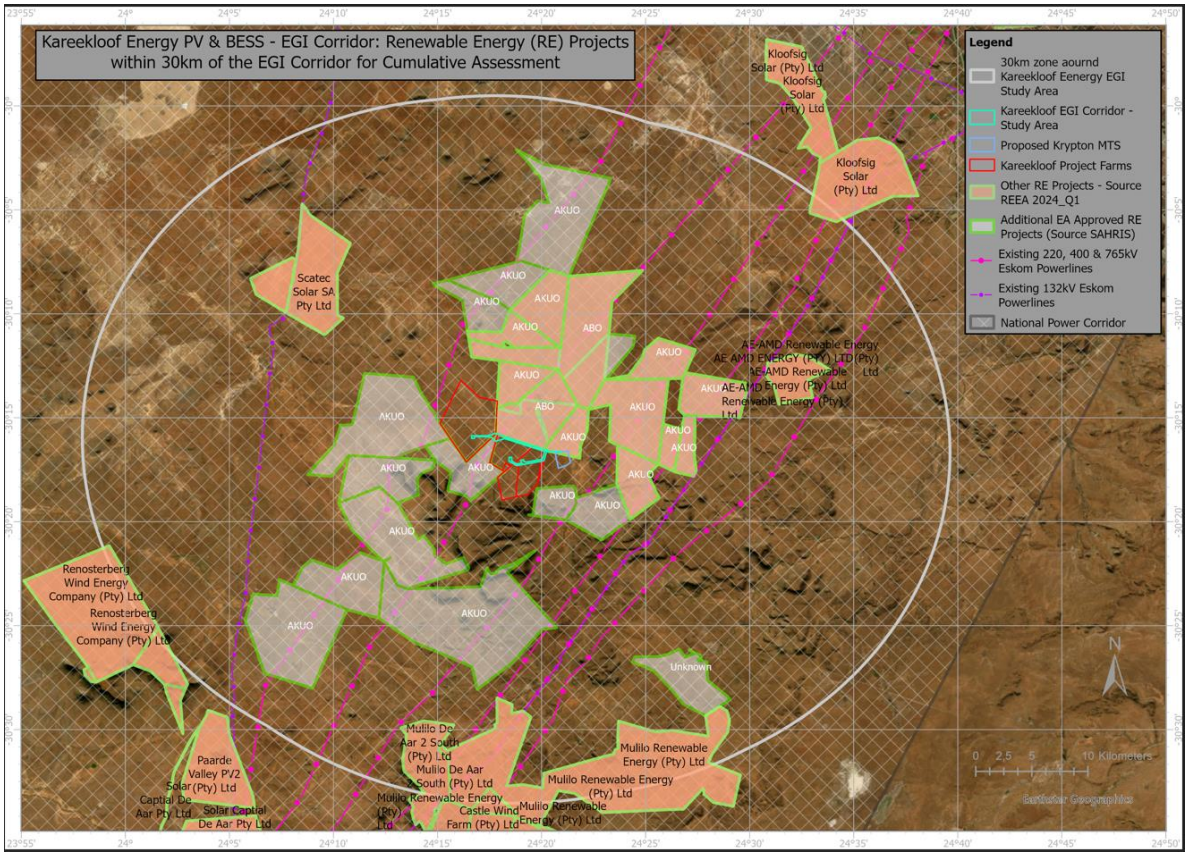

Figure 6: Map depicting DEA Renewable Energy project status.

In terms of close proximity PV projects, there are a number of EA Approved RE projects around the proposed development site. These are all related to the AKUO PV that are yet to be constructed. While it is unlikely that the total AKUO areas will be development, it is highly likely that should some of these areas become established, that clear intervisibility will take place. With the location of the proposed new MTS to the east of the site, it is highly likely that multiple OHPL will be routed within clear view of the project grid connection. The result is that a PV/ OHPL massing effect is likely to take place, degraded local visual resources. However, this landscape change is unlikely to be a significant landscape risk as the local area has a moderate level of scenic quality, and there are no tourist or ecotourism activities taking place within the ZVI.

5.2.4 Conservation Planning

As can be seen in Figure 5 above, there are no conservation areas with the vicinity of the proposed OHPL project. The site survey found that no other landscape based eco-tourism

activities were taking place within the ZVI. The inselbergs to the south of the property do have sufficient landscape appeal such that they could be utilised for eco-tourism. As such, a wide buffer from the steep slopes areas is recommended to set the PV development areas and grid infrastructure away from the hills to the south.

5.2.5 Local and Regional Planning

The following tables list key regional and local planning that has relevance to the project pertaining to landscape-based tourism and renewable energy projects.

Table 10: Pixley ka Seme District Municipality IDP 2022 (Pixley ka Seme District Municipality, 2022)

Theme	Requirements	Page
Opportunities	• Eco Tourism • Solar and Wind Farms • Position of being strategically situated (National Roads) • SKA	12
Biophysical Context	• Possible demand for development that will influence the transformation of land uses • SKA • Renewable Energy	34
Renewable Energy	Potential and impact of renewable energy resource generation	45
	South Africa has embarked in a process of diversifying its energy-mix to enhance energy security while also lowering green-house gas emissions. The country is blessed with a climate that allows Renewable Energy (RE) technologies like solar photovoltaic (PV) and wind generation to be installed almost anywhere in the country. By successfully attracting a share of the IPPPP portfolio investment, Emthanjeni, Siyathemba, Ubuntu and Renosterberg and Umsobomvu are all benefitting from substantial socio-economic development (SED) and Enterprise development (ED) contributions leveraged by the IPPPP commitments.	75

Table 11: Renosterberg Municipality (Renosterberg Local Municipality IDP, 2019)

Theme	Requirements	Page
Industry	• A rapid decline in net migration into the Province is predicted. • The economy of this region is not well diversified. Irrigation is present along the Orange River and in the semi-arid internal areas of the region. Small stock and game farming predominates with few alternative employment opportunities outside agriculture and government.	39
Energy Consumption	The use of wood as energy/fuel source for cooking and heating, to whatever scale, is of major concern. It is almost 100% certain that all the wood used in the municipal area for these purposes comes from indigenous, and in some cases also protected, vegetation i.e. Camel Thorn (Acacia erioloba) trees, and that harvesting is not done in a sustainable way	78

Theme	Requirements	Page
Renewable Energy	The needs that were identified and prioritized by the municipality in collaboration with the representatives forums are as follows: • Development of Solar Parks o 0.8 Mw Vanderkloof o 0.4 Mw Petrusville o 0.4 Mw Philipstown	116/132
Agriculture	Renosterberg is a Municipality in which agriculture is the key economic activity. A greater contribution can be made to the economy of the district and Province by this sector.	50
	These extreme climate conditions reduce the study area's agricultural potential. Access to irrigation water will be crucial for any cultivation to occur due to the overall arid conditions and the risk wilting under the influence of very high temperatures, while frost limits the type of crops that can be cultivated in the study area (PKS IEMP, 2007).	23
	(There is) an exponential degradation of the veldt condition, with resulting decreasing stocking potential and animal biomass productivity. If this trend continues, natural vegetation for grazing will soon outstrip stock watering as the region's inherent limiting factor with respect to live-stock	27
Conservation	The diversity of species in itself does not warrant the establishment of a conservation reserve.	26

5.3 Landscape Planning Policy Fit

Policy fit refers to the degree to which the proposed landscape modifications align with International, National, Provincial and Local planning and policy.

In terms of *international best practice*, the proposed landscape modification will not trigger any issues as there are no significant landscape/ cultural landscape features within the project area there were no significant cultural/ landscape visual resources found on the site or immediate surrounds that are flagged by international landscape guidelines. No significant, international landscapes are located within the proposed project zone of visual influence.

In terms of regional and local planning fit for planned landscape and visual related themes, the **expected visual/ landscape policy fit of the landscape change is rated High.** While not within a REDZ, the project is also within the Central Strategic Powerline Corridor area and, as such, further powerlines are likely to be routing through the vicinity.

6 BASELINE VISUAL INVENTORY

Landscape character is defined by the U.K. Institute of Environmental Management and Assessment (IEMA) as the 'distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement'. It creates the specific sense of place or essential character and 'spirit of the place' (IEMA, 2002). This section of the VIA identified the main landscape features that define the landscape character, as well as the key receptors that make use of the visual resources created by the landscape.

6.1 Local Landscape Context

Land use is a crucial factor in determining landscape character, especially regarding the Visual Absorption Capacity (VAC) of the landscapes. Oberholzer defines VAC as the potential of the landscape to conceal the proposed project (Oberholzer, 2005). i.e.

- High VAC – e.g., effective screening by topography and structures.
- Moderate VAC - e.g., partial screening by topography and structures.
- Low VAC - e.g., little screening by topography or structures.

General land uses of the area are described making use of Open-Source Mapping vector data, overlaid onto ArcGIS World Satellite Imagery.

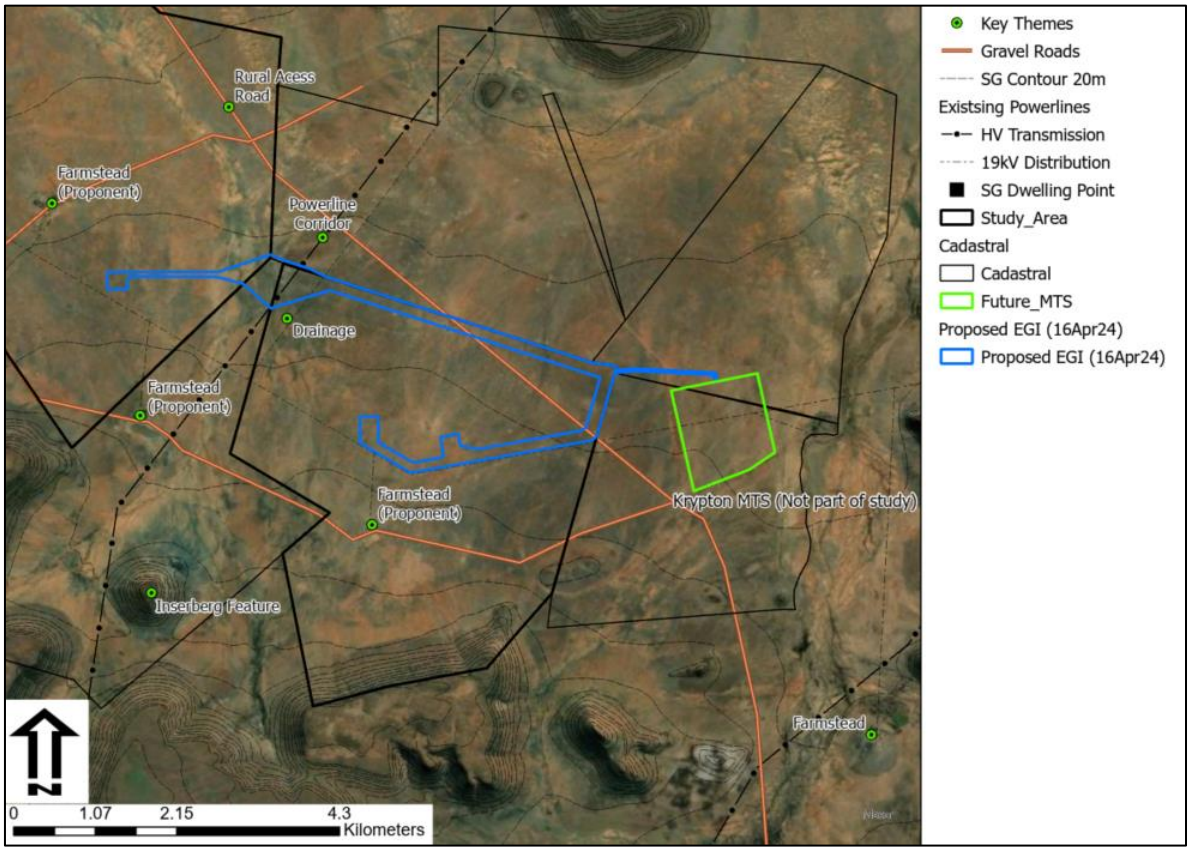

Figure 7. Local landscape themes map.

As mapped in Figure 7 above, the key landscape themes within the Foreground / Middle Ground (6km) distance are tabled below:

Table 12:Key Landscape Themes

Theme	Description
Isolated farmstead	The area is located in the Karoo where the land use is predominantly defined by the arid environment where dryland sheep and goat farming are taking place. There are a number of farms in the project area that are part of the project. One farm was located to the southeast of the proposed OHPL. The farmsteads do add

	scenic value as a key focal point within a cultural landscape.
	
Old farmsteads	As testiment to the very arid environment, one of the farms depicts a farmstead in a delapidated state, degrading local landscape resources.
	
Inselbergs	The inselbergs located to the south of the project area are key landforms in the landscape that significantly add to the scenic quality of the area. These areas are not being used as tourist related landscape resources and, with the powerline running through the hills, some of the value of the hills is degraded. These hills are very iconic in the karoo landscape, and a suitable buffer should be provided to ensure that steep slope areas are excluded.

Powerlines and Krypton MTS	There is a 400kV power line running through the property. This area does fall within a strategic powerline corridor and, as such, other powerlines are likely to be routed alongside the existing powerline. As part of the regional move to accommodate renewable energy in the area, the Krypton MTS is also proposed (unbuilt).

6.2 Visual Absorption Capacity

Land use is a crucial factor in determining landscape character, especially regarding the Visual Absorption Capacity (VAC) of the landscapes. Oberholzer defines VAC as the potential of the landscape to conceal the proposed project (Oberholzer, 2005). i.e.

- High VAC – e.g., effective screening by vegetation and structures.
- Moderate VAC - e.g., partial screening by vegetation and structures.
- Low VAC - e.g., little screening by vegetation or structures.

Vegetation type is a large factor in determining the scenic quality or the site in terms of colour and texture, as well as influencing the local ability of the landscape to absorb the landscape change if larger trees species or prolific vegetation is located on the site or within the local

region. The map below outlines the vegetation type based on BGIS mapping (South African National Biodiversity Institute, 2018).

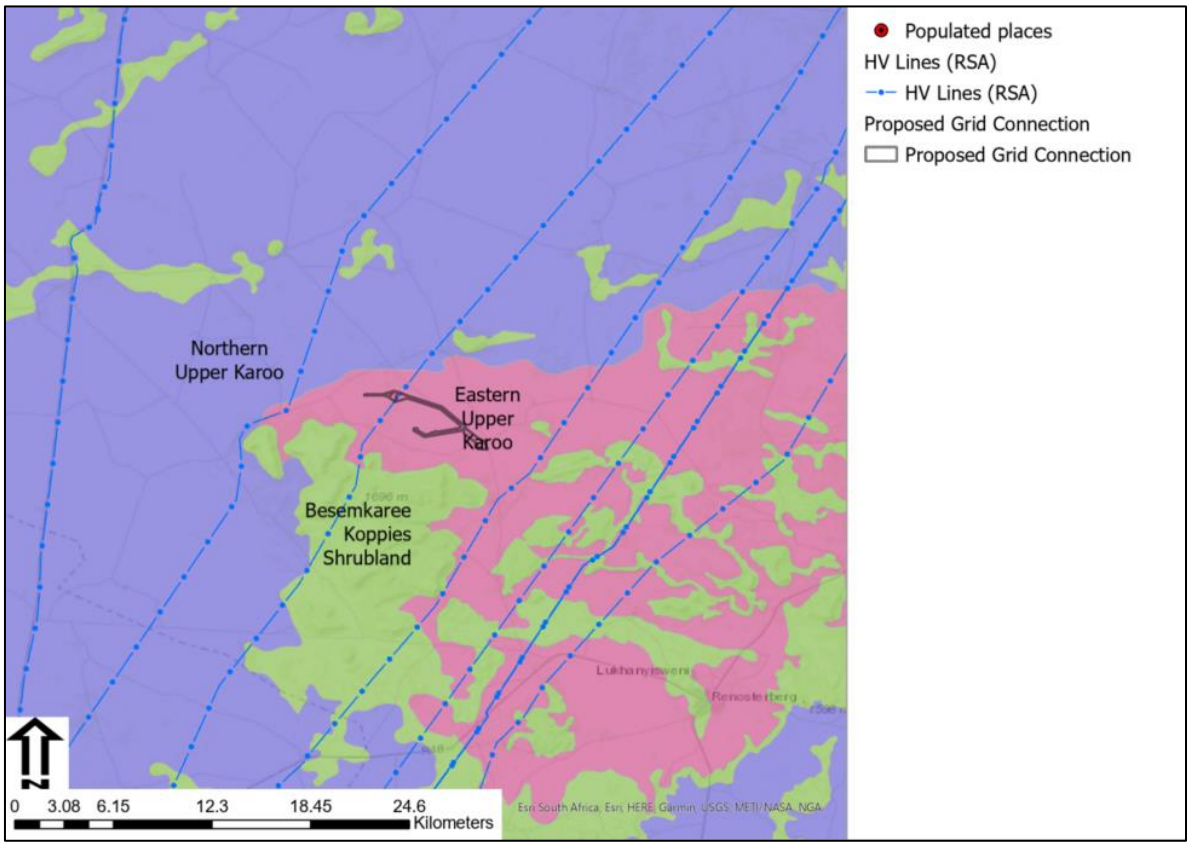

Figure 8. BGIS Biome and Vegetation Type Map (South African National Biodiversity Institute, 2018).

According to the South African National Biodiversity Institute (SANBI) 2012 Vegetation Map of South Africa, Lesotho and Swaziland (South African National Biodiversity Institute, 2012) the project area is located in the Nama-Karoo Biome. The main vegetation types being Eastern Upper Karoo that is mainly scrub mixed with veld grasslands. They fall into the least threatened category because they are largely excluded from intensive agricultural activities. (Mucina et al, 2006)

Of relevance to the project is that the VAC is defined as Low as there is limited vegetation or structures that could be used for visual screening as there are no large trees in the landscape, the karoo scrub vegetation is low in height and there are only three remote farmsteads in the locality. While there are existing OHPL in the local landscape, these routings are far apart and do not generate a massing effect such that they would increase the VAC levels. The proposed routing is also not aligned with the single Eskom OHPL that is routed through the property.

Figure 9. Photograph depicting the typical Nama-Karoo low scrub vegetation.

6.3 Landscape Topography

Landform is a key variable informing the aesthetic nature of the landscape within the VRM methodology. The viewshed is strongly associated with the regional topography where topographic screening from undulating terrain would restrict views of the proposed landscape change. The site-specific characteristics are also analysed by gradient analysis to determine if any steep slopes are located on the proposed development site.

6.3.1 Regional Landscape Topography

Making use of the NASA STRM digital elevation model, profile lines were generated for the area within 12km on either side of the project area predominantly in the North to South and East to West compass reference but orientated to take into account dominant topographic trends that could influence the local landscape and viewscape. The map depicting the regional elevation profile lines can be viewed on the following page.

The general topography of the region is defined as undulating with the main landform being the prominent inselbergs that are scattered within the broad landscape. In comparison to the flat surroundings of the Nama-Karoo, these features significantly add to the local and regional scenic quality. Broadly speaking, the drainage is to the north via shallow washes that do cross over the project area, without any dominating drainage valley or gullies.

The North to South Profile depicts the elevation profile over a distance of 30km. The highest point is just to the south of the study area at a height of 1650mamsl, with the lowest point 1200mamsl located in the north. The generally flat terrain of the karoo plains are clearly visible in relation to the local prominence of the 250m high inselbergs. The West to East Profile depicts some regional prominence with the high point located at 1600mamsl just to the west of the study area, with the low point of 1250mamsl (approx.) to the west. The flat terrain of this Nama-karoo landscape is clearly visible in the profiles.

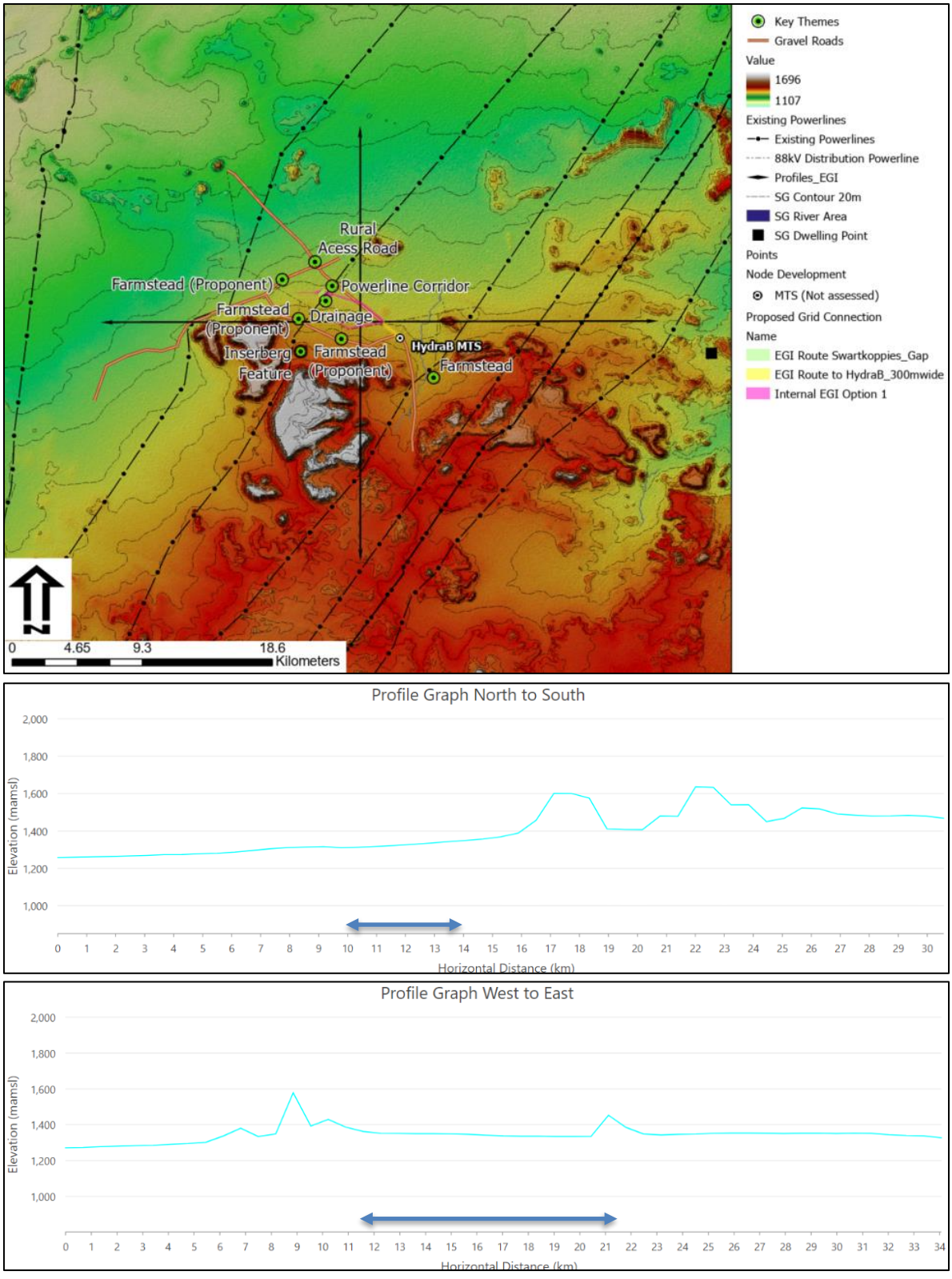

Figure 10: Regional Digital Elevation Mapping and Profiles Graphs *with approximate extent depicted*.

6.3.2 Key local topographic features and site slopes analysis

To ensure that significant landforms related to steep slopes are not located on the site or surrounds, a slopes analysis was undertaken. As mapped in Figure 11 below, **the steep slopes that comprise the northern facing facets of the southern inselbergs are clearly**

visible in the slopes analysis. To ensure that the inselberg landform is not compromised, a 500m buffer from the cliff is proposed as a non-development area.

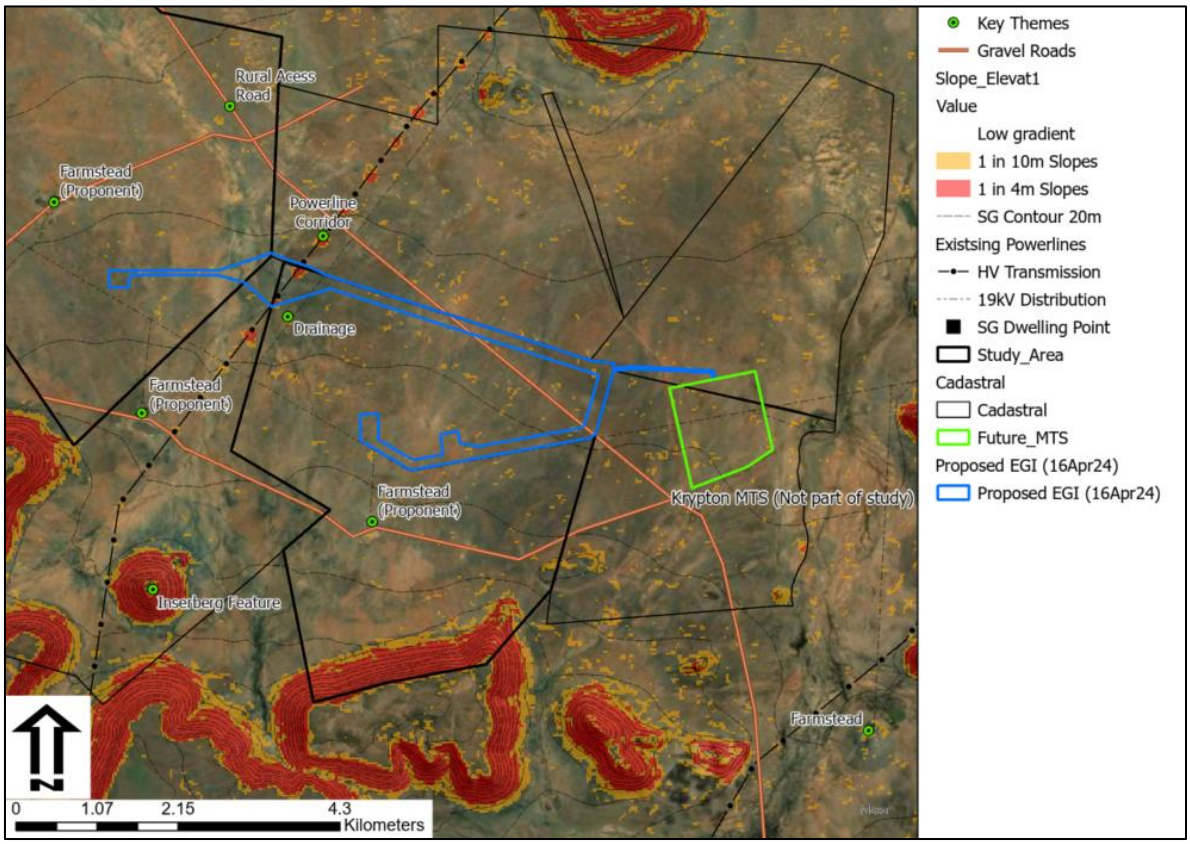

Figure 11: Key topographic features map.

6.4 Project Zone of Visual Influence

The visible extent, or viewshed, is “the outer boundary defining a view catchment area, usually along crests and ridgelines” (Oberholzer, 2005). In order to define the extent of the possible influence of the proposed landscape change, a viewshed analysis was undertaken from the proposed site at a specified height above ground level. This is to assess the ***theoretical extent*** where the proposed landscape change could be visible from. This theoretical viewshed excludes vegetation, structural development as well as distance from the location where atmospheric influence would reduce visual clarity over increasing distance. The viewshed analysis makes use of open-source NASA ASTER Digital Elevation Model data (NASA, 2009).

Based on the theoretical viewshed and the site visit appraisal of the nature of the landscape, an assessment of the ***Zone of Visual Influence (ZVI)*** is made. The ZVI is the area where the proposed landscape change is most likely to be noticed by the casual observer, taking the site visit into account where vegetation, existing development and distance is taken into consideration. This is a subjective appraisal but informed by the viewshed and the other factors mentioned.

6.4.1 Viewshed Analysis

A viewshed analysis was undertaken for the site making use of an Offset value representing the height of the proposed development as reflected in the table below. The model extent

of the viewshed analysis was restricted to a defined distance from the site that represents the expected zone of visual influence (ZVI) of the proposed activities. This takes the scale, and size of the proposed projects into consideration in relation to the natural visual absorption capacity of the receiving environment. The maps are informative only as visibility tends to diminish exponentially with distance, which is well recognised in visual analysis literature (Hull & Bishop, 1988).

Table 13: Proposed Project Heights Table

Proposed Activity	Height (m)	Model Extent	Motivation
PV	30m	24km	The approximate height of the monopoles and substation structures is 30m above ground. Due to the predominantly flat terrain, the extent of the viewshed was capped at 24km. However, the ZVI is unlikely to extend beyond the 12km distance due to the diffuse nature of the substation structures and relatively thin structures of the monopoles.

The viewshed is mapped and can be viewed in Figure 12 on the next page. This depicts the theoretical area where the proposed landscape change could be visible. Due to high ground to the south, as well as smaller inselberg type landforms in the surrounding areas, the viewshed is strongly shaped to the north, creating a fragmented visual envelope to the south and southeast. Within the 3km foreground distance, clear and full visibility will take place, with viewshed starting to fragment considerably at the 6km distance with limited visibility beyond the 12km background distance mark.

The extent of the Zone of Visual Influence is defined as Local for the following reasons:

- The extent is predominantly contained within the Foreground/ Mid Ground but due to the height of the monopoles in relation to the flat terrain to the north, west and east, the viewshed has the potential to extend further into these sectors.
- The hilly landscape of the surrounding terrain fragments clear views of the substations and OHPL, with exposure to the proposed landscape change mainly contained to the foreground areas.
- The relatively small visual footprint of the monopoles contains the ZVI to within the Foreground/ Mid-ground (6km approx.)

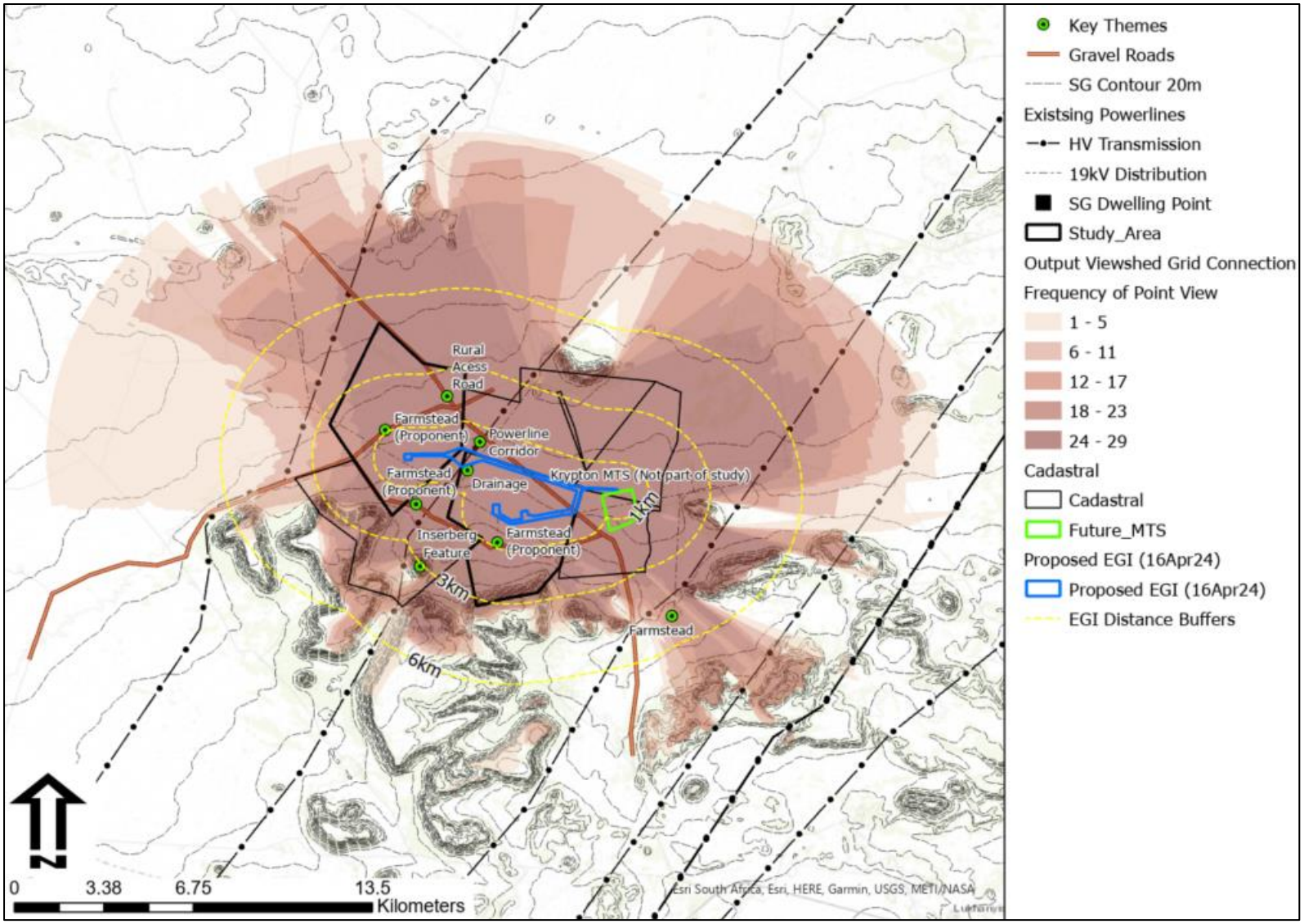

Figure 12: Viewshed analysis map of proposed project.

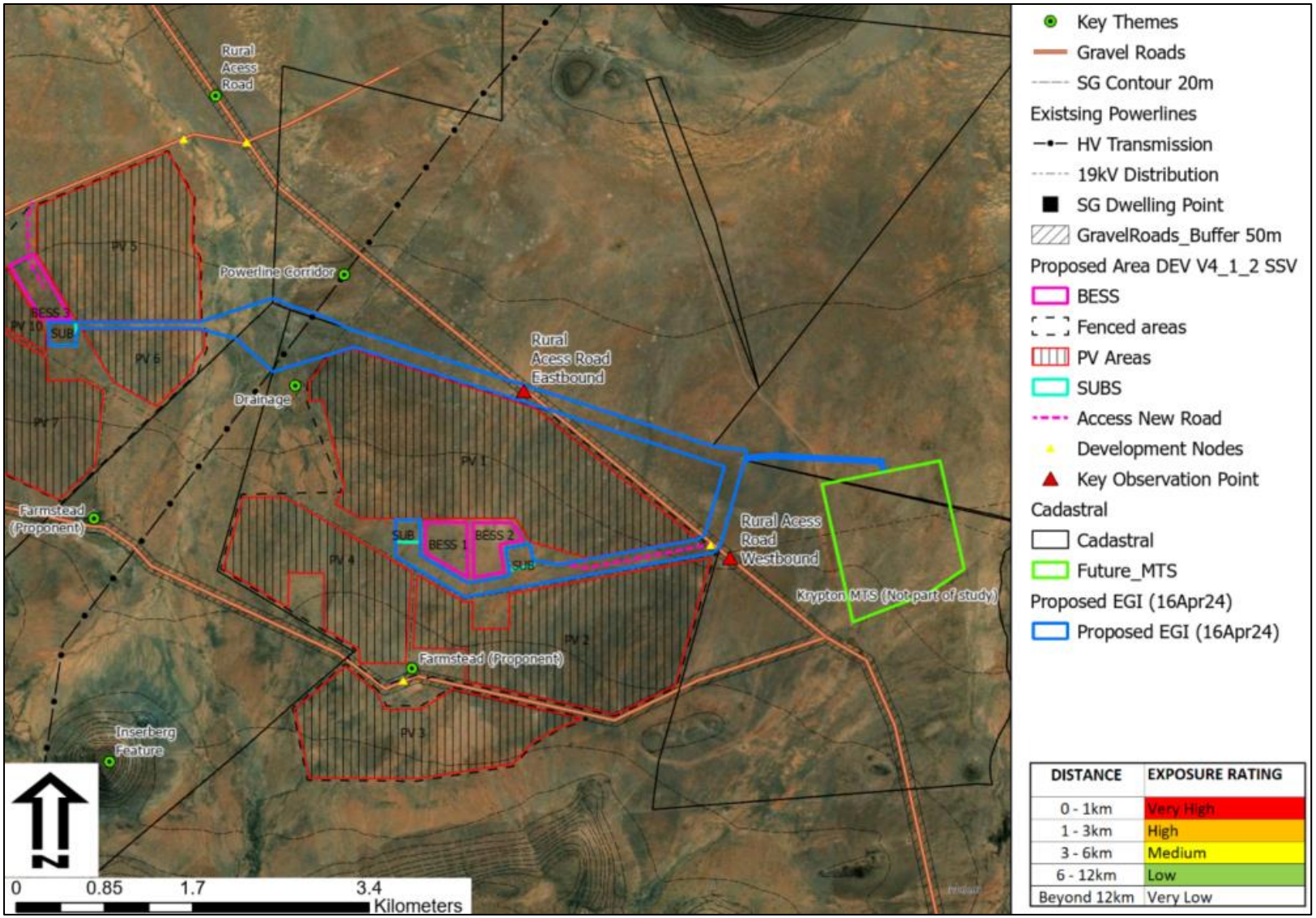

Figure 13: Key Observation Point locality map.

6.5 Receptors and Key Observation Points

As defined in the methodology, KOPs are defined by the Bureau of Land Management as the people (receptors) located in strategic locations surrounding the property that make consistent use of the views associated with the site where the landscape modifications are proposed. The following table identifies the receptors identified within the ZVI, as well as motivates if they have significance and should be defined as KOP. The receptors located within the ZVI, and KOPs view lines are indicated on the map on the following page. As motivated and mapped in Table 14 below and mapped in Figure 12 on the previous page, the following receptors have been identified as Key Observation Points and should be used as locations to assess the suitability of the landscape change.

Table 14: KOP Motivation Table.

Name	Theme	Exposure	Motivation
Access road	Road	Very High	The rural farm access road is routed through the proposed project where rural farmers would be subject to Very High levels of Visual Exposure.

Only a single KOP was located within the project ZVI which is the small and remote Farm Access Road that passes the north of the project site. No residential areas were located within the project ZVI.

7 VISUAL RESOURCE MANAGEMENT

In terms of the VRM methodology, landscape character is derived from a combination of scenic quality, receptor sensitivity to landscape change, and distance of the proposed landscape modification from key receptor points. Making use of the key landscape elements defined in the landscape contextualisation sections above, landscape units are defined which are then rated to derive their intrinsic scenic value, as well as how sensitive people living in the area would be to changes taking place in these landscapes.

7.1 Physiographic Rating Units

The Physiographic Rating Units are the areas within the proposed development area that reflect specific physical and graphic elements that define a particular landscape character. These unique landscapes within the project development areas are rated to assess the scenic quality and receptor sensitivity to landscape change, which is then used to define a Visual Resource Management Class for each of the site's unique landscape/s. The exception is Class I, which is determined based on national and international policy / best practice and landscape significance and as such are not rated for scenic quality and receptor sensitivity to landscape change. Based on the SANBI vegetation mapping and the site visit to define key landscape features, the following broad-brush areas were tabled and mapped in Figure 14 below.

Table 15: Physiographic Landscape Rating Units.

Landscapes	Motivation
Hydrological washes	The area depicts a series of shallow washes that drain the site to the north (broadly mapped and subject to the Surface Water Hydrologists detail)
Nama-karoo	The predominant landscape of the flat areas to the north of the steep sided inselbergs.

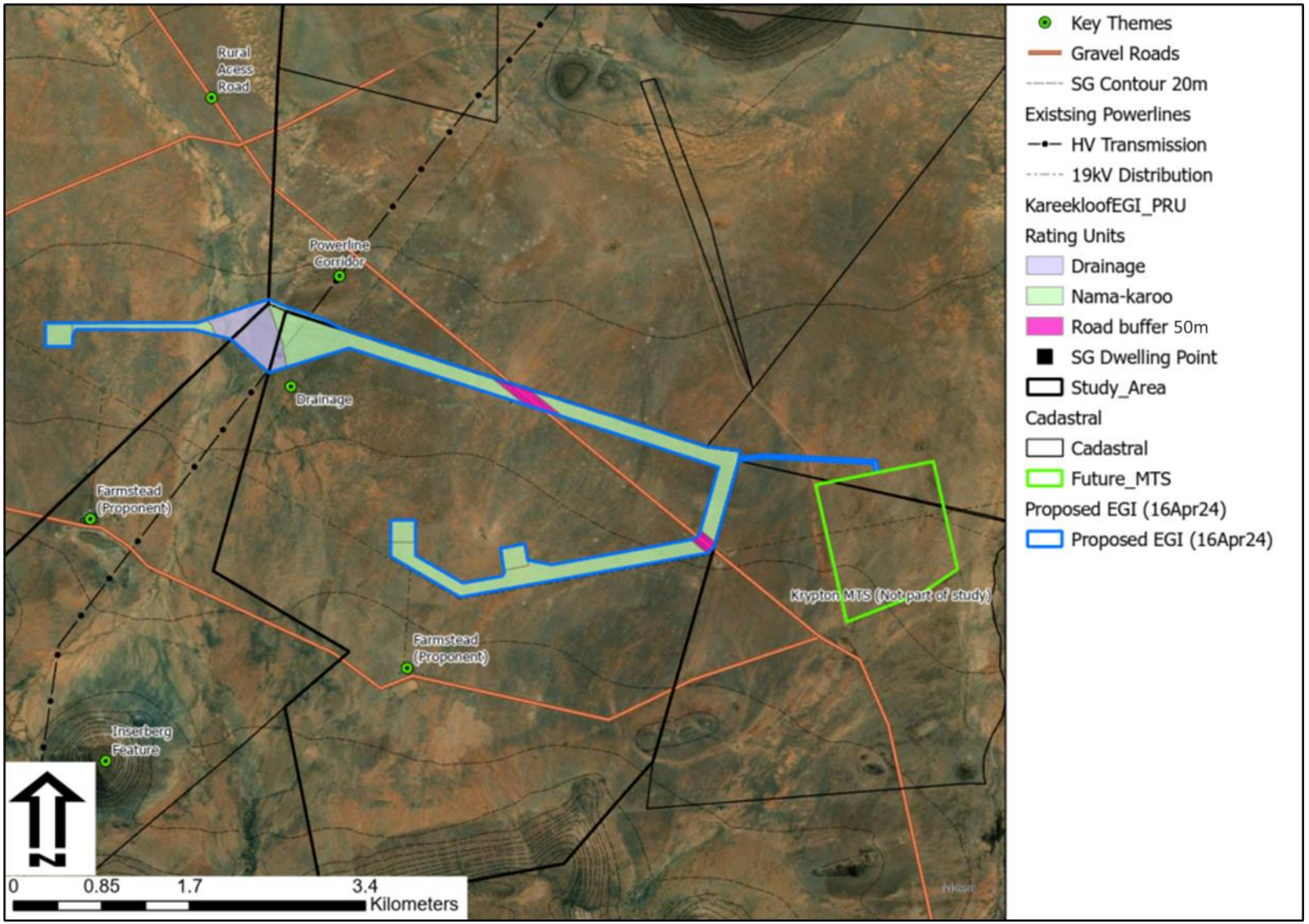

Figure 14: Physiographic Rating Units identified within the defined study area.

Table 16: Scenic Quality and Receptor Sensitivity Rating.

Landscape Rating Units	Scenic Quality									Receptor Sensitivity						VRM		
	A= scenic quality rating of ≥19; B = rating of 12 – 18, C= rating of ≤11									H = High; M = Medium; L = Low								
Attribute	**Landform**	**Vegetation**	**Water**	**Colour**	**Scarcity**	**Adjacent Landscape**	**Cultural Modifications**	**Sum**	**Rating**	**Type of Users**	**Amount of Use**	**Public Interest**	**Adjacent Land Uses**	**Special Areas**	**Rating**	**Inventory Class**	**Management Class**	**Development Sensitivity**
In general, significant Heritage / Ecological / Hydrology. With specific reference to the project: • **Steep slopes** • **Farm buffers** • **Road buffers**	**(Class I is not rated)**																**I**	**NoGo**
Hydrological washes *(Management as per relevant specialist recommendations)*	3	2	1	3	3	2	2	**16**	**M**	M	L	L	M	H	**M**	**III**	**II**	**With specific mitigation**
Nama-Karoo degraded	3	1	0	2	2	2	2	**12**	**M**	L	L	L	L	L	**L**	**IV**	**III**	**With mitigation**

Red colour indicates change in rating from Visual Inventory to Visual Resource Management Classes motivated in the following section.

The ***Scenic Quality*** scores are totalled and assigned an A (High scenic quality), B (Moderate scenic quality) or C (Low scenic quality) category based on the following split: *A= scenic quality rating of ≥19; B = rating of 12 – 18, C= rating of ≤11* (USDI., 2004).
Receptor Sensitivity levels are a measure of public concern for scenic quality. Receptor sensitivity to landscape change is determined by rating the key factors relating to the perception of landscape change in terms of Low to High

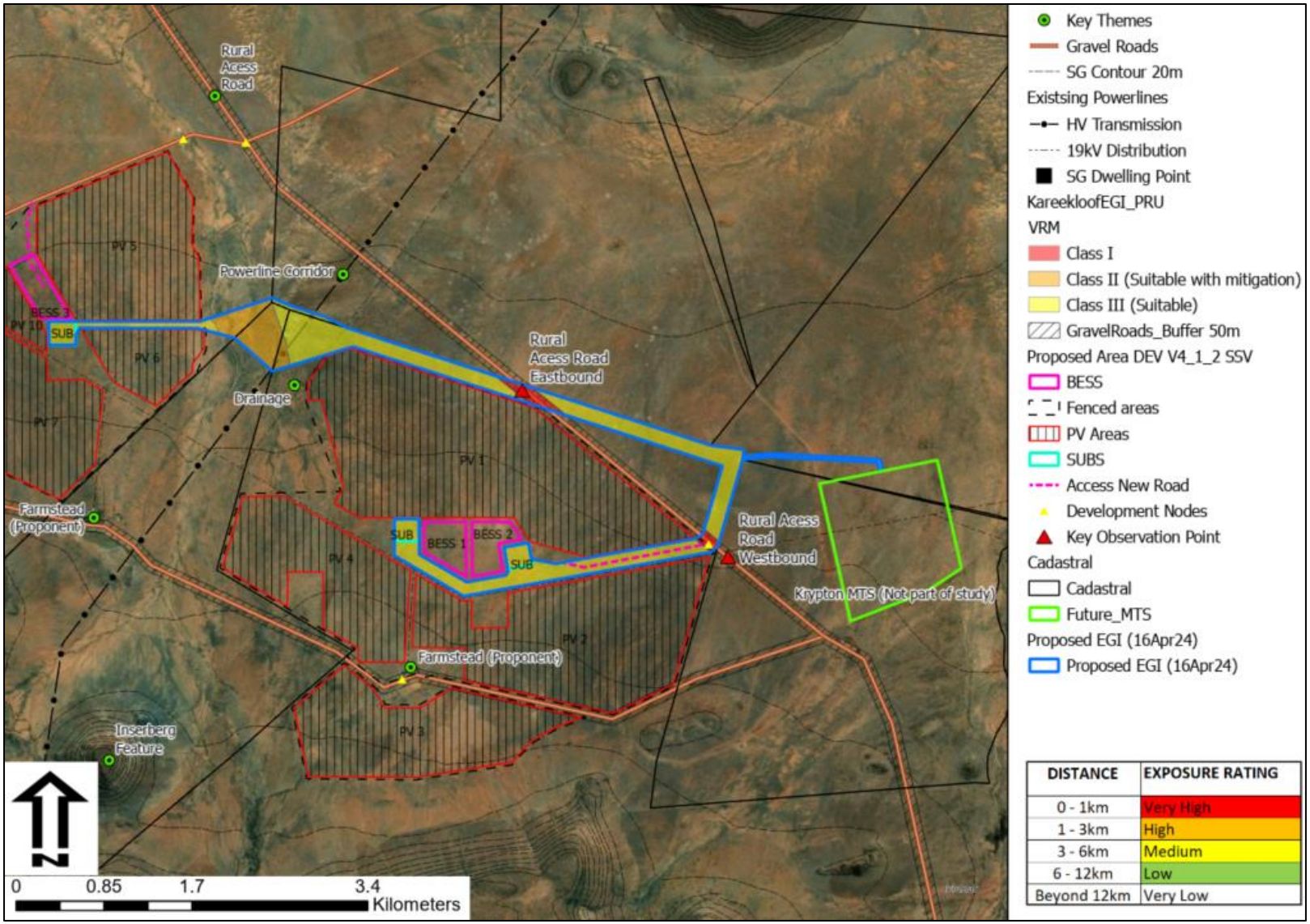

Figure 15: Visual Resource Management Classes map with cumulative mapping to show the proposed EGI Routes.

7.2 Scenic Quality Assessment

The scenic quality is determined making use of the VRM Scenic Quality Checklist that identifies seven scenic quality criteria which are rated with 1 (low) to 5 (high) scale. The scores are totalled and assigned an A (High), B (Moderate) or C (low) based on the following split:

A= scenic quality rating of ≥19 (High).
B = rating of 12 – 18 (Medium).
C= rating of ≤11 (Low).

Table 17: Scenic Quality Rating Table

Landscapes	Rating	Motivation
Landform	Medium to High	The southern inselberg creates significant landforms that are a key factor influencing the local and regional scenic quality.
Vegetation	Medium	The vegetation is uniform, veld grasslands that contrast to the dark rocky areas of the inselbergs, increasing scenic quality.
Water	Medium to Low	No water features were identified on the site but there are a number of hydrological washes that do allude to the presence of water. Theses are not particularly pronounced and appear more as a slight variation of the Nama-karoo landscape.
Colour	Medium	The colours are mainly related to the vegetation and are browns and greens due to season variations.
Scarcity	Medium to Low	The rural agricultural grassland landscapes are interesting in context but are widespread in the region.
Adjacent Landscapes	Medium	The adjacent landscape area is also Nama-Karoo with scattered inselbergs that add value. The adjacent pylons do degrade the local sense of place to some degree.
Cultural Modifications	Medium	There are no cultural landscape modifications that detract from the site sense of place and rated as Low to Medium positive as a reflection of a rural karoo agrarian landscape context.
Scenic Quality	**Medium**	**The overall Scenic Quality is rated Medium to High. The grasslands and Nama-Karoo scrub do add to the rural agricultural sense of place but are not unique landscape elements. The southern inselberg creates significant landforms that are a key factor influencing the local and regional scenic quality. While there are large Eskom distribution OHPL in the landscape, the three lines are well spaced such that they do not generate a massing effect. The single OHPL routed through the project area does degrade the local landscape to some degree.**

7.3 Receptor Sensitivity Assessment

Receptor sensitivity to landscape change is determined by rating the following factors in terms of Low to High:

- **Type of Users**: Visual sensitivity will vary with the type of users, e.g. recreational sightseers may be highly sensitive to any changes in visual quality, whereas workers who pass through the area on a regular basis may not be as sensitive to change.
- **Amount of Use**: Areas seen or used by large numbers of people are potentially more sensitive.

- **Public Interest**: The visual quality of an area may be of concern to local, or regional, groups. Indicators of this concern are usually expressed via public controversy created in response to proposed activities.
- **Adjacent Land Uses**: The interrelationship with land uses in adjacent lands. For example, an area within the viewshed of a residential area may be very sensitive, whereas an area surrounded by commercially developed lands may not be as visually sensitive.
- **Special Areas**: Management objectives for special areas such as Natural Areas, Wilderness Areas or Wilderness Study Areas, Wild and Scenic Rivers, Scenic Areas, Scenic Roads or Trails, and Critical Biodiversity Areas frequently require special consideration for the protection of their visual values.
- **Other Factors**: Consider any other information such as research or studies that include indicators of visual sensitivity.

Table 18: Receptor Sensitivity Rating Table

Landscapes	Rating	Motivation
Type of Users	Low	Other that remote farm access road, the site has no high exposure receptors with only a single residential receptor located 4km to the southeast of the proposed landscape change. There are no tourist based activities in the area that make use of the landscape as a visual resource.
Amount of use	Low	The area is remote, with very few receptors and the amount of use of the landscape is rated Low.
Public interest	Low	Public Interest is rated Low as the area is seldom seen and is visually associated with the four existing Eskom OHPL.
Adjacent land Users	Moderate	Adjacent land users are also rural and are not related to tourist activities.
Special Areas	Low	The area is not zoned as a special area
Receptor Sensitivity	**Low**	**The area is remote, with very few receptors and the amount of use of the landscape is rated Low. Public Interest is rated Low as the area is seldom seen and is visually associated with the three existing Eskom OHPL within the local landscape. Other than a remote farm access road, the site has no high exposure receptors with only a single residential receptor located 1.1km from Route 2 OHPL.**

7.4 Visual Resource Management (VRM) Classes

The BLM has defined four Classes that represent the relative value of the visual resources of an area and are defined in terms of the VRM Matrix as follows:

i. **Classes I and II** are the most valued.
ii. **Class III** represent a moderate value.
iii. **Class IV** is of least value.

7.4.1 VRM Class I

Class I is assigned when legislation restricts development in certain areas. The visual objective is to preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention. A Class I visual objective was assigned to the following features within the proposed development area due to their protected status within the South African legislation:

- Any river / streams and associated flood lines buffers identified as significant in terms of the WULA process.
- Any wetlands identified as significant in terms of the WULA process.
- Any ecological areas (or plant species) identified as having a high significance.
- Any heritage area identified as having a high significance.
- **Hydrological washes (subject to Surface Water Hydrologist mapping and management).**
- **50m buffer on the rural farm roads to maintain some view corridor sense of place.**

No specific visual or landscape constraints were identified within the study area, although the washes do add to the Nama-karoo sense of place. Sensitive surface water hydrology areas would need to be excluded as per the specialists' findings. The 50m buffer on the rural farm roads is to maintain some view corridor sense of place.

7.4.2 VRM Class II

The Class II objective is to retain the existing character of the landscape and the level of change to the characteristic landscape should be low. The proposed development may be seen but should not attract the attention of the casual observer, and should repeat the basic elements of form, line, colour and texture found in the predominant natural features of the characteristic landscape.

- **Not applicable.**

With Medium scenic quality and Low expected sensitivity to landscape change, there were no landscapes where receptors are likely to perceive landscape change as highly negative. As such, no Class II areas were defined.

7.4.3 VRM Class III

The Class III objective is to partially retain the existing character of the landscape, where the level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer, and changes should repeat the basic elements found in the predominant natural features of the characteristic landscape. The following landscape was defined as having Class III Visual Objectives where development would be most suitable:

- **Nama-Karoo**

While there are some landscape resources related to the inselbergs, the area is remote with limited receptors, and these is a strong presence of OHPL in the local landscape. The Nama-karoo areas would be suitable for development with best practice in mitigation. Lights at night mitigation is also a requirement for the substation in order to ensure that the existing dark-sky sense of place of this portion of the karoo is not significantly degraded.

7.4.4 VRM Class IV

The Class IV objective is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the landscape can be high, and the proposed development may dominate the view and be the major focus of the viewer's (s') attention without significantly degrading the local landscape character. Due to the degraded sense of place, the following areas were rated Class IV:

- **Not applicable.**

While the Visual Inventory rating for the Nama-Karoo was defined as Class IV due to medium scenic quality but low receptor sensitivity, the Visual Resource Management rating was upgraded to Class III due to the rural agricultural nature of the receiving landscape. To ensure that the local change is contained to some degree, some light mitigation is required to restrict the ZVI. As such, Class IV is not applicable in this rural landscape.

8 VISUAL IMPACT ASSESSMENT

Impacts are defined in terms of the standardised impact assessment criteria provided by the environmental practitioner. Using the defined impact assessment criteria, the potential environmental impacts identified for the project were evaluated according to severity, duration, extent and significance of the impact. The potential occurrence and cumulative impact (as defined in the methodology) was also assessed. In order to better understand the nature of the severity of the visual impacts, a Contrast Rating exercise was undertaken, assuming the view of the defined Key Observation Point (where photomontages are not provided). As this is an assumption, the findings of the Social Impact Assessment would need to be viewed once they are made available. As this is a Basic Assessment, Photomontages were not generated.

8.1 Contrast Rating and Photomontages

As indicated in the methodology, a contrast rating is undertaken to determine if the VRM Class Objectives are met. The suitability of a landscape modification is assessed by comparing and contrasting the existing receiving landscape to the expected contrast that the proposed landscape change will generate. This is done by evaluating the level of change to the existing landscape by assessing the line, colour, texture and form, in relation to the visual objectives defined for the area.

The following criteria are utilised in defining the degree of contrast (DoC):

- **None**: The element contrast is not visible or perceived.
- **Weak**: The element contrast can be seen but does not attract attention.
- **Moderate**: The element contrast begins to attract attention and begins to dominate the characteristic landscape.
- **Strong**: The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

Table 19: Contrast Rating Key Observation Points Table

	Exposure			**Landscape Elements**					
Key Observation Point	**Distance**	**Exposure**	**Mitigation**	**Form**	**Line**	**Colour**	**Texture**	**Degree of Contrast**	**Visual Objectives Met?**
Farm access road	50m	High	W/Out	M	S	S	S	S	**No**
			With	M	S	S	M	MS	**Yes**

** S = Strong, M = Medium, W = Weak, N = None*

Contrast Rating Findings

Without mitigation, the road receptors passing through the PV development and the associated Electrical Grid Infrastructure would be visually exposed to multiple monopoles along the road. This would be visually intrusive and degrade the local landscape character of the rural road view corridor. With mitigation and the setback buffer on either side of the road, the intensity of the visual experience would be reduced to some degree.

The single farmstead receptor is located 4km to the southeast of the proposed project. As the existing Eskom 400kV OHPL is located in the foreground view as seen from the farmstead receptors, very limited views of the proposed 132kV OHPL would take place as the 4km distance. **As such, this receptor was not identified as a KOP as without mitigation, the Class III visual objective would be met.**

Mitigations for the road buffer are the following:

- 50m buffer on either side of the road.

8.2 Project Impact Ratings and Motivation

The following visual impacts could take place during the lifetime of the project:

Construction:

- Loss of site landscape character due to the removal of vegetation and the construction of the project infrastructure.
- Wind-blown dust due to the removal of large areas of vegetation.
- Possible soil erosion from temporary roads crossing drainage lines.
- Wind-blown litter from the laydown and construction sites.

Operation:

- Massing effect in the landscape from a large-scale landscape modification.
- On-going soil erosion.
- On-going windblown dust.

Decommissioning:

- Movement of vehicles and associated dust.
- Wind-blown dust from the disturbance of cover vegetation / gravel.

Cumulative:

- A long-term change in land use setting a precedent for other similar types of renewable energy projects, resulting in a loss of scenic quality of the local area.

Table 20: Construction Phase Impacts Table

Project phase	**Construction Phase**
Impact	**Short-term landscape change from the current rural agricultural sense of place to the semi-industrial RE landscape.**
Description of impact	• Loss of site landscape character due to the removal of vegetation and the construction of the substations and OHPL structures and associated infrastructure. • Wind-blown dust due to the removal of large areas of vegetation at the substation and laydown • Movement of large earth moving equipment. • Possible soil erosion from temporary roads along the OHPL.

	• Wind-blown litter from the laydown and construction sites.			
Mitigation Viability	Medium	The mitigation will partially reduce the significance of the visual and landscape impacts		
Potential mitigation	• Wind blown dust mitigation. • Dust mitigation for moving vehicles. • Structures at the substations need to be painted mid-grey colour. • 50m setback from farm roads for the placement of monopoles.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Short term	Impact will last approximately 12 months.	Short term	Impact will last approximately 12 months.
Extent	Local	Contained within the Foreground/ Mid Ground (approx. 6km from site)	Local	Contained within the Foreground/ Mid Ground (approx. 6km from site)
Intensity	Medium	Natural and/ or social functions and/ or processes are clearly altered.	Medium to Low	Natural and/ or social functions and/ or processes are partially altered.
Probability	Likely	The impact is likely to occur	Likely	The impact is likely to occur.
Confidence	Sure	Substantive supportive data exists to verify the assessment	Sure	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The landscape change is reversible but only with time and rehabilitation.	Medium	The landscape change is reversible but only with time and rehabilitation.
Significance	**Medium (-ve)**		**Medium to Low (-ve)**	
Comment on significance	Although for a shorter time period, the full extent development with close proximity to the road receptors, will result in Strong levels of visual contrast during construction. The area is remote, and utilisation of the road is limited.		With mitigation and the reduction in the development area with visual setbacks, the construction phase impact will be Medium, with dust likely to be a residual nuisance factor to some degree.	
Cumulatives	**Medium (-ve)**		**Low (-ve)**	
Cumulative impacts	The development without mitigation will set a precedent for development of further PV projects in this area with associated grid infrastructure, creating increased potential for intervisibility that will strongly change the rural karoo landscape With mitigation and retaining the visual setback buffers, intervisibility could be reduced. The area is also remote and already strongly visual associated with OHPL.			

Table 21: Operation Phase Impacts Table

Project phase	**Operation Phase**
Impact	**Long-term landscape change from the operation of the substations and OHPL**
Description of impact	• Loss of site landscape character due to the operation of the substations structures and associated infrastructure.

Mitigation Viability	Medium	The mitigation will partially reduce the significance of the visual and landscape impacts.		
Potential mitigation	• Lights at night management and no overhead lighting at the substations. • Continued dust suppression as required.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Long term	Impact will last approximately 20 years	Long term	Impact will last approximately 20 years
Extent	Local	Contained within the Foreground/ Mid Ground (approx. 6km from site)	Local	Contained within the Foreground/ Mid Ground (approx. 6km from site)
Intensity	Strong	Natural and/ or social functions and/ or processes are clearly altered.	Medium to Strong	Natural and/ or social functions and/ or processes are partially altered.
Probability	Likely	The impact is likely to occur	Likely	The impact is likely to occur.
Confidence	Sure	Substantive supportive data exists to verify the assessment	Sure	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected landscape will be able to recover from the impact.	Medium	The affected landscape will be able to recover from the impact.
Significance	**High (-ve)**		**Medium (-ve)**	
Comment	Over a long-time period, the light spillage from the over-head security lights as the substations has the potential to significantly degrade the existing karoo dark sky sense of place.		With mitigation and the reduction in the development area with visual setbacks, the Operational Phase impact will be moderated to some degree, with careful use of lights at night to ensure that the current dark-sky sense of place is retained.	
Cumulatives	**Medium (-ve)**		**Low (-ve)**	
Comment	The development without mitigation could set a precedent for development of further substation and OHPL projects in this area with light spillage detracting from the local landscape character form intervisibility.		With mitigation and retaining the visual setback buffers and limited light spillage, intervisibility could be reduced. The area is also remote with the local landscapes not being utilised as a visual resource.	

Table 22: Decommissioning Phase Impacts Table

Project phase	**Decommissioning Phase**	
Impact	**Short-term landscape change from the removal of the powerline infrastructure, followed by rehabilitation of the impacted areas back to agricultural lands.**	
Description of impact	• Movement of large vehicles required for the removal of the monopole structure and substations. • Wind-blown dust from impacts to vegetation. • Wind-blown litter from the laydown and construction sites.	
Mitigation Viability	Medium	The mitigation will reduce the significance of the visual and landscape impacts

Potential mitigation	• Dust suppression measures. • Litter management measures. • Removal of all structures and processing in terms of according to NEMWA specifications. • Rehabilitation of impacted areas to veld grasses.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Short term	Impact will last approximately 8 months.	Short term	Impact will last approximately 8 months.
Extent	Local	Contained within the Foreground/ Mid Ground (approx. 6km from site)	Local	Contained within the Foreground/ Mid Ground (approx. 6km from site)
Intensity	Medium	Natural and/ or social functions and/ or processes are moderately altered.	Medium	Natural and/ or social functions and/ or processes are moderately altered.
Probability	Likely	The impact is likely to occur	Likely	The impact is likely to occur.
Confidence	Sure	Substantive supportive data exists to verify the assessment	Sure	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected landscape will be able to recover from the impact.	Medium	The affected landscape will be able to recover from the impact.
Significance	**Medium (-ve)**		**Low (-ve)**	
Comment on significance	The dust and vehicle movement impacts are short-term in Duration, and outside the main views of the receptor residences.		Visual Intrusion from wind blown dust and from vehicle movement is limited and short-term in Duration. With the removal of the structures and the monopoles, the area can be restored to rural karoo landscape.	
Cumulatives	**Medium (-ve)**		**Low (+ve)**	
Cumulative impacts	Without rehabilitation, the return of the vegetation to the site and the associated visual impacts would last a longer time period.		Effective management of rehabilitation can result in the return of the landscape to that of a functional agricultural area.	

9 PRELIMINARY ENVIRONMENTAL MANAGEMENT PLAN

9.1 OHPL Project

9.1.1 Design Phase

- 50m setback from farm roads.
- No overhead security lighting for the substations.

9.1.2 Construction Phase

- The laydown and building structures should be located away from neighbouring property farmsteads and banked into the ground to the eastern areas as much as possible.

- Following the removal of the vegetation, wind-blown dust during construction should be monitored by the ECO to ensure that it does not become a nuisance factor to the local receptors. Should excessive dust be generated from the movement of vehicles on the roads such that the dust becomes visible to the immediate surrounds, dust-retardant measures should be implemented under authorisation of the ECO.
- Topsoil from the footprints of the road and structures should be dealt with in accordance with EMP.
- The buildings at the substation should be painted a grey-brown colour.
- Fencing around the construction camp should be simple, diamond shaped (to catch wind-blown litter) and appear transparent from a distance. The fences should be checked on a monthly basis for the collection of litter caught on the fence.
- Signage on the main access roads should be moderated.
- Lights at night have the potential to significantly increase the visual exposure of the proposed project. It is recommended that mitigations be implemented to reduce light spillage (refer to appendix for general guidelines).

9.1.3 Operation Phase

- Control of lights at night to allow only local disturbance to the current dark sky night landscape (refer to appendix for general guidelines).
- Continued erosion control and management of dust.

9.1.4 Decommissioning Phase

- All structures should be removed and where possible, recycled.
- Building structures should be broken down (including foundations).
- The rubble should be managed according to NEMWA and deposited at a registered landfill if it cannot be recycled or reused.
- All compacted areas should be rehabilitated according to a rehabilitation specialist.
- Monitoring for soil erosion should be undertaken on a routine biannual basis for one year following the completion of the Decommissioning Phase.

10 OPPORTUNITIES AND CONSTRAINTS

10.1 OHPL Project

10.1.1 Opportunities

- The ZVI is contained to the local area with Foreground/ Mid Ground distancing due to slightly undulating terrain that results in a moderate zone of visual influence.
- No tourist activities or tourist view-corridors were located within the project ZVI.
- National energy objectives for renewable energy and job creation will be met.
- Minimal receptors that are not utilising the local landscapes as a visual resource.
- Located within the Central strategic powerline corridor.

10.1.2 Constraints

- The area is not within the REDZ area.
- The local landscape character will be significantly changed by the large MTS structure and other PV/ grid connections, but with Low cumulative risk due to the moderate landscape character that is not be used as a visual resource.

10.2 No-Go Option

10.2.1 Opportunities

- The current rural agricultural land uses of the property do add to the rural agricultural landscape character.
- Agricultural productivity from sheep farming creates some employment opportunities but is limited.

10.2.2 Constraints

- National energy objectives for renewable energy and job creation will not be met.

11 CONCLUSION

The finding of this Level 3 landscape and visual impact assessment is that while the local Nama-karoo sense of place will be significantly altered, it is the recommendation that the proposed development should commence WITH MITIGATION for the following key reasons:

- Moderate Zone of Visual Influence with no tourism activities or tourist view-corridors.
- The area is remote, and few receptors were identified with local landscapes not being utilised as a tourist visual resource.
- The local area is located within the Central Strategic Transmission Corridor, with three large 400kV powerlines routed through the local landscape to that degrade local landscape resources to some degree.
- No residential receptors located within Very High Visual Exposure and only a single farm access road.

With the location of the proposed Krypton MTS to the east of the site, it is highly likely that multiple OHPL will be routed within clear view of the project grid connection. The result is that a PV/ OHPL massing effect is likely to take place, degraded local visual resources. However, this landscape change is unlikely to be a significant landscape risk as the local area has a moderate level of scenic quality, and there are no tourist or ecotourism activities taking place within the anticipated project zone of visual influence.

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13 ANNEXURE A: SITE VISIT PHOTOGRAPHS AND COMMENTS

The following photographs were taken during the field survey as mapped below. The text below the photograph describes the landscape and visual issues of the locality, if applicable. The 'Risk' reference refers to the sensitivity ratings in the DFFE Screening Tool mapping.

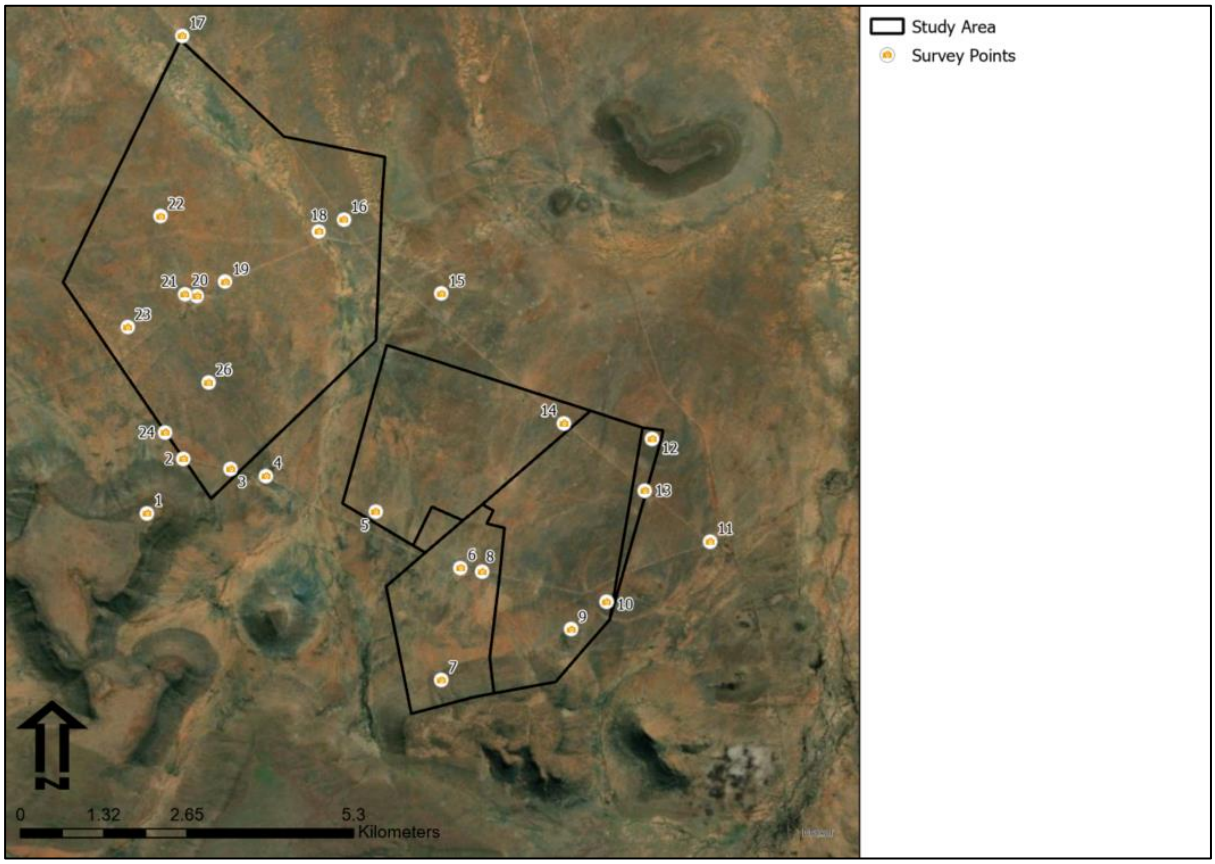


Figure 16: Site Survey Point Map

ID	1
PHOTO	Inselberg hill feature
RISK	Medium
DIRECTION	S
COMMENT	No proposed PV in close proximity to the hill feature as this is the key landform element in the landscape contrasting to the flat plains to the north where the PV is proposed.

ID	2
PHOTO	Site PV
RISK	High
DIRECTION	S
COMMENT	Risk to hill landscape with PV located at the base of the slopes. Setback 200m buffer for Low Visual Impact.

ID	3
PHOTO	Site PV
RISK	Medium
DIRECTION	N
COMMENT	Suitable north of road retaining south as agriculture with potential for future agricultural tourism.

ID	4
PHOTO	Kareekloof farmstead
RISK	Low
DIRECTION	N
COMMENT	Suitable buffer from PV and well vegetation screened.

ID	5
PHOTO	Site PV
RISK	Low
DIRECTION	N
COMMENT	Low prominence and well set back from the southern hills.

ID	6
PHOTO	Site abandoned farmhouse
RISK	Low
DIRECTION	NW
COMMENT	Abandoned and in disrepair with no resident

ID	7
PHOTO	Steep slopes and foothills
RISK	High
DIRECTION	S
COMMENT	Landscape degradation. Mitigation no-go for steep slopes and 500m buffer from foothills.

ID	8
PHOTO	Site PV
RISK	Medium
DIRECTION	E
COMMENT	Private farm access with fir tree plantings. Limited landscape value so can be felled and replaced with PV.

ID	9
PHOTO	Hill feature
RISK	High
DIRECTION	SE
COMMENT	No-go for steep slopes with 500m buffer around hill base.

ID	10
PHOTO	Prominent steep slope area
RISK	High
DIRECTION	N
COMMENT	No-go with low impact north of road.

ID	11
PHOTO	KOP rural farm access road Northbound 1
RISK	Medium
DIRECTION	SW
COMMENT	Medium exposure and remote but prominent areas on foothills detracting from hill scenic quality. Mitigation remove PV from slopes for low Visual Impact outcomes.

ID	12
PHOTO	Site PV
RISK	High
DIRECTION	N
COMMENT	Steep slope area for exclusion No-go.

ID	13
PHOTO	KOP Rural access Northbound 2
RISK	Medium
DIRECTION	NE
COMMENT	Walling of PV on either side of road. Setback 50m on either side if road for low Visual Impact. Moderated by remote locality.

ID	14
PHOTO	Site PV
RISK	Low
DIRECTION	SE
COMMENT	Flat lands well set back from hill landforms. Suitable for 50m setback?# on road.

ID	15
PHOTO	Sense of Place existing OHPL 400kV
RISK	Medium
DIRECTION	NE
COMMENT	Local landscape degradation

ID	16
PHOTO	KOP Rural farm access Northbound 3
RISK	High
DIRECTION	NW
COMMENT	Gravel farm road access with high levels of visual exposure to PV ‘walling’ on either side. Setback PV 50m either side of the road for Medium Visual Impact.

ID	17
PHOTO	KOP Rural access Southbound
RISK	Medium
DIRECTION	SE
COMMENT	PV to south side of road. Setback 50m for reduced intrusion and Low Visual Impact.

ID	18
PHOTO	Site drainage line
RISK	High
DIRECTION	E
COMMENT	No-go exclusion as per surface water hydrologist recommendations.

ID	19
PHOTO	Farmstead
RISK	High
DIRECTION	SE
COMMENT	No-go for farmstead with 50m buffer around cultural landscape areas.

ID	20
PHOTO	Farmstead
RISK	High
DIRECTION	SE
COMMENT	No-go for cultural landscape

ID	21
PHOTO	Small hill
RISK	High
DIRECTION	E
COMMENT	Exclusion as part of farmstead cultural landscape.

ID	22
PHOTO	Site PV
RISK	Low
DIRECTION	SE
COMMENT	Low prominence and exposure. Existing OHPL in the background.

ID	23
PHOTO	Site PV
RISK	Low
DIRECTION	W
COMMENT	Low prominence and exposure.

ID	24
PHOTO	Hill landforms setback point
RISK	Medium
DIRECTION	SE
COMMENT	Flat topped inselberg features unique in landscape. Setback buffer 500m to point for suitable development.

ID	25
PHOTO	Sense of Place Nama Karoo
RISK	High
DIRECTION	NW
COMMENT	Inselberg mountain features contrasting with surrounding flat plains.

ID	26
PHOTO	Site agricultural farming
RISK	Medium
DIRECTION	N
COMMENT	Some landscape value from karoo farm. Not so significant that loss would constitute a fatal flaw. Mitigation requires agriculture continuation. Water holes have value.

14 ANNEXURE B: SPECIALIST INFORMATION

14.1 Professional Registration Certificate

APHP

Association of Professional Heritage Practitioners

MEMBERSHIP CERTIFICATE

THIS CERTIFIES THAT

Stephen Stead

MEMBERSHIP NUMBER: PHP0063

has been awarded membership as a

PROFESSIONAL MEMBER (PHP)

This membership is subject to the *Standards for Membership* and *Code of Conduct*, referred to in Sections 2 and 3 of the APHP Constitution respectively. The definition of a Professional may be found at: www.aphp.org.za/membership

Please contact us via info@aphp.org.za should further information be required.

THIS CERTIFICATE IS VALID FROM 1 JUNE 2024 – 1 JULY 2025

CHAIRPERSON

[Issued by the Association of Professional Heritage Practitioners Executive Committee]

Watermark Image: *Map of land allotted at the Cape of Good Hope giving the numbers of the plots and also the names of the owners*, 1660
William and Yvonne Jacobson Digital Africana Program
University of Cape Town Ibell Collection
https://lbsl.uct.ac.za/jacobson-africana/item/98478

Association of Professional Heritage Practitioners
info@aphp.org.za
www.aphp.org.za

14.2 Curriculum Vitae (CV)

1. **Position**: Owner / Director

2. **Name of Firm**: Visual Resource Management Africa cc *(www.vrma.co.za)*

3. **Name of Staff**: Stephen Stead

4. **Date of Birth**: 9 June 1967

5. **Nationality:** South African

6. **Contact Details:** **Tel: +27 (0) 44 876 0020**
   Cell: +27 (0) 83 560 9911
   Email: steve@vrma.co.za

7. **Educational qualifications**:
   - University of Natal (Pietermaritzburg):
   - Bachelor of Arts: Psychology and Geography
   - Bachelor of Arts (Hons): Human Geography and Geographic Information Management Systems
   - MSc Geography: Land use and land-use change.

8. **Professional Accreditation**
   - Association of Professional Heritage Practitioners (APHP) Western Cape
     - Accredited VIA practitioner member of the Association (2011)

9. **Association involvement:**
   - International Association of Impact Assessment (IAIA) South African Affiliate
     - Past President (2012 - 2013)
     - President (2012)
     - President-Elect (2011)
     - Conference Co-ordinator (2010)
     - National Executive Committee member (2009)
     - Southern Cape Chairperson (2008)

10. **Conferences Attended:**
    - IAIAsa 2012
    - IAIAsa 2011
    - IAIA International 2011 (Mexico)
    - IAIAsa 2010
    - IAIAsa 2009
    - IAIAsa 2007

11. **Continued Professional Development:**
    - Integrating Sustainability with Environment Assessment in South Africa (IAIAsa Conference, 1 day)
    - Achieving the full potential of SIA (Mexico, IAIA Conference, 2 days 2011)

- Researching and Assessing Heritage Resources Course (University of Cape Town, 5 days, 2009)

12. Countries of Work Experience:

- South Africa, Mozambique, Malawi, Lesotho, Kenya and Namibia

13. Relevant Experience:

Stephen gained six years of experience in the field of Geographic Information Systems mapping and spatial analysis working as a consultant for the KwaZulu-Natal Department of Health and then with an Environmental Impact Assessment company based in the Western Cape. In 2004 he set up the company Visual Resource Management Africa that specializes in visual resource management and visual impact assessments in Africa. The company makes use of the well-documented Visual Resource Management methodology developed by the Bureau of Land Management (USA) for assessing the suitability of landscape modifications. Stephen has assessed of over 150 major landscape modifications throughout southern and eastern Africa. The business has been operating for eighteen years and has successfully established and retained a large client base throughout Southern Africa which include amongst other, Rio Tinto (Pty) Ltd, Bannerman (Pty) Ltd, Anglo Coal (Pty) Ltd, Eskom (Pty) Ltd, NamSolar and Vale (Pty) Ltd, Ariva (Pty) Ltd, Harmony Gold (Pty) Ltd, Millennium Challenge Account (USA), Pretoria Portland Cement (Pty) Ltd

14. Languages:

- English – First Language
- Afrikaans – fair in speaking, reading and writing

15. Projects:

A list of ***some*** of the large-scale projects that VRMA has assessed has been attached below with the client list indicated per project (Refer to www.vrma.co.za for a full list of projects undertaken).

Table 23: VRM Africa Projects Assessments Table

DESCRIPTION	COUNT	DESCRIPTION	COUNT
Dam	2	UISP	8
Mari-culture	1	Structure	8
Port	1	OHPL	12
Railway	1	Industrial	12
Power Station	3	Wind Energy	22
Hydroelectric	4	Battery Storage	14
Resort	4	Mine	20
Golf/Residential	1	Residential	45
Road Infrastructure	5	Solar Energy	62
Substation	5	**TOTAL**	**238**

15 ANNEXURE C: GENERAL LIGHTS AT NIGHT MITIGATIONS

Mitigation:

- Effective light management needs to be incorporated into the design of the lighting to ensure that the visual influence is limited to the project, without jeopardising project operational safety and security (See lighting mitigations by The New England Light Pollution Advisory Group (NELPAG) and Sky Publishing Corp in 14.2).
- Utilisation of specific frequency LED lighting with a green hue on perimeter security fencing.
- Directional lighting on the more exposed areas of operation, where point light source is an issue.
- No use of overhead lighting and, if possible, locate the light source closer to the operation.

Mesopic Lighting

Mesopic vision is a combination of photopic vision and scotopic vision in low, but not quite dark, lighting situations. The traditional method of measuring light assumes photopic vision and is often a poor predictor of how a person sees at night. The light spectrum optimized for mesopic vision contains a relatively high amount of bluish light and is therefore effective for peripheral visual tasks at mesopic light levels. *(CIE, 2012)*

The Mesopic Street Lighting Demonstration and Evaluation Report by the Lighting Research Centre (LRC) in New York found that the 'replacement of white light sources (induction and ceramic metal halide) were tuned to optimize human vision under low light levels while remaining in the white light spectrum. Therefore, outdoor electric light sources that are tuned to how humans see under mesopic lighting conditions can be used to reduce the luminance of the road surface while providing the same, or better, visibility. Light sources with shorter wavelengths, which produce a "cooler" (bluer and greener) light, are needed to produce better mesopic vision. Based on this understanding, the LRC developed a means of predicting visual performance under low light conditions. This system is called the unified photometry system. Responses to surveys conducted on new installations revealed that area residents perceived higher levels of visibility, safety, security, brightness, and colour rendering with the new lighting systems than with the standard *High-Purity Standards* (HPS) systems. The new lighting systems used 30% to 50% less energy than the HPS systems. These positive results were achieved through tuning the light source to optimize mesopic vision. Using less wattage and photopic luminance also reduces the reflectance of the light off the road surface. Light reflectance is a major contributor to light pollution (sky glow).' *(Lighting Research Centre. New York. 2008)*

'Good Neighbour – Outdoor Lighting'

Presented by the New England Light Pollution Advisory Group (NELPAG) *(http://cfa/ www.harvard .edu /cfa/ps/nelpag.html)* and Sky & Telescope *(http://SkyandTelescope.com/).* NELPAG and Sky & Telescope support the International Dark-Sky Association (IDA) *(http://www.darksky.org/).*
(NELPAG)

What is good lighting? Good outdoor lights improve visibility, safety, and a sense of security, while minimizing energy use, operating costs, and ugly, dazzling glare.

Why should we be concerned? Many outdoor lights are poorly designed or improperly aimed. Such lights are costly, wasteful, and distractingly glary. They harm the night-time environment and neighbours' property values. Light directed uselessly above the horizon creates murky skyglow — the "light pollution" that washes out our view of the stars.

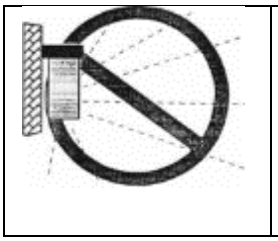
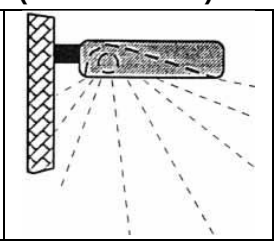
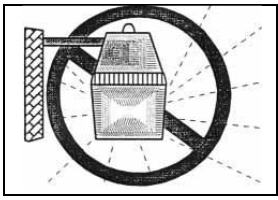
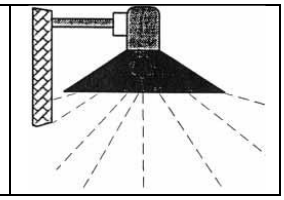
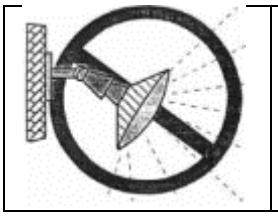
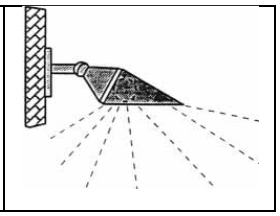
Glare Here's the basic rule of thumb: If you can see the bright bulb from a distance, it's a bad light. With a good light, you see lit ground instead of the dazzling bulb. "Glare" is light that beams directly from a bulb into your eye. It hampers the vision of pedestrians, cyclists, and drivers.

Light Trespass Poor outdoor lighting shines onto neighbours' properties and into bedroom windows, reducing privacy, hindering sleep, and giving the area an unattractive, trashy look.

Energy Waste Many outdoor lights waste energy by spilling much of their light where it is not needed, such as up into the sky. This waste results in high operating costs. Each year we waste more than a billion dollars in the United States needlessly lighting the night sky.

Excess Lighting Some homes and businesses are flooded with much stronger light than is necessary for safety or security.

Good and Bad Light Fixtures

Typical "Wall Pack"	**Typical "Shoe Box" (forward throw)**
	
BAD Waste light goes up and sideways	**GOOD** Directs all light down
Typical "Yard Light"	**Opaque Reflector (lamp inside)**
	
BAD Waste light goes up and sideways	**GOOD** Directs all light down
Area Flood Light	**Area Flood Light with Hood**
	
BAD Waste light goes up and sideways	**GOOD** Directs all light down

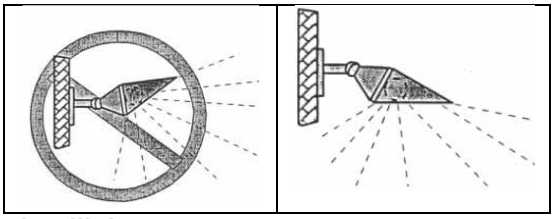
How do I switch to good lighting?

Provide only enough light for the task at hand; don't over-light, and don't spill light off your property. Specifying enough light for a job is sometimes hard to do on paper. Remember that a full Moon can make an area quite bright. Some lighting systems illuminate areas 100 times more brightly than the full Moon! More importantly, by choosing properly shielded lights, you can meet your needs without bothering neighbours or polluting the sky.

- Aim lights down. Choose “full-cut-off shielded” fixtures that keep light from going uselessly up or sideways. Full-cut-off fixtures produce minimum glare. They create a pleasant-looking environment. They increase safety because you see illuminated people, cars, and terrain, not dazzling bulbs.
- Install fixtures carefully to maximize their effectiveness on the targeted area and minimize their impact elsewhere. Proper aiming of fixtures is crucial. Most are aimed too high. Try to install them at night, when you can see where all the rays actually go. Properly aimed and shielded lights may cost more initially, but they save you far more in the long run. They can illuminate your target with a low-wattage bulb just as well as a wasteful light does with a high-wattage bulb.
- If colour discrimination is not important, choose energy- efficient fixtures utilising yellowish high-pressure sodium (HPS) bulbs. If “white” light is needed, fixtures using compact fluorescent or metal-halide (MH) bulbs are more energy-efficient than those using incandescent, halogen, or mercury-vapour bulbs.
- Where feasible, put lights on timers to turn them off each night after they are no longer needed. Put home security lights on a motion-detector switch, which turns them on only when someone enters the area; this provides a great deterrent effect!

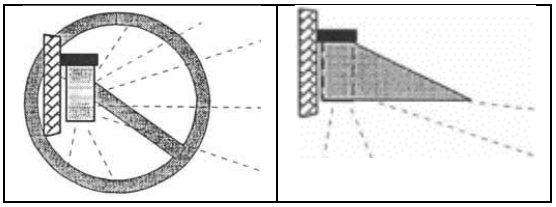
What You Can Do To Modify Existing Fixtures

Change this . . . to this (aim downward)



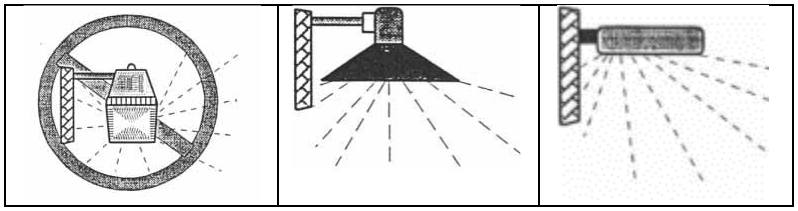
Floodlight:

Change this . . . to this (aim downward)



Wall Pack

Change this . . . to this or this



Yard Light | Opaque Reflector | Show Box

Replace bad lights with good lights.

You’ll save energy and money. You’ll be a good neighbour. And you’ll help preserve our view of the stars.

16 ANNEXURE D: METHODOLOGY DETAIL

16.1 Baseline Analysis Stage

In terms of VRM methodology, landscape character is derived from a combination of ***scenic quality***, ***receptor sensitivity*** to landscape change and ***distance*** from the proposed landscape change. The objective of the analysis is to compile a mapped inventory of the visual resources found in the receiving landscape, and to derive a mapped Visual Resource sensitivity layer from which to evaluate the suitability of the landscape change.

16.1.1 Scenic Quality

The scenic quality is determined making use of the VRM Scenic Quality Checklist that identifies seven scenic quality criteria which are rated with 1 (low) to 5 (high) scale. The scores are totalled and assigned an A (High), B (Moderate) or C (low) based on the following split:
A= scenic quality rating of ≥19;
B = rating of 12 – 18,
C= rating of ≤11

The seven scenic quality criteria are defined below:

- **Land Form**: Topography becomes more of a factor as it becomes steeper, or more severely sculptured.
- **Vegetation**: Primary consideration given to the variety of patterns, forms, and textures created by plant life.
- **Water**: That ingredient which adds movement or serenity to a scene. The degree to which water dominates the scene is the primary consideration.
- **Colour**: The overall colour(s) of the basic components of the landscape (e.g., soil, rock, vegetation, etc.) are considered as they appear during seasons or periods of high use.
- **Scarcity**: This factor provides an opportunity to give added importance to one, or all, of the scenic features that appear to be relatively unique or rare within one physiographic region.
- **Adjacent Land Use**: Degree to which scenery and distance enhance, or start to influence, the overall impression of the scenery within the rating unit.
- **Cultural Modifications**: Cultural modifications should be considered and may detract from the scenery or complement or improve the scenic quality of an area.

16.1.2 Receptor Sensitivity

Receptor sensitivity to landscape change is determined by rating the following factors in terms of Low to High:

- **Type of Users**: Visual sensitivity will vary with the type of users, e.g. recreational sightseers may be highly sensitive to any changes in visual quality, whereas workers who pass through the area on a regular basis may not be as sensitive to change.
- **Amount of Use**: Areas seen or used by large numbers of people are potentially more sensitive.
- **Public Interest**: The visual quality of an area may be of concern to local, or regional, groups. Indicators of this concern are usually expressed via public controversy created in response to proposed activities.

- **Adjacent Land Uses**: The interrelationship with land uses in adjacent lands. For example, an area within the viewshed of a residential area may be very sensitive, whereas an area surrounded by commercially developed lands may not be as visually sensitive.
- **Special Areas**: Management objectives for special areas such as Natural Areas, Wilderness Areas or Wilderness Study Areas, Wild and Scenic Rivers, Scenic Areas, Scenic Roads or Trails, and Critical Biodiversity Areas frequently require special consideration for the protection of their visual values.
- **Other Factors**: Consider any other information such as research or studies that include indicators of visual sensitivity.

16.1.3 Exposure

The area where a landscape modification starts to influence the landscape character is termed the Zone of Visual Influence (ZVI) and is defined by the U.K. Institute of Environmental Management and Assessment's (IEMA) *'Guidelines for Landscape and Visual Impact Assessment'* as 'the area within which a proposed development may have an influence or effect on visual amenity (of the surrounding areas).'

The inverse relationship of distance and visual impact is well recognised in visual analysis literature *(Hull, R.B. and Bishop, I.E., 1988)*. According to Hull and Bishop, exposure, or visual impact, tends to diminish exponentially with distance. The areas where most landscape modifications would be visible are located within 2 km from the site of the landscape modification. Thus, the potential visual impact of an object diminishes at an exponential rate as the distance between the observer and the object increases due to atmospheric conditions prevalent at a location, which causes the air to appear greyer, thereby diminishing detail. For example, viewed from 1000 m from a landscape modification, the impact would be 25% of the impact as viewed from 500 m from a landscape modification. At 2000m it would be 10% of the impact at 500 m.

Distance from a landscape modification influences the size and clarity of the landscape modification viewing. The Bureau of Land Management defines three distance categories:

i. ***Foreground / Middle ground***, up to approximately 6km, which is where there is potential for the sense of place to change;
ii. ***Background areas***, from 6km to 24km, where there is some potential for change in the sense of place, but where change would only occur in the case of very large landscape modifications; and
iii. ***Seldom seen areas***, which fall within the Foreground / Middle ground area but, as a result of no receptors, are not viewed or are seldom viewed.

16.1.4 Key Observation Points

During the Baseline Inventory Stage, Key Observation Points (KOPs) are identified. KOPs are defined by the Bureau of Land Management as the people (receptors) located in strategic locations surrounding the property that make consistent use of the views associated with the site where the landscape modifications are proposed. These locations are important in terms of the VRM methodology, which requires that the Degree of Contrast (DoC) that the proposed landscape modifications will make to the existing landscape be measured from these most critical locations, or receptors, surrounding the property. To define the KOPs, potential receptor locations were identified in the viewshed analysis, and screened, based on the following criteria:

- Angle of observation.
- Number of viewers.
- Length of time the project is in view.
- Relative project size.
- Season of use.
- Critical viewpoints, e.g., views from communities, road crossings; and
- Distance from property.

16.2 Assessment and Impact Stage

The analysis stage involves determining whether the potential visual impacts from proposed surface-disturbing activities or developments will meet the management objectives established for the area, or whether design adjustments will be required. This requires a contrast rating to assess the expected DoC the proposed landscape modifications would generate within the receiving landscape in order to define the Magnitude of the impact.

16.2.1 Contrast Rating

The contrast rating is undertaken to determine if the VRM Class Objectives are met. The suitability of landscape modification is assessed by comparing and contrasting existing receiving landscape to the expected contrast that the proposed landscape change will generate. This is done by evaluating the level of change to the existing landscape by assessing the line, colour, texture and form, in relation to the visual objectives defined for the area. The following criteria are utilised in defining the DoC:

- **None**: The element contrast is not visible or perceived.
- **Weak**: The element contrast can be seen but does not attract attention.
- **Moderate**: The element contrast begins to attract attention and begins to dominate the characteristic landscape.
- **Strong**: The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

As an example, in a Class I area, the visual objective is to preserve the existing character of the landscape, and the resultant contrast to the existing landscape should not be notable to the casual observer and cannot attract attention. In a Class IV area example, the objective is to provide for proposed landscape activities that allow for major modifications of the existing character of the landscape. Based on whether the VRM objectives are met, mitigations, if required, are defined to avoid, reduce or mitigate the proposed landscape modifications so that the visual impact does not detract from the surrounding landscape sense of place.

Based on the findings of the contrast rating, the Magnitude of the Landscape and Visual Impact Assessment is determined.

16.2.2 Photomontages

As a component in this contrast rating process, visual representation, such as photo montages are vital in large-scale modifications, as this serves to inform Interested & Affected Parties and decision-making authorities of the nature and extent of the impact associated with the proposed project/development. There is an ethical obligation in this process, as visualisation can be misleading if not undertaken ethically. In terms of adhering to standards for ethical representation of landscape modifications, VRMA subscribes to the Proposed Interim Code of

Ethics for Landscape Visualisation developed by the Collaborative for Advanced Landscape Planning (CALP) (Sheppard, 2000). This code states that professional presenters of realistic landscape visualisations are responsible for promoting full understanding of proposed landscape changes, providing an honest and neutral visual representation of the expected landscape, by seeking to avoid bias in responses and demonstrating the legitimacy of the visualisation process. Presenters of landscape visualisations should adhere to the principles of:

- Access to Information
- Accuracy
- Legitimacy
- Representativeness
- Visual Clarity and Interest

The Code of Ethical Conduct states that the presenter should:

- Demonstrate an appropriate level of qualification and experience.
- Use visualisation tools and media that are appropriate to the purpose.
- Choose the appropriate level of realism.
- Identify, collect and document supporting visual data available for, or used in, the visualisation process.
- Conduct an on-site visual analysis to determine important issues and views.
- Seek community input on viewpoints and landscape issues to address in the visualisations.
- Provide the viewer with a reasonable choice of viewpoints, view directions, view angles, viewing conditions and timeframes appropriate to the area being visualised.
- Estimate and disclose the expected degree of uncertainty, indicating areas and possible visual consequences of the uncertainties.
- Use more than one appropriate presentation mode and means of access for the affected public.
- Present important non-visual information at the same time as the visual presentation, using a neutral delivery.
- Avoid the use, or the appearance of, ‘sales’ techniques or special effects.
- Avoid seeking a particular response from the audience.
- Provide information describing how the visualisation process was conducted and how key decisions were taken (Sheppard, 2000).